PPNC

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Junichi Mizuno M.D.

Shin-yurigaoka General Hospital

Mt.BANDAI

President

Shinsuke Irie M.D.

Hokkaido Ohno Memorial Hospital

Secretariat

JAPAN

Southern TOHOKU Research Institute for Neuroscience, Koriyama, Japan

Joint Neurosurgical Convention 2023 in HAWAII FEB.5-10 PRINCE WAIKIKI,Honolulu,HI

2023 Joint Neurosurgical Convention

Date: February 5 (Sun) -February 10 (Fri)

Venue: PRINCE WAIKIKI, Honolulu,HI

The 10th Pan-Pacific Neurosurgical Congress
The 9th International Mt.BANDAI Symposium for Neuroscience

Program and Abstracts

From Eye to Insight

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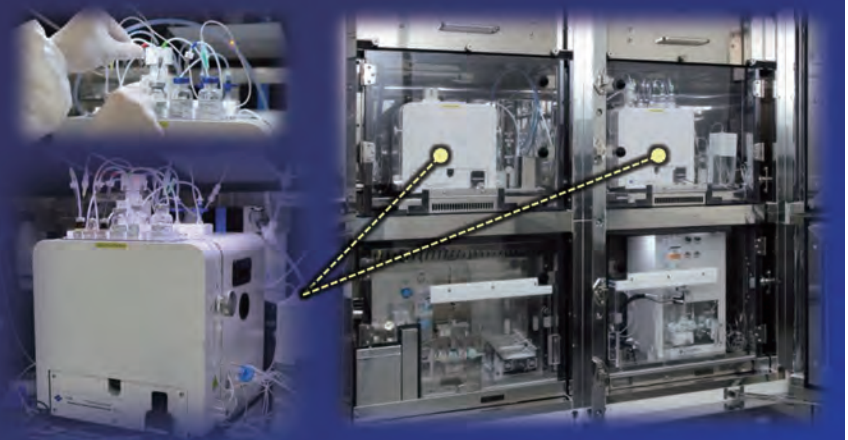

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(TEL 06-7635-3629)

2023

Joint Neurosurgical Convention

Date February 5 (Sun) -February 10 (Fri)

Venue PRINCE WAIKIKI, Honolulu,HI

The 10th Pan-Pacific Neurosurgical Congress
The 9th International Mt.BANDAI Symposium for Neuroscience

Program and Abstracts

PPNC

President

Junichi Mizuno M.D.

Shin-yurigaoka General Hospital

Mt.BANDAI

President

Shinsuke Irie M.D.

Hokkaido Ohno Memorial Hospital

Welcome Message

Dear Colleagues and Friends,

It's our honor and pleasure as co-presidents to invite you from all over the world to the joint meeting.
The previous event was held in Maui and Oahu in Hawaii in 2018. After that successful event, in December 2019, a new type of Coronavirus infection (COVID-19), unfortunately, broke out in Wuhan, China. The entire world, after that, changed completely, posing various restrictions both domestically and internationally.
Due to the impact of the COVID-19 pandemic, this conference has been postponed for a few years. In the meantime, the organizing office received many requests for the resumption of the conference as soon as possible. Many people showed a positive intention to participate. Therefore, we decided to hold this conference.
We hope to have active and wide-ranged information exchange / discussion on cutting-edge neuroscience and clinical neurosurgery topics. Participation from Japan, the United States, and Europe are highly expected in this meeting.
To have a smooth conference operation, we carry on the tradition of international academic activities and friendships among membersand provide stimulative opportunities under the safest and most reliable infection control measures in conference venues.
We look forward to meeting you at this fascinating conference in Hawaii.
We hope you will join us in experiencing international friendship, scientific learning, and the invigorating atmosphere of Hawaii. We look forward to welcoming you from all over the world.

Sincerely yours,

President of the 10th
Pan-Pacific Neurosurgery Congress

Junichi Mizuno M.D.
Shin-yurigaoka General Hospital
Senior Consultant
for Minimaiy
Invasiver SpinalSurgery

President of the 9th International
Mt.Bandai symposium for Neuroscience

Shinsuke Irie M.D.
Hokkaido Ohno
Memorial Hospital
Director

JNC開催一覧

名称	会期	場所	会長名
第１回　国際 Mt. 磐梯神経科学シンポジウム	1999. 10. 29 - 10. 31	日本（栃木県日光市）	財団法人脳神経疾患研究所 理事長　渡邉　一夫
第２回　国際 Mt. 磐梯神経科学シンポジウム	2001. 10. 27 - 10. 29	日本（福島県郡山市）	財団法人脳神経疾患研究所 理事長　渡邉　一夫
1th Mt.Bandai&Pan-Pacific Joint Neurosurgical Convention 第３回　国際 Mt. 磐梯神経科学シンポジウム 第４回　汎太平洋国際脳神経外科学会	2003. 2. 22 - 2. 28	ハワイ	関東脳神経外科病院 理事長　清水　庸夫先生 財団法人脳神経疾患研究所 理事長　渡邉　一夫
2th Mt.Bandai&Pan-Pacific Joint Neurosurgical Convention 第４回　国際 Mt. 磐梯神経科学シンポジウム 第５回　汎太平洋国際脳神経外科学会	2006. 1. 21 - 1. 27	ハワイ	秋田大学医学部脳神経外科 教授　溝井　和夫　先生 社会医療法人　孝仁会 理事長　齋藤　孝次　先生
3th Mt.Bandai&Pan-Pacific Joint Neurosurgical Convention 第５回　国際 Mt. 磐梯神経科学シンポジウム 第６回　汎太平洋国際脳神経外科学会	2010. 1. 24 - 1. 30	ハワイ	東北大学大学院医学系研究科　神経外科学分野　教授　冨永　悌二 医療法人慈風会　厚地脳神経外科病院 理事長　厚地　雅幸
4th Mt.Bandai&Pan-Pacific Joint Neurosurgical Convention 第６回　国際 Mt. 磐梯神経科学シンポジウム 第７回　汎太平洋国際脳神経外科学会	2013. 1. 30 - 2. 3	ハワイ	札幌医科大学　脳神経外科 教授　寶金　清博 大西脳神経外科病院　大西　英之
5th Mt.Bandai&Pan-Pacific Joint Neurosurgical Convention 第７回　国際 Mt. 磐梯神経科学シンポジウム 第８回　汎太平洋国際脳神経外科学会	2016. 4. 7 - 4. 10	カンボジア	藤田保健衛生大学　加藤　庸子 北原国際病院　北原　茂実
6th Mt.Bandai&Pan-Pacific Joint Neurosurgical Convention 第９回　汎太平洋国際脳神経外科学会 第８回　国際 Mt. 磐梯神経科学シンポジウム	2018. 1. 28 - 2. 2	ハワイ	医療法人　財団健貢会　総合東京病院 院長　渡邉　貞義 山梨大学医学部　脳神経外科 教授　木内　博之

Committee

Honorary Chairman

Takashi Yoshimoto

Executive Committee Member (CORE MEMBER)

Koji Saito	Takanori Fukushima	Raymond Taniguchi
Kazuo Watanabe		

Advisor

Masamichi Atsuchi	Masayuki Atsuchi	Hajime Arai
Hideyuki Ohnishi	Hiroyuki Kinouchi	Hidenori Kobayashi
Akinori Kondo	Naokatsu Saeki	Tomio Sasaki
Katsuji Shima	Tsuneo Shimizu	Teiji Tominaga
Hiroshi Nakagawa	Hirohiko Nakamura	Kazuo Hashi
Kiyohiro Houkin	Tomokatsu Hori	Katsuyoshi Mineura
Yoshihiro Muragaki	Masashi Yoshikawa	Toshiki Yoshimine

Organizing Committee

Yasunobu Itoh	Yoko Kato	Takakazu Kawamata
Hiroki Kurita	Masamichi Kurosaki	Michihiro Kohno
Kiyoshi Saito	Ryuta Saito	Tatsuya Sasaki
Hiroaki Shimizu	Michiyasu Suzuki	Yukihiko Sonoda
Isao Date	Hiroyuki Nakase	Shinichi Numazawa
Miki Fujimura	Takamitsu Fujimaki	Kazuhiro Hongo
Toru Matsui	Yuichi Murayama	Toshihiko Wakabayashi
Masahiko Wanibuchi		

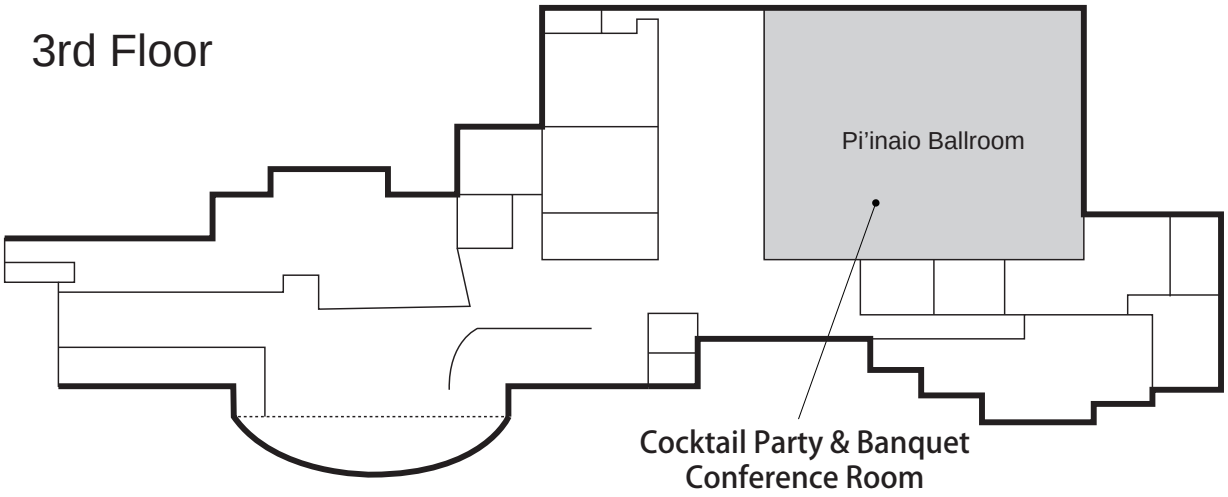
Congress Secretariat

Yuzo Terakawa	Shunsuke Satoh	Lori Radcliffe

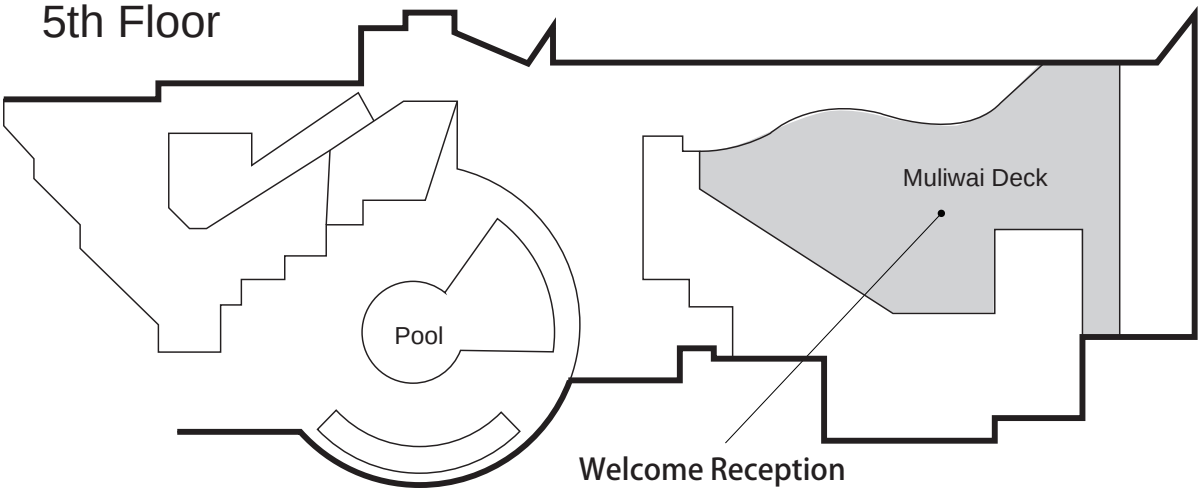
Floor Plan

Prince Waikiki

3rd Floor



5th Floor



Guidance

Conference Date

The 10th Pan-Pacific Neurosurgery Congress
February 5 (Sun) – February 7 (Tue), 2023
The 9th International Mt.BANDAI symposium for Neuroscience
February 8 (Wed) – February 10 (Fri), 2023

Venue

PRINCE WAIKIKI
100 Holomoans Street, Honolulu, HI 968151
Tel. +1-808-956-1111 | Fax. +1-808-946-0811

Official Language

English

Congress Dress Code

Smart Casual or Business Casual

Registration

The staff at the conference registration desk is happy to assist you in all matters of registration.
If you pre-registered, please pick up your congress kit at registration desk.
The opening hours of the registration desk are as follows:

Date	Time
February 5 (Sun)	1:00 p.m. – 5:00 p.m.
February 6 (Mon) – 10 (Fri)	7:00 a.m. –

Category	PPNC only	Mt. BANDAI only	Participate in both
Physicians (1)	JPY30,000	JPY30,000	JPY50,000
Residents, Fellows, Nurses, Medical Engineer, Rehabilitaion etc (1)	JPY20,000	JPY20,000	JPY30,000
Accompanying Person (2)	JPY10,000		
Accompanying Children (2)	Free	Free	Free

* Registration(1) includes: access to all conference sessions and exhibition, Conference materials, free admission to Welcome Reception and Banquets.
* Registration(2) includes: free admission to Welcome Reception and Banquets.
* Children under 12 yrs old is free.

Social Events

PPNC

Events	Date	Time	Venue
Welcome Reception	February 5 (Sun)	18:00～	Muliwai Desk
Cocktail Party	February 7 (Tue)	18:00～	Pi'inaio Ballroom
Banquet	February 7 (Tue)	18:45～	Pi'inaio Ballroom

Mt. BANDAI

Events	Date	Time	Venue
Welcome Reception	February 8 (Wed)	17:30～	Muliwai Deck
Cocktail Party	February 10 (Fri)	17:45～	Pi'inaio Ballroom
Banquet	February 10 (Fri)	18:30～	Pi'inaio Ballroom

Golf Tournament

February 7 (Tue) "Pan-Pacific Cup"
Pearl Country Club
Bus depart at 8:30 to Golf
Golf Fee (Incl. Lunch Box) JPY25,000

February 10 (Fri) "Mt. BANDAI Cup"
Walter J. Nagorski Golf Course
Bus depart at 9:45 to Golf
Golf Fee (Incl. Lunch Box) JPY20,000

Presentation Guidelines

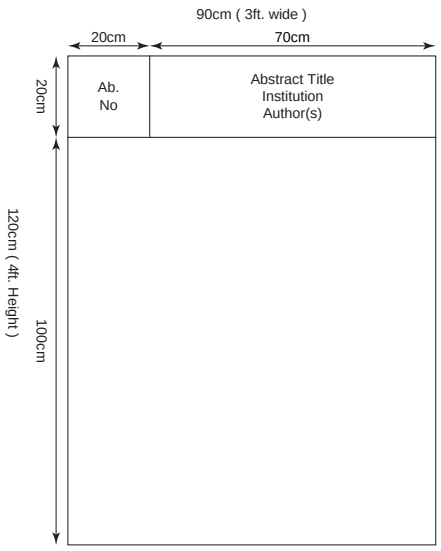
Oral Presentation Guidelines

Below are some guidelines to help you prepare your oral presentation.

1. Each presentation has the different allotted time. Please check the congress program for your assigned time.
2. All presentation must be made by on a computer using PowerPoint or Keynote.
3. The Conference venue will have the computerized LCD projection system. Speakers are required to bring their own laptop computers.
4. Please make sure that your computer is equipped with HDMI
5. Please do not forget to bring your own AC adaptor. Please make sure that your adaptor has 2pin-plugs. If your computer does not have one, please bring the converter.
6. To avoid losing your presentation data, we strongly recommend you to bring your data by USB as well.
7. Please deactivate your screen saver or power setting to avoid any trouble during your presentation.
8. There will be no Speakers ready room for this congress. Please directly bring your laptop with presentation data to the PC operation desk located in the presentation hall anteriorly.
9. The congress has very tight schedules, so we would be grateful for your punctuality.

Poster Guidelines

1. There will be no presentation time allotted for posters this time.
2. The size of each poster is 120 cm (4ft. Height) × 90 cm (3ft. wide).
3. We will have push-pins ready for your posters.
4. The posters left on the poster boards at the end of congress program will be taken down and disposed by the secretariat. Please make sure to take down your posters by yourself if you want to keep.



5. The conference secretariat is not responsible for posters that are left on the poster boards at the end of the conference.

The 10th Pan-Pacific Neurosurgical Congress

	Feb. 5 (Sun)	Feb. 6 (Mon)	Feb. 7 (Tue)	Poster
8:00		8:00-8:15 Opening Ceremony Moderator: Junichi Mizuno	8:00-8:15 Honored Guest Talk 2 Moderator: Hiroyuki Kinouchi	
		8:15-8:30 Keynote Lecure 2 Moderator: Nobuhiro Mikuni	8:15-8:30 Keynote Lecure 3 Moderator: Tomokatsu Hori	
		8:30-8:45 PPNC Guest Talk Moderator: Hiroshi Nakagawa	8:30-10:00 Symposium 2: Cerebro-vascular Diseases Moderators: Shinjitsu Nishimura Tatsuya Sasaki	
		8:45-9:00 Honored Guest Talk 1 Moderator: Hiromi Goto		
9:00		9:00-9:15 Masters Lecture 1 Moderator: Yasunobu Itoh		
		9:15-10:20 Symposium 1-A "Spine" Minimally Invasive Spine Surgery (MISS) Jointly with Minamitohoku-Shinyurigaoka Neuro-Spine Winter Seminar Moderators: Kazutoshi Hida Taku Sugawara		
10:00			10:00-10:15 Masters Lecture 3 Moderator: Hirotoshi Sano	
		10:20-11:10 Symposium 1-B "Spine" Minimally Invasive Spine Surgery (MISS) Jointly with Minamitohoku-Shinyurigaoka Neuro-Spine Winter Seminar Moderator: Yasuhiro Nakajima	10:15-11:30 Oral Session 4 & Keynote Lecture 4: Spine Moderators: Takashi Yagi Takaoki Kimura	
11:00		11:10-11:40 Masters Lecture 2 Moderator: Satoshi Tani		
		11:40-12:30 Oral Session 3: CVD 2 Moderator: Hideyuki Yoshioka	11:30-12:00 Oral Session 5: Miscellaneous Moderator: Shinichi Numazawa	
12:00		12:30-13:30 Special Seminar (in Japanese) Moderator: Takanori Fukushima		Feb. 5 (Sun) 〜 Feb. 7 (Tue)
13:00	13:50-13:55 Opening Remarks			
	13:55-14:10 Keynote Lecture 1 Moderator: Raymond Taniguchi			
14:00	14:10-15:00 Oral Session 1: Skull Base and Brain Tumor Moderator: Masamichi Kurosaki			
15:00	15:00-16:00 Special Lecture 1 Moderators: Sadayoshi Watanabe Yuichi Murayama			
16:00	16:00-17:00 Special Lecture 2 Moderators: Yukihiko Sonoda Kentaro Watanabe			
17:00	17:00-17:40 Oral Session 2: CVD 1 Moderators: Zenichiro Watanabe		18:00- PPNC Cocktail Party 18:45- PPNC Banquet	
		18:00-19:00 PPNC Welcome Reception		

The 9th International Mt. BANDAI Symposium for Neuroscience

Feb. 8 (Wed)	Feb. 9 (Thu)	Feb. 10 (Fri)	Poster	
8:00-8:40 Sponsored Seminar : MedicaLine Moderator: Akinori Kondo	8:00-8:50 Cerebrovascular Disease Moderators: Motoki Inaji Takeo Kataoka	8:00-8:20 Master's Lecture ③ Moderator: Takanori Fukushima		8:00
		8:20-8:40 Master's Lecture ④ : Acoustic Neurinoma Moderator: Takanori Fukushima		
8:40-9:40 Moyamoya Disease 1: Moyamoya Disease in Hawaii State Moderators: Takanori Fukushima Shinichi Numazawa	8:50-9:10 Keynote Lecture ⑨ : AVM Moderator: Hirotoshi Sano	8:40-9:00 Master's Lecture ⑤ : Acoustic Neurinoma Moderator: Takanori Fukushima		
	9:10-9:30 Keynote Lecture ⑩ Moderator: Takanori Fukushima	9:00-9:20 Honored Guest Special Lecture ① Moderator: Michihiro Kohno		9:00
	9:30-9:50 Master's Lecture ① : Cerebral Aneurysm clipping Moderator: Takanori Fukushima	9:20-9:40 Honored Guest Special Lecture ② Moderator: Kazuo Hashi		
9:40-10:00 Keynote Lecture ① : Moyamoya Disease Moderator: Shinichi Numazawa	9:50-10:10 Master's Lecture ② : Cerebral Aneurysm Clipping Moderator: Takanori Fukushima	9:40-10:00 Master's Lecture ⑥ Moderator: Yuzo Terakawa		
10:00-10:20 Keynote Lecture ② : Moyamoya Disease Moderator: Takanori Fukushima	10:10-10:30 Keynote Lecture ⑪ : Exoscope Moderator: Shunsuke Satoh	10:00-10:15 Keynote Lecture ⑮ Moderator: Yuzo Terakawa		10:00
10:20-10:40 Keynote Lecture ③ Moderator: Shinsuke Irie	10:30-10:50 Keynote Lecture ⑫ : MVD Moderator: Kikuo Ohno	10:15-11:35 Brain Tumor Moderators: Jun Sakai Shin-ichi Miyatake		
10:40-11:00 Keynote Lecture ④ : Dementia Moderator: Shinsuke Irie	10:50-11:10 Keynote Lecture ⑬ : MVD Moderator: Kikuo Ohno		Feb. 8 (Wed) 〜 Feb. 10 (Fri)	
11:00-11:20 Keynote Lecture ⑤ : Rehabilitation Moderator: Shinsuke Irie	11:10-11:30 Keynote Lecture ⑭ : MVD Moderator: Kikuo Ohno			11:00
11:20-11:30 Spine & Peripheral Nerve Moderator: Hiroshi Nakagawa				
11:30-11:50 Keynote Lecture ⑥ Moderator: Hiroshi Nakagawa	11:30-12:00 Moyamoya Disease 2 Moderator: Taketoshi Maehara	11:35-11:40 Closing Remarks		
11:50-12:10 Keynote Lecture ⑦ Moderator: Hiroshi Nakagawa	12:00-12:30 Others Moderator: Hiromi Goto			12:00
12:10-12:30 Keynote Lecture ⑧ :Smart Operation Room Moderator: Takanori Fukushima				
12:30-13:30 Special Seminar (in Japanese) Moderator: Takanori Fukushima	12:30-13:30 Special Seminar (in Japanese) Moderator: Takanori Fukushima			13:00
17:30- Mt. BANDAI Welcome Reception		17:45- Mt. BANDAI Cocktail Party 18:30- Mt. BANDAI Banquet		

PROGRAM

Sunday, February 5, 2023 (The 10th Pan-Pacific Neurosurgery Congress DAY1)

13:50 p.m. - 13:55 p.m. Opening Remarks
Junichi Mizuno (*Shin-yurigaoka General Hospital*)

13:55 p.m. - 14:10 p.m. Keynote Lecture 1
Moderator: Raymond Taniguchi (*Neurological Surgery Board Certified*)

1-1. Considerations in Laser Interstitial Thermal Therapy and brain tumors
THOMAS NOH
Advanced Neurosurgery of Hawaii

14:10 p.m. - 15:10 p.m. Oral Session 1: Skull Base and Brain Tumor
Moderator: Masamichi Kurosaki (*Tottori University Hospital*)

2-1. Microvascular decompression for hemifacial spasm caused by vertebral artery
YOICHI NONAKA, Naokazu Hayashi
Department of Neurosurgery, Tokai University School of Medicine

2-2. My experience with on- and off- the- job training regarding orbitozygomatic approach
YUHEI KUWAMOTO, Masamichi Kurosaki, Sadao Nakajima, Atsushi Kambe, Makoto Sakamoto
Faculty of Medicine Tottori University

2-3. A case report : intracranial hypotension treated effectively by epidural blood patch after tumor removal via craniotomy with intraoperative spinal drainage
DAICHI FUJIMORI, Yuta Kobayashi, Shunsuke Sato, Hiromi Goto, Kazuo Watanabe
Southern TOHOKU Research Institute for Neuroscience

2-4. MRI-guided brain tumor surgery
RYUTA SAITO
Department of Neurosurgery, Nagoya University

2-5. Clinical significance of early venous filling on preoperative angiography in glioblastoma
KOTARO TATEBAYASHI, Daisuke Sakamoto, Hiroto Kageyama, Shinichi Yoshimura
Department of Neurosurgery, Hyogo Medical University

15:00 p.m. - 16:00 p.m. Special Lecture 1
Moderators: Sadayoshi Watanabe (*Tokyo General Hospital*)
Yuichi Murayama (*The Jikei University*)

3-1. Surgery of Pineal Region Tumors
TAKANORI FUKUSHIMA
Duke University

3-2. How did I live a Pioneering Time in Neurosurgery.
HIROTOSHI SANO
Shinkawabashi Hospital

3-3. Surgical strategies in management of cervical spondylosis and OPLL
HIROSHI NAKAGAWA, Manabu Sumiyoshi, Toshiyuki Okazaki, Koji Saito
Kushiro Kojinkai Memorial Hospital

3-4. Long-term outcomes after surgery for brainstem cavernous malformations: analysis of 46 consecutive cases

TOMOKATSU HORI
Moriyama Neurological Center Hospital

16:00 p.m. - 17:00 p.m. Special Lecture 2

Moderators: Yukihiko Sonoda (*Yamagata Univeristy*)
Kentaro Watanabe (*Tokyo Jikei University*)

4-1. Paradigm Shift of the Treatment for Cerebral Vasospasm Following Aneurysmal Subarachnoid Hemorrhage

HIROYUKI KINOUCHI
Department of Neurosurgery, University of Yamanashi School of Medicine

4-2. Current Status of Neurosurgical Hybrid Operating Room at the Jikei University Hospital

YUICHI MURAYAMA
The Jikei University

4-3. Combined transmastoid approach and high cervical exposure for intra- and extradural tumors around the jugular foramen

YOICHI NONAKA, Naokazu Hayashi
Department of Neurosurgery, Tokai University School of Medicine

4-4. Use of microscopy, endoscopy, and exoscopy in skull base surgery

KENTARO WATANABE, Yuichi Murayama
Tokyo Jikei University school of Medicine

17:00 p.m. - 17:40 p.m. Oral Session 2: CVD1

Moderator: Zenichiro Watanabe (*Southern TOHOKU Research Institute for Neuroscience Southern TOHOKU General Hospital*)

5-1. Lessons learned from 265 AVM surgery: battle plans and clinical results

HIROKI KURITA
Department of Cerebrovascular Surgery, International Medical Center, Saitama Medical University

5-2. Subacute procedure within 28 days, triple antithrombotics, and calcified lesion affect functional outcomes after Carotid-Artery-Stenting (CAS): CEA and CAS risk analysis in multicenter retrospective study

SO OZAKI[1)], Wataru Shimohigoshi[1)], Taisuke Akimoto[1)], Yasunori Nakai[3)], Katsumi Sakata[1)], Tetsuya Yamamoto[2)]
[1)] *Yokohama City University Medical Center*
[2)] *Yokohama City University School of Medicine*
[3)] *Yokohama Municipal Stroke and Neurospine Center*

5-3. A case of large middle cerebral artery aneurysm ruptures into intracystic hemorrhage and subdural hematoma while awaiting surgery

RIKIYA KAMENO
Southern TOHOKU Research Institute for Neuroscience

5-4. The effectiveness of intracranial bypass surgery for complicated aneurysms in two patients: case report.

KEIGO MIZUNO[1)], Naoto Kimura[1)], Ryosuke Dijiri[2)], Hiroki Uchida[3)], Michiko Yokosawa[1)], Takayuki Sugawara[1)], Akira Ito[1)], Takuji Sonoda[2)], Kiyotaka Oi[2)], Teiji Tominaga[3)]
[1)] *Department of Neurosurgery, Iwate Prefectural Central Hospital*
[2)] *Department of Neurology, Iwate Prefectural Central Hospital*
[3)] *Department of Neurosurgery, Tohoku University Graduate School of Medicine*

Monday, February 6, 2023 (The 10th Pan-Pacific Neurosurgery Congress DAY2)

8:00 a.m. - 8:15 a.m. Opening Ceremony
Raymond Taniguchi (*Neurological Surgery Board Certified*)
Moderator: Junichi Mizuno (*Shin-yurigaoka General Hospital*)

8:15 a.m. - 8:30 a.m. Keynote Lecture 2
Moderator: Nobuhiro Mikuni (*Sapporo Medical University*)

6-1. Neurosurgical Practice in Honolulu

REID HOSHIDE
Queens Medical Center

8:30 a.m. - 8:45 a.m. PPNC Guest Talk
Moderator: Hiroshi Nakagawa (*Kushiro Kojinkai Memorial Hospital*)

7-1. Sustainable Steps to Survive as Private Practice in the US Healthcare System

JACOB RODMAN
Raleigh Neurosurgical Clinic, Inc.

8:45 a.m. - 9:00 a.m. Honored Guest Talk 1
Moderator: Hiromi Goto (*Southern TOHOKU Research Institute for Neuroscience*)

8-1. Vertebrobasilar flow evaluation by QMRA: hemodynamic VB insufficiency reversed with occipital artery – vertebral artery bypass (OA-V3 bypass)

MARTIN SAMES, Hynek Zitek, Ales Hejcl
Masaryk Hospital, University J.E.Purkinje

9:00 a.m. - 9:15 a.m. Masters Lecture 1
Moderator: Yasunobu Itoh (*Tokyo General Hospital*)

9-1. Intramedullary spinal cavernomas - microsurgical strategy and postoperative outcome

UWE SPETZGER[1,2)]
[1)] *Klinikum Karlsruhe / Karlsruhe Institute of Technology, KIT*
[2)] *Karlsruhe Institute of Technology, KIT*

9:15 a.m. - 10:20 a.m. Symposium 1-A "Spine": Minimally Invasive Spine Surgery (MISS) Jointly with Minamitohoku-Shinyurigaoka Neuro-Spine Winter Seminar
Moderators: Kazutoshi Hida (*Sapporo Azabu Neurosurgical Hospital*)
Taku Sugawara (*Akita Cerebrospinal and Cardiovascular Center*)

10-1. Surgical outcomes of operative microscope-assisted extreme lateral interbody fusion for lumbar degenerative spondylolisthesis

YASUNOBU ITOH[1)], Ryo Kitagawa[1)], Shinichi Numazawa[1)], Kota Yamakawa[1)], Osamu Yamada[1)], Shuhei Morita[1)], Tomoko Otomo[1)], Isao Akasu[1)], Kentaro Mori[1)], Sadayoshi Watanabe[1)], Kazuo Watanabe[2)]
[1)] *Department of Neurosurgery, Tokyo General Hospital*
[2)] *Department of Neurosurgery, Southern Tohoku General Hospital*

10-2. Biomechanical simulation studies in cervical laminoplasty constructed by various spacers

SATOSHI TANI[1)], Hiroki Ohashi[2)], Hiroyuki Takao[2)], Daichi Kawamura[2)]

[1)] *Shin-yurigaoka General Hospital*

[2)] *Jikei University School of Medicine*

10-3. Development of screw guide templates and spinal fixation implants using 3D computer technology

TAKU SUGAWARA, Naoki Higashiyama, Shinya Tamura

Akita Cerebrospinal and Cardiovascular Center

10-4. Usefulness of hybrid method of anterior cervical decompression and fusion and transvertebral anterior foraminotomy for cervical multiple lesions

TAKASHI YAGI, Nobuo Senbokuya, Hiroyuki Kinouchi

University of Yamanashi

10-5. Posterior Cervical Foraminotomy via Full-endoscopic versus Microscopic Approach for Radiculopathy: A Systematic Review and Meta-analysis

HIROTO KAGEYAMA, Kotaro Tatebayashi, Shinichi Yoshimura

Department of Neurosurgery, Hyogo Medical University

10:20 a.m. - 11:10 a.m. Symposium 1-B "Spine": Minimally Invasive Spine Surgery (MISS) Jointly with Minamitohoku-Shinyurigaoka Neuro-Spine Winter Seminar

Moderator: Yasuhiro Nakajima (*Daido Hospital*)

11-1. Selective use of vertebroplasty devices for osteoporotic vertebral body fractures

YASUHIRO NAKAJIMA[1)], Mamoru Matsuo[1,2)], Ayako Motomura[1,2)], Akinori Kageyama[1,2)], Takashi Tsujiuchi[2)]

[1)] *Neuro-Spine Center, Daido Hospital*

[2)] *Department of Neurosurgery, Daido Hospital*

11-2. Respiratory complications after anterior corpectomy to thoracolumbar spine

TAKESHI UMEBAYASHI

Tokyo Spine Clinic

11-3. Surgical Treatment strategy for intramedullary tumors in Japan

TOSHIKI ENDO, Shinya Haryu, Yoshiharu Takahashi, Tatsuya Sasaki

Tohoku Medical and Pharmaceutical University

11-4. Emerging Technology in Spine Surgery...Augmental Reality and Enhanced Surgical Navigation

THOMAS NOH

Advanced Neurosurgery of Hawaii

11:10 a.m. - 11:40 a.m. Masters Lecture 2

Moderator: Satoshi Tani (*Shin-yurigaoka General Hospital*)

12-1. Surgical management of intramedullary tumors. -surgical strategy during operation-

KAZUTOSHI HIDA

Sapporo Azabu Neurosurgical Hospital

12-2. Surgical characteristics in water and the full endoscopic anatomy of the vertebral foramen

YASUHIKO NISHIMURA[1)], Junichi Mizuno[2)]

[1)] *Wakayama KOYO Hospital*

[2)] *Shin-yurigaoka General Hospital*

11:40 a.m. - 12:30 p.m. Oral Session 3: CVD2
Moderator: Hideyuki Yoshioka (*University of Yamanashi*)

13-1. Iodine-123-Iomazenil SPECT revealed recovery of neuronal viability in association with improvement of cognitive dysfunction after Revascularization in Moyamoya Disease

HIDEYUKI YOSHIOKA, Takuma Wakai, Koji Hashimoto, Toru Tateoka, Ryo Horiuchi, Hiroyuki Kinouchi
University of Yamanashi

13-2. Treatment outcome of acute revascularization for large vessel occlusion due to dissection

KOHEI ISHIKAWA[1,2)], Hideki Endo[1,2)], Koichiro Shindo[1,2)], Tatsuya Ogino[1)], Tomoki Fuchizaki[1)], Tomoaki Ishizuka[1)], Kaori Honjo[1)], Toshiichi Watanabe[1)], Kenji Kamiyama[1)], Toshiaki Osato[1)], Hirohiko Nakamura[1)]
[1)] *Nakamura Memorial Hospital*
[2)] *Nakamura Memorial South Hospital*

13-3. The Efficacy and pitfalls of MoMa Ultra with flow reversal in carotid artery stenting

KAZUKI TAKAHIRA, Taketo Kataoka, Shohei Noro, Yuzo Terakawa, Shinsuke Irie, Koji Saito
Hokkaido Ohno Memorial Hospital

13-4. Hypofractionated stereotactic radiotherapy for unresected large brain metastases

MASATAKA TAKAHASHI[1)], Yusuke Takahashi[1)], Masaya Oda[2)], Hiroaki Shimizu[1)]
[1)] *Akita University Graduate School of Medicine*
[2)] *Nakadori General Hospital,*

13-5. Causality assessment for fatal cerebral haemorrhage as an adverse drug reaction: an algorithmic approach

MIKI OHTA[1)], Satoru Miyawaki[2)], Shinichiroh Yokota[3)], Makoto Yoshimoto[1)], Tatsuya Maruyama[1)], Daisuke Koide[1)], Takashi Moritoyo[1)], Nobuhito Saito[2)]
[1)] *Clinical Research Promotion Center, The University of Tokyo Hospital*
[2)] *Department of Neurosurgery, Graduate School of Medicine, University of Tokyo*
[3)] *Department of Healthcare Information Management, The University of Tokyo Hospital*

12:30 p.m. – 13:30 p.m. Special Seminar (in Japanese)
Moderator: Takanori Fukushima (*Duku University*)

Wealth Management with US dollars in Honolulu

Hirai and Utsugi
Central Pacific Bank, Honolulu

Gren Michel
APS Investments, Los Angeles

Daniel Bennett
APS Investments, Los Angeles

Hiro Isogawa
International Accountant

Tuesday, February 7, 2023 (The 10th Pan-Pacific Neurosurgery Congress DAY3)

8:00 a.m. - 8:15 a.m. Honored Guest Talk 2
Moderator: Hiroyuki Kinouchi (*University of Yamanashi*)

14-1. Inhibition of the MEK/ERK pathway for management of symptomatic vasospasm

MATHIESEN TIIT, Jesper Bomers, Lars Edvinson, Kristian Haanes

University Hospital of Copenhagen

8:15 a.m. - 8:30 a.m. Keynote Lecure 3
Moderator: Tomokatsu Hori (*Moriyama Neurological Center Hospital*)

15-1. Influence of FLAIRectomy on survival outcome after gross total resection of glioblastoma

YUKIHIKO SONODA, Ken-ichiro Matsuda

Faculty of medicine, Yamagata Univeristy

8:30 a.m. - 10:00 a.m. Symposium 2: Cerebro-vascular Diseases
Moderators: Shinjitsu Nishimura (*Southern TOHOKU General Hospital*)
Tatsuya Sasaki (*Tohoku Medical and Pharmaceutical University*)

16-1. Semi-sitting Position Surgery for Cerebrovascular Disease

SHINJITSU NISHIMURA, Makoto Saito, Sumito Okuyama, Keiichi Kubota, Atsuhito Takemura, Junko Matsuyama, Tadao Matsushima, Kazuo Watanabe

Southern TOHOKU General Hospital

16-2. Usefulness of transcranial motor evoked potential in clipping surgery for cerebral aneurysms- Introduction of a new protocol for stable monitoring-

TATSUYA SASAKI

Tohoku Medical and Pharmaceutical University

16-3. Surgical Treatment strategy for Brainstem Cavernous Angiomas

TOSHIKI ENDO[1)], Shinya Haryu[1)], Yoshiharu Takahashi[1)], Tatsuya Sasaki[1)], Teiji Tominaga[2)]

[1)] *Tohoku Medical and Pharmaceutical University*

[2)] *Tohoku University*

16-4. Development of stem cell-based therapy for ischemic stroke

KUNIYASU NIIZUMA[1,2,3,4)], Teiji Tominaga[3)]

[1)] *Department of Neurosurgical Engineering and Translational Neuroscience, Graduate School of Biomedical Engineering, Tohoku University*

[2)] *Department of Neurosurgical Engineering and Translational Neuroscience, Tohoku University Graduate School of Medicine*

[3)] *Department of Neurosurgery, Tohoku University Graduate School of Medicine*

[4)] *Division of Muse Cell Clinical Research, Tohoku University Hospital*

16-5. Optimal Strategy for Mechanical Thrombectomy Based on Preoperative Imaging Diagnosis of Thrombus Composition

HIROYUKI SAKATA[1,2)], Masayuki Ezura[2)], Hidenori Endo[2)], Kuniyasu Niizuma[3,4)], Teiji Tominaga[3)]

[1)] *Kohnan Hospital*

[2)] *National Hospital Organization Sendai Medical Center*

[3)] *Tohoku University Graduate School of Medicine*

[4)] *Graduate School of Biomedical Engineering, Tohoku University*

16-6. Timing and Efficacy of Endovascular Treatment in Non-hemorrhagic Intracranial Vertebral Artery Dissection

ATSUHITO TAKEMURA[1)], Shinjitsu Nishimura[1)], Hana Tobishima[2)], Hidefumi Tabata[2)], Tadao Matsushima[1)], Keiichi Kubota[1)], Sumio Okuyama[1)], Junko Mtsuyama[1)], Makoto Siato[1)], Kazuo Watanabe[1)]

[1)] *Southern Tohoku General Hospital*

[2)] *Aomori City Hospital*

10:00 a.m. - 10:15 a.m. Masters Lecture 3

Moderator: Hirotoshi Sano (*Shinkawabashi Hospital*)

17-1. Subtemporal approach for mesial temporal lesion

NOBUHIRO MIKUNI

Sapporo Medical University

10:15 a.m. - 11:30 a.m. Oral Session 4 & Keynote Lecture 4: Spine

Moderators: Takashi Yagi (*University of Yamanashi*)

Takaoki Kimura (*Shin-yurigaoka General Hospital*)

18-1. Keynote Lecture 4
Minimally Invasive Spine Surgery in an Ambulatory Surgery Setting

JON F. GRAHAM

Hawaii spine Institute, Honolulu Spine and Orthopedic Center

18-2. Surgical treatment of thoracolumbar burst fracture with neurological symptoms

TADAO MATSUSHIMA, Keiichi Kubota, Makoto Saito, Sumito Okuyama, Junko Matsuyama, Atsuto Takemura, Shinjitsu Nishimura, Kazuo Watanabe

Department of Neurosurgery, Southern TOHOKU General Hospital

18-3. Epidural hematoma in the cervical spine

TOSHIYUKI OKAZAKI[1)], Hiroshi Nakagawa[1)], Manabu Sumiyoshi[1)], Hitoshi Hayase[2)], Tmohiro Murakami[2)], Koji Saito[1,2)]

[1)] *Kushiro Kojinkai Memorial Hospital*

[2)] *Hokkaido Ohno Memorial Hospital*

18-4. Long-term recurrence after surgery for schwannoma of the cauda equina

HIROTOMO TANAKA[1)], Yoshiyuki Takaishi[1)], Haruka Enami[1)], Takashi Mizowaki[1)], Takeshi Kondoh[1)], Takashi Sasayama[2)]

[1)] *Shinsuma General Hospital*

[2)] *Kobe University*

18-5. Key points of XLIF surgery Experience with over 160 cases

SHINICHI NUMAZAWA[1)], Sadayoshi Watanabe[1)], Yasunobu Itoh[1)], Kentaro Mori[1)], Jun Sakai[1)], Hirotaka Yoshida[1)], Ryo Kitagawa[1)], Isao Akatsu[1)], Tomoko Otomo[1)], Isao Yamada[1)], Kouta Yamakawa[1)], Awfa Aktham[1)], Kazuo Watanabe[2)]

[1)] *Tokyo General Hospital, Neurosurgery*

[2)] *Southern Tohoku General Hospital Neurosurgery*

18-6. Calcifying pseudoneoplasm of filum terminale with tethered cord syndrome

TAKAOKI KIMURA

Spine and Spinal cord surgery, Shin-yurigaoka General Hospital

18-7. Risk Factors of Subsidence after Anterior Cervical Discectomy and Fusion with Cylindrical Cages for Cervical Degenerative Disease: Minimum 2- year Follow-up Results

KAZUMA DOI[1)], Satoshi Tani[1)], Toshiyuki Okazaki[2)], Junichi Mizuno[1)]

[1)] *Shin-yurigaoka General Hospital*

[2)] *Kushiro Kojinkai Memorial Hospital*

11:30 a.m. - 12:00 p.m. Oral Session 5: Miscellaneous

Moderator: Shinichi Numazawa (*Tokyo General Hospital*)

19-1. Comparing the Transcriptome Profile of the Middle Cerebral Artery between the RNF213 genotypes in the Patients with Moyamoya disease

FUMIAKI KANAMORI[1)], Kai Takayanagi[1)], Kinya Yokoyama[1)], Kosuke Aoki[1)], Sachi Maeda[1)], Kazuki Ishii[1)], Kenji Uda[1)], Yoshio Araki[1)], Kazuhiro Yoshikawa[2)], Ryuta Saito[1)]

[1)] *Nagoya University Graduate School of Medicine*

[2)] *Aichi Medical University*

19-2. What is important for favorable outcome of mechanical thrombectomy for mild cerebral infarction with NIHSS<6: K-NET sub-analysis

HIDEKAZU YAMAZAKI[1)], Masafumi Morimoto[2)], Mitsuhiro Iwaasaki[2)], Toshihiro Ueda[3)], Yasuhiro Hasegawa[4)], Masataka Takeuchi[5)], Ryoo Yamamoto[6)], Yoshifumi Tsuboi[7)], Shougo Kaku[8)], Jyunichi Ayabe[9)], Takekazu Akiyama[10)]

[1)] *Department of Neurology and Neuroendovascular Treatment, Yokohama Shintoshi Neurosurgical Hospital*

[2)] *Department of Neurosurgery, Yokohama Shintoshi Neurosurgical Hospital*

[3)] *Department of Neuroendovascular Treatment, St Marianna University Toyoko Hospital*

[4)] *Department of Neurology, St Marianna University*

[5)] *Department of Neurosurgery, Seisyo Hospital*

[6)] *Department of Neurology, Yokohama Brain and Spne Center*

[7)] *Department of Neurosurgery, Kawasaki Saiwai Hospital*

[8)] *Department of Neurosurgery, Nousinkeigeka Higasikanagawa Hospital*

[9)] *Department of Neurosurgery, Yokosukakyousai Hospital*

[10)] *Department of Neurosurgery, Akiyaka Neurosurgical Hospital*

19-3. Spatial projection ratio using 3D geometry to differentiate rupture status

FUJIMARO ISHIDA[1)], Kazuhiro Furukawa[1)], Masanori Tsuji[2)], Takenori Sato[2)], Shota Ito[1)], Munenari Ikezawa[1)], Yoko Yamamoto[1)], Katsuhiro Tanaka[1)], Hidenori Suzuki[2)]

[1)] *Mie Chuo Medical Center, NHO*

[2)] *Mie University Graduate School of Medicine*

Poster

P-1. Plasma ACTH levels at the onset of SAH may be a predictive marker for symptomatic vasospasm occurrence.

YOICHI UOZUMI[1)], Tomoaki Harada[1,2)], Shigeru Miyake[2)], Daisuke Yamamoto[2)], Yusuke Okamura[3,5)], Taiji Ishii[3,4)], Shotaro Tatsumi[4)], Takashi Mizobe[4)], Hideo Aihara[4)], Eiji Kohmura[1,6)], Takashi Sasayama[1)]

[1)] *Department of Neurosurgery, Kobe University Graduate School of Medicine*

[2)] *Department of Neurosurgery, Kita-Harima Medical Center*

[3)] *Department of Neurosurgery, Toyooka Hospital*

[4)] *Department of Neurosurgery, Hyogo Prefectural Harima-Himeji General Medical Center*

[5)] *Department of Neurosurgery, Hyogo Prefectural Tamba Medical Center*

[6)] *Department of Neurosurgery, Kinki Central Hospital*

P-2. Hemodynamic characteristics of plaque rupture of carotid stenosis

TAKAHIRO NAKAGAWA[1)], Kazuhiro Furukawa[1)], Masanori Tsuji[2)], Takenori Sato[2)], Shota Ito[1)], Munenari Ikezawa[1)], Yoko Yamamoto[1)], Katsuhiro Tanaka[1)], Fujimaro Ishida[1)], Hidenori Suzuki[2)]

[1)] *Mie Chuo Medical Center, NHO*

[2)] *Mie Univeresity Graduate School of Medicine*

P-3. Genetic features and clinical outcome of spinal cord glioma

YOSHITAKA NAGASHIMA, Yusuke Nishimura, Ryuta Saito

Department of Neurosurgery, Nagoya University

P-4. Moyamoya disease-specific extracellular vesicle-derived microRNAs in the cerebrospinal fluid as revealed by comprehensive expression analysis through microRNA sequencing

KINYA YOKOYAMA, Fumiaki Kanamori, Yoshio Araki, Kenji Uda, Toshihiko Wakabayashi, Ryuta Saito

Nagoya University Hospital

P-5. Spinal glomus AVM presenting solely with groin pain: A case report

NATSUMI BABA, Ryo Horiuchi, Takashi Yagi, Kazuya Kanemaru, Hideyuki Yoshioka, Hiroyuki Kinouchi

University of Yamanashi

P-6. Usefulness Of Serum Soluble Interleukin-2 Receptor Levels For Differentiating Between PCNSL And SCNSL

SHIGERU KIKUCHI, Yuta Mitobe, Kenichiro Matsuda, Yukihiko Sonoda

Department of Neurosurgery, Faculty of Medicine, Yamagata University

P-7. Flow diverter treatment for hemifacial spasm due to unruptured vertebral artery fusiform aneurysm

YUKI AONUMA, Hideyuki Yoshioka, Kazuya Kanemaru, Koji Hashimoto, So Saito, Takuma Wakai, Norito Fukuda, Hiroyuki Kinouchi

University of Yamanashi

P-8. Tirabrutinib, a second-generation BTK inhibitor in relapsed and refractory primary CNS lymphoma: A single institute study

KAZUHIKO MISHIMA, Mitsuaki Shirahata, Tomonari Suzuki, Reina Mizuno, Tatsuya Ozawa

Saitama Medical University Comprehensive Cancer Center

P-9. Transarterial embolization from a pial feeder of tentorial dural arteriovenous fistula

AYUKA TANZAWA[1)], Takuma Wakai[2)], Kazuya Kanemaru[2)], Hideyuki Yoshioka[2)], Norito Fukuda[2)], Masahiro Shimizu[1)], Hiroyuki Kinouchi[2)]

[1)] *Kanto Neurosurgical Hospital*

[2)] *Department of Neurosurgery, University of Yamanashi*

P-10. Nonconvulsive status epilepticus due to pneumocephalus after suprasellar arachnoid cyst fenestration with transsphenoidal surgery

YOHEI KAGAMI, Ryu Saito, Tomoyuki Kawataki, Masakazu Ogiwara, Mitsuto Hanihara, Hirohumi Kazama, Hiroyuki Kinouchi

Department of Neurosurgery, Interdisciplinary Graduate School of Medicine and Engineering, University of Yamanashi

P-11. Intraoperative Evaluation of Cerebral Blood Flow Using Laser Speckle Contrast Imaging (LSCI)

KAZUHIDE SHIMIZU, Yoji Tanaka, Daisu Abe, Motoki Inaji, Taketoshi Maehara

Department of Neurosurgery, Tokyo Medical and Dental University

P-12. Renin-angiotensin-aldosterone system inhibitors as a risk factor for chronic subdural hematoma recurrence

WATARU SHIMOHIGOSHI[1)], Hajime Takase[2,3)], Tatsuya Haze[2,4,5)], Yusuke Kobayashi[2,4)], Hiroshi Manaka[1)], Takashi Kawasaki[1)], Katsumi Sakata[1)], Tetsuya Yamamoto[3)]

[1)] *Yokohama-city-university Medical-center*

[2)] *Center for Novel and Exploratory Clinical Trials (Y-NEXT), Yokohama City University Hospital*

[3)] *Department of Neurosurgery, Yokohama City University Graduate School of Medicine*

[4)] *Department of Medical Science and Cardiorenal Medicine, Yokohama City University Graduate School of Medicine*

[5)] *Department of Nephrology and Hypertension, Yokohama City University Medical Center*

P-13. Endoscope-Integrated Fluorescence Video Angiography for the Surgery of Ventrally Located Perimedullary Arteriovenous Fistula at Craniocervical Junction

RYO HORIUCHI, Kazuya Kanemaru, Hideyuki Yoshioka, Koji Hashimoto, Hiroaki Murayama, Takashi Yagi, Masakazu Ogiwara, Hiroyuki Kinouchi

University of Yamanashi

P-14. Efficacy of endoscopic assistance in dural closure for a patient with superficial siderosis

MURASE RYOTA, Okuhara Tetuya, Yagi Takashi, Senbokuya Nobuo, Kinouchi HIroyuki

University of Yamanashi

P-15. Keyhole corpectomy with single-cage fixation for anterior cervical spine decompression

MANABU SUMIYOSHI, Hiroshi Nakagawa, Toshiyuki Okazaki, Koji Saito

Kushiro Kojinkai Memorial Hospital, spine center

P-16. Cervical juxta-facet cyst presenting with Brown-Séquard syndrome -A Case Report-

SHIGEYOSHI SHIMURA, Ryu Saito, Takashi Yagi, Hideyuki Yoshioka, Hiroyuki Kinouchi

Department of Neurosurgery, University of Yamanashi

P-17. A case of subarachnoid hemorrhage due to ruptured multiple peripheral fusiform aneurysms associated with systemic lupus erythematosus

YUKI HIROSE, Ryota Murase, Koji Hashimoto, Hideyuki Yoshioka, Takuma Wakai, Toru Tateoka, Masakazu Ogiwara, Hiroyuki Kinouchi

University of Yamanashi

P-18. A case of posterior circulation tandem occlusion treated retrograde recanalization of a vertebral artery origin via collateral vessels, followed by thrombectomy of the basilar artery

KOHEI INAGAKI, Makoto Sakamoto, Syuntaro Sueyoshi, Tomohiro Hosoya, Tetsuji Uno, Masamichi Kurosaki

Faculty of Medicine, Tottori University

Wednesday, February 8, 2023 (The 9th International Mt. BANDAI Symposium for Neuroscience DAY1)

8:00 a.m. - 8:40 a.m. Sponsored Seminar: MedicaLine
Moderator: Akinori Kondo (*Shiroyama Hospital*)

20-1. FOREVER HEALTHY: FINDING LONGIVITY AND STRENGHT IN OUR LIVES.

JOHN TEW

UC Health and UC College of Medicine

20-2. With Corona and Beyond:
Let's predict and create Future world & healthcare

JUNJI BERNARD MACHI

University of Hawaii

8:40 a.m. - 9:40 a.m. Moyamoya Disease 1: Moyamoya Disease in Hawaii State
Moderators: Takanori Fukushima (*Duke University*)
Shinichi Numazawa (*Tokyo General Hospital*)

21-1. A Vascular Neurologist Perspective, A Cardiologist Perspective, Filipino Moyamoya in Hawaii

MELVIN WONG, Raymond Taniguchi, David Lee, Jonathan Zhang, Ferdinand Hui, Jon Graham, Allyson Kuwana, Celia Chang, Takanori Fukushima

University of Hawaii

9:40 a.m. - 10:00 a.m. Keynote Lecture ①: Moyamoya Disease
Moderator: Shinichi Numazawa (*Tokyo General Hospital*)

22-1. Techniques and Results of STA Microbypass and EDAGS

ALI ZOMORODI

Duke University

10:00 a.m. - 10:20 a.m. Keynote Lecture ②: Moyamoya Disease
Moderator: Takanori Fukushima (*Duke University*)

23-1. Revascularization for Moyamoya Disease : Results in Personal series of 110 surgical cases.

SHINICHI NUMAZAWA[1)], Sadayoshi Watanabe[1)],Yasunobu Itoh[1)], Kentaro Mori[1)], Jun Sakai[1)], Hirotaka Yoshida[1)], Ryo Kitagawa[1)], Isao Akatsu[1)], Tomoko Otomo[1)], Isao Yamada[1)], Kouta Yamakawa[1)], Awfa Aktham[1)], Kazuo Watanabe[2)]

[1)] *Tokyo General Hospital, Neurosurgery*

[2)] *Southern Tohoku General Hospital Neurosurgery*

10:20 a.m. - 10:40 a.m. Keynote Lecture ③
Moderator: Shinsuke Irie (*Hokkaido Ohno Memorial Hospital*)

24-1. Four Years Private Practice Management of Moyamoya Surgical Revascularization

BRANDON BURNSED, Andrey Belayev, Russell Margraf, Takanori Fukushima

Raleigh Neurosurgical Clinic

10:40 a.m. - 11:00 a.m. Keynote Lecture ④: Dementia
Moderator: Shinsuke Irie (*Hokkaido Ohno Memorial Hospital*)

25-1. Aging deceleration as the way to prevent dementia

KAZUO HASHI

Shinsapporo Neurosurgical Hospital

11:00 a.m. - 11:20 a.m. Keynote Lecture ⑤ : **Rehabilitation**
Moderator: Shinsuke Irie (*Hokkaido Ohno Memorial Hospital*)

26-1. Physiatrist and registered therapist operating acute rehabilitation (PROr) improves activities of daily living and home-discharge rate in patients with stroke.

FUMIHIRO TAJIMA, Tokio Kinoshita, Takeshi Nakamura, Takamasa Hashizaki, Daisuke Kojima, Makoto Kawanishi, Hiroyasu Uenishi, Hideki Arakawa, Takahiro Ogawa, Yoshi-Ichiro Kamijo, Takashi Kawasaki, Tatsuya Yoshikawa, Sven P Hoekstra, Yukihide Nishimura

Wakayama Medical University

11:20 a.m. - 11:30 a.m. Spine & Peripheral Nerve
Moderator: Hiroshi Nakagawa (*Kushiro Kojinkai Memorial Hospital*)

27-1. Evolution in management of Hangmans fracture : From C2 Pedicle alignment to C2 pedicle reformation

PANKAJ KUMAR SINGH, Sarat P Chandra, Shashank Sharad Kale

AIIMS, NEW DELHI

11:30 a.m. - 11:50 a.m. Keynote Lecture ⑥
Moderator: Hiroshi Nakagawa (*Kushiro Kojinkai Memorial Hospital*)

28-1. 1) Nerve transfers for axillary nerve repair in brachial plexus injury: results of 206 adult patients

2) Risk factors for obstetrical brachial plexus palsy: can we predict the failure of spontaneous reinnervation?

3) Surgical treatment of obstetrical brachial plexus palsy

LIBOR MENCL, Pavel Haninec, Petr Waldauf

3rd Faculty of Medicine, Charles University Prague

11:50 a.m. - 12:10 p.m. Keynote Lecture ⑦
Moderator: Hiroshi Nakagawa (*Kushiro Kojinkai Memorial Hospital*)

29-1. LIMITED EXTREME LATERAL INFRAJUGULAR TRANSCONDYLAR TRANSTUBERCULAR EXPOSURE (ELITE) FOR THE MICROSURGICAL MANAGEMENT OF C1-C2 SCHWANNOMA.

LUCIANO MASTRONARDI, Francesco Corrivetti, Guglielmo Cacciotti, Flavia Fraschetti, Carlo Giscobbo Scavo, Ettore Carpineta, Fabio Boccacci, Raffaelino Roperto

Department of Neurosurgery, San Filippo Neri Hospital/ASLRoma1

12:10 p.m. - 12:30 p.m. Keynote Lecture ⑧ : Smart Operation Room
Moderator: Takanori Fukushima (*Duke University*)

30-1. Smart Cyber Operating Theater (SCOT) for Information-guided Neurosurgery

YOSHIHIRO MURAGAKI[1,2,3)], Takakazu Kawamata[3)], Ken Masamune[2)]

Professor of Center for Advanced Medical Engineering Research and Development (CAMED)[1)], Kobe University, Visiting Professor of Faculty of Advanced Techno-Surgery (FATS)[2)], and Department of Neurosurgery[3)], Tokyo Women's Medical University (TWMU)

12:30 p.m. - 13:30 p.m. Special Seminar (in Japanese)
Moderator: Takanori Fukushima (*Duke University*)

Wealth Management with US dollars in Honolulu

Hirai and Utsugi

Central Pacific Bank, Honolulu

Gren Michel

APS Investments, Los Angeles

Daniel Bennett

APS Investments, Los Angeles

Hiro Isogawa

International Accountant

Thursday, February 9, 2023 (The 9th International Mt. BANDAI Symposium for Neuroscience DAY2)

8:00 a.m. - 8:50 a.m. Cerebrovascular Disease
Moderators: Motoki Inaji (*Tokyo Medical and Dental University*)
Taketo Kataoka (*Hokkaido Ohno Memorial Hospital*)

31-1. chronic capsulated expanding hematomas after Gamma Knife radiosurgery for intracerebral arteriovenous malformations: report of 3 cases treated by surgical resection

AKINORI ONUKI

Southern TOHOKU Research Institute for Neuroscience

31-2. Endoscopic intraventriclar hematoma evacuation can decrease the duration of drainage

KEI ITO, Shin Hirota, Ryosuke Sakai, Keitaro Chiba, Shota Takahashi, Juri Kiyokawa, Masataka Yoshimura, Shinji Yamamoto

Tsuchiura Kyodo Hospital

31-3. Endovascular Treatment of Internal carotid artery aneurysms less than 15mm using the Pipeline Embolization Device with Shield Technology.

TAKETO KATAOKA, Shinsuke Irie, Kazuki Takahira, Noro Shouhei, Yuzo Terakawa, Koji Saito

Hokkaido Ohno Memorial Hospital

31-4. Intracerebral transplantation of autologous bone marrow stem cell (BMSC) for subacute ischemic stroke, phase 1 clinical trial (RAINBOW trial)

MASAHITO KAWABORI, Miki Fujimura

Hokkaido University

31-5. A case of MCA occlusion that was refractory to thrombectomy and performed emergency STA-MCA bypas

YUTO SUZUKI[1)], Takahiro Yamauchi[1)], Osamu Saitoh[1)], Tohru Inagaki[1)], Shinsuke Irie[2)]

[1)] *Kushiro Kojinkai Memorial Hospital*

[2)] *Hokkaido Ohno Memorial Hospital*

8:50 a.m. - 9:10 a.m. Keynote Lecture ⑨ : AVM
Moderator: Hirotoshi Sano (*Shinkawabashi Hospital*)

32-1. AVM surgery using intra-arterial ICG videoangiography in hybrid operating room

YASUSHI TAKAGI

Department of Neurosurgery, Tokushima University

9:10 a.m. - 9:30 a.m. Keynote Lecture ⑩
Moderator: Takanori Fukushima (*Duke University*)

33-1. Current Management of Cerebral Aneurysms Clipping Surgery or Endovascular Repair. Duke 10 years Experience

ALI ZOMORODI

Duke University

9:30 a.m. - 9:50 a.m. Master's Lecture ① : Cerebral Aneurysm clipping
Moderator: Takanori Fukushima (*Duke University*)

34-1. 30years Experience of Non-ruptured Aneurysm clipping surgery in Kushiro Area

SHINSUKE IRIE[1)], Koji Saito[2)], Toru Inagaki[2)], Osamu Saito[2)]

[1)] *Hokkaido Ohno Memorial Hospital*

[2)] *Kushiro Kojinkai Memorial Hospital*

9:50 a.m. - 10:10 a.m. Master's Lecture ② : Cerebral Aneurysm Clipping
Moderator: Takanori Fukushima (*Duke University*)

35-1. Esoterica of Aneurysm Surgery

HIROTOSHI SANO

Shinkawabashi Hospital

10:10 a.m. - 10:30 a.m. Keynote Lecture ⑪ : Exoscope
Moderator: Shunsuke Satoh (*Southern TOHOKU Research Institute for Neuroscience, Southern TOHOKU General Hospital*)

36-1. Our experiences of neurosurgical operation using exoscope (ORBEYE)

TAKETOSHI MAEHARA, Motoki Inaji, Takashi Sugawara, Hiroto Yamaoka, Yoji Tanaka

Department of Neurosurgery, Tokyo Medical and Dental University

10:30 a.m. - 10:50 a.m. Keynote Lecture ⑫ : MVD
Moderator: Kikuo Ohno (*Yushima Clinic*)

37-1. Operative results of MVD for HFS and TN over the past 5 years

RYAN MILLAR, Russell Margraf, Lori Radcliffe, Takanori Fukushima

Raleigh Neurosurgical Clinic

10:50 a.m. - 11:10 a.m. Keynote Lecture ⑬ : MVD
Moderator: Kikuo Ohno (*Yushima Clinic*)

38-1. A Novel Approach to Microvascular Decompression for Hemifacial Spasm: The Shelter Method and Associated Outcomes

SHINJI NAGAHIRO[1)], Yoshifumi Mizobuchi[2)]

[1)] *Department of Neurosurgery, Yoshinogawa Hospital*

[2)] *Department of Neurosurgery, Kochi Red Cross Hospital*

11:10 a.m. - 11:30 a.m. Keynote Lecture ⑭ : MVD
Moderator: Kikuo Ohno (*Yushima Clinic*)

39-1. Standardized analysis of the patient satisfaction after trigeminal neuralgia surgery

AKINORI KONDO, Hiroshi Shimano, Souichiro Yasuda, Kouji Takeuchi, Takashi Yoneda, Kousuke Miyake

Shiroyama Hospital

11:30 a.m. - 12:00 p.m. Moyamoya Disease 2
Moderator: Taketoshi Maehara (*Tokyo Medical and Dental University*)

40-1. Peri-surgical outcomes of combined revascularization surgery for moyamoya disease with MR-first diagnostic protocol

TOMOHIRO OKUYAMA[1)], Masahito Kawabori[1)], Masaki Ito[1)], Taku Sugiyama[1)], Ken Kazumata[2)], Miki Fujimura[1)]
[1)] *Department of Neurosurgery, Hokkaido University Graduate School of Medicine*
[2)] *Department of Neurosurgery, Hokkaido Medical Center*

40-2. Chronological Volume Changes of the Temporal Muscle Pedicle Used for Encephalo-Myo-Synangiosis after Combined Revascularization for Moyamoya Disease

MAKOTO MIZUSHIMA[1)], Masaki Ito[1)], Noriyuki Fujima[2)], Haruto Uchino[1)], Taku Sugiyama[1)], Miki Fujimura[1)]
[1)] *Department of Neurosurgery, Hokkaido University Graduate School of Medicine*
[2)] *Department of Diagnostic and Interventional Radiology, Hokkaido University Hospital*

40-3. Encephalo-duro-pericranio-synangiosis for the treatment of moyamoya disease with posterior cerebral artery lesions

MOTOKI INAJI, Motoshige Yamashina, Shoko hara, Yoji Tanaka, Tadashi Nariai, Taketoshi Maehara
Tokyo Medical and Dental University

12:00 p.m. - 12:30 p.m. Others
Moderator: Hiromi Goto (*Southern TOHOKU Research Institute for Neuroscience*)

41-1. Dural closure using inlay fascial graft may be useful to prevent cerebrospinal fluid leak following the key hole surgery of the posterior fossa

YUZO TERAKAWA, Shinsuke Irie, Kazuki Takahira, Shohei Noro, Taketo Kataoka, Koji Saito
Hokkaido Ohno Memorial Hospital

41-2. Stereotactic electroencephalography with O-arm and Leksell Vantage Stereotactic System

MOTOKI INAJI[1)], Satoshi Kaneko[1)], Kazutaka Kobayashi[2)], Taketoshi Maehara[1)]
[1)] *Tokyo Medical and Dental University*
[2)] *Tanaka Neurosurgical Hospital*

41-3. Post Covid Neurosurgical Practice Modifications

MYRIAM THYS
Grand Hopital de Charleroi

12:30 p.m. - 13:30 p.m. Special Seminar (in Japanese)
Moderator: Takanori Fukushima (*Duke University*)

Wealth Management with US dollars in Honolulu

Hirai and Utsugi
Central Pacific Bank, Honolulu

Gren Michel
APS Investments, Los Angeles

Daniel Bennett
APS Investments, Los Angeles

Hiro Isogawa
International Accountant

Friday, February 10, 2023 (The 9th International Mt. BANDAI Symposium for Neuroscience DAY3)

8:00 a.m. - 8:20 a.m. Master's Lecture ③
Moderator: Takanori Fukushima (*Duke University*)

42-1. Surgery for jugular foramen tumors

MICHIHIRO KOHNO

Tokyo Medical University

8:20 a.m. - 8:40 a.m. Master's Lecture ④ : Acoustic Neurinoma
Moderator: Takanori Fukushima (*Duke University*)

43-1. Microsurgery of Koos Grade I-II Vestibular Schwannomas: A Case Series Of 100 Consecutive Patients and Technical Video.

LUCIANO MASTRONARDI, Alberto Campione, Fabio Boccacci, Guglielmo Cacciotti, Ettore Carpineta, Carlo Giacobbo Scavo, Raffaelino Roperto, Giovanni Stati, Amer Alomari

Department of Neurosurgery, San Filippo Neri Hospital/ASLRoma1

8:40 a.m. - 9:00 a.m. Master's Lecture ⑤ : Acoustic Neurinoma
Moderator: Takanori Fukushima (*Duke University*)

44-1. Vestibular schwannoma surgery - monitoring, dissection and hemostasis -

MICHIHIRO KOHNO

Department of Neurosurgery, Tokyo Medical University

9:00 a.m. - 9:20 a.m. Honored Guest Special Lecture ①
Moderator: Michihiro Kohno (*Tokyo Medical University*)

45-1. Removal of large vestibular schwannomas (VS) by retrosigmoid approach: results of a cumulative series and criticism of "planned" partial resection followed by SRS

MARTIN SAMES[1)], Luciano Mastronardi[2)]

[1)] *Masaryk Hospital, University J.E.Purkinje*

[2)] *San Filippo Neri Hospital, Neurosurgery*

9:20 a.m. - 9:40 a.m. Honored Guest Special Lecture ②
Moderator: Kazuo Hashi (*Shinsapporo Neurosurgical Hospital*)

46-1. Extent of resection for meningiomas: Copenhagen grading

MATHIESEN TIIT, Jeppe Haslund Vinding, Andrea Maier, Bjarne Winther Kristensen, David Scheie, Ian Law

University Hospital of Copenhagen

9:40 a.m. - 10:00 a.m. Master's Lecture ⑥
Moderator: Yuzo Terakawa (*Hokkaido Ohno Memorial Hospital*)

47-1. Surgical Management of Large and Giant Craniopharyngiomas in Children

MICHAEL LEVY, Michael Brandel, Rob Rennert

Rady Children's Hospital of San Diego - UCSD

10:00 a.m. - 10:15 a.m. Keynote Lecture ⑮

Moderator: Yuzo Terakawa (*Hokkaido Ohno Memorial Hospital*)

48-1. Neurosurgical management of petrous bone lesions: classification system and selection of surgical approaches

UDOM BAWORNVARAPORN[1)], Ali R. Zomorodi[2)], Allan H. Friedman[2)], Takanori Fukushima[2)]

[1)] *Chulalongkorn university and King Chulalongkorn Memorial hospital*

[2)] *Duke University Medical Center*

10:15 a.m. - 11:35 a.m. Brain Tumor

Moderators: Jun Sakai (*General Tokyo Hospital*)

Shin-ichi Miyatake (*Osaka Medical and Pharmaceutical University*)

49-1. Primary Intraosseous Cavernous Hemangioma of the Clivus: Case Report and Review of the Literature

YUTA KOBAYASHI[1)], Daichi Fujimori[1)], Shunsuke Satoh[1)], Hiromi Goto[1)], Kazuo Watanabe[1)], Noriaki Tomura[2)]

[1)] *Department of Neurosurgery, Southern Tohoku General Hospital*

[2)] *Department of Neuroradiology, Southern Tohoku General Hospital*

49-2. A case of choroid plexus carcinoma in adult

TAKAHIRO YAMAUCHI[1)], Yuuto Suzuki[1)], Manabu Sumiyoshi[1)], Toshiyuki Okazaki[1)], Osamu Saito[1)], Toru Inagaki[1)], Yuuzo Terakawa[2)], Shinsuke Irie[2)], Koji Saito[1)]

[1)] *Kushiro Kojinkai Memorial Hospital*

[2)] *Hokkaido Ohno Memorial Hospital*

49-3. Meningitis and secondary hydrocephaly as presenting symptoms for olfactory groove meningioma invading bone: case report

MYRIAM THYS, Denis Glorieux, Marc Gobert, Dan Gusu

Grand Hopital de Charleroi

49-4. Long-term surgical outcome of the skull base meningioma. The role of post-operative radiotherapy

HIROMI GOTO, Shunsuke Satoh, Yasuhiro Kikuchi, Kazuo Watanabe

Department of Neurosurgery, Southern TOHOKU Research Institute for Neuroscience

49-5. A phase II clinical trial using accelerator-based BNCT system for refractory recurrent high-grade meningioma

SHIN-ICHI MIYATAKE[1,2)], Masahiko Wanibuchi[1,2)], Shinji Kawabata[1)], Motomasa Furuse[1)], Naosuke Nonoguchi[1)], Koji Ono[2)]

[1)] *Osaka Medical and Pharmaceutical University, Department of Neurosurgery*

[2)] *Osaka Medical and Pharmaceutical University, Kansai BNCT Medical Center*

49-6. Mid-frontal Interhemispheric Precallosal Approach for Third Ventricle Tumors

JUN SAKAI[1)], Shinichi Numasawa[1)], Yasunobu Ito[1)], Sadayoshi Watanabe[1)], Takanori Fukushima[2)]

[1)] *Tokyo General Hospital,*

[2)] *Department of Neurosurgery, Duke University*

49-7. Extra wide sphenoidotomy for transnasal skull base surgery

HIROAKI MOTEGI, Shigeru Yamaguchi, Sogo Oki, Ryosuke Sawaya, Michinari Okamoto, Sumire Echizenya, Yukitomo Ishi, Miki Fujimura

Hokkaido University

49-8. Variation of the surgical approaches for orbital tumors

SHUNSUKE SATOH, Hiromi Goto, Kazuo Watanabe

Southern TOHOKU Research Institute for Neuroscience, Southern TOHOKU General Hospital

11:35 a.m. - 11: 40 a.m. Closing Remarks

Poster

P1. Superficial Siderosis of the central nervous system secondary to Capillary Hemangioma of the cauda equina: a case report

TOMOHIRO MURAKAMI[1)], Kazuki Takahira[2)], Hitoshi Hayase[1)], Takahisa Kaneko[1)], Hiroshi Nakagawa[3)], Koji Saito[3)]

[1)] *Department of Neurospinal surgery, Hokkaido Ohno Memorial Hospital*

[2)] *Department of Neurosurgery, Hokkaido Ohno Memorial Hospital*

[3)] *Department of Neurosurgery, Kushiro Kojinkai Memorial Hospital*

P2. A case of delayed cerebral infarction in the posterior circulation region after a Distractive Flexion injury

SHINJI KUMAMOTO

Fukuoka Kinen Hospital

P3. Pathological considerations of chronic expanding hematomas after stereotactic radiosurgery for cerebral arteriovenous malformations

SONOMI SATO[1)], Yasuhiro Kikuchi[2)], Zenichiro Watanabe[2)], Kazuo Watanabe[2)]

[1)] *Southern TOHOKU Fukushima Hospital*

[2)] *Southern TOHOKU General Hospital*

P4. Treatment of giant unruptured aneurysm on cavernous part of the internal carotid artery by direct puncture of the dissected common carotid artery

MASAYUKI MORIKAWA, Akari Machida, Tetsuya Nagayama

Medical Corporation Jifukai Atsuchi Neurosurgical Hospital

P5. Clinical experience of intravenous clazosentan in preventing cerebral vasospasmafter aneurysmal subarachnoid hemorrhage in our institution

MASAHIRO SHIMIZU, Nobuo Senbokuya

Kanto Neurological Hospital

P6. Dural Arteriovenous Fistula Involving the Inferior Petroclival Vein Treated by Transvenous Embolization: A Case Report

TOMOKI FUCHIZAKI, Yasuyuki Tatsuta, Tatsuya Ogino, Hideki Endo, Suguru Sakurai, Kohei Ishikawa, Tomoaki Ishiduka, Kenji Kamiyama, Toshiaki Osato, Hirohiko Nakamura

Nakamura Memorial Hospital

P7. Three-fraction stereotactic radiotherapy with Cyberknife for eloquent arteriovenous malformations

YASUHIRO KIKUCHI, Sonomi Sato, Masahiro Oinuma, Kazuomi Horiuchi, Ryoji Munakata, Zenichiro Watanabe, Takashi Yoshimoto, Kazuo Watanabe

Southern Tohoku General Hospital

P8. Prevention of late vasospasm after subarachnoid hemorrhage (SAH) Now and in the future, based on our experience

ZENICHIRO WATANABE, Rikiya Kameno, Akinori Oonuki, Ryouji Munakata, Kazuomi Horiuchi, Masahiro Oinuma, Kazuo Watanabe

Southern TOHOKU Research Institute for Neuroscience Southern TOHOKU General Hospital

Guest Speakers

Honored Guest

Martin Sames, MD, PhD

Professor and Chairman of the Department of Neurosurgery Masaryk Hospital, University J.E.Purkinje, Usti nad Labem, Czech Republic

Clinical work:

■ Neurovascular program

■ Skull base program

Editorial positions:

Editorial Board of Czech and Slovak Neurology and Neurosurgery

Advisory Board Journal of Neurological Surgery

Editorial Board Acta Neurochirurgica

Publications with IF 140 papers, publications 40 articles, monographs and books 10, invited speaker 165 lectures, 510 abstracts and posters

PubMed Publications: https://pubmed.ncbi.nlm.nih.gov/?term=Sames%20M

WoS Researcher ID: https://app.webofknowledge.com/author/record/425249,41125751

SCOPUS https://www.scopus.com/authid/detail.uri?authorId=55889540300

Membership:

President of the Czech Neurosurgical Society (2014 – 2018, 2022-now)

European Association of Neurosurgical Societies (EANS)–member of Training Committee, Vascular Section,

WFNS Skull Base Surgery Committee (Education Center Class“A”)

WFNS Cerebrovascular Disease Therapy Committee

Honored Guest

Tiit Mathiesen, MD, PhD

Tiit Mathiesen is professor and academic chair at the department of Neurosurgery at Rigshospitalet and University of Copenhagen in Copenhagen, Denmark and editor-in-chief for Acta Neurochirurgica. He studied medicine at Karolinska Institute, and philosophy at the University of Stockholm. He received neurosurgical training at Karolinska, defended his thesis on neuroimmunology in 1988 subspecialized in cranial base surgery, vascular, meningiomas and third ventricle tumors.

Tiit Mathiesen has been internationally active and previously been chairman and professor of Neurosurgery at Karolinska Hospital and in charge of neurosurgical training for the Swedish Neurosurgical Society. He is now chairman of the board of the Danish Society for Neuroscience and chairman of the WFNS ethics committee.

Tiit Mathiesen's research focuses on meningiomas, subarachnoid hemorrhage and inflammation. As academic chair of Neurosurgery in Copenhagen, he has developed a research strategy based on personalized management of neurosurgical patients and founded the Personalized neurosurgery research center (PERNS). Tiit Mathiesen has authored approximately 190 original publications with 9700 citations and has an h-index of 52.

Honored Guest

Luciano Mastronardi, MD, PhD (Roma, 28th March 1960)

CURRICULUM VITAE

1. Degree in Medicine and Surgery, University Sapienza, Roma (1985)
2. Specialization in Neurosurgery, University Sapienza, Roma (1990)
3. European Abilitation (Board certificate) in Neurosurgery (1995)
4. Philosophy Doctor in Neurosurgery, University Sapienza, Roma (1996)
5. Associate Professor of Neurosurgery National Eligibility (2017)
6. Actual Position (Since July 2010): Chief of Neurosurgery and (since June 2017): Head of Department of Surgical Specialties, "San Filippo Neri" Hospital - ASL Roma1, Roma, Italy
   Actual International Academic Position (since September 2019): Professor of the Department of Neurosurgery, Institute of Clinical Medicine, Sechenov Moscow First Medical State University, Ministry of Health of Russian Federation
7. Surgical Experience: >4100 surgical procedures. Fields of interest: acoustic neuroma and skull base surgery, microsurgery of brain tumors (including intraoperative MRI, tractography, neuronavigation), MVD, for trigeminal neuralgia/hemifacial spasm, cerebrovascular, complex spine surgery (degenerative, trauma, tumors).
8. National teachings: A. 2004-2010: Professor of Neurosurgical Techniques, Residency Program in Neurosurgery, Univ. of Roma "La Sapienza"; B. 2009-2011: Professor in the National Master of advanced surgical techniques in Microneurosurgery, Univ. of Torino; C. 2010-2011: Professor of Microsurgery of Anterior Skull Base, Residency School of Neurosurgery, Univ. of Roma Tor Vergata 2010-2013;
9. International teachings: Since 2003, Director and Teacher of more than 50 International cadaver hands-on dissection courses of Microneurosurgery, Skull-base (www.friends-surgicalcourses. com, www.inerf.org) and Spine
10. Since January 2017, the Unit Neurosurgery of San Filippo Neri Hospital/ASLRoma1 is included in the European Association of NeuroSurgery (EANS) Fellowship Program, hosting fellows from all over the world
11. Co-Founder of the FRIENDS Foundation (www.friends-surgicalcourses.com), international Foundation active in teaching in Italy, Europe, China, and Russia mainly by hands-on cadaver dissection courses on Cerebral Microneurosurgery and Skull Base Surgical Anatomy.
12. Scientific Activity: Co-author of 530 scientific papers, including 10 books and 159 articles in journals, 135 indexed on Medline (www.ncbi.nlm.nih.gov/PubMed/ digit: Mastronardi L). Total H-index = 33 (on Google Scholar) and 28 (on Scopus). In addition, >250 Lectures in National and International Meetings and Courses and 2491 citations (Scopus) on scientific journals.
13. Executive Board Member (since 2021) of the International Academy of Neurosurgical Anatomy (IANA); Presidents: Imad Kanaan and Vladimir Benes.
14. Member of the Board of Directors (2021-2023) of the Society of Hospital Neurosciences (Società delle Neuroscienze Ospedaliere = SNO)
15. Active Member of National & International Scientific Societies: EANS, AANS, CNS, SNO, SINch.
16. International Research Groups Co-Direction and Membership: 1) Russian-Italian International Research and Educational Group on Skull Base Surgery; 2) INERF (www.inerf.org); 3) International Research Group on MVD for the surgical treatment of Typical Trigeminal Neuralgia; 4) International Translational Research Group on Glioblastoma; 5) Member of the Scientific Committee of ICLO teaching and research anatomical laboratories (www.iclo.eu).
17. Editorial Activity: Referee of international journals of Neurosurgery (World Neurosurgery, Acta Neurochirurgica, Neurosurgical Review, INAT, Spine, and others)
18. Awards: National and International (AANS) Awards for researches on cerebral tumors and cervical spine surgery and technology.
19. Websites: www.neurologiachirurgica.it - www.inerf.org - www.friends-surgicalcourses.com
20. Linkedin: www.linkedin.com/in/luciano-mastronardi-4086b9198/
21. Twitter: @mastronardi_ns

Opening Ceremony

Raymond Taniguchi

Welcome!

Because of the pandemic it has been five years since our last meeting here and we are thrilled to have you back in Hawaii. Almost three decades ago our charismatic and energetic leader Taka Fukushima conceived of this conference and we had our inception in 1995 with the first meeting on the island of Lanai. Subsequently we have met on Maui and the Big Island of Hawaii with great success. We have had 125-250 participants in past conventions with prominent figures such as Drs. Spetzler, Samii, Apfelbaum, Fukushima and others. These speakers came from over 25 countries throughout the world including Europe, Asia, North America and even Ukraine. To carry out this tremendous undertaking we must not forget the generosity and continued financial support of the genius Dr. Kazuo Watanabe whose resourcefulness and assistance have been imperative in the continuation of the Mt. Bandai/PPNC conference. I'd like to also acknowledge the contribution of the Japan Brain Foundation and the International Neurosurgical Education Foundation.

We pride ourselves in carrying out this fantastic meeting way out in the Pacific in a less than formal setting of the big national meetings away from the cold in most other countries at this time of the year. Here is a chance to reacquaint yourselves with old friends and hopefully spend more time with the family.

Presidents Mizuno (PPNC) and Irie (Mt. Bandai) and their respective committees have worked very hard to put together this Joint Neurosurgical Convention and so without further adieu let's go on with the show!

I herewith declare the 10th Session of the Joint Neurosurgical Convention to be in session!

Michael Levy

Medical School: UC San Francisco School of Medicine
Residency: USC School of Medicine, Department Neurosurgery
Fellowship: Pediatric Neurological Surgery USC School of Medicine
Graduate School: USC School of Medicine Department of Biophysics.
Professor of Neurosurgery, Level VI, UCSD Department of Neurological Surgery, Division of Pediatric Neurological Surgery.
Residency Program Director, UCSD, Division of Pediatric Neurosurgery
Member, Editorial Advisory board for Neurosurgery, Journal of Health Communications, and Journal of Neurosurgery Focus
Past President, Society of University Neurosurgeons, 2016
Peer Review Publications 495, Presentations 527, Books 8

Master's Lecture⑥

47-1 Surgical Management of Large and Giant Craniopharyngiomas in Children

MICHAEL LEVY, Michael Brandel, Rob Rennert

Rady Children's Hospital of San Diego - UCSD

Introduction:
Despite benign histology, pediatric craniopharyngiomas are challenging to manage and associated with hypopituitarism, hypothalamic dysfunction, and cognitive/behavioral changes. This is particularly true for larger craniopharyngiomas.

Objective:
We present our institutional approach with the nuances of selecting a surgical approach, goal of GTR, minimizing radiation, and techniques to preserve hypothalamic function in patients with large and giant craniopharyngiomas.

Methods:
Retrospective institutional study of craniopharyngioma patients age ≤ 18 years between 2002-2021. Tumor size was defined as large (>2 cm) or giant (>5 cm).

Results:
38 pediatric craniopharyngioma patients met inclusion criteria (14 giant, 24 large). Mean age was 8.7 years and 42% were female. Patients presented with headache (62%), vision changes (59%), nausea/vomiting (43%), and pituitary dysfunction (14%). All histology was adamantinomatous, 34% of tumors extended into the third ventricle, and 50% of patients had hydrocephalus.

For large tumors, surgical approach was 46% transsphenoidal and 54% transcranial (e.g. orbitozygomatic craniotomy). For giant tumors, approach was 21% transsphenoidal and 79% transcranial. Gross-total or near-total resection was achieved in 97.4% of patients.

Median follow-up was 62 months. Complication rate was 18%, including a 5% rate of cerebrospinal fluid leak. Panhypopituitarism occurred in 84%. Forty-six percent were overweight or obese preoperatively; 54% were obese postoperatively. Forty-two percent of patients experienced progression (recurrence or growth of residual), and 32% underwent reoperation. Five-year progression-free survival was 61%, 12% received adjuvant radiation, and only 16% of patients required shunt placement. One patient had asymptomatic recurrence 108 months after GTR, detected on surveillance MRI.

Conclusion:
Preservation of hypothalamic function is key amongst the goals in craniopharyngioma treatment. The hypothalamus is exquisitely radiosensitive in children. Therefore, we favor maximal surgical resection involving careful dissection and variable suction to respect the tumor-hypothalamus interface. GTR may also reduce the need for shunt placement. Long-term surveillance is necessary to detect recurrence.

Brandon Burnsed, MD, FAANS

Raleigh Neurosurgical Clinic, Raleigh, NC, United States
5838 Six Forks Rd, Raleigh, NC 27609, Ste. 100

Education/Experience:
BS, Georgia Southern University (2004); *MD* Mercer University School of Medicine (2010); *Neurosurgery Residency*, University of Mississippi Medical Center (2010); *Dual Cerebrovascular Fellowship*, University of Tennessee / Semmes-Murphey Clinic (2018); *Practice*, Raleigh Neurosurgical Clinic (Present)

Certification/Licensure:
Mississippi State Board of Medical Licensure (2010), American Board of Neurological Surgeons *Board Eligible* (2016), Tennessee State Board of Medical Licensure (2018), North Carolina State Board of Medical Licensure (2018), American Board of Neurological Surgeons *Board Certification* (2021)

Member/Faculty:
American Association of Neurological Surgeons, Faculty; Congress of Neurological Surgeons

Interests:
Neurovascular Surgery (Cranial/Spinal/Endovascular), MIS Degenerative Spine, Trauma, Peripheral Nerve

Keynote Lecture③

24-1 Four Years Private Practice Management of Moyamoya Surgical Revascularization

BRANDON BURNSED, Andrey Belayev, Russell Margraf, Takanori Fukushima

Raleigh Neurosurgical Clinic

Background:
Moyamoya revascularization surgical sub-specialization techniques implemented in a private practice model piloted under the mentorship of Dr. Fukushima.

Objectives:
Surgical management of moyamoya disease includes a varying range of technical revascularization nuances typically applied within academic/training centers with fellows and residents. Through direct supervision on revascularization cases of moyamoya patients, the superficial temporal artery – middle cerebral artery (STA-MCA) with encephaloarterial galeal synangiosis (EAGAS) technique is feasible under the tutelage of a proficiently experienced, subspecialized cerebrovascular surgeon.

Methods:
4-year retrospective analysis of 14 cases applying Dr. Fukushima's (STA-MCA EAGAS) technique on revascularization of moyamoya disease.

Results:
Successful revascularization of 14 cases without complications.

Conclusions:
The STA-MCA EAGAS technique is an effective technique performed in the private practice setting under the guidance of a qualified cerebrovascular surgeon.

Ryan K. Millar

Summary of Qualifications:
-Proficient in operating room environment and sterile technique
-Proficient in evaluating and diagnosing neurosurgical conditions along with facilitating their corresponding treatments
-Extremely skilled at making time-sensitive decisions independently and as part of a medical team.
-Experience in emergency medical situations and able to perform well under stress while maintaining quality and effective patient care.
-Able to communicate information effectively and efficiently to fellow practitioners as well as the public; extensive experience in educating patients about the nature of their disease as well as appropriate care and treatment to prevent exacerbations and resulting readmissions.

Master of Physician Assistant Practice, July 2017
Campbell University, Buies Creek, North Carolina
Cumulative GPA: 3.73/4.0
Bachelor of Science in Biological Sciences, Cum Laude, December 2011
North Carolina State University (NCSU), Raleigh, North Carolina Cumulative GPA: 3.45/4.0 Post Bacc GPA: 3.90/4.0

Raleigh Neurosurgical Clinic
PA-C Raleigh, NC
August 2017-Present
First assist in neurosurgical procedures, brain and spine
Management of outpatient, inpatient, post-op patients, including intensive care
Prescribe appropriate medications to patients
Perform emergency procedures such as EVD, Bolt ICP monitor, SEPS drain placement
Place lumbar drains
Proficient in EPIC EMR

Keynote Lecture⑫: MVD

37-1 Operative results of MVD for HFS and TN over the past 5 years

RYAN MILLAR, Russell Margraf, Lori Radcliffe, Takanori Fukushima

Raleigh Neurosurgical Clinic

Since Dr. Fukushima joined Raleigh Neurosurgical Clinic (RNC) in 2018, as well as the use of intra-operative Leica microscopy allowing for face-to-face co-surgeon operations, Prof. Fukushima has been teaching and guiding the principles of skull-based surgery. RNC's attending faculty have been able to gain an enormous amount of technical skill regarding the treatment of aneurysms, brain tumors and microvascular decompressions (MVDs). This presentation will summarize the results of MVDs for HFS and TN by Dr. Fukushima's Keyhole Method over the past 5 years performed by RNC attendings: Drs. Margraf, Khoury, Burnsed and Belayev. Initial operative cure rate, follow up recurrence rate for Keyhole Method and results of re-operative cases from other institutions will be discussed as well.

Jacob A. Rodman, MBA, CMPE

Jacob is the Chief Executive Officer for Raleigh Neurosurgical Clinic, Inc, a group that was established in 1954. Jacob has over 20 years of management experience encompassing leadership positions at every level. He is a past president and board member for the North Carolina Medical Group Managers Association (NCMGMA). Jacob has held several leadership positions in his local Triangle chapter of MGMA (TMM) including Program Chair, President, and past President. Jacob has also served on several advisory committees and boards for United Healthcare of NC, BCBS of NC, the Town of Morrisville's budget office, Medical Mutual Insurance Company and the Wake Monarch Academy. Jacob is a board-certified medical practice executive by the American College of Medical Practice Executives (ACMPE). Jacob has presented both nationally and internationally on a variety of topics surrounding medical practice management and leadership. A native of Kentucky, Jacob attended the University of Kentucky and the State University of New York.

PPNC Guest Talk

7-1 Sustainable Steps to Survive as Private Practice in the US Healthcare System

JACOB RODMAN

Raleigh Neurosurgical Clinic, Inc.

Raleigh Neurosurgical Clinic, Inc. was founded by Dr. Leroy Allen in 1954. At the time, Raleigh was a town of 40,000 people and Dr. Allen wanted to provide neurosurgery in his hometown. He was told Raleigh was too small for a neurosurgeon since neurosurgery was available at both Duke University (23 miles away) and University of North Carolina (21 miles way). In the last 65 years, Raleigh Neurosurgical has grown to 17 doctors and covers the busiest trauma center in North Carolina and the 10th busiest in the United States.

Raleigh Neurosurgical Clinic has been on a mission to lower healthcare cost for its 35,000 patients it treats every year. Most recently the group has opened the only spine and pain focused ambulatory surgery center in North Carolina, in addition to opening the first office-based biplane suite in the United States. This focused effort has led to hundreds of thousands of dollars in saved healthcare cost for its patients in addition to providing a superior patient experience.

Raleigh Neurosurgical Clinic, Inc. has annual revenues of approximately $20,000,000. WakeMed has annual revenues of approximately $1.4 billion.

All of the above will be discussed during my presentation.

Robert L. Allen, M.D.

Education:

Wake Forest University
Winston-Salem, North Carolina
B.A., Biology, Magna Cum Laude, May 1975

Bowman Gray School of Medicine
Winston-Salem, North Carolina
M.D., May 1979

Intern in Surgery
Medical University of South Carolina
Charleston, South Carolina
July 1979 - June 1980

Chief Resident and Teaching Fellow in Neurosurgery
Medical University of South Carolina
Charleston, South Carolina
July 1983 - June 1985

Resident in Neurological Surgery
Medical University of South Carolina
Charleston, South Carolina
July 1980 - June 1985

Employment History:

Raleigh Neurosurgical Clinic, Inc.
Raleigh, North Carolina
July 1985 to present

Certification/ Licensure:

South Carolina: 1979-1985 #9858
North Carolina: 1982 to present #26076

Professional Societies:

North Carolina Medical Society 1985
Wake County Medical Society 1985
North Carolina Neurological Society May 1986
The Congress of Neurological Surgeons September 1986
American Association of Neurological Surgeons 1990
Southern Neurosurgical Society 1990

Publications:

Bibliography

1. Allen, R.L., Perot, P.L., Gudeman, S. D.: The evaluation of acute nonpenetrating cervical spinal cord injuries with CT metrizamide myelography. J. Neurosurgery 63: 510 520, 1985

2. Allen, R.L., Perot, P.L., Gudeman, S.D.: The use of somatosensory evoked potentials during closed reduction of cervical fracture-dislocations. (submitted for publication)

3. Biggs, J.B., Allen, R.L., Power, J.M.: Phaeohyphomycosis complicating compound skull fracture. Surgical Neurology 25: 393-396, 1986

Uwe Spetzger

Uwe Spetzger is the Chairman of the Department of Neurosurgery, Klinikum Karlsruhe (SKK) and active member of the Faculty of Computer Science, Humanoids and Intelligence Systems Lab, Institute for Anthropomatics and Robotic at the Karlsruhe Institute of Technology (KIT). Spetzger is 60 years old and received his medical degree 1989 at the Medical Faculty University of Heidelberg, Germany. He passed the US American medical exam (ECFMG) in 1990. He has started his neurosurgical training in 1990 at the Department of Neurosurgery Technical University (RWTH) Aachen and got his board certification of neurosurgeon 1996. In June 1999 he passed the European Examination in Neurosurgery (EANS). Prof. Spetzger is member of multiple national and international medical societies and the Past-President of the German Academy of Neurosurgery GANS. Spetzger was the CEO of the Klinikum Karlsruhe from 2019–2020. His main surgical and research interests are cerebrovascular-surgery, skull-base-surgery, computer-assisted and robotic surgery, neuronavigation and spinal microsurgery.

Masters Lecture 1

9-1 Intramedullary spinal cavernomas - microsurgical strategy and postoperative outcome

UWE SPETZGER[1,2)]

[1)] Klinikum Karlsruhe / Karlsruhe Institute of Technology, KIT
[2)] Karlsruhe Institute of Technology, KIT

Background: We detail the surgical strategy and the postoperative results of 33 patients (18 m / 15 f) with microsurgical treated symptomatic intramedullary spinal cavernomas.
Material/Methods: The spinal locations of the medullary cavernomas were: 20 cervical, 11 thoracic, 2 thoracolumbar. All 33 patients were symptomatic with signs of myelopathy and/or sensorimotor deficits, corresponding to the level of the lesion. In 16 patients a laminectomy or laminonotomy and in 17 patients a hemilaminectomy was performed to approach the lesion. Two patients were treated via an anterior spinal approach (1 cervical / 1 thoracic). All surgical procedures were performed under intraoperative electrophysiological monitoring.
Results: Direct postoperatively, a transient deterioration of pre-existing neurological deficits occur in 22 of our 33 patients (67%). However, only 3 patients (9%) remain with a permanent deterioration of the pre-existing neurological deficits. Long-term improvement of initial neurological deficits are found in 19 of 33 patients (58%). Strong predictors for the surgical morbidity were the size and location of the cavernoma and the grading of the pre-existing neurological deficits. The exact localization within the spinal cord and especially the contact to the surface of the medulla and therefore, the accessibility was crucial.
Conclusion: According to our current experience we summarize, that microsurgical treatment of intramedullary spinal cavernomas has an acceptable surgical morbidity. However, the postoperative outcome shows a long-term improvement of the clinical condition in the majority of cases. We conclude that microsurgical resection is the treatment of choice in symptomatic spinal medullary cavernomas. However, the microsurgical treatment of spinal cavernoma remains a subject for discussion.

Thomas K. Noh

Hospital / Clinic Affiliations
Kapiolani Medical Center for Women & Children
Pali Momi Medical Center
Straub Medical Center
Wilcox Medical Center

Education & Training
Medical School: University of Hawaii Foreign Languages: Korean Fellowships: Brigham & Womens Hospital - Image-Guided Neurosurgery

BIOGRAPHY & INTERESTS
Biography
Dr. Thomas Noh was born and raised in Honolulu, Hawaii. He attended the University of Washington and graduated from the undergraduate honors program in biology and psychology. He was selected to work in Dr. Richard Winn's neuroscience research lab, which inspired him to become a doctor.

While attending the University of Hawaii John A. Burns School of Medicine (JABSOM), he was awarded a prestigious neurosurgical research fellowship at Duke University. Dr. Noh then completed his neurosurgical residency at Henry Ford Hospital and additionally pursued a fellowship in tumor and image-guided surgery at Harvard's Brigham and Women's Hospital.

Dr. Noh has over 50 posters, presentations, and publications in peer-reviewed journals and textbooks. Prior to returning home to Hawaii to practice, he had 8 years of experience in complex cranial and spine surgery. He is currently an Adjunct Associate Professor at JABSOM.

Having undergone spine surgery himself, Dr. Noh's philosophy of care focuses on helping his patients navigate the surgical journey with his caring attentiveness and evidence-based precision.

When Dr. Noh isn't at work, he enjoys traveling to see friends, listening to podcasts, and spending time with his wife and daughter.

Professional Interests
Complex spine disorders, brain tumors, image-guided surgery, and laser interstitial thermal therapy.

Keynote Lecture 1

1-1 Considerations in Laser Interstitial Thermal Therapy and brain tumors

THOMAS NOH

Advanced Neurosurgery of Hawaii

Introduction:
Laser Interstitial Thermal Therapy (LITT) is a minimally invasive treatment modality for brain tumors. LITT has gained popularity as an adjunct in the treatment of lesions located adjacent to eloquent areas and deep seeded lesions.

Methods:
We review indications, advantages, disadvantages, intraoperative considerations as well as an in-depth case review.

Results:
LITT leads to shorter hospital stays, the ability to provide earlier adjuvant therapy, and can treat radiation necrosis. Its utility should be questioned with larger or irregular lesions, and potential artifact when combined with biopsy.

Discussion:
LITT is an effective tool for difficult to access malignant gliomas, radiosurgically resistant metastases, epileptogenic lesions and radiation necrosis. While it is not all encompassing, cases should be carefully chosen with the aforementioned considerations.

Melvin Wong
Vascular Neurologist, University of Hawaii John A. Burns School of Medicine

David Lee, FACC
Cardiologist, The Queen's Medical Center

Jonathan Zhang
Cerebrovascular and Endovascular Neurosurgeon, The Queen's Medical Center.

Moyamoya Disease 1: Moyamoya Disease in Hawaii State

21-1 A Vascular Neurologist Perspective, A Cardiologist Perspective, Filipino Moyamoya in Hawaii

MELVIN WONG, Raymond Taniguchi, David Lee, Jonathan Zhang, Ferdinand Hui, Jon Graham, Allyson Kuwana, Celia Chang, Takanori Fukushima

University of Hawaii

Moyamoya Disease (MMD), also known as spontaneous occlusion of the circle of Willis, is named for the Japanese expression meaning smoky or hazy like a puff of cigarette smoke in reference to the appearance of cerebral angiography depicting the characteristic network of dilated collateral vessels. MMD is a progressive cerebrovascular disorder characterized by stenoses of the internal carotid arteries, resulting in a vascular network of collateral vessels at the base of the brain. Due to the stenoses, patients with MMD suffer from decreased cerebral blood flow, which can often cause multiple transient ischemic attacks, ischemic strokes, intracranial hemorrhages, seizures, and headaches.
Although cases are reported most frequently in east Asian populations, primarily noted in patients of Japanese, Chinese, and Korean descent, MMD is well-documented around the world in people of various ethnic backgrounds. Hawaii has a unique population because many individuals have multiple mixed ethnicities including Japanese, Okinawan, Chinese, Korean, and Filipino. Incidence and prevalence of MMD are higher in Hawaii compared to the rest of the US, likely a result of the greater percentage of Hawaii residents with Asian ancestry, specifically Japanese. Hawaii also has a relatively high population of individuals of Polynesian ancestry such as Native Hawaiian, Samoan, and Tongan.
As a result, the diagnosis of MMD requires an extensive evaluation to rule out other causes of cerebrovascular disease. Moreover, as MMD patients are relatively young, they should have a “Stroke in Young Adult” workup to evaluate for unusual causes of stroke including coagulopathy and vasculitis. TIA/Stroke patients are often screened for cardiovascular risk factors and heart disease, and MMD may be associated with significant cardiovascular disease, which may impact the treatment of MMD.
Typical evaluation of MMD includes Neuroimaging with Head CT/CTA/CT perfusion, MRI/MRA with MR perfusion including Arterial Spin Labeling (ASL), SPECT with/without Acetazolamide (Diamox), and Cerebral Angiography. Treatment of MMD involves individualized strategies for medical management and neurosurgical revascularization.
MMD pathophysiology and genetics are not well understood, and there may be differences across various ethnic groups in the presentation of the disease. While registries for MMD in other countries such as Japan, China, South Korea, and Taiwan are available, they only contain data for their respective populations. The unique mixture of ethnic diversity in Hawaii and the high prevalence of MMD in Hawaii compared to the continental US population suggests a strong need for a Hawaii MMD database, so that the disease can be more readily and accurately identified and treated. A Hawaii MMD registry combined and compared with international registries should be able to characterize MMD across different ethnic groups and mixed ethnicities, thus allowing for a better understanding of the disease and implementation of the most effective clinical management plan.

Jon F Graham

Dr. Graham obtained his Bachelor of Science degree in Biochemistry at Michigan State University in East Lansing Michigan, with high honors, in 1974. He obtained his Doctorate degree in Medicine at Wayne State University in Detroit Michigan, with distinction, in 1978. He was elected to the Alpha Omega Alpha Honor Medical Society while at Wayne State. He did his internship and neurosurgical residency at Walter Reed Army Medical Center in Washington DC and neuro-oncology research at the national Institute of health in Bethesda Maryland, completing his neurosurgical training in 1984. Born in Wahiawa, Hawaii, he returned to the islands in 1984. He initially practiced at Tripler Army Medical Center, then Kaiser Medical Center, and has been in private practice at Queens Medical Center since 2000. Since then he has continued to serve the needs of the community on Oahu. As a firm believer in providing outreach services to outer island communities with a shortage of neurosurgical care, Dr. Graham travels to the Big Island (Hawaii Island), where he also performs surgery, and more recently to Maui.

As a member of the American Association of neurological surgeons, Congress of neurological surgeons, American Medical Association, Hawaii Medical Association, Philippine Medical Association of Hawaii, and Hawaii Association of Neurological Surgeons, and with more than 30 years of experience, Dr. Graham is more than qualified to diagnose and treat your condition while providing the best possible outcome. Dr. Graham feels that providing a detailed evaluation, analysis of the condition, explanation of treatment options, and recommendations in layman's terms will allow patients and their families to make the best treatment choices allowing for the best possible outcome. Dr. Graham is a proud father of 3 adult children: Scott, Kyla, and Lara. When he is not working to improve your health, he can be found hiking, golfing, taking nature photographs, and surfing.

Oral Session 4 & Kyenote Lecture 4

18-1 Minimally Invasive Spine Surgery in an Ambulatory Surgery Setting

JON F. GRAHAM

Hawaii spine Institute, Honolulu Spine and Orthopedic Center

Over the past 15 years, there has been a gradual shift from spine surgeries being performed in hospitals to ambulatory surgery centers (ASC's). ASC spine surgeries have been shown to be safe with the same or improved outcomes compared with the same procedures performed in the hospital setting. Our experience in outpatient spine surgery at Honolulu Spine and Orthopedic Center began in 2005 with lumbar microdiscectomy and gradually other procedures such as lumbar laminotomy, anterior cervical diskectomy and interbody fusion (ACDF), cervical disk arthroplasty, cervical micro-foraminotomy, single position extreme lateral interbody fusion (XLIF), trans-facet lumbar interbody fusion (TLIF), and more recently posterior trans-psoas interbody fusion (PTP) have been successfully implemented. Case examples will be discussed including patient selection and pitfalls to avoid. The advancement of minimally invasive spine surgery (MIS) combined with improved Instrumentation, anesthesia, neurophysiologic monitoring, patient demand, and cost savings will continue to drive increased utilization of ASC's in the future.

Takanori Fukushima,M.D.,D.M.Sc.

April 1962~Sept.1968	University of Tokyo,Faculty of Medicine
	National Board,Japan,License#199726
1968~1973	Clinical & Research Assistant,Univ of Tokyo Hospital
June 1973~May 1975	Reseach Fellow,Klinikum Steglitz,Univ, of Berlin
June 1975~June1978	Clinical & Research Fellow,Mayo Clinic
Sept 1978~Feb 1980	Faculty Staff,University of Tokyo Hospital
March1980~Aug 1991	Head,Dept. of Neurosurgery ,Mitsui Memorial Hospital Tokyo
Sept 1991~Dec1993	Prof. of Neurosugery,USC Medical Center
Jan 1994~June1998	Prof .of Neurosurgery, Allegheny General Hospital,Pittsburgh
Sept 1998~Present	Prof. of Neurosugery,Duke Univ,Med.Ctr.
	Director of Brain Tumor &Skullbase Sugery,Raleigh Neurosurgical Clinic

300 Publications, 32 Books & Book Chapters, 300 International Presentation

Special Lecture 1

3-1 Surgery of Pineal Region Tumors

TAKANORI FUKUSHIMA

Duke University

Direct surgical resection of pineal region tumors has been one of the most difficult in neurosurgery. They are rare and the surgical approaches are through the narrow and deep corridors. There are much variety of histological features including pure germinomas, mixed germ cell tumors, teratomas (mature, immature), pineal parenchymal tumors, meningiomas, gliomas, epidermoid tumors etc. MRI is the cardinal importance to provide accurate preoperative diagnosis and the diagnostic biopsy is not indicated to initiate chemotherapy. When the MRI diagnosis suggests germ cell tumors or other malignancy, I recommend chemotherapy (CARE or ICE) as the 1st choice treatment. Endoscopic third ventriculostomy and the biopsy carry the significant risks of bleeding and dissemination-seeding of malignant cells. When the germ cell tumors or other malignant neoplasm are suspected on MRI, I do not recommend endoscopic approach, but encourage the chemotherapy as the primary treatment. As long as chemotherapy is effective, I recommend to continue CARE or ICE for 5～10 courses. Then, half dosis of Stereotactic focused beam Radiation (3RT) followed by microsurgical radical resection. In my protocol, I Keep the possibility of boost radiotion at the time of recurrence. In most of pineal region tumors, either occipital trams tenurial tentorial-thmsfalcian approach or midline infratentorial supracere bellar approach is selected. Angle of straight sinus, Size and extension of the tumor and the patient's neck and physical status are the main factors for decision of operative approach. Devascularize, Debulking and the careful Dissection from the thalami and the midbrains are required. The most important is the Dissection and preservation of 5 veins (2ICV, 2Rosenthal and the Galen). Even one vein damage may load to fatality. Operative results in 180cases will be prented and discussed.

Hirotoshi SANO, M.D., ph.D.

Vice Director & Adviser Shinkawabashi Hospital
Emeritus Professor Fujita Health University

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1-15 Shinkawa Str.Kawasaki-ku,Kawasaki-city,Kanagawa Pref. 210-0013 Japan
Tel:+81-44-222-2111 Fax: +81-44-245-4839

Outpatient:
Shinkawabashi Hospital,
Nagoya Noushinkeigeka clinic(http://www7.ocn.ne.jp/~n.brain/faq.html)
Japan Tounou clinic(http://www.prof-k.jp/s_sano.html)
Nagoya Tokushukai(http://www.nagoya.tokushukai.or.jp/dept/index.html)
Surgery:
Shinkawabashi Hospital,
Aoyama Hospital (http://aoyama-hp.or.jp/05medical/noshinkeigeka.html)
Shimamoto Noushinkeigeka(http://www.shimamoto-noushinkeigeka.com/
Heisei Memorial Hospital (http://www.heiseihp.com/)
Shinyurigaoka Sougou Hospital (http://www.shinyuri-hospital.com/)
Nagoya Tokushukai (http://www.nagoya.tokushukai.or.jp/dept/index.html)
Tokyo Neurosurgical Center (http://dr-fukushima.com/information/tokyo-neurological-center-hospital.html)
Date of birth: March 11, 1945

Educational Background and Academic Titles

1970	Graduate from Keio University, School of Medicine in Tokyo
1970	Intern at U.S. Naval Hospital in Yokosuka, Japan
1971	Department of Neurosurgery, Keio University
1977	Board of Japan Neurosurgical Society
	Assistant Professor, Department of Neurosurgery, Fujita Health University
1979	Title of ph.D.
1980	Associate Professor, Department of Neurosurgery, Fujita Health University
2000	Professor, Department of Neurosurgery, Fujita Health University
	President of the 9th Conference on Neurosurgical Techniques and Tools (CNTT)
2001-2003	Professor, Emergency Medicine
2003～	Director of Critical Care Center
2004	President of the 10th Annual Meeting of the Japan Society of Neurosurgical Emergency
2004～	Chairman of Dept. of Neurosurgery
2005～	Board of Directors in Japan Neurosurgical Society
2006～	Best Doctors in Japan
2009	President 9th International Conference on Cerebrovascular Surgery
2009.9~2013.9	Chairman, Cerebrovascular Surgery Diseases and Therapy Committee of WFNS
2010.4～	Vice Director & Adviser of Dept. of Neurosurgery, Synthesis Shinkawabashi Hospital
	Emeritus Professor of Fujita Health University
2012.2	Honorary President of the 28th Hakuba Neurosurgical Seminar
Now	Hosting Neurosurgical Video Seminar (2/year)
2018.4.30～	Established Sano & Sengupta Academy on Aneurysm Surgery in Kolkata,India

Past Visiting Professor: University of Ljubljana, Slovenia
University of Illinois, U.S.A.
University of San Paulo, Brazil
University of George Washington, U.S.A.
Meijo University Faculty of Pharmacy

Field of Interests: Cerebral aneurysm, AVM, Developing neurosurgical techniques and tools

Rewards:

1999	Outstanding People of the 20th Century
	International biographical Centre, Cambridge
1999	New Century Award, The Asia 500 Barons Who's Who, USA
1999	Twentieth century Achievement Award, 1000 Leaders of World Influence
2000	Guinness World record (Cerebral aneurysm surgery 2007)
2001	Guinness World record (Cerebral aneurysm surgery 2001)
	Now cerebral aneurysm surgery more than 3500(un-officially)
2004 Feb.	14th Sarveshwaki Memorial Award
2006 Apr.	Prof Gulati memorial Award
2007 Sep.	Prof D. Rout Oration Award
2008 Mar.	Ginde Oration Award
2010 Feb.	Mihara Award (Charitable trust Mihara Cerebrovascular Disorder Research Promotion Fund)
2010 Oct.	President of Fujita Health University Award
2019 Feb.	Dr. A.D. Sehgal Oration

Hiroyuki Kinouchi, M.D., Ph.D.

Date of birth: June 30, 1958 Citizenship: Japan
Current position: Professor and Chairman, Department of Neurosurgery
Interdisciplinary Graduate School of Medicine and Engineering, University of Yamanashi
Phone: +81-55-273-6786, Fax: +81-55-274-2468
Email: hkinouchi@yamanashi.ac.jp

EDUCATION

1983 M.D. Akita University School of Medicine, Akita, Japan
1987 Ph.D. Postgraduate School of Medicine, Tohoku University School of Medicine, Sendai, Japan

ACADEMIC APPOINTMENTS

1983-1989 Neurosurgery Residency, Division of Neurosurgery, Tohoku University, School of Medicine
1989-1991 Visiting Assistant Research, Departments of Neurology and Neurosurgery
University of California, San Francisco, CA, USA
1991-1992 Postgraduate Research Neurosurgeon, Departments of Neurology and Neurosurgery
University of California, San Francisco, CA, USA
1992-1995 Assistant Professor, Department of Neurosurgery, Tohoku University School of Medicine
1995-1997 Chief, Department of Neurosurgery, Kohnan Hospital, Sendai
1997-2002 Associate Professor, Department of Neurosurgery. Akita University School of Medicine
2002-2003 Department of Neurosurgery, Stanford University, CA, USA
2003-2005 Associate Professor, Department of Neurosurgery, Akita University School of Medicine
2005- Professor and Chairman, Department of Neurosurgery,
Interdisciplinary Graduate School of Medicine and Engineering, University of Yamanashi,
2015~ Vice President of the Yamanashi University Hospital
2022~ Advisor to the President of the Yamanashi University

COUNCIL MEMBER

<Domestic>

1. The Japan Neurosurgical Society
   - Director 2013~
   - Chair, Research Ethics Committee 2015~
   - Vice-chair, Board Examination Committee 2015~
   - Neurologia Medico-Chirurgica: Executive Editorial Board 2011~
   - Congress Chairperson, 80th Annual Meeting (2021)
2. The Japan Stroke Society
   - Director 2015~2020
   - Auditor 2021~
   - Chair, Finance Committee 2017~
   - Editorial Board of Journal of Stroke and Cerebrovascular Diseases 2005~
3. Japanese Congress of Neurological Surgeons
   - Congress Chairperson, 30th Annual Meeting (2010)
   - Editor-in-Chief of Japanese Journal of Neurosurgery, 2009~2016
4. Japanese Society on Surgery for Cerebral Stroke
   - Editor-in-Chief of Surgery for Cerebral Stroke 2017~2021
   - Congress Chairperson,47th Annual Meeting (2018)
5. The Japanese Society of Cerebral Blood Flow and Metabolism
   - President 2020~
   - Chair, International Committee 2017~2020
   - Congress Chairperson,65 Annual Meeting (2022)
6. Japanese Society for Neuroendoscopy
   - President 2020~
   - Congress Chairperson, 20th Annual Meeting (2016)
   - Chair, Patient Safety Committee 2019~2020
7. The Japanese Congress for Brain Tumor Surgery
   - Director 2011~
   - Chair, Research Ethics Committee 2015~
8. Japanese Society for Skull Base Surgery
   - Director 2011~
9. The Japanese Society of Neurosurgical Emergency
   - Director 2018~
   - Editorial Coordinator
10. Journal of Cerebral Blood Flow and Metabolism
    - Editorial Board 2002 ~2013
11. Cerebrovascular disease
    - Associate Editor 2014~

<International>

1. World Federation of Neurosurgical Society
   - Chair, Education and Training Committee 2017~
2. International Society of Cerebral Blood Flow and Metabolism
   - Chair of education committee 2009~2011
   - Publication committee 2013~2014
   - Brain'19 Program committee 2017~2019
   - Brain'21 Program committee 2019~2022
   - Conference Chairperson, The 29th International Symposium on Cerebral Blood Flow, Metabolism and Function
3. Neurosurgical review
   - Reviewer Board
4. Cerebrovascular disease
   - Associate Editor 2014~
5. Brain research
   - Reviewer Board
6. Stroke
   - Reviewer Board
7. Conditioning Medicine
   - Editorial board 2017~

Yuichi Murayama, M.D.

EDUCATION

Medical School: **The Jikei University School of Medicine**
March 1989
Residency: Jikei University (1989-1995)

Fellow ship: UCLA Medical Center (1996-1998)

ACADEMIC APPOINTMENT

May 1991- December 1994: Assistant, Department of Neurosurgery, The Jikei University School of Medicine.
Jan 1995- Sept 1996: Visiting Scholar, Endovascular Therapy Service, UCLA School of Medicine.
Sept 1996- June 1998: Assistant Professor step I, Division of Interventional Neuroradiology, UCLA.
July 1998-June 2000: Assistant Professor step III, Division of Interventional Neuroradiology.
July 2000: Assistant professor step IV, Division of Interventional Neuroradiology.
July 2001-June 2003: Associate Professor step I, Division of Interventional Neuroradiology.
July 2001-present: Co-Director, Leo G. Rigler Radiological Research Center.
July 2003-present: Associate Professor step III, Division of Interventional Neuroradiology.
September 2003-present: Director, Center for Endovascular Neurosurgery, Jikei University school of Medicine.
January 2004-present: Professor of Neurosurgery, Jikei University school of Medicine.
July 2004-June 2011: Professor step I, Division of Interventional Neuroradiology, UCLA School of Medicine.
July 2011-present: Professor step II, Division of Interventional Neuroradiology, UCLA School of Medicine.
April 2013- present : Chairman of Neurosurgery, The Jikei University school of Medicine
April 2015-present: Director, Stroke center, The Jikei University school of Medicine

PROFESSIONAL ACTIVITIES

Board committee member: Japanese Society of Neuroendovascular Therapy
2006-present: International committee member, Japanese Society of Neurological Surgeons
2005-present: International committee member, Japanese Society of Neuro Endovascular Therapy
2009 -2018: Expert Advisory Panel, Cerebrovascular disease and therapy committee, World Federation of neurological Surgeons
2009 -2018: Education committee member, World Federation of neurological Surgeons
Editorial board member: Journal of Neuro Endovascular therapy (Japanese)
Editorial Review board member: Neurologia Medico Chirrgia
Editorial board member: No Shinkei Geka (Jpn. Neurological Surgery)
International advisory panel: Journal of Neuro Interventional Surgery
Reviewer: Stroke, American Journal of Neuroradiology, Neurosurgery
2009-present: Member of the Abstract Grading Subcommittee
American Heart association the International Stroke conference

AWARDS:

1) Raúl Carrea Award for the best Investigational Study in the Neurosciences at the 7th Annual Meeting of the Sociedad Iberolatinoamericana de Neuroradiología Diagnóstica y Terapéutica (SILAN), Buenos Aires, Argentina, 1995.
2) Summa Cum Laude Award for investigational scientific exhibit at the 34th Annual Meeting of the American Society of Neuroradiology, Seattle, 1996.
3) Magna Cum Laude Award for investigational scientific exhibit at the 39th Annual Meeting of the American Society of Neuroradiology, Boston, 2001 (Co-investigator).
4) The Michael Brothers Memorial Award for the best paper in Interventional Neuroradiology presented at the American Society of Neuroradiology, Boston, 2001.
5) Gold prize (Co-author). Best poster presentation at the Japanese Society of Neuroendovascular Therapy, Sapporo, Japan, 2004.
6) Silver prize (Co-author). Best poster presentation at the Japanese Society of Neuroendovascular Therapy, Sapporo, Japan, 2004.
7) Gold prize (Co-author). Best poster presentation at the Japanese Society of Neuroendovascular Therapy, Wakayama, Japan, 2005.
8) Silver prize (Co-author). Best poster presentation at the Japanese Society of Neuroendovascular Therapy, Wakayama, Japan, 2005.
9) Bronze prize (Co-author). Best poster presentation at the Japanese Society of Neuroendovascular Therapy, Wakayama, Japan, 2005.
10) The Michael Brothers Memorial Award for the best paper in Interventional Neuroradiology presented at the American Society of Neuroradiology, San Diego,

INVENTION & DEVELOPMENT

Onyx liquid embolic system (Co-development with MTI)
Matrix detachable coils (Invention and license agreement with Stryker)
NeuroVision aneurysm volume measurement software (Invention: Cyber net Inc)
JOIN, handheld telemedicine system (Invention: NTT docomo)

KAZUTOSHI HIDA, M.D., D.M.Sc.

Personal: Born, June 17, 1956, Hokkaido, Japan

Address: Work as a Director of Sapporo Azabu Neurosurgical Hospital,
North 22, East 1, 1-40, Sapporo, 065-0022, JAPAN
Phone: (81)-11-731-2321
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Education:	College of General Education, Univ. of Hokkaido	1975-1978
	Faculty of Medicine, Univ. of Hokkaido	1978-1981
Residency:	Neurosurgery	1981-1986
Post-doctorial Fellowship:	Neurosurgery: University of Hokkaido	1986-1991
	Research Fellow: University of California Davis	1988-1990
Academic Positions:	University of Hokkaido	
	Assistant Professor of Neurosurgery	1991-2002
	Associate Professor of Neurosurgery	2002- 2007
	Clinical Professor of Neurosurgery	2007- 2013

Degree: M.D. (1981), D.M.Sc. (1992)
Prize: 1st Tsuru award (1996)
Membership: Neurospinal Society of Japan (Director)
Japan Neurosurgical Society (Delegate)
Japanese Society of Spinal Surgery (Executive Committee)
Japan Medical Society of Spinal Cord Lesion (Executive Committee)

Yukihiko Sonoda, MD, PhD

Professor and chairman, Department of Neurosurgery, Faculty of Medicine, Yamagata University

Education and Training

1986-1992 MD, Tohoku University School of Medicine
1992-1994 Residency: Tohoku University Hospital
1994-1998 PhD, Tohoku University Graduate School of Medicine
1998-2001 Post-doctoral fellow, University of California San Francisco

Academic Appointments

1998-2001 Assistant Professor, Dept. of Neurosurgery, Tohoku University School of Medicine
2001-2004 Assistant Professor, Dept. of Neurosurgery, Yamagata University School of Medicine
2004-2005 Lecturer, Dept. of Neurosurgery, Yamagata University Hospital
2007-2010 Lecturer, Dept. of Neurosurgery, Tohoku University Hospital
2014-2015 Associate Professor, Dept. of Neurosurgery, Tohoku University Graduate School of Medicine
2015- Professor and chairman, Department of Neurosurgery, Faculty of Medicine, Yamagata University

Awards

Young Investigator Award, American Association of Cancer Research, 2000
Hoshino Memorial Award, Japan Society of Neuro-oncology, 2002
JSCO Research Award, Japan Society of Clinical Oncology, 2011

Certification

Japanese Board of Neurological Surgery, August 1998

Membership

The Japan Neurosurgical Society
The Japanese Congress of Neurological Surgeons
The Japan Society for Neuro-oncology
The Japanese Congress for Brain Tumor Surgery
The Japanese Society of Brain Tumor Pathology
The Japan Cancer Association

Nobuhiro Mikuni, M.D., Ph.D.

Professor and Chair
Department of Neurosurgery
Sapporo Medical University School of Medicine
South 1, West 16, Chuo-ku, Sapporo 060-8543, Japan

Education:

1989	Graduated from Kyoto University School of Medicine
1993- 1997	Postdoctoral Course, Kyoto University School of Medicine
	Department of Neurosurgery (Prof. Haruhiko Kikuchi, Prof. Nobuo Hashimoto)
	Department of Brain Pathophysiology (Prof. Hiroshi Shibasaki)

Professional Training and Employment:

1989- 1990	Residency at Kyoto University School of Medicine
1991- 1993	Medical Staff of Neurosurgery in Osaka Red Cross Hospital
1996- 1999	Research fellow, Department of Neuroscience, Cleveland Clinic Foundation
1999- 2007	Assistant professor, Department of Neurosurgery, Kyoto University
2007- 2008	Lecturer, Department of Neurosurgery, Kyoto University
2008-2010	Associate professor, Department of Neurosurgery, Kyoto University
2010-present	Professor, Sapporo Medical University School of Medicine
2011-present	Manager, Human Brain Function Center, Sapporo Medical University

Major Societies:

Japanese Neurosurgical Society; Managing Director, Editor-in-Chief
Japanese Congress of Neurological Surgeons; 35th President (2015)
Conference on Neurosurgical Techniques and Tools; Chief director, 2021 President
Epilepsy Surgery Society of Japan; 2021 President
Japan Society for Stereotactic and Functional Neurosurgery; Editor-in-Chief
Board of directors: Japanese Epilepsy Society, Japanese Congress for Brain Tumor Surgery, Japan Awake surgery. etc

Kazuo Hashi M.D.

birth date: 1935, 7, 15 **birth place:** Kyoto, Japan

1960	graduated Kyoto University Medical School
1961	Department of Surgery, Kyoto University Hospital
1964	Department of Neurosurgery, Kyoto University Hospital
1969-72	Department of Neurology, Baylor College of Medicine, USA
1972	Assistant Professor, Department of Neurosurgery, Osaka City University
1978	Director of Neurosurgery, Kitano Hospital (Osaka)
1984	Professor, Department of Neurosurgery, Sapporo Medical University
2001	Emeritus Professor, Sapporo Medical University

Honorary member: Japan Neurosurgical Society
Japan Stroke Society
Japanese Society of cerebrovascular surgery
Society of Japanese skull base surgery
Founder: Japan Brain Dock Society
Vice President: Asia-Australasian Neurosurgical Society (1999-2003)

Fumihiro Tajima

Name: Fumihiro Tajima (Born Nov 3, 1957, in Tokyo, Japan)
Education:
Ph.D., 1990, University of Occupational & Environmental Health, Japan.
M.D., 1984, University of Occupational & Environmental Health, School of Medicine.

Major Research Interest:
Environmental and Exercise Physiology in Persons with Impairments.
Acute Care Rehabilitation
Sports Science and Medicine in Persons with Spinal Cord Injuries.

Professional Experiences:
Deputy Director of University Hospital, Medical University of Wakayama. 2013- 2017
Chairman, Sports and Exercise Research Center, Wakayama Medical University, School of Medicine, 2009- Present.
President, Nachi-Katsuura Research Center of Sports Medicine and Balneology, Wakayama Medical University, School of Medicine, 2008- Present.
Professor and Director, Department of Rehabilitation Medicine, Wakayama Medical University, School of Medicine, 2003-Present.
Associate professor, Department of Rehabilitation Medicine, Hamamatsu University, School of Medicine, 2000-2003.
Assistant professor, Department of Rehabilitation Medicine, University of Occupational and Environmental Health, 1994-2000.
Research assistant professor, Department of Rehabilitation Medicine, State University of New York at Buffalo, 1992-1994.
Senior Instructor, Department of Rehabilitation Medicine, University of Occupational and Environmental Health, Department of Rehabilitation Medicine.1990-1992.
Resident of Rehabilitation Medicine and Internal Medicine. 1984-1986.

Other Scientific Experiences
Vice President, Japanese Association of Rehabilitation Medicine 2017- Present.
Governor, Japanese Society of Parasports. 2002 - Present.
Chairman, annual meeting of 12 medical committee.
Editor in chief, Journal of Wakayama Medical Association, 2017-2022.
Editor, Japanese Journal of Rehabilitation (Official Journal of Japanese Association of Rehabilitation Medicine) 2000-2006.

Publications
1. Thirty-tow textbooks regarding to Rehabilitation Medicine and applied physiology.
2. Two hundred two peer reviewed original articles regarding to Rehabilitation Medicine and applied physiology.

Grant
Total 8 million dollar Grant.

Education
Promotion: 12 Professors, 3 Associate Professors, 4 Assistant Professors.
Degree: 25 PhD, 40 MS.

Yasushi Takagi, M. D., Ph. D.

Address: 3-8-15, Kuramoto-cho, Tokushima, 770-8503, Japan

Position: Professor&Chairman,
Department of Neurosurgery,
Institute of Biological Sciences,
Tokushima University Graduate School

Date of Birth: May 6, 1966

Place of Birth: Hyogo, Japan

Citizenship: Japan

Education:
1985 Graduate from High School
1991 M.D. Kyoto University School of Medicine, Kyoto
1999 Ph.D. Kyoto Universuty Graduate School of Medicine, Kyoto
(Thesis: Redox Control of Neuronal Damage during Brain Ischemia)

Internship & Residency:
1991-1992 Resident in Neurosurgery, Kyoto University Hospital, Kyoto
1992-1993 Chief Resident in Neurosurgery, Fukui Redcross Hospital, Fukui, Japan
1993-1995 Resident in Neurosurgery, National Cardiovascular Center, Suita, Osaka, Japan

Profession:
2000-2001 Research Fellow, Stroke and Neurovascular Regulation, Department of Neurology and Neurosurgery, Massachusetts General Hospital, Harvard Medical School
2001-2002 Research Fellow, Department of Medical Embryology and Neurobiology, Institute for Frontier Medical Sciences, Kyoto University
2002 Staff, Organogenesis and Neurogenesis Group, Center for Developmental Biology, RIKEN Kobe
2002-2008 Assistant Professor, Department of Neurosurgery, Kyoto University Graduate Scholl of Medicine
2008.4 Lecturer, Department of Neurosurgery, Kyoto University Graduate Scholl of Medicine
2011.8 Associate Professor, Department of Neurosurgery, Kyoto University Graduate Scholl of Medicine
2017.10 Professor&Chairman, Department of Neurosurgery, Graduate School of Biomedical Sciences, Tokushima University

Licensure & Certification:
1991 Japanese Board of Medicine, Registration No.336680
Memberships, Offices and Committee Assignment in professional Societies:
1991 Japan Neurosurgical Society
1993 Japan Society of Stroke
1993 Japan Society of Cerebral Blood Flow and Metabolism
1998 Japan Society of Surgery for Cerebral Stroke

Honors &Awards
2000 Japan Heart Foundation, Kusano Award
2006 Japan Neurosurgical Society, Encouraging Prize

Yoshihiro Muragaki M.D., Ph.D.

Professor of Center for Advanced Medical Engineering Research and Development (CAMED)[1], Kobe University, Kobe, Japan, Visiting Professor of Faculty of Advanced Techno-Surgery (FATS)[2], and Department of Neurosurgery[3], Tokyo Women's Medical University (TWMU), Japan.

Yoshihiro Muragaki received the M.D. degree from Kobe University in 1986, Ph.D. degree in Medical Science from Tokyo Women's Medical College in 1997, and Ph.D. degree in BioMedical Science from Waseda University in 2014. He was a certified neurosurgeon from 1992 and a professor from 2011 at the Faculty of Advanced Techno-Surgery, Tokyo Women's Medical University (TWMU). He has been also a director of Medical AI Center of TWMU from 2019. He moved to CAMED of Kobe University in 2022. He engages in brain tumor treatment, intraoperative MRI, smart cyber operating theater (SCOT). His typical award is the Japan Open Innovation Prize.

Taketoshi Maehara

Name: Taketoshi Maehara **Date of birth:** April 2,1960 **Age:** 62 year old

Education and Training

1979-1985 M.D. Tokyo Medical and Dental University
1986-1986 Fellowship: Department of Neurosurgery, Tokyo Medical and Dental University
1986-1988 Medical Staff : Department of Neurosurgery, Musashino Red Cross Hospital
1988-1989 Medical Staff: Department of Neurosurgery, Tokyo Medical and Dental University
1989-1990 Medical Staff: Department of Neurosurgery, Fujiyoshida Municipal Hospital
1991-1993: Medical Staff: Department of Neurosurgery, Tokyo Medical and Dental University
1994-2000: Medical Staff: Department of Neurosurgery, Tokyo Metropolitan Neurological Hospital

Principal Positions Hold

2000-2002: Medical Staff: Department of Neurosurgery, Tokyo Medical and Dental University
2002-2012: Assistant Professor: Department of Neurosurgery, Tokyo Medical and Dental University
2012-present: Professor: Department of Neurosurgery, Tokyo Medical and Dental University

PhD

1995: Tokyo Medical and Dental University

Editorial Board

2004-2007: Epilepsia

Shinji Nagahiro, MD, PhD

PRESENT POSITION

Director, Yoshinogawa Hospital

UNIVERSITY EDUCATION

1970-1976 MD, Kumamoto University Medical School, Kumamoto (KUMS), Japan

FELLOWSHIPS and ACADEMIC POSITIONS

1976-1978 Resident, Department of Neurosurgery, Kumamoto University Medical School
1978-1980 Department of Neurosurgery, Oita Prefectural Hospital
1981-1985 Assistant Professor, Department of Neurosurgery, KUMS
1986-1988 Research Scientist, Department of Neurosurgery, Cone Laboratory, Montreal Neurological Institute (Drs. L. Yamamoto, M. Diksic and W. Feindel)
1988-1997 Associate Professor, Department of Neurosurgery, KUMS
1997-2017 Professor and Chairman, Department of Neurosurgery, Tokushima University
2016-2018 Director, Tokushima University Hospital
2018- Director, Yoshinogawa Hospital

SUBSPECIALTIES and Research

Microvascular decompression, Stroke Surgery, Brain tumor Surgery, Sports Head Injury
Experimental research of aneurysm and ischemia, CBF and Metabolism

ACADEMIC ACTIVITIES

1999 President, the 2nd Meeting of Japan Society of Microvascular Decompression Surgery
2004 President, the 24th Meeting of Japanese Congress of Neurological Surgeons
2009 President, the 38th Meeting of Japanese Society of Stroke Surgery
2011 President, the 20th Conference on Neurosurgical Technique and Tools
2015 President, the 38th Meeting of Japanese Society of Neurotraumatology
2015 President, the 2nd Meeting of Cardiovascular Stroke Society of Japan
2016 President, the 28th Meeting of Japanese Society of Cerebral Blood Flow and Metabolism

PUBLICATIONS

English peer-reviewed papers; 306, English review papers; 4
Japanese peer-reviewed papers; 340

Michihiro KOHNO, MD, PhD

25/Oct/1961 (61 y.o.)
Professor & Chairman, Department of Neurosurgery, Tokyo Medical University, Tokyo, Japan

Employment History

June 1987 - December 1987	Department of Neurosurgery, National Hospital Medical Center
December 1987 - September 1988	Department of Neurosurgery, University of Tokyo Hospital
October 1988 - August 1991	Department of Neurosurgery, Ibaraki Prefectural Central Hospital
September 1991 - August 1992	Department of Neurosurgery, University of Tokyo Hospital
September 1992 - December 1992	Department of Neurosurgery, Fuji Brain Institute & Hospital
January 1993 - March 1995	Department of Neurosurgery, Tokyo Metropolitan Neurological Hospital
April 1995 - May 2004	Director of Department of Neurosurgery, Fuji Brain Institute & Hospital
June 2004 - March 2013	Director of Neurosurgery, Tokyo Metropolitan Police Hospital
January 2011- March 2013	Deputy director of Tokyo Metropolitan Police Hospital
April 2013 -	Professor & Chairman of Department of Neurosurgery, Tokyo Medical University
May 2014 -	Director of Stroke Center of Tokyo Medical University Hospital
July 2019	Director of Vestibular schwannoma and Skull base tumor Center of Tokyo Medical University Hospital.

Graduate March,1987 Hamamatsu University School of Medicine

Degrees and Certificates

- May 1987- License, Medical Board of Japan
- July 1993- Certified, Japanese Board of Neurosurgery
- July 1999- PhD Degree (University of Tokyo)
- March 2004- Certified, The Japan Stroke Society
- June 2005- Certified, The Japanese Society of Spinal Surgery
- April 2008-2013 Visiting assistant professor of University of Tokyo.
- Best Doctors in Japan 2008-2021
- Active member of World Academy of Neurological Surgeons (WANS) 2016 -
- World Federation of Neurosurgical Societies (WFNS) Education Course faculty member 2017 -

Speciality

- Surgery for Cerebellopontine angle tumors (Acoustic neuroma), benign skull base tumors
- Surgery for Cerebrovascular diseases (bypass, clipping)
- Spinal surgery

He has been performing surgery for cerebellopontine angle tumors about 150 cases including 100 vestibular schwannomas per year, and his surgical experience is over 2200 CPA tumors including more than 1600 vestibular schwannomas.

Akinori Kondo

Keynote Lecture⑭: MVD

39-1 Standardized analysis of the patient satisfaction after trigeminal neuralgia surgery

AKINORI KONDO, Hiroshi Shimano, Souichiro Yasuda, Kouji Takeuchi, Takashi Yoneda, Kousuke Miyake

Shiroyama Hospital

Background

Microvascular decompression (MVD) is useful for the treatment of trigeminal neuralgia. Despite many data reported, they just evaluated postoperative pain relief without measuring patient satisfaction

Objective ;

Measuring subjective satisfaction rate using standardized analysis combining pain relief and complications.

Methods ;

Subjective satisfaction of the patients evaluated : pain score(P), represented residual pain levels ranging from P-0(complete pain relief) to P-1,P-2 and P-3 when pain persisted in variable degrees. The complication score (C) ranged from C-0 (no complication) to C-1, C-2 in which slight or problematic nerve dysfunction remained . Total results (T) are summed P and C scores

Results ;

Among the 94 patients, 81(86.2%) patients were categorized as P-0. In 13(13.3%) patients, pain persisted as P-1, P-2,or P-3. And in14(14.9%) patients, complications occurred at the C-1,or C-2 level. Total analysis results revealed T-0 in 71(75,5%)T-1 in 15(15.9%) T-2 in 5(5.3%), T-3 in 2(2.1%)

Conclusion ;

Based on our single-institute study with long-term follow- up , our method combing separate measures for pain relief and complication occurrence effectively measures the actual subjective satisfaction rate of patients after surgery. The standardized analysis is mandatory to evaluate the actual surgical results of MVD.

Sponsored Seminar

John Tew

John M. Tew, Jr., MD, a leader in his field and in his community, stopped performing surgery at the Mayfield Clinic on June 30, 2014, after more than 45 years of neurosurgical service.
Dr. Tew's legacy at Mayfield is internationally recognized. In addition to his extraordinary work as a subspecialist in cerebrovascular disease, brain tumors, trigeminal neuralgia, and Chiari malformations, Dr. Tew led the development of the University of Cincinnati Department of Neurosurgery and was the first Frank H. Mayfield Chair for Neurological Surgery. He served as Professor and Chairman of the department for 20 years before co-founding and taking the helm of the UC Neuroscience Institute in 1998. He also served as Medical Director of the Mayfield Chiari Center. He is a retired colonel in the U.S. Army Reserve.
Ever young in his embrace of new challenges, Dr. Tew has been appointed to new executive positions that will direct the community outreach and philanthropic efforts of the integrative medicine program at UC Health and the UC College of Medicine. Tew will serve as the program's vice president of community affairs at UC Health and as executive director of community affairs at the College of Medicine. Tew also will continue to serve as a tenured professor of neurosurgery within the College of Medicine and focus his international clinical practice in neurosurgery by providing consultative services to patients and neurosurgeons.

Sponsored Seminar: MedicaLine

20-1 FOREVER HEALTHY: FINDING LONGIVITY AND STRENGHT IN OUR LIVES.

JOHN TEW

UC Health and UC College of Medicine

Today, more than 1⁄2 million people are living to be over 100 years of age. The oldest woman Kane Tanaka, 119 years, lived in Fukuoka Japan until April 2022 and the oldest man, Jiro Kimura, lived 116 years in Kyoto Japan.
Susan and John TewIn fact, Japan has the longest life expectancy and the greatest number of centenarians, people living to be over 100 years of age.
In the last century, the life expectancy of individuals in the developing world increased by 50 years, largely due to improvement in sanitation, inoculation and education.
Most people believe that genetics is largely responsible for long life but actually less than 15% of longevity depends on our genes. The major factors determining our longevity are behavioral, tha means, under our personal control.
Today, we can identify the major factors or choices that allow us to live long and remain well for over 100 years of life?
In the 21st century, the six principal predictors of a long healthy life will be discussed and a proven plan for success will be described in this presentation.
For surgeons and most other professionals, the preservation of body strength and cognitive skills are strongly related to exercise, nutrition, avoidance of toxins, and maintaining long-term stable social relationships.
The Good Life or Long Health Span depends on maintaining a strong body and mind, and avoidance of social isolation.

Junji Bernard Machi, M.D., Ph.D., FACS

WORK ADDRESS:
Department of Surgery; Office of Global Health & International Medicine University of Hawaii

EDUCATION:

1977:	Juntendo University, School of Medicine, Tokyo, Japan (M.D.)
1982-1984:	Research fellow, University of Illinois at Chicago, Chicago, Illinois
1989-1995:	Surgical Residency, Medical College of Pennsylvania Hospital, Philadelphia, Pennsylvania and Mercy Hospital of Pittsburgh, Pittsburgh, Pennsylvania
1998:	American Board of Surgery (Re-certified: 2006, 2017)

ACADEMIC & EDUCATIONAL APPOINTMENTS:

1987-1989:	Assistant Professor, Medical College of Pennsylvania, Philadelphia, Pennsylvania
2001-Present:	Professor of Surgery, University of Hawaii, Honolulu, Hawaii
2014-Present:	Founder & CEO, Junior Senior Corporation, Tokyo, Japan
2016-Present:	Director, HMEP (Hawaii Medical Education Program) in Japan
2022-Present:	Director , Office of Global Health & International Medicine, Univ. of Hawaii

(Updated on 12/2022)

Sponsored Seminar: MedicaLine

20-2 With Corona and Beyond: Let's predict and create Future world & healthcare

JUNJI BERNARD MACHI

University of Hawaii

We, people in the world have been with Corona for 3 years, and new-normal society and life are going on. Even before corona era, new technology including IT and AI has been evolving. Considering such evolutions, can we predict the future world and healthcare?

It is expected that innovation in various technology, genetic and regenerative healthcare, globalization and diversity, environmental changes, changes of variety of medical diseases themselves such as new infection like corona would further occur in the future. Such occurrence or recurrence will affect human life as well as economy, politics, and business of the entire world.

Problems in healthcare are influenced by many other factors such as problems in environment and climate, land and water lives, energy and resources, poverty and hunger, justice peace/war and gender equality and so forth (summarized in SDGs).

"The future is unwritten but not unpredictable".

Based on our history and present status, our future can be predicted, and thereby better world and healthcare can be created. "The best way to predict the future is to create it". Since healthcare problems are related to many other problems on the earth, human being needs to address such problems and create better health of human but also other animal/plant health and health of the earth and even space.

To achieve SDGs and to solve problems to create better new health of each, we should work together as a team of Japan and the earth/universe. Can we do it? Yes, we can, and we should.

- "Learn from yesterday, live for today, hope for tomorrow. The important thing is to keep moving forward for better world and healthcare."
- "The future belongs to those who believe in the beauty of their dreams."

Abstracts

Keynote Lecture 1

1-1 Considerations in Laser Interstitial Thermal Therapy and brain tumors

THOMAS NOH

Advanced Neurosurgery of Hawaii

Introduction:
Laser Interstitial Thermal Therapy (LITT) is a minimally invasive treatment modality for brain tumors. LITT has gained popularity as an adjunct in the treatment of lesions located adjacent to eloquent areas and deep seeded lesions.

Methods:
We review indications, advantages, disadvantages, intraoperative considerations as well as an in-depth case review.

Results:
LITT leads to shorter hospital stays, the ability to provide earlier adjuvant therapy, and can treat radiation necrosis. Its utility should be questioned with larger or irregular lesions, and potential artifact when combined with biopsy.

Discussion:
LITT is an effective tool for difficult to access malignant gliomas, radiosurgically resistant metastases, epileptogenic lesions and radiation necrosis. While it is not all encompassing, cases should be carefully chosen with the aforementioned considerations.

Oral Session 1: Skull Base and Brain Tumor

2-1 Microvascular decompression for hemifacial spasm caused by vertebral artery

YOICHI NONAKA, Naokazu Hayashi

Department of Neurosurgery, Tokai University School of Medicine

Background:
Hemifacial spasm caused by vertebral artery poses significant challenges for neurosurgeons, and the rate of morbidity has reported to be high. Various procedures have been proposed to transpose the immobile tortuous VA that cannot be decompressed satisfactorily in the usual manner.
Methods:
A Teflon piece that is cut into a wedge-shape was used for transposition of the VA as an offending artery in HFS. One or more wedge-shaped Teflon pieces were simply inserted into a small space between the VA and the brainstem or cerebellar hemisphere without any contact with the entry into the root exit zone (REZ) of the facial nerve. A minimal space can be created by slight mobilization of the VA through rostral, caudal, or in between to the lower cranial nerves (LCNs). In cases of a hypertrophic VA that is hard to mobilize, two or more rigid wedge-shaped Teflon pieces that are coated by fibrin glue can be applied to obtain adequate mobilization of the VA. Moreover, a much harder Teflon bar, which is bent into a V-shape, can be used in cases of an immobile VA.
Results:
Twenty-one cases of HFS caused by VA or VA with posterior inferior cerebellar artery (PICA) were successfully treated using the "Wedge-technique." Symptoms disappeared within 2 weeks in all patients. Transient hoarseness developed in 1 case, and Wallenberg syndrome developed in 1 case.
Conclusions:
The wedge-technique is a simple straight-line maneuver that facilitates sufficient transposition of the VA. This technique is also useful for other large offending vessels, such as the anterior or posterior inferior cerebellar arteries, which are hard to mobilize due to the torque of the vessels. Stretch or occlusion of the perforator should be avoided while the Teflon bar is inserted.

2-2 My experience with on- and off- the- job training regarding orbitozygomatic approach

YUHEI KUWAMOTO, Masamichi Kurosaki, Sadao Nakajima, Atsushi Kambe, Makoto Sakamoto

Faculty of Medicine Tottori University

Background and Objectives

The orbitozygomatic approach is a modification of the pterional craniotomy. This approach provides a wide field of view looking up from the skull base. However, there is a risk of the facial nerve injury and brain contusion. It is important to have an anatomical understanding to preserve the facial nerve. We report three cases who underwent surgical procedures using orbitozygomatic approach.

Methods

Between August 2016 and March 2022, three patients with meningioma underwent surgeries with the orbitozygomatic approach. Trainee neurosurgeons at our department perform cadaver dissections under the guidance of a supervisor twice a year at our cadaver surgical training center as on- the job training. I performed two-pieces orbitozygomatic approach using cadaver heads.

Results

This study included two sphenoid ridge meningiomas and a cerebellar tentorial meningioma. All cases underwent two-pieces orbitozygomatic craniotomy. Gross total resections were achieved for all patients. Facial nerves were preserved in two patients.

Conclusions

Practice in a cadaver dissection is essential for us trainee neurosurgeons to learn the complex surgical approaches and the skull base microanatomy.

2-3 A case report : intracranial hypotension treated effectively by epidural blood patch after tumor removal via craniotomy with intraoperative spinal drainage

DAICHI FUJIMORI, Yuta Kobayashi, Shunsuke Sato, Hiromi Goto, Kazuo Watanabe

Southern TOHOKU Research Institute for Neuroscience

Background :

Postoperative intracranial hypotension after craniotomy with intraoperative spinal drainage is not common, but patients sometimes fall into a coma and develop a fatal clinical course.

We report a case :

intracranial hypotension treated effectively by epidural blood patch after tumor removal via craniotomy with intraoperative spinal drainage.

Case :

A man in his 40s was referred for left hemiparalysis with a large extra-axial tumor in the bifrontal lobes. The maximum size was 73mm, and hypervascularity was shown by cerebral angiography. Tumor was embolized by NBCA and coils with no complications, and on the next day, removed totally via bifrontal craniotomy with spinal drainage for about 14 hours. The blood loss was 585ml. Spinal drainage was removed just after the surgery. His left paralysis got a little recovery and he was alert the day after surgery. But he fell into a coma the next morning, and head CT scan revealed effacement of the basal cistern with an oblong brainstem. Postoperative intracranial hypotension was diagnosed and treated effectively by lumber epidural blood patch. He developed a good clinical course.

Discussion :

It is common that inserting a spinal drainage during craniotomy surgery and continuous postoperative spinal drainage causes intracranial hypotension. However, it is not well known that temporal intraoperative spinal drainage also causes postoperative intracranial hypotension at times, so patients may fall into a coma and develop a fatal clinical course. If patients with spinal drainage during operation develop postoperative disturbance of consciousness, we have to consider intracranial hypotension as one of the causes. In addition, although there were no common factors of hypotension with intraoperative spinal drainage in papers, our case may suggest that preoperative intracranial hypertension is relative to the clinical conditions.

2-4 MRI-guided brain tumor surgery

RYUTA SAITO

Department of Neurosurgery, Nagoya University

Objective. Surgery using intraoperative MRI has become widely performed mainly for glioma surgery. There are various types of MRI equipment used for intraoperative MRI, and magnetic field strengths range from an open type of 0.4 Tesla (T) to 3T. Based on the experience of using 0.4T, 1.5T, and 3T MRI models, we report the advantages and disadvantages of each machine.
Methods. The presenter was involved in the introduction of 3T MRI at Tohoku University, and after transferring to Nagoya University in December 2020, had the opportunity to use 0.4T MRI at Nagoya University Hospital and 1.5T MRI at Nagoya Central Hospital. For head fixation, the Sugita type fixation device was used at Nagoya University Hospital, and Noras OR Head Holder was used at Tohoku University Hospital and Nagoya Central Hospital. We examined the advantages and disadvantages of each intraoperative MRI based on the experience of using each model.
Results. A common problem with intraoperative MRI is the restriction of body position. Due to the limited size of the gantry, it is possible to perform surgery in the normal supine position, supine lateral position, and prone position, but not in the lateral position or park bench position. In addition, as for the difference due to the magnetic field strength, low-field MRI can be placed in the same operating room. Therefore, it is easy to handle during imaging, but there are problems such as coarse images and easy artifacts. On the other hand, high-field MRI requires the MRI equipment to be installed in a separate room, which requires more attention to the surroundings as well as being troublesome to move during imaging. Advantages include good image quality and the possibility of fiber tracking. However, the increase in the number of imaging sequences also poses a problem of extending the operation time.
Conclusion. Surgery with intraoperative MRI requires different precautions than non-MRI surgery, depending on the specific MRI. When performing surgery using intraoperative MRI, it is necessary to consider the surgical method after understanding the characteristics of each model.

2-5 Clinical significance of early venous filling on preoperative angiography in glioblastoma

KOTARO TATEBAYASHI, Daisuke Sakamoto, Hiroto Kageyama, Shinichi Yoshimura

Department of Neurosurgery, Hyogo Medical University

Introduction:
Glioblastoma (GBM) is the most common and fatal primary brain tumor in adults. GBM is highly vascularized tumors, and its growth depends on the formation of new blood vessels. GBM angiogenesis is consisted with vascular endothelial growth factor (VEGF)-dependent and -independent pathways. The presence of a VEGF-independent pathway is suspected to be one of the factors that inhibit the efficacy of anti-angiogenic therapy. Establishing biomarkers that reflect some treatment efficacy in GBM may allow for detecting the efficient intervention groups. Therefore, we decided to focus on the AV shunt formation (early venous filling) of GBM seen on angiography and explore its validity as a biomarker.
Methods:
This was a retrospective and noninvasive study that consecutively enrolled patients with GBM at Hyogo Medical University and Gifu University who were performed angiography and a definitive diagnosis of GBM was obtained by pathological examination between 4/1/2013 to 3/31/2021. The existence of early venous filling in GBM was confirmed by the angiography and vascular mimicry which is one of the VEGF-independent pathways was visualized by CD34 immunohistochemistry combined with PAS staining. Primary endpoint was the difference in overall survival with or without early venous filling. Secondary endpoint was the difference in progression free survival with or without early venous filling. The exploratory endpoint was the relationship between early venous filling and pathologic vascular mimicry.
Results:
Among the 119 patients initially enrolled in the cohort, 91 who were diagnosed with primary GBM was performed angiography preoperatively. Subsequent results will be presented at the conference.

Special Lecture 1

3-1 Surgery of Pineal Region Tumors

TAKANORI FUKUSHIMA

Duke University

Direct surgical resection of pineal region tumors has been one of the most difficult in neurosurgery. They are rare and the surgical approaches are through the narrow and deep corridors. There are much variety of histological features including pure germinomas, mixed germ cell tumors, teratomas (mature, immature), pineal parenchymal tumors, meningiomas, gliomas, epidermoid tumors etc. MRI is the cardinal importance to provide accurate preoperative diagnosis and the diagnostic biopsy is not indicated to initiate chemotherapy. When the MRI diagnosis suggests germ cell tumors or other malignancy, I recommend chemotherapy (CARE or ICE) as the 1st choice treatment. Endoscopic third ventriculostomy and the biopsy carry the significant risks of bleeding and dissemination-seeding of malignant cells. When the germ cell tumors or other malignant neoplasm are suspected on MRI, I do not recommend endoscopic approach, but encourage the chemotherapy as the primary treatment. As long as chemotherapy is effective, I recommend to continue CARE or ICE for 5～10 courses. Then, half dosis of Stereotactic focused beam Radiation (3RT) followed by microsurgical radical resection. In my protocol, I Keep the possibility of boost radiotion at the time of recurrence. In most of pineal region tumors, either occipital trams tenurial tentorial-thmsfalcian approach or midline infratentorial supracere bellar approach is selected. Angle of straight sinus, Size and extension of the tumor and the patient's neck and physical status are the main factors for decision of operative approach. Devascularize, Debulking and the careful Dissection from the thalami and the midbrains are required. The most important is the Dissection and preservation of 5 veins (2ICV, 2Rosenthal and the Galen). Even one vein damage may load to fatality. Operative results in 180cases will be prented and discussed.

3-2 How did I live a Pioneering Time in Neurosurgery.

HIROTOSHI SANO

Shinkawabashi Hospital

The time was 1960s, I was a medical student and I always wanted to become a neuro-surgeon. Those were the days, where doctors did not have fancy gadgets and technique such as CT and MRZ, we diagnosed by Cerebral Angiography. So, was the microscope used? Yes, it was used in ENT, not in neuro-surgery.

I was a resident doctor and I first saw the microscope in an ENT Clinic. A surge arised within me, which confirmed and clarified my passion to become a neuro-surgeon. Why? To introduce the microscope.

In 1975, I heard that the CT was introduced into Fujita Heisei University and Tokyo Women's Medical University, I hopped onto the train for FHU. Now, FHU was a newly established University, which meant there were no graduate doctors. This screamed an opportunity to pioneer. What an opportunity it was.

The 1980s came along and it was the era, a revolutionary one. The introduction of the microscope revolutionized operative method for neuro-surgery and the CT for the diagnostic method. It laid new solid foundations in the neuro-surgical department. Riding this wave, I invented many micro-instruments and pioneered new micro-surgical techniques, which you will see in this video.

3-3 Surgical strategies in management of cervical spondylosis and OPLL

HIROSHI NAKAGAWA, Manabu Sumiyoshi, Toshiyuki Okazaki, Koji Saito

Kushiro Kojinkai Memorial Hospital

Surgical strategies in management of cervical spondylosis and discs remains controversial, especially when they are associated with ossification of the posterior longitudinal ligament (OPLL).

For the last 10 years (2012 – 2021), among 428 cases of cervical spondylosis and OPLL, 286 cases (66.8%) were operated by anterior approach and 142 cases (33.2%) were by posterior approach.
In anterior approach, microdiscectomy and osteophytectomy with twin cylindrical cage fixation were usually performed at one or two levels. However, when they were associated with segmental OPLL, keyhole corpectomy with single-cage fixation using 10 or 12mm cage was done in 34 cases (11.9%).

In anterior approach, we, right-handed surgeons, almost always operate from right side, therefore, right vertebral foramen is not easily decompressed by intervertebral space. When cervical radiculopathy was dominant symptom on right side due to foraminal stenosis, transuncal foraminotomy through 7mm hole was added to cage fixation in 38 cases (13.3%). These anterior methods are less invasive and effective with high successful rate.

Posterior approach was selected in cases with myelopathy due to canal stenosis and OPLL with multilevel cord and root compression (usually 3-4 levels). Unilateral open-door laminoplasty with “Laminoplasty Basket” were usually performed with good results.
Rare complications such as C5 palsy, wound infection and dural laceration will be also discussed.

In conclusion, 1) Microdiscectomy with cage fixation is an effective and less invasive method in cervical spondylotic myelopathy and radiculopathy at one or two levels.
2) Expansive open-door laminoplasty is indicated when cord compression due to canal stenosis and OPLL is 3 to 4 levels.
3) Keyhole corpectomy with single cage fixation is an effective and safe method in segmental OPLL.
4) Transuncal foraminotomy is a less invasive and effective method for right sided severe radiculopathy.

3-4 Long-term outcomes after surgery for brainstem cavernous malformations: analysis of 46 consecutive cases

TOMOKATSU HORI

Moriyama Neurological Center Hospital

OBJECTIVE The objective of this study was to evaluate the long-term outcomes after resection of brainstem cavernous malformations (BSCMs) and to assess the usefulness of the Lawton grading system in these cases.
METHODS This retrospective study analyzed 46 consecutive patients with BSCMs operated on between July 1990 and December 2020. Outcomes at the last follow-up were defined as favorable (modified Rankin Scale [mRS] score 0–2) or unfavorable (mRS score > 2).
RESULTS The study cohort comprised 24 men (52%) and 22 women (48%), ranging in age from 8 to 78 years old (median 37 years). In 19 patients (41%), the preoperative mRS score was > 2. All patients had hemorrhagic BSCM.
There were 12 (26%) mesencephalic, 19 (41%) pontine, 7 (15%) medullary, and 8 (17%) cerebellar peduncle lesions, with a maximal diameter ranging from 5 to 40 mm (median 15 mm). In total, 24 BSCMs (52%) had bilateral extension crossing the brainstem midline. Lawton grades of 0, I, II, III, IV, V, and VI were defined in 3 (7%), 2 (4%), 10 (22%), 11 (24%), 8 (17%), 7 (15%), and 5 (11%) cases, respectively. Total resection of BSCMs was attained in 43 patients (93%). There were no perioperative deaths. Excluding the 3 most recent cases, the length of follow-up ranged from 56 to 365 months. The majority of patients demonstrated good functional recovery, but regress of the preexisting oculomotor nerve deficit was usually incomplete. No new hemorrhagic events were noted after total resection of BSCMs. In 42 patients (91%), the mRS score at the time of last follow-up was ≤ 2 (favorable outcome), and in 18 (39%), it was 0 (absence of neurological symptoms). Forty-four patients (96%) demonstrated clinical improvement and 2 (4%) had no changes compared with the preoperative period. Multivariate analysis revealed that only lower Lawton grade had a statistically significant independent association ($p = 0.0280$) with favorable long-term outcome. The area under the receiver operating characteristic curve for prediction of favorable outcome with 7 available Lawton grades of BSCM was 0.93.
CONCLUSIONS Resection of hemorrhagic BSCMs by an experienced neurosurgeon may be performed safely and effectively, even in severely disabled patients. In the authors’ experience, preexisting oculomotor nerve palsy represents the main cause of permanent postoperative neurological morbidity. The Lawton grading system effectively predicts long-term outcome after surgery.

Special Lecture 2

4-1 Paradigm Shift of the Treatment for Cerebral Vasospasm Following Aneurysmal Subarachnoid Hemorrhage

HIROYUKI KINOUCHI

Department of Neurosurgery, University of Yamanashi School of Medicine

Cerebral vasospasm remains one of the most serious complications in patients with aneurysmal subarachnoid hemorrhage (SAH), and the resulting ischemic brain damage can cause poor outcomes. An international cooperative study reported that 39% of morbidity after aneurysmal SAH was caused by cerebral vasospasm. Angiographic vasospasm was initially confirmed by cerebral angiography in the early 1950s, and the distribution and severity of cerebral vasospasm are well known to correlate with those of subarachnoid clots. Vasoconstriction promoters derived from subarachnoid clots may cause imbalance of vasodilation and vasoconstriction, resulting in cerebral vasospasm. Removal of subarachnoid clots is known to be effective in preventing the occurrence of cerebral vasospasm. Intraoperative bolus injection of tissue-type plasminogen activator into the cisterns appeared to be effective, but a randomized study failed to confirm any preventive effect against cerebral vasospasm. Postoperative cisternal irrigation and drainage using tissue-type plasminogen activator or urokinase has also been described, but the procedure is cumbersome and carries the risk of infection. In addition to medical treatments, such as calcium antagonist nimodipine, Rho kinase inhibitor, statin, magnesium and anti-inflammatory drugs, triple-H therapy and endovascular treatments including angioplasty and intra-arterial drug administration have been reported to be effective improving cerebral vasospasm. However, angioplasty can be used only in major arteries and cannot be performed for distal arteries because of the risk of arterial dissection. The effect of intra-arterial infusion of agents, such as papaverine, nimodipine, or Rho kinase inhibitor, is temporary, and the procedure needs to be repeated to maintain the efficacy. The incidence of cerebral vasospasm has been gradually reduced by such treatments, but the risks of symptomatic and angiographic vasospasm reportedly remained as high as 20%–50% and 30% to nearly 80%, respectively.

Recently, the efficacy of clazosentan, an endothelin receptor antagonist, was investigated in a multicenter randomized phase 3 trial in Japan. The results of this study revealed that clazosentan at a dose of 10 mg/hr reduced vasospasm-related morbidity and all-cause mortality events with no unexpected safety findings in patients with aneurysmal SAH secured by both endovascular coiling and surgical clipping (relative risk reduction, coiling 53%; clipping 59%), which would be the paradigm shift for the treatment of cerebral vasospasm.

Here, we review the chronological perspectives of the treatment for the cerebral vasospasm and will discuss the management following aneurysmal SAH in the era of clazosentan.

4-2 Current Status of Neurosurgical Hybrid Operating Room at the Jikei University Hospital

YUICHI MURAYAMA

The Jikei University

Purpose:

The authors describe clinical innovation of the modern Neurosurgical Hybrid operation rooms (OR) at the Jikei University hospital.

Methods:

We have installed a bi-plane digital subtraction angiography (DSA) system and 2 Robotic DSAs in our Hybrid ORs. These ORs, which have 3D digital subtraction angiography (DSA) imaging and microsurgery capabilities, allow neurosurgeons to perform a wide array of neurosurgical and endovascular procedures. Since November 2003, more than 6000 procedures have been performed in the Hybrid ORs.

Results:

Conventional endovascular /vascular diseases, brain tumor and spine procedures were successfully performed using intraoperative imaging assistance. Intra-operative 2D /3D/4D angiography and C-arm CT images (DynaCT) including perfusion CT were easily performed without moving OR tables.

Conclusions:

Newly developed Hybrid OR systems provide safe and precise treatment in the field of Neurosurgery.

4-3 Combined transmastoid approach and high cervical exposure for intra- and extradural tumors around the jugular foramen

YOICHI NONAKA, Naokazu Hayashi

Department of Neurosurgery, Tokai University School of Medicine

Background:
Lesions of the jugular foramen (JF) and infrajugular-high cervical area pose significant challenges for neurosurgeons, and the rate of morbidity and mortality from classic neurosurgical approaches has proven to be unacceptably high.
Methods:
Recent advances in understanding skull base microanatomy and these operative approaches facilitated the development of the Extreme Lateral Infrajugular Transcondylar-transtubercular Exposure (ELITE) technique, which Fukushima named in 1987. This skull base approach consists of an extended lateral suboccipital craniectomy with partial removal of the occipital condyle and jugular tubercle, which provides a wider view of the cerebello-medullary cistern without excessive cerebellar retraction. This extended procedure entails a mastoidectomy, skeletonization of the sigmoid sinus and jugular bulb, exposure of the high cervical region, and removal of the C1 transverse process or lamina with mobilization of the vertebral artery.
Results:
JF schwannoma, hypoglossal schwannoma, and chordoma were resected via a combined transmastoid approach with high cervical exposure. Recently, we changed our surgical strategy for these lesions to more conservative to accomplish deficit-free neurovascular protective surgery. Therefore, a small portion of the tumor around the JF was intentionally left to keep intact the lower cranial nerves (LCNs).
Conclusions:
Transmastoid approaches can be extended with high cervical exposure to enhance the resectability of the tumors around the JF. The most important key element in the surgical management of JF tumors is the preservation of LCNs by leaving a thin tumor capsule on them. A precise understanding of microsurgical anatomy around JF and advanced skull base surgical technique is mandatory to attack these lesions.

4-4 Use of microscopy, endoscopy, and exoscopy in skull base surgery

KENTARO WATANABE, Yuichi Murayama

Tokyo Jikei University school of Medicine

Skull base tumor surgery is always a battle against a deep and narrow surgical field. It is necessary to perform surgery with a variety of situations in mind.Endoscopes began to enter the cranial base region, and endoscopic situations have increased, showing the usefulness of endoscopes in many situations.

In particular, the transsphenoidal sinus approach is very useful for central skull base diseases, and various surgical methods, such as magnification, have been proposed.

Endoscopes have also been introduced into the conventional skull base approach, and their usefulness has been demonstrated in many situations.

In recent years, the exoscope has emerged as the next tool, and combinations of microscopes, endoscopes, and exoscopes are being explored for more effective and less invasive surgery in many future situations. However, the basis of everything lies in anatomy, and the conventional skull base approach is fundamental. We believe that it is very important to follow the anatomy and learn the essence of the skull base approach in order to construct a rational and constructive surgical approach and to better consider the characteristics of the tools.

We have discussed the introduction and usefulness of endoscopes and exoscopes in skull base surgery to date.

Oral Session 2: CVD1

5-1 Lessons learned from 265 AVM surgery: battle plans and clinical results

HIROKI KURITA

Department of Cerebrovascular Surgery, International Medical Center, Saitama Medical University

Objectives:
This presentation aimed to review my personal experience of surgical battles against 265 consecutive cerebral AVMs, illustrating recent technologies and techniques to avoid surgical complications.
Methods:
Between 2007-2022, 265 patients with cerebral AVMs underwent direct surgery. Spetzler-Martin grade was I-II in148, III in 71, and IV-V in 46. ARUBA-eligible AVM was found in 102.
Results:
Preoperative embolization was used in 81.1% of the patients. Majority of scheduled surgery was performed in hybrid suit. At surgery, embolized AVMs were easily dissected from adjacent brain with minimal bleeding. Intraoperative selective 3D-angiography (and subsequent intraoperative embolization in selected cases) was very helpful for understanding of the microstructure of the complex lesions, and preserving passing normal vessels. After surgery, preoperative mRS was maintained in 91% of the patients.
Conclusions:
Results of AVM management with our combined neurovascular team was satisfactory. Hybrid OR with multiple neurovascular intervention/monitoring is powerful tool for AVM resection. ARUBA shall not exterminate but centralize unruptured AVM surgical practice.

5-2 Subacute procedure within 28 days, triple antithrombotics, and calcified lesion affect functional outcomes after Carotid-Artery-Stenting (CAS): CEA and CAS risk analysis in multicenter retrospective study

SO OZAKI[1)], Wataru Shimohigoshi[1)], Taisuke Akimoto[1)], Yasunori Nakai[3)], Katsumi Sakata[1)], Tetsuya Yamamoto[2)]

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Key Words: Carotid-Artery-Stenting, Carotid-Endarterectomy, calcification, antithrombotic, subacute

Objective
For internal carotid artery stenosis, Carotid-Artery-Stenting (CAS) is selected for patients with Carotid-Endarterectomy (CEA) risks. They also sometimes choose CAS for patients with CAS risks. We will clarify the factors related to the results and complications of CAS, in cases with CEA or CAS risks.
Materials and Methods
This study is multicenter retrospective study for 152 CAS cases in 3 facilities, Yokohama, Japan. We defined CAS risks as tortuosity of access route, calcification, vulnerable plaque, eGFR <30, and etc. We also defined CEA risks as high lesion above C2, triple antithrombotic drugs, lung disease, and etc. The primary endpoint was modified-Rankin-Scale(mRS) change after 90 days, and the secondary endpoint was perioperative symptomatic complications.
Results
The subjects were 152 patients who underwent CAS, with an average NASCET score of 68.3% and lesion length of 20.5 mm. There were 107 patients (70.3%) with CAS risks and 70 patients (46.0%) with CEA risks. After 90 days, mRS deteriorated in 21 cases (13.8%) and symptomatic complications happened in 20 cases (13.1%). in In multivariate analysis, subacute CAS procedure within 28 days ($p < 0.001$), triple antithrombotic drugs ($p = 0.003$) among CEA risks, and highly calcified lesion ($p = 0.019$) among CAS risks are independent factors for mRS worsening. Subacute CAS ($p<0.001$) is also related to overall complications in univariate analysis.
Conclusion
CAS is a reliable treatment option for carotid-artery-stenosis. In our multicenter retrospective study, subacute CAS procedure within 28 days, highly calcified lesion among CAS risk factors, and triple antithrombotic drugs among CEA risk factors are associated with worse functional prognosis. In these cases with higher risks, treatment indications should be considered carefully.

5-3 A case of large middle cerebral artery aneurysm ruptures into intracystic hemorrhage and subdural hematoma while awaiting surgery

RIKIYA KAMENO

Southern TOHOKU Research Institute for Neuroscience

Although arachnoid cysts and large cerebral aneurysms are observed relatively frequently, there are not many reported cases in which they occur simultaneously. Previous reports included cases ruptured into hemorrhages only in arachnoid cysts and not in subarachnoid space, but there were no reports of experiencing before with after rupture of aneurysms. In this study, we report a case of the patient who was admitted to the hospital with a large aneurysm considered to be a thrombosed one in arachnoid cyst, but it ruptured while the patient was waiting for surgery. The patient was diagnosed with hemorrhage in cyst and acute subdural hematoma but not a subarachnoid hemorrhage. Craniotomy clipping was performed and a favorable outcome was achieved.

Discussion

It is possible that some cerebral aneurysms that occur within the arachnoid cysts do not cause subarachnoid hemorrhage. Considering the prior literature as well, it was suggested that the prognosis at the time of rupture may be slightly better than that of normal cerebral aneurysms.

5-4 The effectiveness of intracranial bypass surgery for complicated aneurysms in two patients: case report.

KEIGO MIZUNO[1)], Naoto Kimura[1)], Ryosuke Dijiri[2)], Hiroki Uchida[3)], Michiko Yokosawa[1)], Takayuki Sugawara[1)], Akira Ito[1)], Takuji Sonoda[2)], Kiyotaka Oi[2)], Teiji Tominaga[3)]

[1)] Department of Neurosurgery, Iwate Prefectural Central Hospital
[2)] Department of Neurology, Iwate Prefectural Central Hospital
[3)] Department of Neurosurgery, Tohoku University Graduate School of Medicine

Background and Objectives:

Large and giant cerebral aneurysms are known to be difficult to cure by endovascular treatment and recur repeatedly. It has been reported that additional embolization of recurrent aneurysms can cause compression findings due to the coil mass or the aneurysm itself. In this report, we describe two cases in which bypass surgery successfully treated recurrent aneurysms after multiple endovascular procedures.

Case presentation:

Case 1) 64-year-old woman. She had undergone a simple technique for embolization of a large left middle cerebral artery aneurysm that was incidentally identified 5 years earlier, but coil compaction developed after 6 months. After 5 years, the coil mass deformation became stronger again, and FLAIR high-signal areas appeared in the surrounding brain due to compression, so we planned to perform STA-MCA bypass and trapping of the M2 superior trunk to the side wall of the aneurysm before endovascular treatment. The patient was discharged home with no symptoms of neurological deficit after additional embolization using the Trans cell technique. The patient is now under outpatient follow-up.

Case 2) 70-year-old woman. She underwent flow diverter implantation twice, but after about 6 months, her visual field disorder worsened due to the increase in the thrombosed aneurysm. After trapping, the internal carotid artery aneurysm was neck clipped. The patient was discharged home without any postoperative new symptoms or worsening of visual field disturbance and is now under outpatient follow-up.

Conclusions:

We report two cases in which bypass surgery was successful in patients with refractory or recurrent aneurysms after endovascular treatment. These cases showed good outcomes by inducing hemodynamic changes, and we hope to accumulate more cases of bypass surgery as a treatment option for refractory or recurrent large or giant cerebral aneurysms in the future.

Opening Ceremony

RAYMOND M. TANIGUCHI

NEUROLOGICAL SURGERY BOARD CERTIFIED

Welcome!

Because of the pandemic it has been five years since our last meeting here and we are thrilled to have you back in Hawaii. Almost three decades ago our charismatic and energetic leader Taka Fukushima conceived of this conference and we had our inception in 1995 with the first meeting on the island of Lanai. Subsequently we have met on Maui and the Big Island of Hawaii with great success. We have had 125-250 participants in past conventions with prominent figures such as Drs. Spetzler, Samii, Apfelbaum, Fukushima and others. These speakers came from over 25 countries throughout the world including Europe, Asia, North America and even Ukraine. To carry out this tremendous undertaking we must not forget the generosity and continued financial support of the genius Dr. Kazuo Watanabe whose resourcefulness and assistance have been imperative in the continuation of the Mt. Bandai/PPNC conference. I'd like to also acknowledge the contribution of the Japan Brain Foundation and the International Neurosurgical Education Foundation.

We pride ourselves in carrying out this fantastic meeting way out in the Pacific in a less than formal setting of the big national meetings away from the cold in most other countries at this time of the year. Here is a chance to reacquaint yourselves with old friends and hopefully spend more time with the family.

Presidents Mizuno (PPNC) and Irie (Mt. Bandai) and their respective committees have worked very hard to put together this Joint Neurosurgical Convention and so without further adieu let's go on with the show!

I herewith declare the 10th Session of the Joint Neurosurgical Convention to be in session!

Keynote Lecture 2

6-1 Neurosurgical Practice in Honolulu

REID HOSHIDE

Queens Medical Center

The state of neurosurgery in Honolulu is unique and robust. Being in the middle of the Pacific Ocean, there exists a geographic uniqueness that requires both breadth and depth of neurosurgical capabilities. In Honolulu, there are 5 civilian hospitals staffed by a total of 13 neurosurgeons. The Queen's Medical Center is the only Level 1 trauma center and is staffed by 6 neurosurgeons. The remaining 4 hospitals are staffed by 7 full time neurosurgeons. The distribution of neurosurgical pathology is consistent with the rest of the United States, with approximately 70% spine and 30% cranial cases. The Queen's Medical Center hospital practice covers both breadth and depth of neurosurgical pathology, including neurovascular, skull base, functional, endovascular, trauma, and spine. Hawaii consistently ranks among the highest in the nation for health insurance coverage and consistently ranks among the lowest in the nation for malpractice claims. Surgeon compensation in Hawaii remains above average but countered by the significant cost of living expenses for living in one of the most expensive places to live in the United States.

PPNC Guest Talk

7-1 Sustainable Steps to Survive as Private Practice in the US Healthcare System

JACOB RODMAN

Raleigh Neurosurgical Clinic, Inc.

Raleigh Neurosurgical Clinic, Inc. was founded by Dr. Leroy Allen in 1954. At the time, Raleigh was a town of 40,000 people and Dr. Allen wanted to provide neurosurgery in his hometown. He was told Raleigh was too small for a neurosurgeon since neurosurgery was available at both Duke University (23 miles away) and University of North Carolina (21 miles way). In the last 65 years, Raleigh Neurosurgical has grown to 17 doctors and covers the busiest trauma center in North Carolina and the 10th busiest in the United States.

Raleigh Neurosurgical Clinic has been on a mission to lower healthcare cost for its 35,000 patients it treats every year. Most recently the group has opened the only spine and pain focused ambulatory surgery center in North Carolina, in addition to opening the first office-based biplane suite in the United States. This focused effort has led to hundreds of thousands of dollars in saved healthcare cost for its patients in addition to providing a superior patient experience.

Raleigh Neurosurgical Clinic, Inc. has annual revenues of approximately $20,000,000. WakeMed has annual revenues of approximately $1.4 billion.

All of the above will be discussed during my presentation.

Honored Guest Talk 1

8-1 Vertebrobasilar flow evaluation by QMRA: hemodynamic VB insufficiency reversed with occipital artery – vertebral artery bypass (OA-V3 bypass)

MARTIN SAMES, Hynek Zitek, Ales Hejcl

Masaryk Hospital, University J.E.Purkinje

Introduction: Vertebrobasilar (VB) circulation stroke represent 30% of all ischemic stroke. Large artery disease is etiological factor in 32% according to posterior circulation registry (1). The aim of this study is to evaluate patients with recently symptomatic VB disease by QMRA and indicate them for active approach (endovascular of bypass revascularization).
Methods: Study protocol was inspired by Veritas study (2), we included patients with stroke or TIA in VB territory, CTA demonstration of ≥50% stenosis or occlusion of extracranial or intracranial vertebral or basilar artery. These patients were evaluated by quantitative MRA (QMRA NOVA) for flow measurement. Patients with QMRA flows evaluated as low (22% cumulative risk of recurrent stroke at 12 months) we indicated for more aggressive interventional therapy (stent, angioplasty or bypass).
Results: We evaluated 22 patients from 9/2019 to 9/2022 according to our protocol. Three patients (14%) were evaluated as "low flow" cases and were indicated for intervention: 2 patients for stenting, one patient for occipital artery-V3 bypass.
Discussion: We will present symptoms, diagnostic protocol and microsurgical technique of the OA-V3 bypass (3D animation, video)
Conclusion: QMRA is effective method for evaluating patients with VB disease and selecting high risk patients for revascularization procedure.

Literature:
Caplan et al. Ann Neurol, 2004
Amin-Hanjani S. JAMA Neurol, 2016

Masters Lecture 1

9-1 Intramedullary spinal cavernomas - microsurgical strategy and postoperative outcome

UWE SPETZGER[1,2)]

[1)] Klinikum Karlsruhe / Karlsruhe Institute of Technology, KIT
[2)] Karlsruhe Institute of Technology, KIT

Background: We detail the surgical strategy and the postoperative results of 33 patients (18 m / 15 f) with microsurgical treated symptomatic intramedullary spinal cavernomas.
Material/Methods: The spinal locations of the medullary cavernomas were: 20 cervical, 11 thoracic, 2 thoracolumbar. All 33 patients were symptomatic with signs of myelopathy and/or sensorimotor deficits, corresponding to the level of the lesion. In 16 patients a laminectomy or laminonotomy and in 17 patients a hemilaminectomy was performed to approach the lesion. Two patients were treated via an anterior spinal approach (1 cervical / 1 thoracic). All surgical procedures were performed under intraoperative electrophysiological monitoring.
Results: Direct postoperatively, a transient deterioration of pre-existing neurological deficits occur in 22 of our 33 patients (67%). However, only 3 patients (9%) remain with a permanent deterioration of the pre-existing neurological deficits. Long-term improvement of initial neurological deficits are found in 19 of 33 patients (58%). Strong predictors for the surgical morbidity were the size and location of the cavernoma and the grading of the pre-existing neurological deficits. The exact localization within the spinal cord and especially the contact to the surface of the medulla and therefore, the accessibility was crucial.
Conclusion: According to our current experience we summarize, that microsurgical treatment of intramedullary spinal cavernomas has an acceptable surgical morbidity. However, the postoperative outcome shows a long-term improvement of the clinical condition in the majority of cases. We conclude that microsurgical resection is the treatment of choice in symptomatic spinal medullary cavernomas. However, the microsurgical treatment of spinal cavernoma remains a subject for discussion.

Symposium 1-A "Spine": Minimally Invasive Spine Surgery (MISS) Jointly with Minamitohoku-Shinyurigaoka Neuro-Spine Winter Seminar

10-1 Surgical outcomes of operative microscope-assisted extreme lateral interbody fusion for lumbar degenerative spondylolisthesis

YASUNOBU ITOH[1)], Ryo Kitagawa[1)], Shinichi Numazawa[1)], Kota Yamakawa[1)], Osamu Yamada[1)], Shuhei Morita[1)], Tomoko Otomo[1)], Isao Akasu[1)], Kentaro Mori[1)], Sadayoshi Watanabe[1)], Kazuo Watanabe[2)]

[1)] Department of Neurosurgery, Tokyo General Hospital
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【Background】 Extreme lumbar interbody fusion (XLIF) can minimize injury to ligaments surrounding spinal column and decrease blood loss while maintaining the equivalent or improved clinical and radiographic outcomes as compared to the conventional posterior decompression and fusion. Sagittal and coronal deformity correction can be performed with large and lordotic cages stepping over the ring apophysis. As a result, XLIF has been shown to increase the volume of central canal and the height of foramen, thus achieving indirect decompression.
【Objectives】 The purpose of this paper is to present the surgical outcome of XLIF for lumbar degenerative spondylolisthesis(LDS), especially Grade 2 LDS, and to provide the pearls and pitfalls along with the advantage of XLIF under operative microscope.
【Methods】 236 patients have been treated in our hospital from March 2018 to October 2022. Among them, 122 patients with LDS (<Grade 2) were most frequent, 73 degenerate disc disease with instability, and 35 adult spinal deformity. Lysthesis in LDS was characterized as Grade 1 in 108 patients and Grade 2 in 14 patients. The mean age at the time of surgery of patients with Grade 2 LDS (11 female and 3 male) was 69.73 years. All patients presented with back and leg symptomatology. The mean follow-up time was 17 months with a range of 1-45 months. Posterior instrumentation was placed with bilateral pedicle screws or interspinous plate fixations. Postoperative outcomes were estimated by Oswestry Disability Index (ODI) and JOA score. The central canal areas in axial MR image profiles were measured pre- and post-operatively.
【Results】 The preoperative ODI and JOA scores of Grade 2 LDS continued to improve significantly 1 year after surgery. The mean operative time was 195 minutes for the combined anterior and posterior phases of the operation. The mean estimated blood loss was 23ml. Anterior thigh dysesthesia was identified in 33%. Most of the patients resolved within 1 week postoperatively. Spinal canal area at the level of L4-5 on MR imaging continued to enlarge from 53 to 137mm^2, reflecting a clinical improvement.
【Conclusions】 XLIF is a safe and effective treatment for patients with Grade 1 and 2 LDS. The use of this surgical approach provides a minimally invasive solution that offers favorable clinical and radiographic outcomes with low lates of postoperative complications. Furthermore, operative microscope assisted XLIF was particularly helpful for secure performance in transpsoas lateral approach as well as information sharing with the staffs in the operation room.

10-2 Biomechanical simulation studies in cervical laminoplasty constructed by various spacers

SATOSHI TANI[1)], Hiroki Ohashi[2)], Hiroyuki Takao[2)], Daichi Kawamura[2)]

[1)] Shin-yurigaoka General Hospital
[2)] Jikei University School of Medicine

In order to obtain the presence and standardization of cervical laminoplasty as the decompressive procedures, Reducing the risk of mechanical failure in laminar construct and confirmation of biomechanical engineering are mandatory. The authors conducted to evaluate mechanical comparisons in elevated laminar constructs with basket type, titanium plate type, and Hydroxyapatite spacers with 3D voxel simulation method.

From the observation of local displacement-maximum load, Mises stress and other physical elements, the authors obtained following speculations.

1. All spacers provide sufficient mechanical properties to stabilize laminar construct against pressure from any directions in the unilateral laminoplasty. Especially basket spacer showed stronger yield load against closing force (posterior-anterior force). Initial durable fixation of the implant to lamina and lateral mass as well as appropriate gutter in lateral mass are crucial.

2. Hyperextension of the neck provokes significant mechanical stress in cephalo-caudal direction which seems to be the harmful force for the construct. The height of the elevated lamina should be always considered.

3. Bilateral laminoplasty shows weaker mechanical properties compared with unilateral laminoplasty against laterally directed force, which may result in so-called wiper motion in elevated laminas.

10-3 Development of screw guide templates and spinal fixation implants using 3D computer technology

TAKU SUGAWARA, Naoki Higashiyama, Shinya Tamura

Akita Cerebrospinal and Cardiovascular Center

Recent progress in 3-dimensional (3D) computer technology has enabled spinal surgeons to make accurate diagnosis and detailed preoperative planning. Spine models in actual size can also be made by 3D plastic printer so that the surgeons can perform preoperative simulation of the procedures. The authors introduce their two applications of this technology; a pedicle screw guiding method and order-made titanium spinal fixation implants.

For the screw guiding method, preoperative bone images of the computed tomography (CT) scans were analyzed using 3D multi-planar imaging software and the trajectories of the screws were planned. Plastic templates with screw guiding structures were created for each lamina by 3D design and printing technology. Three types of the templates were made for precise multi-step guidance, and all templates were specially designed to fit and lock on the lamina during the procedure. Postoperative CT scans showed a small deviation of the screws from the planned trajectories and few cortical violations. This multi-step, patient-specific "Screw Guide Template" (SGT) system has been repeatedly tested around the world, proven to be effective and now is in clinical use in many countries.

For the production of order-made titanium spinal stabilization implants for instable spinal diseases, bone data were also extracted from CT images, and the implants that cover posterior surface of the lamina were designed with industrial 3D technology. The titanium cover for each lamina was connected with rods, providing stabilization of intervertebral segmental motions. These order-made implants were printed by a 3D titanium printer, and physical property and precision of the products were determined. Animal study showed excellent stabilization and long-term safety. This device was named "Tailor-Made Fixation System (TMFS)" and has been approved for clinical use in Japan. Clinical outcomes of TMFS for lumbar fixation surgery are presented.

3D computer technology is making an epoch in spinal surgery and new applications are still to be developed.

10-4 Usefulness of hybrid method of anterior cervical decompression and fusion and transvertebral anterior foraminotomy for cervical multiple lesions

TAKASHI YAGI, Nobuo Senbokuya, Hiroyuki Kinouchi

University of Yamanashi

Background

Anterior cervical decompression and fusion (ACDF) for cervical spondylotic radiculopathy has been established as a standard treatment, but it has the drawback that the development of adjacent segment disease cannot be completely avoided in the long term. Transvertebral anterior foraminotomy (TVAF) is a minimally invasive procedure that allows nerve root decompression while maintaining physiological mobility.

Objectives

We present a combination technique of ACDF and TVAF for cervical spondylotic radiculopathy with multiple intervertebral lesions and discuss the usefulness of this procedure.

Methods

Three cases of multi-level cervical spondylosis with unilateral radiculopathy treated with hybrid methods were studied. All cases were male, and the mean age was 42.3 years (33-48 years). Clinical outcomes were evaluated by improvement of neurological findings and changes in pain (VAS), and in the radiological results, changes in lordotic angle and cage subsidence associated with the procedure were verified.

Result

Case 1: C6/7ACDF combined with C7/T1TVAF were applied to patient with comorbid C7 segmentomyelopathy and C8 radiculopathy. Case 2: C5/6 ACDF combined with same level TVAF were applied to patient with C6 radiculopathy and kyphotic deformity. Case 3: C5/6 ACDF combined with C6/7 TVAF were applied to patient with C6 and C7 radiculopathy due to C5/6 bony foraminal stenosis and C6/7 disc hernia. Postoperative symptoms improved in all patients, VAS significantly improved in 2 patients with upper extremity pain, and improvement was obtained in 1 patient with muscle weakness of the finger extensor muscles. In Case 2 with kyphotic deformity, cervical lordotic angle improved by 17°and radiological findings did not worsen during the mean follow up period of 24 months.

Conclusions

Combined use of ACDF with TVAF for multi-level cervical spondylosis with unilateral radiculopathy is minimally invasive as it reduces manipulation of cervical tissues and avoids unnecessary interbody fusion.

10-5 Posterior Cervical Foraminotomy via Full-endoscopic versus Microscopic Approach for Radiculopathy: A Systematic Review and Meta-analysis

HIROTO KAGEYAMA, Kotaro Tatebayashi, Shinichi Yoshimura

Department of Neurosurgery, Hyogo Medical University

Background:
Posterior cervical foraminotomy (PCF) is one of the standard surgeries for treatment of cervical spondylotic radiculopathy. Microscopic open posterior cervical foraminotomy (OPCF) has been undergone traditionally by Japanese neurosurgeons. On the other hand, full-endoscopic posterior cervical foraminotomy (FEPCF) has been performed recently as a minimally invasive surgery. This time, we present about PCF and a systematic review comparing OPCF with FEPCF.
Material and Method:
Searching previous articles was conducted using PubMed according to PRISMA guidelines. A total of 306 articles were collected. The title, abstract and full text of each article were read to select eligible research content. 14 studies met the inclusion criteria.
Result:
5OPCF study and 13 FEPCF studies were finally analyzed. A total of 1035 patients were included. Effective rates were not significantly between groups OPCF VS FEPCF; 93.9% (95% CI, 91.6–96.2%) vs 95.2% (95% CI, 92.7–97.8%) respectively (P value was 0.143).
Although statistical significance was not tested, blood loss tended to be less in the endoscopic group operative time, and hospital stay tended to be shorter in the endoscopic group.
Conclusion;
FEPCF is technically feasible and considered as less invasive treatment options for cervical spondylotic radiculopathy.

Symposium 1-B "Spine": Minimally Invasive Spine Surgery (MISS) Jointly with Minamitohoku-Shinyurigaoka Neuro-Spine Winter Seminar

11-1 Selective use of vertebroplasty devices for osteoporotic vertebral body fractures

YASUHIRO NAKAJIMA[1)], Mamoru Matsuo[1,2)], Ayako Motomura[1,2)], Akinori Kageyama[1,2)], Takashi Tsujiuchi[2)]

[1)] Neuro-Spine Center, Daido Hospital
[2)] Department of Neurosurgery, Daido Hospital

[Background] In Japan, several types of vertebroplasty devices such as Vertebral Body Stenting (VBS) for osteoporotic vertebral body fractures have become available.
[Objectives] Although the number of VBS cases performed at our hospital is still small, we would like to report on the advantages and disadvantages of BKP and VBS, which have gradually been clarified. We would also like to report small cases of Synflate that was available from August 2022.
[Methods] 23 patients who underwent VBS from November 2021 and were followed up for more than 12 months. The average age was 76.5 years, 17 males and 6 females, and the average time from injury to VBS was 26.0 days. We compared pain sore, changes of vertebral body height, frequency of vertebral body leakage of PMMA, etc. in the same number of BKP cases performed at the same time as VBS cases.
[Results] There was no significant difference in pain score between the VBS and BKP groups, but VBS was superior in maintaining anterior vertebral wall height 6 months after surgery and beyond. In addition, VBS caused less PMMA leakage in patients with anterior or posterior wall collapse of the vertebral body.
[Conclusions] Our study shows that VBS can prevent the correction loss of the anterior wall of the vertebral body in the long term, depending on the shape of the stent. Furthermore, it was suggested that stents expanded within the vertebral body may allow visualization of the desired area to be filled with PMMA, making PMMA leakage less likely.

11-2 Respiratory complications after anterior corpectomy to thoracolumbar spine

TAKESHI UMEBAYASHI

Tokyo Spine Clinic

Introduction) Extracoelomic (retropleural/retroperitoneal) approach was unique and complicated due to the presence of the lower rib cages and the diaphragm. After approaching anterior corpectomy to thoracolumbar spine, there were some risk about respiratory complications such as pneumothorax, pneumonia and hemothorax owed to violation of pleura.

Methods) This was the retrospective review of ten consecutive patients who underwent single l-level anterior thoracolumbar corpectomy for delayed osteoporotic vertebral collapse fracture. The purpose of this study was to investigate respiratory complications after this procedure.

Results) All patients were approached on the right decubitus position. The average age was 75 (56-80) years old. There ware nine women and one man. Ten of 5 patients were fused at L1, 4 patients were fused at Th12 and one patient was fused at L2. Mean operative time was 178 mins and mean estimated blood loss was 118ml. Four patients needed to repair of the parietal pleura with suturing by 4-0 nairon and fibrin glue but no patient needed thoracic drainage. The respiratory complications were none fortunately.

Discussion) When performing the minimally invasive lateral extracoelomic approach, the lateral and posterior attachments was dissected bluntly to mobilize the diaphragm anteriorly or incise the diaphragm minimally. We believe that this procedure like preserving the construct of diaphragm was less invasive than conventional open thoracotomy in regard to respiratory function.

Conclusion) Minimally invasive lateral extracoelomic approach has a possibility to reduce the respiratory complications after surgery.

11-3 Surgical Treatment strategy for intramedullary tumors in Japan

TOSHIKI ENDO, Shinya Haryu, Yoshiharu Takahashi, Tatsuya Sasaki

Tohoku Medical and Pharmaceutical University

Intramedullary spinal cord tumors are rare lesions. However, they significantly affect patients` daily life by causing neurological dysfunction and mortality. When we treat patients with the intramedullary tumors, we always share several themes in common.
1. The diagnoses and surgical indications of the spinal cord tumors should rely on neurological findings and imagining studies.
2. The surgical treatment should be aimed to achieve both maximum degrees of tumor resections and neurological functional preservations.
In this presentation, we describe representative cases to explain the above mentioned important strategies in treating the spinal cord tumors. Especially, we discuss useful strategy to remove intramedullary tumors with preserving neurological functions in the small and fragile spinal cord. Further, we introduce our new treatment strategy using photodynamic therapy for the malignant spinal cord astrocytoma.

11-4 Emerging Technology in Spine Surgery...Augmental Reality and Enhanced Surgical Navigation

THOMAS NOH

Advanced Neurosurgery of Hawaii

Introduction:
There are a number of emerging options to enhance surgical navigation during spine surgery. Augmented Reality (AR) is one form of injecting a visual display into the surgeon's line of sight to enhance surgical precision and accuracy.

Methods:
We review indications, advantages, disadvantages, and intraoperative considerations. We share case examples of where there is active development with this technology and future applications.

Results:
AR allows an integrated line of sight, no distraction and a smaller footprint while maintaining a 94-98% accuracy rate of pedicle screw placement. There is the added benefit of less attention shifting for trainees. Considerations need to be made for ergonomics, quality, visual fatigue and the surgical learning curve.

Discussion:
AR is a powerful surgical adjunct. The near-future features should focus on heads-up displays. Future work needs to address the human factor of error, unseen movements of rotation, imaging errors, and variable inaccuracy.

Masters Lecture 2

12-1 Surgical management of intramedullary tumors. -surgical strategy during operation-

KAZUTOSHI HIDA

Sapporo Azabu Neurosurgical Hospital

Surgical management of intramedullary tumors depend on their pathology. Ependymoma has clear margin between tumor and spinal cord. Therefore, we can expect total removal of the tumor. On the other hand, astrocytoma is infiltrative tumor. We can not remove it. As for hemangioblastoma, we remove it after coagulating its feeding artery and tumor itself. Cavernous angioma sometimes accompany surrounding gliosis which hinder total resection of the tumor. The author presents surgical strategy depending on tumor pathology.

12-2 Surgical characteristics in water and the full endoscopic anatomy of the vertebral foramen

YASUHIKO NISHIMURA[1)], Junichi Mizuno[2)]

[1)] Wakayama KOYO Hospital

[2)] Shinyurigaoka general hospital

Conventionally performed spinal surgeries, such as discectomies and decompression, involve direct viewing, under a microscope, with the aid of an endoscope (MED) and are all surgeries conducted in the air. Alternatively, in the field of neurosurgery as well,introduction of FESS as minimally invasive surgery changed conception from surgery in the air to underwater surgery since approximately 2008. With FESS method, surgery with field of view as close as possible to targeted organ is enabled, making it least invasive in terms of access involving a shorter operation time if familiar therewith. Underwater surgery is carried out within perfusate and is therefore physiological, making it also excellent in neuroprotection and infection reduction. On the other hand, extremely delicate technology is required because an endoscope having a working channel of only approximately 4 mm in diameter is operated within an operation field of about 1.5 cubic centimeters. It is also disadvantageous in viewing angle is reduced by approximately 30% in water. Endoscope used is basically a foraminoscope that passes through the intervertebral foramen to reach the lesion. It is necessary to be familiar with dissection of intervertebral foramen which does not have an anatomically fixed definition, including the hidden-zone which Macnab advocated in accessing from the Kambin's triangle and safely operating in the intervertebral foramen. In this study, investigate the characteristics of FESS as underwater surgery along with the reflux pressure, and report on and examine the results of lumbar intervertebral foramen decompression (FELF) regarding dissection of foramen for foraminoscopes.

Oral Session 3: CVD2

13-1 Iodine-123-Iomazenil SPECT revealed recovery of neuronal viability in association with improvement of cognitive dysfunction after Revascularization in Moyamoya Disease

HIDEYUKI YOSHIOKA, Takuma Wakai, Koji Hashimoto, Toru Tateoka, Ryo Horiuchi, Hiroyuki Kinouchi

University of Yamanashi

Background:
Recent studies indicate ^{123}I-iomazenil (^{123}I-IMZ) SPECT could demonstrate a neuronal viability. Although cognitive dysfunction has been recognized as an important issue in adult moyamoya disease (MMD), standard neuroradiological methods to define such condition are not established. In this study, the relationship between cognitive function and ^{123}I-IMZ SPECT before and after revascularization in MMD was firstly examined.

Method:
Fifteen patients whose cerebrovascular reactivities (CVRs) were decreased only on the treatment sides were studied. Cognitive function was examined using mini-mental scale examination (MMSE, cutoff 27) and frontal assessment battery (FAB, cutoff 16) before and 6 months after surgery. ^{123}I-IMZ and ^{123}I-iodoamphetamine SPECT with acetazolamide challenge were performed at the same timings. Radioreactivities of ^{123}I-IMZ SPECT at the regions with decreased CVR were investigated using affected-to-contralateral side ratio (ACR).

Results:
Eleven patients showed normal cognitive dysfunction before surgery (MMSE 29.5, FAB 18). In their preoperative ^{123}I-IMZ SPECT, there were no regions with decreased uptakes (ACR 0.97). The cognitive functions and ^{123}I-IMZ SPECT were not worsened after surgery (MMSE 29.9, FAB 18, ACR 0.99). By contrast, preoperative images of four patients with cognitive dysfunction (MMSE 23.8, FAB 14) showed decrease of ^{123}I-IMZ uptakes, and the preoperative ACRs (0.82) were significantly lower than those of the normal group. Cognitive functions and ^{123}I-IMZ uptakes of these four patients tended to ameliorate after revascularization (MMSE 27.5, FAB 15.5, ACR 0.92).

Conclusion:
Cognitive functions of MMD patients were associated with ^{123}I-IMZ uptakes, and could improve after surgery with recoveries of neuronal viabilities.

13-2 Treatment outcome of acute revascularization for large vessel occlusion due to dissection

KOHEI ISHIKAWA[1,2], Hideki Endo[1,2], Koichiro Shindo[1,2], Tatsuya Ogino[1], Tomoki Fuchizaki[1], Tomoaki Ishizuka[1], Kaori Honjo[1], Toshiichi Watanabe[1], Kenji Kamiyama[1], Toshiaki Osato[1], Hirohiko Nakamura[1]

[1] Nakamura Memorial Hospital
[2] Nakamura Memorial South Hospital

Background: In recent years, mechanical thrombectomy for large vessel occlusion (LVO) is strongly recommended, but treatment strategy for acute LVO due to dissection is not established.

Objectives: To evaluate treatment outcome of acute revascularization for LVO due to dissection in our institute.

Methods: Retrospective data of patients who had undergone acute revascularization surgery for LVO within 24 hours from onset and finally diagnosed vessel dissection, between January 2017 to June 2022. Tandem occlusion, such as distal embolism due to proximal large vessel dissection, was excluded.

Results: Ten patients were identified. Average age was 50.1 years, 6 patients were male, and 4 patients were female. About occluded site, middle cerebral artery was 2, internal carotid artery was 6, common carotid artery was 1, vertebral artery was 1. Median preoperative National Institutes of Health Stroke Scale score was 16.5 points. About treatment method, 2 patients who was diagnosed as vessel dissection before operation, were performed bypass surgery. 8 patients were performed mechanical thrombectomy, and 1 patient of them was added bypass surgery because recanalization was not obtained. About periprocedural complication, asymptomatic subarachnoid hemorrhage due to vessel injury occurred in 1 case of mechanical thrombectomy. A modified Rankin Scale score of 0-2 at 90 days was observed in 9 patients.

Conclusions: Treatment outcome of acute revascularization for LVO due to vessel dissection was good. In mechanical thrombectomy, it is necessary to avoid vessel injury. If recanalization was not obtained, an additional acute bypass surgery may prevent neurological symptom deteriorations.

13-3 The Efficacy and pitfalls of MoMa Ultra with flow reversal in carotid artery stenting

KAZUKI TAKAHIRA, Taketo Kataoka, Shohei Noro, Yuzo Terakawa, Shinsuke Irie, Koji Saito

Hokkaido Ohno Memorial Hospital

[Background]
MoMa Ultra with reverse flow in carotid artery stenting is useful for embolism prevention, and eager to use at our hospital. We examined our treatment results of the same EPD, and reported on pitfalls by the experiments.

[Methods]
Of the 65 consecutive cases of CAS from November 2016 to November 2022, 31 cases using MoMa Ultra with reverse flow underwent MRI on the day after surgery, excluding emergency cases. Patient background, anesthesia method, adjustment of the opening direction of MoMa Ultra, the ratio of the ipsilateral DWI positive spots on the day after surgery, and complications were evaluated as items for treatment results.

[Results]
Age: average 72.6 years (57-87), gender: 26 males, symptomatic: 16 cases, stenosis rate (NASCET method): 79.9% (50-95), general anesthesia: 96.8% (30 cases). In 16 cases, the opening direction of MoMa Ultra was adjusted, and the ratio of the ipsilateral DWI positive spots was 38.7% (12 cases). As a complication, transient aggravation of paralysis was observed in one patient, but no permanent sequelae were observed. A higher ration of the ipsilateral DWI positive was found in cases requiring adjustment of the opening direction of MoMa Ultra (P=0.01, odds ratio=10.83).

[Conclusion]
From our study, the treatment results of MoMa Ultra with reverse flow were favorable. The opening direction of MoMa Ultra was important for the procedure and embolism prevention by our experiments with a human body model. On the other hand, it was considered necessary not to adhere too much to the adjustment of the opening direction of MoMa Ultra.

13-4 Hypofractionated stereotactic radiotherapy for unresected large brain metastases

MASATAKA TAKAHASHI[1)], Yusuke Takahashi[1)], Masaya Oda[2)], Hiroaki Shimizu[1)]

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[2)] Nakadori General Hospital,

Background:
Brain metastases represent one of the most common intracranial neoplasms. In general, indications for surgery include the presence of a tumor greater than 3 cm, significant edema or mass effect, neurological symptoms attributable to the lesion.
However, in the patents with advanced cancer , stereotactic radiotherapy may have advantage in terms of avoidance of invasive surgery.
Purpose:
We aimed to evaluate outcomes of hypofractionated stereotactic radiotherapy (hFSRT) for large brain metastases.
Patients and Methods:
Between Jan 2020 and Sep 2022, 34 consecutive patients (23 men and 11 women) with 34 large brain metastases underwent hFSRT in Akita University Hospital. Subjects included 34 patients, age from 43 to 89 years, who had large brain metastases (> 10 ml in volume). Primary cancers were in the lung in 15, colon in 6, breast in 5, and other in 7 patients.The average radiation doses were 33 (27-50) Gy in three to ten fractions. The mean tumor volume before treatment was 18.6 (10.1 – 48.3) ml. Mean follow-up period was 10.6 (0.5-33) months. The local tumor control rate was analyzed at 6 and 12 months. Overall and progression free survivals were calculated using the Kaplan-Meier method.
Results:
The median overall survival and progression free period were eleven and nine months. Progression free in brain metastasis at 6 and 12 months were 65.3% and 36.5% respectively. Local tumor control rates among the survivors were 86.4% and 71.4% at 6 and 12 months, respectively. Two patients suffered from cerebral hemorrhage and one with cerebral infarction during the course of the disease. We experienced three patients with a first episode of symptomatic epilepsy. The most cause of death in our series was stated as worsening condition because of original cancer or non-brain disorders. A case of aspiration pneumonitis and another case of status epileptics due to brain metastasis were observed as the direct cause of death.
Conclusion:
Outcomes of hFSRT in patients with unresected large brain metastases may be acceptable in terms of local tumor control.

13-5 Causality assessment for fatal cerebral haemorrhage as an adverse drug reaction: an algorithmic approach

MIKI OHTA[1)], Satoru Miyawaki[2)], Shinichiroh Yokota[3)], Makoto Yoshimoto[1)], Tatsuya Maruyama[1)], Daisuke Koide[1)], Takashi Moritoyo[1)], Nobuhito Saito[2)]

[1)] Clinical Research Promotion Center, The University of Tokyo Hospital
[2)] Department of Neurosurgery, Graduate School of Medicine, University of Tokyo
[3)] Department of Healthcare Information Management, The University of Tokyo Hospital

Background and Objectives: The assessment of the causal relationship between medicinal products and adverse events is crucial to ensure the safety of medicinal products. Suspected adverse drug reaction case reports from clinical practice to the regulatory authorities often fail to assess causality due to lack of information. In particular, fatal cerebral haemorrhage is one of events for which it is often difficult to assess causality due to a lack of information in the report. The objective of this study is to explore the usefulness of an algorithm for assessing the causal relationship between medicinal products and fatal cerebral haemorrhage, using hospital electronic medical record information.
Methods: Patients whose outcome on the electronic medical record was death at the University of Tokyo Hospital between 1 January and 31 June 2019 were selected and their electronic medical record information was reviewed. In this study, cases with cerebral haemorrhage on imaging tests performed during the hospitalisation period or in the outpatient department immediately before admission were included. Two neurosurgeons reviewed the information on the same cases and examined the association between the medicines used and the cerebral haemorrhage using three types of tools to assess the causal relationship: Ohta algorithm (an algorithm developed by the presenter), Naranjo algorithm and WHO criteria. In each case, the agreement between the two assessors and the differences in judgement results according to the assessment method were analysed.
Results: There were 144 patients whose outcome was registered as "Death" within the period. Of these, 70 had a head CT or MRI, and 14 were noted to have intracranial haemorrhage. The number of cases with concordant assessment results by the two assessors was: the Ohta algorithm 13/14 (93%), Naranjo algorithm 4/14 (29 %) and WHO criteria 3/14 (21%). There were no cases in which the two assessors' decision agreed with all three methods. The results of the evaluation of the individual items comprising the Ohta algorithm showed that there was an average of 89% (86-93%) agreement on items related to the appropriate use of drugs, temporal relationship and severity of cerebral haemorrhage, but an average of 66% (50-86%) agreement on items related to drugs used and patient background.
Conclusions: The use of the Ohta algorithm was expected to increase inter-rater agreement on the causality assessment between drugs and fatal cerebral haemorrhage. Detailed criteria for individual items would be needed for a more accurate assessment.

Honored Guest Talk 2

14-1 Inhibition of the MEK/ERK pathway for management of symptomatic vasospasm

MATHIESEN TIIT, Jesper Bomers, Lars Edvinson, Kristian Haanes

University Hospital of Copenhagen

Background:
After SAH, cerebral perfusion pressure decreases dramatically, ischemia ensues and contractor mediators become upregulated due to MEKL/ERK signaling.

Objectives:
To develop clinically feasible MEK/ERK inhibition for prevention of vasospasm and amelioration of inflammatory processes

Methods:
We have used successfully used a MEK/ERK inhibitor to ameliorate delayed ischemia after experimental SAH and now implemented it for a firs in man study.

Results:
MEK/ERK inhibition decreases vascular reactivity and experimental spasm in vivo with ensuing better neurological outcomes; preliminary observation in human trials are encouraging.
Conclusions: MEK/ERK inhibition is a potential tool to ameliorate outcome after SAH since experimental results are encouraging and clinical application is feasible in an experimental setting

Keynote Lecure 3

15-1 Influence of FLAIRectomy on survival outcome after gross total resection of glioblastoma

YUKIHIKO SONODA, Ken-ichiro Matsuda

Faculty of medicine, Yamagata Univeristy

[Background]
Glioblastoma is the most common malignant brain tumor in adults. Despite of aggressive surgery followed by Temozolomide based chemoradiotherapy, the median survival of the patients remains 18 months.
Gross total resection (GTR; complete disappearance of contrast enhancement lesion on MRI) without severe morbidity has been generally accepted as the surgery for glioblastoma. However, even the patients treated with GTR and chemoradiotherapy survived only 24 months.
Recently, several literature reported the survival advantage of *FLAIRectomy* (additional resection of FLAIR hyperintensity lesion surrounding contrast enhancement lesion) compared with GTR alone in glioblastoma patients.
[Patients and Methods]
We retrospectively analyzed 87 GBM patients including 43 males and 44 females with a median of age is 66 years old (range 27-85). All patients received GTR and chemoradiotherapy. Volumetric evaluation of pre and post operative MRI was performed both on contrast enhancement -T1 and FLAIR sequences. All patients underwent MRI within 72 h after surgery. Extent of removal (EOR) was performed according to the following formula: {1- (Post FLAIR volume / Pre FLAIR volume-Pre Gd volume)}x 100. Overall survival (OS) was defined as the time between the day of the first operation and the day of death or final follow-up. Statistical analyses were performed using the SPSS (IBM Japan, Tokyo, Japan) software. Estimates of OS were calculated with the Kaplan–Meier method, and the Log-rank (Mantel–Cox) test was used to evaluate differences between the groups.
[Results]
The median OS was 18 months (4-111). The mean (range) preoperative CE tumor volume was 39.8 (1.2–125.4) cm3, and the mean (range) preoperative FLAIR-hyperintense volume was 58.7 (0.8–148) cm3. After GTR, the mean (range) residual volume on FLAIR was 54.6 (1–182.5) cm3. On the other hand, after chemoradiotherapy, he mean (range) residual volume on FLAIR was 31.3 (1.5–141.5) cm3. There was no significant difference of OS between the patients with ≥20% *FLAIRectomy* and those with <20% *FLAIRectomy* at postoperative MRI. Similarly, more than 40%cwas not correlated with longer survival.
Only the patients with ≥60 *FLAIRectomy* after chemoradiation was significantly associated with longer OS (P=0.045).
[Coclusion]
From this analysis, the growth advantage of *FLAIRectomy* for glioblastoma patients remains unclear.
Prospective studies are required to support these findings and determine the threshold of associated
with maximal benefit in OS.

Symposium 2: Cerebro-vascular Diseases

16-1 Semi-sitting Position Surgery for Cerebrovascular Disease

SHINJITSU NISHIMURA, Makoto Saito, Sumito Okuyama, Keiichi Kubota, Atsuhito Takemura, Junko Matsuyama, Tadao Matsushima, Kazuo Watanabe

Southern TOHOKU General Hospital

【Purpose】
We have experienced 45 patients (22 cases of microvascular decompression surgery, 14 cases of brain tumor resection, and 9 cases of cerebrovascular disease surgery) of semi-sitting position surgery. Of these, semi-sitting position surgery for cerebrovascular diseases is reported.
【Subject and Method】
The subjects were 2 cases of unruptured large vertebral artery (VA) aneurysms (ANs), 1 case of unruptured peripheral AN of superior cerebellar artery, 1 case of VA AN associated with hemifacial spasm, 1 case of cerebellar arteriovenous malformation, 1 case of cerebellar cavernous hemangioma (CA), 2 cases of midbrain CA, and 1 case of cerebellar hemorrhage.
Age ranged from 41 to 63, with an average age of 54.1. 6 males, 3 females. The large VA ANs were operated with the Dorsolateral Transcondylar app., the superior cerebellar artery AN with the Occipital Transtentorial app., and the midbrain CA with the Infratentorial Supracerebellar app..
【Result】
In one case of cerebellar AVM, we were unable to take an appropriate position after anterior cervical spine fusion surgery, so we switched to the lateral position. Two large VA ANs presented with mild ipsilateral accessory nerve palsy that resolved in a short period of time, and one with midbrain CA was complicated by mild sensory disturbance on the contralateral side of the body. One patient with VA AN associated with hemifacial spasm presented with mild hoarseness and dysphagia.
In all cases, there were no venous air embolism (AE), which were an intraoperative problem, and the postoperative course were uneventful.
【Conclusion】
Semi-sitting position surgery is effective for posterior fossa vascular disease including the brainstem.
In semi-sitting position surgery, it is necessary to emphasize the prevention of intraoperative AE, and the angle of head elevation is particularly important. Close cooperation with an anesthesiologist, including meticulous hemostasis and monitoring is essential. In addition, it is important to maintain the surgical posture of the operator in order to stabilize the procedure during surgery.

16-2 Usefulness of transcranial motor evoked potential in clipping surgery for cerebral aneurysms-Introduction of a new protocol for stable monitoring-

TATSUYA SASAKI

Tohoku Medical and Pharmaceutical University

OBJECTIVE Usefulness of transcranial motor evoked potentials (Tc-MEP) in clipping surgery for cerebral aneurysms has been reported. On the other hand, numerous false positive and false negative cases were also reported. We introduced a new protocol of Tc-MEP for stable monitoring. We report usefulness of our protocol compared with direct cortical MEP (Dc-MEP) which had been considered gold standard.
METHODS Clinical materials were consecutive 351 patients who underwent aneurysmal clipping under simultaneous monitoring of Tc- and Dc-MEPs. Three hundred thirty-seven patients (ruptured 126, unruptured 211) without preoperative hemiparesis and 14 patients with ruptured aneurysms and preoperative hemiparesis were separately analyzed. In addition, intraoperative changes of Tc-MEP thresholds in affected and healthy sides were examined in the first 50 patients without hemiparesis. Stimulation strength of Tc-MEP was set +20% to stimulation threshold in which response waveforms became stable. As thresholds changed intraoperatively, thresholds were examined every 10 minutes and changed stimulation strength (120% of threshold). After dural opening, the strip electrode with 16 electrodes was inserted subdurally. Stimulation strength of Dc-MEP was set +2 mA to stimulation threshold. Then both MEPs were recorded every 10 minutes from electrodes of contralateral thener muscle.
RESULTS Stimulation thresholds of Tc-MEP were significantly decreased after craniotomy and significantly increased after CSF aspiration; these changes were larger on the craniotomy side. Recording ratio of Tc- and Dc-MEPs were 98.8% and 90.5%, respectively. Tc- or Dc-MEP was recorded in all patients (100%). Out of 304 patients whose MEP did not change, 5 patients (1.6%) developed transient or mild hemiparesis. In all 5 patients, the infarction was thought to be attributable to blood flow insufficiency of the perforating artery arising from the posterior communicating artery. In 31 patients MEP transiently disappeared after temporary occlusion of the artery or neck clipping. Three patients developed transient or mild hemiparesis, postoperatively. The other two patients without MEP recovery manifested persistent hemiparesis (MMT 2/5 and 4/5). In 14 patients with preoperative hemiparesis, 3 patients whose healthy/affected ratio of Tc-MEP were large and Dc-MEP cloud not be recorded, developed severe persistent hemiparesis.
CONCLUSIONS New protocol of Tc-MEP which followed thresholds and changed stimulation strength to +20% to thresholds is useful for stable monitoring. Usefulness of Tc-MEP is equal to or greater than Dc-MEP, because it can be monitored through the operation and both sides which enable us to evaluate a healthy/affected ratio of Tc-MEP.

16-3 Surgical Treatment strategy for Brainstem Cavernous Angiomas

TOSHIKI ENDO[1)], Shinya Haryu[1)], Yoshiharu Takahashi[1)], Tatsuya Sasaki[1)], Teiji Tominaga[2)]

[1)] Tohoku Medical and Pharmaceutical University
[2)] Tohoku University

Backgrounds:
Surgical resection is indicated when patients with brainstem cavernous hemangioma present with repeated hemorrhage and exacerbation of neurological symptoms. Achieving maximum excision of the lesions through a small incision on the brainstem and functional preservation are required in such cases.
Methods:
Since 2011, the authors have experienced surgical resection of 13 brainstem cavernous hemangiomas. The trans-fourth ventricular approach was applied for 7 cases (6 females, mean age 53.8 years), including 5 pontine and 2 medullar lesions. The surgical approach was determined by the "2-point method". This method connects the lesion's center and the point where the lesion was closest to the surface. The nerve function was protected during the operations with the aid of neuromonitoring. In addition, an angled neuroendoscope was used in 4 cases in the latter period to secure a different visual axis from that of the microscope.
Results:
The lesions were completely removed except in 1 case. The trans-fourth ventricular approach is an established surgical corridor for the cavernous hemangioma located in the dorsal pons and the medulla. Since surgeons need to remove the lesion through a small opening of the brainstem, neuromonitoring and adjunctive use of the endoscope were helpful.
Conclusion:
Selecting an appropriate surgical approach for the brainstem lesion is essential to achieve a safe and maximum degree of brainstem cavernous angiomas resections.

16-4 Development of stem cell-based therapy for ischemic stroke

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Background: Multilineage-differentiating stress enduring (Muse) cells which are endogenous non-tumorigenic stem cells exhibiting pluripotency, collectable as pluripotent surface marker, SSEA-3, from various kinds of sources such as the bone marrow, peripheral blood, and connective tissue. After transplantation, Muse cells recognize and migrate to the injured site through sphingosine-1-phosphate (S1P)-S1P receptor 2 signaling, and repair the tissue, delivering functional and structural regeneration. Based on these unique properties, the simple strategy; collect Muse cells by SSEA-3, expand them and treat patients by systemic administration, rendering gene introduction and/or induction into purposive cells in cell processing center unnecessary, is available.
Objectives: We aimed to develop Muse cell-based therapy for ischemic stroke.
Methods: We confirmed the treatment effects of Muse cell therapy using experimental stroke model in rats and mice. Then, a randomized placebo-controlled phase II trial using CL2020, a clinical-grade Muse cell-based product, was performed.
Results: Muse cells not only preferentially integrated into damaged area, but they also spontaneously differentiated into neuronal cells, extended neurites from the cortex into the spinal cord that reformed synapses with host neurons and conducted the reconstruction of pyramidal tract with pyramidal decussation as well as the sensory circuit after middle cerebral artery occlusion in rats. They also repaired neural circuits and improved neural function after subcortical infarction in rats in the subacute phase. CL2020 also demonstrated to improve neurological functions after mouse subcortical infarction. CL2020 was intravenously administered at the subacute phase (9±1 days) or chronic phase (30±1 days), and the treated animals showed stable functional recovery. After verifying the proof-of concept, we have conducted a phase II clinical trial for subacute ischemic stroke. To week 12, 24 (96%) patients in the CL2020 group experienced adverse events and 7 (28%) experienced adverse reactions (including one Grade 4 status epilepticus), compared with 10 (100%) and 1 (10%), respectively, in the placebo group. Response rate (percentage of patients with mRS ≤2 at week 12) was 40.0% (95% CI, 21.1–61.3) in the CL2020 group and 10.0% (0.3–44.5) in the placebo group.
Conclusions: Muse cell migrated into the injured site, and repaid damaged brain tissue in animal studies. The exploratory phase II study suggests that a single IV injection of the clinical-grade allogenic Muse cell product CL2020, without immunosuppressants or HLA matching, may be a safe and effective treatment for subacute stroke, with the potential to make regenerative medicine more accessible.

16-5 Optimal Strategy for Mechanical Thrombectomy Based on Preoperative Imaging Diagnosis of Thrombus Composition

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Background and Objective: The benefit of mechanical thrombectomy for large-vessel occlusion stroke has been established: however, a proportion of patients (~20%) still fail to achieve successful recanalization after mechanical thrombectomy possibly due to the underlying thrombus characteristics. We investigated whether the most appropriate thrombectomy strategy could be determined based on thrombus imaging findings.
Methods: We retrospectively studied 70 patients with acute large-vessel ischemic stroke who underwent mechanical thrombectomy. Thrombus density was measured using non-contrast computed tomography (ΔCT value) and computed tomography angiography (thrombus permeability). Difficult-to-retrieve thrombi were defined based on the cutoff values of ΔCT value and/or thrombus permeability. The primary analysis aimed to evaluate the predictors of favorable outcome (modified Rankin Scale 0–2) and successful recanalization (Thrombolysis in Cerebral Infarction scale 2b or 3). The secondary analysis evaluated the interaction between thrombus imaging diagnosis and thrombectomy strategy (stent retriever (SR) alone vs. combined strategy) on recanalization and functional outcome.
Results: Patients with favorable outcomes and successful recanalization had significantly higher ΔCT values ($p < 0.001$, $p < 0.001$) and thrombus permeability ($p < 0.001$, $p = 0.014$). Patients with unsuccessful recanalization had a higher frequency of difficult-to-retrieve thrombi than those with successful recanalization (92.3% vs. 43.9%, $p < 0.001$). The combined strategy was significantly more effective for achieving successful recanalization with a difficult-to-retrieve thrombus compared with SR alone strategy (84.2 % vs. 50%, OR 0.19, 95% CI [0.04, 0.88], $p = 0.038$), whereas the normal thrombus showed a similar response with both strategies (92.3% vs. 100%, $p = 0.394$).
Conclusions: Our data suggest that measuring thrombus density, which predicts thrombus characteristics as well as clinical outcomes, is a simple and beneficial approach to enhance the effectiveness of mechanical thrombectomy by indicating the optimal strategy.

16-6 Timing and Efficacy of Endovascular Treatment in Non-hemorrhagic Intracranial Vertebral Artery Dissection

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[Background and aim] Because Non-hemorrhagic Intracranial Vertebral Artery Dissection (nhVAD) has often favorable outcome, we may hesitate to undergo endovascular treatment. The aim of this study is to investigate the timing and efficacy of endovascular treatment (EVT).
[Methods] The clinical and radiological features of thirty-three nhVADs, which were admitted in a single institute between 2008 and 2020, were retrospectively reviewed. The mean follow-up period was 29.3 months (2-128 months). The onset forms were 6 cases of cerebral infarction, 17 cases of headache, and 10 cases of accidental. Imaging studies were DSA and MRI in 94% and MRI in the rest. EVT was determined by worsening dissection findings or findings at the time of initial diagnosis. We analyzed the radiological findings, timing and procedure-related complications of EVT and modified Rankin Scale (mRS) at 30days.
[Results] Radiological findings at the first examination were pearl & string (P&S) in 5, dilation in 23 and stenosis in 5. Of the 30 patients excluding 3 patients who underwent EVT at the first visit, radiological findings changed in 14 patients (47%), of whom 8 worsened and 6 improved. The mean period for changes in findings was 13.5 months for worsening group and 2.8 months for improving group, and there was a tendency for early changes in improving cases ($p=0.11$). However, in half of the worsening cases, the findings changed within 3 months. EVT was performed in 9 patients, including reconstructive stent coil embolization (SAC) in 3 at the initial diagnosis, PTA in 1 with early occlusion, and internal coil trapping (1) and SAC (4) in 5 with enlarged changes. All patients underwent EVT were within 2 weeks from the first visit. 3 patients had postoperative minor stroke, but all patients, including the untreated group, had a good outcome with mRS 0-2.
[Conclusions] The outcome of EVT is also comparable to the natural course. Radiological findings of nhVAD often change within 3 months from the onset, and frequent imaging examinations are recommended in this period. The outcome may improve by performing EVT as early as possible, when dissection findings worsen.

Masters Lecture 2

17-1 Subtemporal approach for mesial temporal lesion

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The subtemporal approach should be mastered as one of the Neurosurgical options.
Familiarize yourself with venous perfusion of the temporal lobe before surgery. It is also important to determine the extent and skin incision required to remove the temporal base in craniotomy. The superficial vein flows anteriorly into the superficial middle cerebral vein and posteriorly into the transverse sinus via the Labé vein, but there are many variations. In particular, when the sphenobasal vein or sphenopetrosal vein runs under the temporal lobe and enters the middle skull base dura, or when the Labé vein flows into the transversal sinus sigmoid sinus junction or the superior pyramidal sinus. For venous ablation, cerebrospinal fluid is gradually drained while the temporal lobe is elevated. However, the problem is that the dural perfusion site cannot be identified on preoperative images. Since the angle at which the microscope optical axis enters varies depending on the course of the vein, the oculomotor nerve should be confirmed when opening the ambient cistern, then the posterior communicating artery from the posterior cerebral artery P2 to the internal carotid artery, and the anterior choroid plexus artery. By the time the operation in the diversion tank is completed, the cerebrospinal fluid is discharged and the ventricle can be opened. When using a brain spatula, it is important to adjust the pressure and usage time during surgery. This basic procedure can be applied depending on the position and size of the tumor.
The subtemporal approach can resect lesions in the medial temporal lobe without damaging the association fiber through a safe intraoperative procedure based on careful preoperative planning.

Oral Session 4 & Kyenote Lecture 4

18-1 Minimally Invasive Spine Surgery in an Ambulatory Surgery Setting

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Over the past 15 years, there has been a gradual shift from spine surgeries being performed in hospitals to ambulatory surgery centers (ASC's). ASC spine surgeries have been shown to be safe with the same or improved outcomes compared with the same procedures performed in the hospital setting. Our experience in outpatient spine surgery at Honolulu Spine and Orthopedic Center began in 2005 with lumbar microdiscectomy and gradually other procedures such as lumbar laminotomy, anterior cervical diskectomy and interbody fusion (ACDF), cervical disk arthroplasty, cervical micro-foraminotomy, single position extreme lateral interbody fusion (XLIF), trans-facet lumbar interbody fusion (TLIF), and more recently posterior trans-psoas interbody fusion (PTP) have been successfully implemented. Case examples will be discussed including patient selection and pitfalls to avoid. The advancement of minimally invasive spine surgery (MIS) combined with improved Instrumentation, anesthesia, neurophysiologic monitoring, patient demand, and cost savings will continue to drive increased utilization of ASC's in the future.

18-2 Surgical treatment of thoracolumbar burst fracture with neurological symptoms

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There are cases in which neuropathy occurs during the course of vertebral fractures caused by falls. In particular, vertebral burst fractures, which are considered unstable fractures, and reverse Chance fractures with DISH (diffuse idiopathic skeletal hyperostosis) may cause serious neuropathy if fixation including decompression is not performed at an appropriate time. We report three cases who underwent surgical treatment.
Case1 is a 64-year-old woman. She slipped down the stairs and was injured. She was diagnosed as Th12 vertebral compression fracture by MRI and she started conservative treatment. A few days later, she felt numbness and pain in both thighs, and 5 days after her injury, MRI showed progressive spinal cord compression. Her symptoms had developed due to spinal cord compression of Th12 vertebral burst fracture. She underwent Th12 corpectomy with trans-thoracic approach and anterior screw fixation.
Case2 is a 92-year-old woman. She fell down in the toilet, developed back pain, and was carried to the emergency room. She was diagnosed as L1 burst fracture. Although she was very old, she had a good verbal response and no dementia. After her injury she developed numbness in her toes. Because she was very old, we avoided screw fixation, created a corset, and underwent vertebroplasty (BKP/Balloon Kyphoplasty)) while resting on bed for about a month to treat osteoporosis. Postoperatively, lumbago disappeared, she practiced sitting and standing, was able to walk with a walker, and was discharged from the hospital.
Case3 is a 69-year-old man. He fell and was unable to move with back pain, and was carried to the hospital the next day. He was diagnosed with L1, Th12 vertebral fractures by MRI and was discharged 28 days after wearing corset. After that, the lower back pain gradually worsened, and left leg pain and left leg muscle weakness appeared. Spinal cord compression in the Th12 and L1 regions were revealed in MRI, and the findings of DISH in CT, and fractures of the L1 vertebral body and pedicles. Fracture type was diagnosed as reverse Chance fracture.
First, decompression of the compressed part (partial laminectomy), and vertebroplasty (BKP) of the fractured part, then PPS (percutaneous pedicle screw) (12 pieces) above and below the fractured part, Rod fixation and bone grafting were performed. Postoperatively, his lower extremity paralysis improved and he was discharged from the
hospital on his own with a cane.

18-3 Epidural hematoma in the cervical spine

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(Background) The symptoms of the cervical epidural hematoma (CEH) are similar to the cerebrovascular disease, but posterior neck pain is seemed to be a key symptom. CEH is rare and the guideline for the surgical intervention and the proper timing is not clear. There are cases in which the myelopathy improves rapidly, and in which myelopathy gradually worsens due to compression of the CEH, which makes the strategy difficult.
(Objectives) In our institution, more than 600 cerebrovascular disease patients per year are treated. Therefore, we guessed that many CEH patients were transported by ambulance and retrospectively investigated the CEH patients who admitted in our hospital with or without the surgical intervention.
(Methods) Since 2009, 13 patients (man: 5, woman: 8) were admitted to our hospital. The average of the age was 70.2 years (55-84). 9 patients were idiopathic and 4 were secondary with antiplatelet agents or anticoagulants. Pre-operative ASIA score was B in 4, D in 5, and E in 4. The volume of the CEH was accessed with magnetic resonance imaging on T2 on admission. The CEH occupancy rate in the spinal canal was calculated at the thickest level. The removal of the CEH was performed in 8 patients (Asia score B: 4, D; 3, E:1). The average of the interval between the onset to the operation was 9.1 hrs (range 4.5 to 24 hrs).
(Results) In all cases, the CEH compressed the spinal cord and changed the shape of the spinal cord. The average of the CEH occupancy rate was 40% (range 27.0-55.6%). 12 patients without one were neurologically almost fully recovered. The 81 years-old woman suffered from sudden right hemiplesia and severe neck pain and was transported to the another hospital and cerebrovascular disease was suspected. Finally, the patient was transported to our hospital. MRI demonstrated severe cord compression due to the CEH and diffuse high signal on T2 images at C4-7. Emergent surgery was performed 11 hours after the onset, but right hemiparesis remained.
(Conclusions) Cervical spinal cord is very delicate and not reversible when the spinal cord injury occurs. Naturally, surgical intervention is needed for severe ASIA score patients and we believe that it can lead the excellent results in thick CEH patients in high cervical spine even if low ASIA score patients.

18-4 Long-term recurrence after surgery for schwannoma of the cauda equina

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Background:
Cauda equina tumors are rare primary spinal tumors. Histologically, the most common tumor type arising from the cauda equina is schwannoma; however, little is known about the long-term outcomes of cauda equina schwannoma after surgical resection. Here, we describe the median-to-long-term postoperative outcomes of patients with schwannoma of the cauda equina.
Methods:
Between July 2007 and September 2020, 14 surgeries were performed in 13 patients with cauda equina schwannoma at our institution. Among them, we present eight cases of patients who were followed up for more than 40 months after surgery. Preoperative symptoms, modified McCormick scale, tumor size and location, extent of resection, treatment of the tumor-involved nerve root, and postoperative observational time were retrospectively analyzed.
Results:
There were five males and three females, and the average age at surgery was 56.5 years. Gross total resection was achieved in all patients. Adjuvant therapy was not administered. The involved nerve root was sacrificed in seven patients and partially resected in one. During a median follow-up of 108 months, recurrence was identified in one patient 164 months after surgery.
Conclusion:
Cauda equina schwannoma may recur > 10 years after surgery. Radical resection of the tumor, including the involved nerve root, during the first surgery and long-term postoperative follow-up are necessary.

18-5 Key points of XLIF surgery Experience with over 160 cases

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The authors has performed more than 300 XLIF cases from 2017 to 2022. The speaker will present the basic points of more than 160 surgeries that he has experienced. The number of patients who underwent XLIF was 146, excluding cases of XLIF corpectomy, and in which TLIF and Fenestration were performed simultaneously. There were 65 males and 81 females with a mean age of 71.8 years. Seventy patients were fixed in one level, 42 in two levels, and 34 in three or more lecvels. Fixation of three or more levels was initially performed in two stages, but recently it has been performed in one stage. The patient is positioned in the lateral decubitus position and a one-port approach is made under a microscope. A transverse incision of 4 cm is made up to 2 levels and 6 cm for 3 or more levels. The fat layer under the transversus abdominis fascia is covered by the lateral conus fascia and the posterior renal fascia, which are dissected to identify the quadratus lumborum muscle. If this muscle is identified, this space is extra-posterior pararenal extraperitoneal space and the vital organs are located within the fat and there is no risk of organ injury. Next, it reaches the psoas major muscle, and although it often enters the fat layer, carefully expose the psoas major muscle. After this, avoid the lumbar plexus and proceed with the surgery. Even in cases where the iliac crest and ribs were in the operative field, an XLIF was possible using an angled device. Results : The average operative time was 2 hours and 08 minutes for one level, 2 hours and 46 minutes for two levels, 4 hours and 29 minutes for 14 patients with three or more levels who underwent a two-stage procedure, and 3 hours and 41 minutes for 20 patients who underwent a one-stage procedure. Bleeding averaged 18 cc in one level, 20 cc in two levels, 70 cc in three or more levels in the 14 patients who underwent twe-stage operation and 66 cc in three or more levels in the 20 patients who underwent one-stage. Complications included deviation of the cage during the waiting period in 2 of the 2 patients who underwent 2-stage procedures, and the cage was fixed after reinsertion. In another case, a vertebral fracture was observed due to a fall during the waiting period, but no other treatment was necessary because the patient was fixed. In one case of 2-vertebral fusion, a herniated disc appeared and was removed. In one case, a compression fracture occurred one month after operation, and the cage moved, and reinsertion. There were no serious complications such as intestinal injury. Pre- and postoperative ODI improved from 47.5 to 15.6, JOA improved from 12.8 to 23.1, and VAS improved from 7.1 to 2.1. Discussion and Conclusion: By entering extra-posterior pararenal extraperitoneal space, we were able to reduce serious complications. Using a microscope, the wound was small, there was little bleeding, the procedure was minimally invasive, and the improvement in symptoms was excellent.

18-6 Calcifying pseudoneoplasm of filum terminale with tethered cord syndrome

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【Introduction】 There are few reports of calcifying pseudotumors occurring in the dura mater, and it is a very rare disease. We report calcifying pseudotumor of the filum terminale which developed with tethered cord syndrome in adult.
【Methods】 38 year old female. She visited our department with lower back pain and lower extremity pain gradually worsening from about 1 year ago. At the first visit, paresthesia was found in the distal muscle of the left lower limb. CT and MRI showed tumorous lesions accompanied by strong calcification at the L2 vertebral body level. The low set conus was not found on the image findings, and the relationship between the tumor and the filum terminale could not be clearly identified, and surgery was performed under suspected cauda equina tumor.
【Results】 During surgery, we found the tumor was generated from the spinal filum terminale, and the tumor was gross total removed together with the filum terminale. When the filum terminale was cut, it was towed to the cranial side and we had confirmed the cord was tethered. In the initial pathological findings, the tumor was diagnosed as Myxopapillary ependymoma, but the final pathological diagnosis was Calcifying pseudoneoplasm of the neuraxis, the adipocyte was proliferation in the filum terminale, and it was diagnosed as the filum terminale lipoma. Symptoms improved with 3 months postoperative evaluation.
【Discussion】 Calcified pseudotumor occurs frequently in the patient undergoing renal dialysis, with renal dysfunction, abnormalities in calcium, phosphate, or vitamin D metabolism. The patient described in this report had normal calcium and phosphate levels, as well as normal renal function. And it is generally thought to occur in the heart, lungs, kidney and stomach. Although there are several reports of cases of spinal lesion, only one case in the past report occurred in the dura mater. We mistook the initial diagnosis because the preoperative image was judged to be a cauda equina tumor and the first pathological findings diagnosed as Myxopapillary ependymoma. In addition, although it was difficult to suspect her symptoms caused by the tethered cord syndrome because the low set conus was not recognized in the preoperative image evaluation, it was a reflection point that detailed interview and neurosurgical examination which suspected this syndrome before operation were not done.
【Conclusion】 We reported a very rare calcifying pseudotumor of the filum terminale developed with tethered cord syndrome in adult.

18-7 Risk Factors of Subsidence after Anterior Cervical Discectomy and Fusion with Cylindrical Cages for Cervical Degenerative Disease: Minimum 2- year Follow-up Results

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Cylindrical cages have been shown to cause subsidence after anterior cervical discectomy and fusion (ACDF); hence, they were gradually replaced by box-shaped cages. However, this phenomenon has not been fully proven due to limited information and short-term results. Therefore, this study aimed to clarify risk factors for subsidence after ACDF using titanium cylindrical cages with mid-term follow-up periods. This retrospective study included 49 patients (76 segments) diagnosed with cervical radiculopathy or myelopathy caused by disc herniation, spondylosis, and ossification of the posterior longitudinal ligament. These patients underwent ACDF using cages from January 2016 to March 2020 in a single institution. Patient demographics and neurological outcomes were also examined. Subsidence was defined as a >3-mm segmental disc height decrease at the final follow-up lateral X-ray compared to that on the next day postoperatively. Subsidence occurred in 26 of 76 segments (34.7%) within follow-up periods of approximately 3 years. Multivariate analysis using a logistic regression model demonstrated that multi-segmental surgery was significantly associated with subsidence. The majority of patients achieved good clinical outcomes based on the Odom criteria. This study showed that multi-segmental surgery was the only risk factor of subsidence post-ACDF with cylindrical cages. Despite the relatively high subsidence rates, the clinical outcome was almost good at least during the mid-term period.

Oral Session 5: Miscellaneous

19-1 Comparing the Transcriptome Profile of the Middle Cerebral Artery between the RNF213 genotypes in the Patients with Moyamoya disease

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Purpose:
Ring finger protein 213 (*RNF213*) is a sensitivity gene for Moyamoya disease (MMD); *RNF213* c.14576G>A variant is detected in nearly 80% of Japanese patients with the odds rate > 250. Furthermore, in clinical characteristics, *RNF213* c.14576G>A variant has been shown to correlate with the development of periventricular anastomosis, the degree of post-operative indirect revascularization, and disease progression. However, the pathophysiological difference in MMD with or without *RNF213* c.14576G>A variant has not been clarified. The aim of this study was to investigate the influence of *RNF213* c.14576G>A variant on the transcriptome profile in the middle cerebral artery (MCA) of MMD.
Material and Methods:
Micro-samples of MCA were collected from 10 patients with MMD during the superficial temporal artery to MCA anastomosis. Seven patients had the heterozygous *RNF213* c.14576G>A variant and 3 patients had wild-type *RNF213*. Using RNA-sequencing analysis, the transcriptomes of MCA were compared between *RNF213* c.14576G>A variant group and *RNF213* wild-type group. In addition, Gene Ontology analysis was applied to predict the functions of differentially expressed genes (DEGs).
Results:
Comparison of MCA gene expression between *RNF213* c.14576G>A variant group and *RNF213* wild-type group by RNA-sequencing analysis revealed that 67 genes were significantly up-regulated ($q < 0.05$, fold change > 2) and 3 genes were significantly down-regulated in the MCA of *RNF213* c.14576G>A variant group. Gene Ontology analysis of DEGs suggested the involvement of chemotaxis, response to lipopolysaccharide, and positive regulation of leukocyte differentiation, as possible associated biological functions.
Conclusions:
The MCA transcriptome from MMD patients with *RNF213* c.14576G>A variant had some difference from those with *RNF213* wild-type, and the predicted biological functions of DEGs were consistent with previous in vivo experimental results. Our results could be a clue for understanding the role of *RNF213* on the pathophysiology of MMD, however, further validations or investigation are needed.

19-2 What is important for favorable outcome of mechanical thrombectomy for mild cerebral infarction with NIHSS<6: K-NET sub-analysis

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OBJECTIVE: Effective factors of mechanical thrombectomy (MT) for mild cerebral infarction has not been established. In this study, we examined such factors for good outcomes of MT in patients with mild cerebral infarction (NIHSS<6 points).
METHODS: Consecutive patients with preoperative NIHSS <6 points enrolled in the K-NET registry (multicenter prospective study), who underwent MT at 40 facilities in Kanagawa between February 2018 and December 2021, were included. Background factors and clinical outcomes were retrospectively evaluated. We also identified what factors were associated with a favorable outcomes.
RESULTS: Of 1763 patients enrolled in K-NET registry who underwent MT, 134 patients were included in this study. The median NIHSS and DWI-ASPECTS were 3 and 9 points respectively. TICI2b-3 and mRS0-2 after MT were 89.6% and 78.4% respectively. Intracranial bleeding was 4.4% (all patients were asymptomatic), and mRS6 was 5.2% (no patients died from procedure events). Comparing patients with mRS 0-2 to 3-6, 2 or less passes of thrombectomy devices were associated with a favorable outcome (88.8 vs 63.3%, p=0.0040, Odds ratio 3.6 (1.03-12.5)). No significant differences were found as to age (median 72 vs 79 years, p=0.14), site of occlusion (LVO: 48.1 vs 51.5%, MeVO: 40.1 vs 36.4%, vertebrobasilar artery occlusion: 11.3 vs 12.2%), intracranial hemorrhage (3.8 vs 9.1%, p=0.35), procedure time (54 vs 58 minutes, p=0.18).
CONCLUSION: MT for mild cerebral infarction could be performed safely, especially fewer passes of MT might be important to achieve a good outcome.

19-3 Spatial projection ratio using 3D geometry to differentiate rupture status

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Background:
Aneurysm shape indices such as aspect ratio, projection ratio and size ratio have been reported as useful indicators for evaluating rupture risk. However, these shape indices have a particular bias because the variables are measured on 2D images.
Objectives:
To realize a more accurate evaluation of aneurysm geometry, we developed a novel shape index, spatial projection ratio (SPR) as an indicator to diagnose aneurysm rupture status.
Methods:
We examined the location of the aneurysm and primary measurements such as maximum size and dome volume in 271 ruptured and unruptured cerebral aneurysms diagnosed 3D-CT angiography. In addition, morphological characteristics were analyzed by shape indices including SPR. The center of gravity of the neck orifice and the projection point that was the farthest point from the gravity point were figured using Mimics Innovation Suite 24.0 (Materialise, Leuven, Belgium), and the length between the two points was defined as dome projection length (DPL). SPR was calculated by dividing DPL by the equivalent diameter of the neck orifice. Statistical analysis was made using EZR software (Saitama Medical Center, Jichi Medical University, Saitama, Japan). Kruskal-Wallis test was conducted for the aneurysm location. Brunner-Munzel test was performed to evaluate the differences between the unruptured and ruptured groups.
Results:
There were no significant differences in age, gender and the location of the aneurysm. The maximum size and the dome volume of the ruptured group had significantly higher than those of the unruptured group. In addition, significant differences were found in all shape indices including SPR. The ROC curve analysis revealed that SPR had the highest area under the curve (0.789, 95%CI 0.731-0.848, $P<0.01$).
Conclusions:
SPR was the most reliable morphological indicator to diagnose the aneurysm rupture status, which might be related to the hemodynamics and rupture risk.

Poster Session

P-1 Plasma ACTH levels at the onset of SAH may be a predictive marker for symptomatic vasospasm occurrence.

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Background: Symptomatic vasospasm (SVS) is a major cause of morbidity and mortality in aneurysmal subarachnoid hemorrhage (SAH), and serum sodium frequently decreases before SVS. Serum sodium changes might be regulated by sodium metabolism-related hormones. Therefore, in this multi-institutional study, we investigated the relationship between sodium metabolism-related hormones and SVS, and sought to find the predictors of SVS occurrence among sodium metabolism-related hormones by multiple logistic regression analysis.
Methods: SAH patients were treated with clipping or coiling from September 2017 to March 2021 at five hospitals.
The laboratory data of 155 SAH patients were collected over 14 days and correlations between sodium metabolism-related hormones (plasma adrenocorticotropic hormone (ACTH), serum cortisol, plasma arginine vasopressin (AVP)), and SVS were investigated. Serum sodium concentrations were
measured every day and serum sodium levels >135 mEq/L were maintained until day 14.
Results: Of the 155 patients, 22 developed SVS within 14 days of subarachnoid hemorrhage onset (SVS group)
and 133 did not suffer from SVS (non-SVS group). Circulating AVP, ACTH, and cortisol concentrations were
significantly higher on day 1 in the SVS group compared with the non-SVS group. Multiple logistic regression analysis showed that only ACTH on day 1 was associated with SVS occurrence.
Conclusions: Elevated levels of ACTH on day 1 may be a predictive marker for the occurrence of SVS.

PPNC Poster

P-2 Hemodynamic characteristics of plaque rupture of carotid stenosis

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Background:
The plaque rupture of carotid stenosis is a significant pathology of cerebral infarction. Previous computational fluid dynamics (CFD) using MRI showed that high wall shear stress (WSS) influences plaque vulnerability. In addition, stress analysis revealed that pressure might be the main mechanical trigger for plaque rupture. However, the clinical mechanism of plaque rupture has not been fully examined.
Objectives:
We evaluated hemodynamics using CFD to clarify the mechanism of the plaque rupture in a patient with carotid stenosis.
Methods:
A 78-year-old patient with asymptomatic severe right carotid stenosis had a cerebral infarction during his follow-up period. 3D rotational angiography (3DRA) revealed ulcer formation that was not observed in the initial examination. Plaque rupture area (PRA) was defined by superposing images between the initial and the onset geometry using 3-matic (Materialise, Leuven, Belgium) and patient-specific geometry was output as stereolithography. The computational hybrid mesh was generated with tetrahedral and prism elements (ANSYS ICEM CFD 2020R1, ANSYS, Inc., Canonsburg, PA, USA). Transient analysis was performed with the patient-specific blood flow rate using a commercially available CFD package (ANSYS CFX 2020R1; ANSYS Inc.). For the fluid domain, 3D incompressible laminar flow fields were obtained by solving the continuity and Navier-Stokes equations. Blood was assumed to be an incompressible Newtonian fluid with a blood density of 1,056kg/m^3 and a blood dynamic viscosity of 0.0035 Pa·s. The time steps were 0.0001 seconds and traction-free boundary conditions were applied to the outlets. WSS, oscillatory shear index (OSI) and pressure were calculated at PRA and stenotic segment.
Results:
The WSS at PRA was 20 Pa which was around three times higher than that at the stenotic segment. In addition, PRA coincided with the region of low OSI and high pressure gradient.
Conclusion:
This study demonstrated that PRA were localized at a unique hemodynamic region including high WSS, low OSI and high pressure gradient. This is the first report of hemodynamic evidence for plaque rupture using a patient-specific geometry model. These hemodynamic characteristics may bring a better understanding of plaque rupture mechanism and become a potential parameter for predicting future events.

P-3 Genetic features and clinical outcome of spinal cord glioma

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Background

The World Health Organization (WHO) classification, updated in 2021, puts more focus on various genes, molecules, and pathways for diagnosis, as well as histological findings. The genetic analysis of intracranial gliomas is quite well developed, whereas the clinical significance of genetic mutations of spinal gliomas remains unclear due to their low frequency of occurrence.

Objectives

We review the cases of spinal glioma treated at our institution, classifying them according to the WHO 2021 guidelines.

Methods

The study included cases of spinal cord glioma treated at the Nagoya University Neurosurgery Department between January 2016 and October 2022. We reviewed their pathological and genetic characteristics and the clinical course of the disease.

Results

A total of 12 patients were included in the study, with five grade 1, four grade 2, and three grade 3/4 patients according to the WHO classification. Among 4 cases of grade 2 diffuse astrocytoma, 2 cases were found to have IDH mutations (IDH1 R132c and IDH1 R132H). In grade 3/4 astrocytoma, H3F3A mutation was found in all 3 cases. During the follow-up period, all grade 3/4 patients died, while grade 1/2 patients showed gradual worsening of symptoms, while the patients with IDH mutations followed a stable course relatively.

Conclusion

As previously reported, spinal gliomas with the H3F3A mutation are associated with a poor prognosis. Conversely, the presence of IDH mutations, which have rarely been reported in spinal gliomas, was associated with a relatively favorable functional prognosis.

P-4 Moyamoya disease-specific extracellular vesicle-derived microRNAs in the cerebrospinal fluid as revealed by comprehensive expression analysis through microRNA sequencing

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Background

Studies on extracellular vesicles (EV)-derived microRNAs(miRNAs) in the cerebrospinal fluid (CSF) in moyamoya disease are limited

Methods

We examined the specific changes that occur in the expression levels of EV-derived miRNAs in intracranial CSF in moyamoya disease. Patients with arteriosclerotic cerebral ischemia were used as controls to eliminate the effects of cerebral ischemia. Comprehensive expression analysis of miRNAs extracted from EVs by next-generation sequencing (NGS) and validation by quantitative reverse transcription-polymerase chain reaction (qRT-PCR) was performed.

Results

Experiments were conducted on eight cases of moyamoya disease and four control cases. In the comprehensive miRNA expression analysis, 153 miRNAs were upregulated and 98 miRNAs were downregulated in moyamoya disease compared to the control (q-value < 0.05 and |log2 fold change| > 1). qRT-PCR performed on the four most valuable miRNAs (hsa-miR-421, hsa-miR-361-5p, hsa-miR-320a, and hsa-miR-29b-3p) associated with vascular lesions among the differentially expressed miRNAs gave the same results as miRNA sequencing. In GO analysis for the target genes, cytoplasmic stress granule was the most significant GO term.

Conclusions

This study is the first comprehensive expression analysis of EV-derived miRNAs in the CSF of moyamoya disease patients using NGS. The miRNAs identified here may be related to the etiology and pathophysiology of moyamoya disease.

P-5 Spinal glomus AVM presenting solely with groin pain: A case report

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University of Yamanashi

Background

Spinal glomus arteriovenous malformations (AVMs) are rare and can cause spinal hemorrhage or myelopathy. Here, we report a rare case of spinal glomus AVM presenting with groin pain due to nerve root compression by a feeder aneurysm.

Case report

A 41-year-old female was referred to our hospital with initial right groin pain that had worsened over two months. Magnetic resonance imaging showed intra- and extramedullary abnormal flow voids at the T11-12 level, and spinal angiography revealed an intramedullary AVM, with extramedullary protrusion of an aneurysm on the feeder vessel, which arose from the sulcal artery of the anterior spinal artery. As compression of the right L1 nerve root by the aneurysm was the likely cause of the patient's pain, endovascular embolization was performed. The feeder aneurysm disappeared after partial n-Butyl 2-cyanoacrylate embolization and the groin pain disappeared immediately after treatment. Her clinical status has been stable with no recurrence during one year of follow-up.

Discussion

Radiculopathy associated with spinal AVMs is extremely rare, and only one case of juvenile type AVM has been reported. In the present case, a prenidal aneurysm of a radiculopial artery at the T12 level caused severe radicular pain. Although complete occlusion of the nidus could not be achieved, endovascular treatment was effective because the radicular pain disappeared immediately after the treatment, without any complications.

Conclusion

This is the first report of glomus-type AVM presenting with radiculopathy alone. One should not overlook the possibility of spinal AVM among patients with groin pain.

P-6 Usefulness Of Serum Soluble Interleukin-2 Receptor Levels For Differentiating Between PCNSL And SCNSL

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Serum soluble interleukin-2 receptor (sIL-2R) is a practical tumor marker that is elevated in hematogenous tumors. The purpose of this study was to determine the usefulness of serum sIL-2R for differentiating among malignant brain tumors, including primary central nervous system lymphoma (PCNSL) and secondary central nervous system lymphoma (SCNSL). This studyretrospectively investigated the sIL-2R levels in 130 patients with various types of malignant brain tumors, including PCNSL patients (n = 48) and SCNSL (n = 8); metastatic brain tumors (MTs, n = 16); and glioblastoma (GBM, n = 58).The median sIL-2R level (U/mL) of the PCNSL, SCNSL, MTs, and GBM groups were 489.7, 1024.8, 413.3, and 332.7 respectively. The sIL-2R level was significantly higher in the SCNSL group than in the PCNSL or other groups.The area under the ROCcurve generated from the sIL-2R level was 0.826 (sensitivity: 0.875, specificity: 0.667, cutoff value: 521 U/mL) for differentiating SCNSL from PCNSL and 0.685 (sensitivity: 0.667, specificity: 0.707, cutoff value: 342 U/mL) for differentiating PCNSL from GBM. Measurement of sIL-2R level was convenient and useful to differentiate between SCNSL and PCSNL, both of which demand different treatment strategies.

P-7 Flow diverter treatment for hemifacial spasm due to unruptured vertebral artery fusiform aneurysm

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[Introduction]
Hemifacial spasm (HFS) is usually caused by mechanical compression of the facial nerve root at the root exit zone (REZ). The most common etiology is compression by an arterial loop of the anterior or posterior inferior cerebellar artery. However, other compressive pathologies can induce HFS, and 0.2-0.5% of the cases are caused by saccular or fusiform vertebral artery aneurysms. HFS due to a saccular aneurysm is commonly treated by a combination of aneurysm neck clipping and microvascular decompression (MVD). However, aneurysm neck clipping is difficult to perform in fusiform aneurysms. Therefore, MVD alone and parental artery occlusion have been previously performed despite the associated risks of future aneurysm rupture and ischemic complications, respectively.
Flow diversion reduces blood inflow into aneurysms while preserving the parent arteries, and have recently emerged as a treatment option for complex intracranial aneurysms, including fusiform aneurysms. Here, we present a case of HFS caused by an unruptured vertebral artery fusiform aneurysm that was treated with flow diversion treatment, resulting in completely cure of the aneurysm and symptoms.
[Clinical presentation]
A 46-year-old man was referred to our hospital with phasic type HFS from the right lower eyelid to the cheek for six months. MR imaging and angiography showed compression of the right facial nerve REZ by an unruptured right vertebral artery fusiform aneurysm. Flow diversion was performed for a fusiform aneurysm with a maximum diameter of 10 mm in the V4 portion of the right vertebral artery. We selected a 3.5 mm × 30 mm Pipeline Flex Embolization Device with Shield Technology (Medtronic Inc.), which was deployed over the neck of the aneurysm on Digital subtraction angiography (DSA). Immediately after treatment, an eclipse sign was observed in the aneurysm, and the HFS disappeared. DSA performed 3 months after surgery showed that the aneurysm had disappeared and there was no recurrence of HFS.
[Discussion]
In the past, treatment of HFS caused by vertebral artery fusiform aneurysms often required the sacrifice of the parent arteries. This is the first report of a case in which HFS and aneurysm disappeared after flow diversion with preservation of the parent artery. However, the pathological mechanism of HFS resolution is not fully understood, and more cases and longer follow-up periods are needed to determine whether flow diversion is as effective as MVD alone or PAO for HFS caused by fusiform aneurysms.

P-8 Tirabrutinib, a second-generation BTK inhibitor in relapsed and refractory primary CNS lymphoma: A single institute study

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BACKGROUND: The prognosis of relapsed and refractory (r/r) primary CNS lymphoma (PCNSL) is poor, and the development of new therapeutic agents is desirable. Comprehensive genetic analysis of PCNSL has shown that MYD88 and CD79B are frequently mutated and are oncogenic drivers, suggesting that Bruton's tyrosine kinase (BTK), which is located downstream of MYD88 and CD79B, may be a reasonable therapeutic target. Tirabrutinib is a second-generation oral BTK inhibitor recently approved in Japan for the treatment of r/r PCNSL. Aim: In this study, we evaluated the efficacy and safety of tiraburtinib treatment of r/r PCNSL at Saitama Medical University.
METHODS: Twenty-four patients with r/r PCNSL to HD-MTX-based regimens were treated with 480 mg tiraburtinib daily under fasting conditions until disease progression.
RESULTS: The median age was 70.5 years, and the median KPS was 70. Eleven patients (45.8%) achieved a CR, 5 (20.8%) had a partial response, 3 (12.5%) had stable disease, and 5 (20.8%) had progressive disease. After a median follow-up of 18.9 months, the median progression-free survival was 7.9 months, and the median overall survival was 23.6 months. There were two cases of long-term treatment lasting more than two years. Grade 3 or higher adverse events were observed in 1 case of maculopapular rash, 1 case of cardiac failure, 1 case of neutropenia, 1 case of thrombocytopenia, 1 case of lymphopenia, 1 case of lung infection, 1 case of seizure and 1 case of subdural hematoma.
CONCLUSIONS: Tiraburtinib can be administered relatively safely to patients with relapsed or refractory PCNSL, and a certain degree of efficacy can be expected. Which patients can be treated with tiraburtinib over the long term, when can stop tirabrutinib treatment for patients with long-term CR, and the mechanism of tiraburtinib resistance needs to be determined.

P-9 Transarterial embolization from a pial feeder of tentorial dural arteriovenous fistula

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Background:
The presence of a pial feeder is an important strategic factor in the embolization of dural arteriovenous fistula (dAVF). In other words, blood congestion in a pial feeder during the embolization may lead to intracerebral hemorrhage, which must be avoided as much as possible. In this report, we describe a case in which complete occlusion of dAVF with a pial feeder was achieved safely by transarterial embolization.

Case:
A 36-year-old male presented with headache, dyslexia, and right homonymous hemianopsia. Computed tomography showed intracerebral hemorrhage in the left temporal lobe. Angiography revealed the lateral type of tentorial dAVF which was supplied by both pial feeder from the posterior cerebral artery (PCA) and dural feeders from the middle meningeal artery (MMA), posterior meningeal artery (PMA), and occipital artery (OA), drained directly into the cortical veins. Transarterial embolization was performed to prevent rebleeding. First, Marathon, a flow-guide catheter, was advanced to the pial feeder of the PCA, and reached just proximal to the shunt point. We injected 20% NBCA, resulting in the disappearance of the shunt. Although external carotid angiography showed that the shunt from dural feeders had also disappeared, additional embolization of the MMA was performed with 17% NBCA to ensure the complete occlusion of the shunt. Postoperative MRI diffusion-weighted images showed a spotty ischemic lesion in the occipital lobe cortex near the lesion, but the patient was discharged without any new neurological symptoms. There has been no recurrence on follow-up for 20 months.

Discussion:
It has been reported that 11-24% of dAVF with pial feeders are associated with a high complication rate in transarterial embolization procedures. This may be caused by bleeding from a residual shunt point from pial feeders after embolization of dural feeders. In this report, we describe a case in which complete occlusion of the pial feeder was achieved safely by transarterial embolization.

P-10 Nonconvulsive status epilepticus due to pneumocephalus after suprasellar arachnoid cyst fenestration with transsphenoidal surgery

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Background: Nonconvulsive status epilepticus (NCSE) has been documented to rarely occur in patients undergoing neurosurgical procedures. Most cases have cerebral parenchymal damage incurred by surgical morbidity or the primary lesion. NCSE requires prompt diagnosis and treatment for reducing cerebral damage. Here, we report an extremely rare case of suprasellar arachnoid cyst presenting with NCSE after cyst fenestration with transsphenoidal surgery, and discuss a potential etiology of NCSE.
Case presentation: A 61-year-old man presented with visual impairment and was diagnosed with a suprasellar arachnoid cyst on magnetic resonance imaging (MRI). The patient received cyst fenestration with endonasal transsphenoidal surgery. His visual symptoms improved immediately after the operation and the suprasellar cyst shrank; however, pneumocephalus was found around the bilateral frontal lobe, associated with intraoperative cerebrospinal fluid (CSF) leakage. On postoperative day 3, semicoma suddenly appeared and was prolonged. Emergency MRI showed slightly high signal in the bilateral frontal cortex on diffusion weighted imaging (DWI) and arterial spin labeling perfusion imaging (ASL-PI). Electroencephalography (EEG) also appeared generalized slow wave activity, the patient was diagnosed with NCSE based on MRI and EEG findings. The administration of antiepileptic drugs (AEDs) improved his clinical symptoms and the abnormal findings on MRI and EEG, and his consciousness gradually recovered. The patient was subsequently discharged without any neurological deficits or seizure recurrence.
Discussion: Although EEG and AED tests are generally used to diagnose NCSE, MRI sequences, such as ASL-PI and DWI, are also helpful in diagnosing NCSE and confirming the effectiveness of treatment. The findings of ASL-PI hyperperfusion with cortical hyperintensity on DWI indicate the epileptogenic lesion and related activated cortex. These MRI findings in patients with acute status epilepticus are transient; their complete disappearance on both ASL-PI and DWI was confirmed several days after the start of treatment.
Regarding the pathogenesis of postoperative NCSE without cerebral damage, we hypothesize that pneumocephalus due to CSF leakage can be implicated in the subduction of the brain, which leads to regional circulation change and cause NCSE. In fact, the hyperperfusion area on ASL-PI and pneumocephalus area were in same position such as bilateral frontal lobe cortex.
Conclusion: This is the first case of NCSE with pneumocephalus after transsphenoidal surgery for a suprasellar arachnoid cyst. Pneumocephalus due to CSF leakage can cause NCSE. The MRI sequences such as ASL-PI and DWI are as useful for differentially diagnosing NCSE as EEG and AED tests.

P-11 Intraoperative Evaluation of Cerebral Blood Flow Using Laser Speckle Contrast Imaging (LSCI)

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A key to the surgical treatment of cerebrovascular diseases is the identification of normal or abnormal vascular structures. Thus, a surgical support system that helps the surgeon quickly and easily identify the vessels during surgery would be helpful. Laser speckle contrast imaging (LSCI) is a non-invasive, drug-free imaging technique to recognize fluid flow in real-time and may enable safe and innovative surgical treatments for cerebrovascular disorders. In this study, we developed an LSCI cerebral blood flow measurement system that can be used during direct surgery for cerebrovascular diseases. We also established appropriate use conditions and verified the system's usefulness. First, we examined the system's parameters through preliminary experiments using a phantom. Then we used the system in 18 surgical cases (ten bypass surgeries, four cerebral aneurysm surgeries, two cerebral arteriovenous malformation (AVM) surgeries, one carotid endarterectomy, and one spinal arteriovenous fistula surgery) to evaluate cerebral blood flow intraoperatively. In a bypass surgery for cerebral infarction (superficial temporal artery to middle cerebral artery anastomosis), we were able to assess the patency of the anastomosis repeatedly without using drugs by LSCI. In addition, increased blood flow to the brain's surface was objectively confirmed before and after the bypass. Furthermore, real-time observation of the blood flow shutdown to the cerebral aneurysm by the clipping was also possible. Also, LSCI was particularly helpful in resecting a cerebral AVM. When the surgeon temporarily occluded a vessel to be resected, we could check how the blood flow in the surrounding brain surface changed to see if safe resection was feasible. By confirming that there was no decrease in the blood flow in the surrounding normal brain tissue, safe resection of the nidus was achieved. LSCI is a safe and helpful technique for intraoperative measurement of cerebral circulation. Noninvasive, repeated measurement is a significant advantage over other methods. In the future, we will examine the possibility of quantitative measurement of cerebral blood flow using LSCI and assess postoperative patient outcomes.

P-12 Renin-angiotensin-aldosterone system inhibitors as a risk factor for chronic subdural hematoma recurrence

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Chronic subdural hematoma (cSDH) is a common central nervous system condition. Recent reports indicate that cSDH affects long-term prognosis; however, its definitive risk factors remain unknown. Renin–angiotensin–aldosterone system inhibitors (RAASi) can affect vascular permeability and cell proliferation processes, which may suppress the recurrence of cSDH. However, several studies have reported negative results to this effect. Therefore, we aimed to evaluate RAASi consumption and other antihypertensive drugs as risk factors for recurrent cSDH. A total of 203 consecutive cases of surgically treated cSDH were retrospectively reviewed. Clinical and radiological parameters were compared between the groups with and without cSDH recurrence to identify risk factors. Of the included cases, 68 (33.5%) used RAASi and 37 (18.2%) developed recurrence within 60 days of surgery. In the Cox proportional hazard model, the covariate-adjusted hazard ratio (95% confidence interval) of RAASi, calcium channel blockers, diuretics, β and α blockers, for the recurrent risk of cSDH after surgery were 2.47 (1.26, 4.83), 1.79 (0.93, 3.43), 2.09 (0.91, 4.80), 1.08 (0.41, 2.81), and 1.01 (0.31, 3.32), respectively. Multiple logistic regression analysis also demonstrated that RAASi-use was an independent risk factor for cSDH recurrence. Present series suggests RAASi-use as a risk factor for cSDH recurrence, although the role of RAASi-use in cSDH remains debatable. Further studies for deeper understanding of the microenvironment between hematoma and outer membrane are preferable.

P-13 Endoscope-Integrated Fluorescence Video Angiography for the Surgery of Ventrally Located Perimedullary Arteriovenous Fistula at Craniocervical Junction

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Background: Intraoperative confirmation of the vascular anatomy and blood flow contributes to the safety of the surgery for perimedullary arteriovenous fistulas (PAVF). However, because the PAVF at the craniocervical junction (CCJ) is mainly located on the ventral spinal cord surface, it is difficult to observe the entire pathology by a conventional surgical approach.
Objectives: To achieve increased viewing angle and visualization of real time blood flow, we introduced endoscope-integrated fluorescein video angiography in the treatment for PAVF at the CCJ for the first time.
Methods: A 63-year-old man presented with subarachnoid hemorrhage due to rupture of PAVF at the CCJ, fed by both the right C1 radiculomedullary artery and the anterior spinal artery (ASA). Suboccipital craniotomy and C1 hemilaminotomy was performed and microscopic observation revealed partial anatomy of the PAVF covered by subarachnoid clots on the ventrolateral surface at the right C1 nerve root level. However, pathology ventral to the C1 nerve root was obscure and an endoscope-integrated fluorescein video angiography was introduced.
Results: Observation under endoscope-integrated fluorescein video angiography clearly demonstrated the PAVF components and the ASA. According to these findings, the PAVF was coagulated and the ASA was preserved. Endoscope-integrated fluorescein video angiography allowed to visualize its real-time blood flow, leading to a safe and reliable treatment.
Conclusions: Even when the pathologies are located on the ventral aspect of the spinal cord, assistance of the endoscope enables observation of the angioarchitecture. Furthermore, the endoscope-integrated fluorescein video angiography system allows us to visualize its real-time blood flow. Even when subarachnoid blood clots obscure the vascular structures under direct observation, this system enables the user to observe accurate vascular structures, leading to a safer and more reliable treatment.

P-14 Efficacy of endoscopic assistance in dural closure for a patient with superficial siderosis

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University of Yamanashi

Background
Superficial siderosis (SS) is a rare disease in which hemosiderin is deposited on the surface of the brain and spinal cord because of chronic repeated bleeding into the subarachnoid space. Ventral spinal dural defect has been associated with SS and surgical defect closure has been recognized as an effective treatment. We describe a patient with SS in whom endoscopic assistance was required to identify and repair the dural defect.

Case report
A 79-year-old man presented with progressive hearing loss and ataxia. Magnetic resonance imaging (MRI) demonstrated SS and a ventral spinal epidural fluid collection extending from T5 to T8. Computed tomography myelography showed ventral epidural leakage of contrast medium at T8. Thoracic osteoplastic laminotomy for dural closure was performed. Endoscopic inspection of the ventral dura revealed a communication between the epidural and subarachnoid spaces through a dural defect that could not be visualized with the operative microscope. The dural defect could be successfully closed. The patient experienced no further neurological deterioration. Follow-up MRI showed disappearance of the epidural fluid collection.

Discussion
Endoscopy provides a surgical view of microscopic blind area. Even for dural lesions that could not be accurately identified preoperatively, endoscopy enabled us to clearly identify the dural defect.

Conclusion
Endoscopic assistance was useful in our patient because it enabled visualization and repair of the responsible ventral dural defect with minimal spinal cord manipulation.

P-15 Keyhole corpectomy with single-cage fixation for anterior cervical spine decompression

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Background:
Anterior cervical spine decompression surgery can achieve prompt improvement of the symptoms by direct removal of ventral lesions such as spondylosis, herniated disc, or OPLL. Anterior cervical discectomy and fusion (ACDF) and anterior corpectomy and fusion (ACCF) are main procedures of the anterior approach. ACCF is selected for extended lesions such as large OPLL, but it is more invasive and involves risks such as plate-related complications. Keyhole discectomy with single-cage fixation (keyhole corpectomy) is a less invasive procedure we choose as an alternative to ACCF in many cases.

Materials and Methods:
We retrospectively reviewed records of 318 patients who underwent anterior cervical spine decompression surgery at our hospital between February 2011 and November 2022.

Results:
Of all the 318 patients, 278 (87.4%) were treated by only ACDF, 4 (1.3%) by ACCF, and 36 (11.3%) by keyhole corpectomy with/without ACDF. Of all the 36 keyhole corpectomy cases, average age was 60.2 (range: 37-91), 23 (63.9%) were males, and OPLL was found in 30 (83.3%) at the decompression site. All surgeries of the keyhole corpectomy were performed without any special complications such as CSF leakage.

Conclusions:
Keyhole corpectomy is a less invasive, effective, and safe procedure that can accomplish acceptable decompression of anterior cervical spine and could be considered as an alternative to ACCF.

P-16 Cervical juxta-facet cyst presenting with Brown-Séquard syndrome -A Case Report-

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Background
Intraspinal juxta-facet cyst of the spine are known to predominate at the lumbar level and are relatively rare at the cervical level. Most cervical spine lesions are asymptomatic or have radiculopathy or myelopathy in a chronic course.

Case Report
An 86-year-old woman suffered from right hemiparesis following neck pain and two days later her neurological symptoms worsened, leading to tetraparesis. She developed right Brown-Séquard syndrome, and cervical Magnetic resonance imaging revealed intraspinal mass lesion at the C4/5 level. C4-5 laminoplasty and the mass removal was performed. Pathological findings showed hemosiderin deposition and fibroblast proliferation, consistent with post-bleeding juxta-facet cysts. The patient recovered well and returned to an independent daily life.

Discussion
Rarely, hemorrhagic cervical juxta-facet cyst causes stroke-like symptoms. In the mechanism of acute neurological deterioration, it is speculated that chronic inflammation of the cyst wall induces neovascularization of its wall and stress such as trauma leads to bleeding. In this case, instability associated with degeneration of the cervical spine was presumed to be involved in cyst formation and bleeding.

Conclusions
In the case of hemiparesis that develops following neck pain, hemorrhagic cervical juxta-facet cyst is also taken into consideration as a differentiation, and careful neurological examination and accurate diagnosis are important.

P-17 A case of subarachnoid hemorrhage due to ruptured multiple peripheral fusiform aneurysms associated with systemic lupus erythematosus

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University of Yamanashi

【Introduction】

Systemic lupus erythematosus (SLE) is associated with cerebrovascular disease in 3-20%, most often intracerebral hemorrhage or cerebral infarction due to microarterial necrosis or coagulation abnormalities associated with vasculitis, but rarely subarachnoid hemorrhage (SAH) due to ruptured aneurysms. Ruptured aneurysms with SLE tend to occur in the posterior circulatory system, but are extremely rare in the spinal vascular territory. In this report, we describe a very rare case of SAH due to repeated rupture of a peripheral fusiform aneurysm in the spinal vascular territory during treatment of SLE, with a review of the literature.

【Case presentation】

A 33-year-old woman undergoing treatment for SLE had a sudden onset of posterior neck pain. Head CT showed SAH localized near the anterior surface of the medulla oblongata. DSA demonstrated multiple small fusiform aneurysms in the radial artery at the C1 level, the radial myelomeningeal artery at the C2 level and the anterior spinal artery at the C5-6 level, which were treated conservatively without re-bleeding.

One year later, she suffered from a recurrent SAH around the right medulla oblongata. Although the fusiform aneurysms seen at the initial hospitalization had disappeared on DSA, a de novo small fusiform aneurysm was observed in the anterior spinal artery. Conservative treatment was performed, and re-bleeding was not observed thereafter. DSA two weeks later revealed that the aneurysm decreased in size.

【Conclusion】

In SLE, spinal arteriography should be performed for the possible development of peripheral fusiform aneurysms in the spinal vascular territory associated with vasculitis. In addition, careful follow-up is necessary, considering the risk of re-bleeding due to de novo aneurysms.

PPNC Poster

P-18 A case of posterior circulation tandem occlusion treated retrograde recanalization of a vertebral artery origin via collateral vessels, followed by thrombectomy of the basilar artery

KOHEI INAGAKI, Makoto Sakamoto, Syuntaro Sueyoshi, Tomohiro Hosoya, Tetsuji Uno, Masamichi Kurosaki

Faculty of Medicine, Tottori University

Background

Acute basilar artery occlusion (BAO) has a variety of pathological manifestations, including embolic, dissecting, and atherosclerotic lesions, and has a relatively poor prognosis.

Objectives

We report a case in which the origin of the VA (vertebral artery) was retrogradely recanalized via the distal collateral vessels of the VA occlusion, and the basilar artery thrombus was then retrieved in the anterograde direction.

Methods

A 79-year-old man with hypertension and diabetes mellitus collapsed on the right side while eating and was transferred to our hospital. Emergency revascularization was performed.

Results

Treatment was via the right brachial artery. Three-dimensional CT angiography showed basilar artery occlusion, and perfusion imaging showed extensive hypoperfusion in the posterior fossa. Subclavian arteriography showed no visualization of the origin of the vertebral artery (VA), and the VA beyond C3 was visualized progressively via collateral vessels from the thyrocervical trunk. It was not easy to insert a guidewire or catheter into the origin of the VA when approaching via the subclavian artery. Then Headway DUO microcatheter and Chikai X010 micro-guide wire were advanced coaxially to the thyrocervical trunk of the subclavian artery, and the VA was reached through the highly tortuous ascending cervical artery. After retrograde access to the origin of the VA from the collateral vessels, a guide wire was used to penetrate the occlusion site and reach the right subclavian artery. After stepwise dilatation of the VA origin using PTA balloons of different sizes, Catalyst 6 aspiration catheter and double-angled Chikai-14 black were used to navigate the right VA via rt. Subclavian artery. Then Solitaire 4mmx40mm was deployed in the occluded basilar artery, and thrombectomy was performed using the ASAP technique. Complete recanalization was obtained in 1 pass. Immediately after the procedure, patients' aphasia and hemiparesis were improved.

Conclusions

With the evolution of guidewires and catheters, it is now possible to guide the passage of even highly tortuous and small-caliber vessels. Retrograde revascularization via collateral vessels should be an alternative option.

We described a rare case of retrograde vertebral artery (VA) revascularization using thyrocervical collaterals for anterograde mechanical aspiration of a BAO followed by PTA of the chronically occluded VA origin.

Sponsored Seminar: MedicaLine

20-1 FOREVER HEALTHY: FINDING LONGIVITY AND STRENGHT IN OUR LIVES.

JOHN TEW

UC Health and UC College of Medicine

Today, more than 1⁄2 million people are living to be over 100 years of age. The oldest woman Kane Tanaka, 119 years, lived in Fukuoka Japan until April 2022 and the oldest man, Jiro Kimura, lived 116 years in Kyoto Japan.
Susan and John TewIn fact, Japan has the longest life expectancy and the greatest number of centenarians, people living to be over 100 years of age.
In the last century, the life expectancy of individuals in the developing world increased by 50 years, largely due to improvement in sanitation, inoculation and education.
Most people believe that genetics is largely responsible for long life but actually less than 15% of longevity depends on our genes. The major factors determining our longevity are behavioral, tha means, under our personal control.
Today, we can identify the major factors or choices that allow us to live long and remain well for over 100 years of life?
In the 21st century, the six principal predictors of a long healthy life will be discussed and a proven plan for success will be described in this presentation.
For surgeons and most other professionals, the preservation of body strength and cognitive skills are strongly related to exercise, nutrition, avoidance of toxins, and maintaining long-term stable social relationships.
The Good Life or Long Health Span depends on maintaining a strong body and mind, and avoidance of social isolation.

20-2 With Corona and Beyond: Let's predict and create Future world & healthcare

JUNJI BERNARD MACHI

University of Hawaii

We, people in the world have been with Corona for 3 years, and new-normal society and life are going on. Even before corona era, new technology including IT and AI has been evolving. Considering such evolutions, can we predict the future world and healthcare?

It is expected that innovation in various technology, genetic and regenerative healthcare, globalization and diversity, environmental changes, changes of variety of medical diseases themselves such as new infection like corona would further occur in the future. Such occurrence or recurrence will affect human life as well as economy, politics, and business of the entire world.

Problems in healthcare are influenced by many other factors such as problems in environment and climate, land and water lives, energy and resources, poverty and hunger, justice peace/war and gender equality and so forth (summarized in SDGs).

"The future is unwritten but not unpredictable".

Based on our history and present status, our future can be predicted, and thereby better world and healthcare can be created. "The best way to predict the future is to create it". Since healthcare problems are related to many other problems on the earth, human being needs to address such problems and create better health of human but also other animal/plant health and health of the earth and even space.

To achieve SDGs and to solve problems to create better new health of each, we should work together as a team of Japan and the earth/universe. Can we do it? Yes, we can, and we should.

- "Learn from yesterday, live for today, hope for tomorrow. The important thing is to keep moving forward for better world and healthcare."
- "The future belongs to those who believe in the beauty of their dreams."

Moyamoya Disease 1: Moyamoya Disease in Hawaii State

21-1 A Vascular Neurologist Perspective, A Cardiologist Perspective, Filipino Moyamoya in Hawaii

MELVIN WONG, Raymond Taniguchi, David Lee, Jonathan Zhang, Ferdinand Hui, Jon Graham, Allyson Kuwana, Celia Chang, Takanori Fukushima

University of Hawaii

Moyamoya Disease (MMD), also known as spontaneous occlusion of the circle of Willis, is named for the Japanese expression meaning smoky or hazy like a puff of cigarette smoke in reference to the appearance of cerebral angiography depicting the characteristic network of dilated collateral vessels. MMD is a progressive cerebrovascular disorder characterized by stenoses of the internal carotid arteries, resulting in a vascular network of collateral vessels at the base of the brain. Due to the stenoses, patients with MMD suffer from decreased cerebral blood flow, which can often cause multiple transient ischemic attacks, ischemic strokes, intracranial hemorrhages, seizures, and headaches.
Although cases are reported most frequently in east Asian populations, primarily noted in patients of Japanese, Chinese, and Korean descent, MMD is well-documented around the world in people of various ethnic backgrounds. Hawaii has a unique population because many individuals have multiple mixed ethnicities including Japanese, Okinawan, Chinese, Korean, and Filipino. Incidence and prevalence of MMD are higher in Hawaii compared to the rest of the US, likely a result of the greater percentage of Hawaii residents with Asian ancestry, specifically Japanese. Hawaii also has a relatively high population of individuals of Polynesian ancestry such as Native Hawaiian, Samoan, and Tongan. As a result, the diagnosis of MMD requires an extensive evaluation to rule out other causes of cerebrovascular disease. Moreover, as MMD patients are relatively young, they should have a “Stroke in Young Adult” workup to evaluate for unusual causes of stroke including coagulopathy and vasculitis. TIA/Stroke patients are often screened for cardiovascular risk factors and heart disease, and MMD may be associated with significant cardiovascular disease, which may impact the treatment of MMD.
Typical evaluation of MMD includes Neuroimaging with Head CT/CTA/CT perfusion, MRI/MRA with MR perfusion including Arterial Spin Labeling (ASL), SPECT with/without Acetazolamide (Diamox), and Cerebral Angiography. Treatment of MMD involves individualized strategies for medical management and neurosurgical revascularization.
MMD pathophysiology and genetics are not well understood, and there may be differences across various ethnic groups in the presentation of the disease. While registries for MMD in other countries such as Japan, China, South Korea, and Taiwan are available, they only contain data for their respective populations. The unique mixture of ethnic diversity in Hawaii and the high prevalence of MMD in Hawaii compared to the continental US population suggests a strong need for a Hawaii MMD database, so that the disease can be more readily and accurately identified and treated. A Hawaii MMD registry combined and compared with international registries should be able to characterize MMD across different ethnic groups and mixed ethnicities, thus allowing for a better understanding of the disease and implementation of the most effective clinical management plan.

Keynote Lecture ① : Moyamoya Disease

22-1 Techniques and Results of STA Microbypass and EDAGS

ALI ZOMORODI

Duke University

Patients with non-inflammatory moya moya syndrome remain at high risk for ischemic events despite best medical therapy. The results of several trials have suggested that there is limited role for flow augmentation procedures in these patients. Based on our experience we propose that for well selected patients, revascularization surgery is very effective at reducing these events and preventing secondary strokes. We review our institution experience with these procedures and discuss strategies for optimizing outcomes.

Keynote Lecture ② : Moyamoya Disease

23-1 Revascularization for Moyamoya Disease: Results in Personal Series of 110 surgical cases.

SHINICHI NUMAZAWA[1)], Sadayoshi Watanabe[1)],Yasunobu Itoh[1)], Kentaro Mori[1)], Jun Sakai[1)], Hirotaka Yoshida[1)], Ryo Kitagawa[1)], Isao Akatsu[1)], Tomoko Otomo[1)] Isao Yamada[1)] Kouta Yamakawa[1)], Awfa Aktham[1)], Kazuo Watanabe[2)]

[1)] Tokyo General Hospital, Neurosurgery

[2)] Southern Tohoku General Hospital Neurosurgery

【Introduction】 We have treated 82 patients with moyamoya disease over a 32-year period from 1991 to 2022, and have experienced 110 surgeries, so this report focuses on surgeries.
[Patients] The age ranged from 2 to 77 years, with a mean age of 38.5 years, 29 males and 53 females. 12 patients were younger than 16 years, 2-12 years, with a mean age of 6.8 years, 2 males and 10 females. 70 adult cases were 17-77 years, with a mean age of 47.7 years, 29 males and 41 females. The number of patients with TIA/infarction was 62, 8 with hemorrhage, and 12 with headache, involuntary movements, and brain examination with MRI, MRA. 66 patients were followed up for 1-27 years.
Surgery: For children, direct anastomosis and vascularized galea synangiosis to the frontal lobe were performed on the diseased side, followed by similar surgery on the contralateral side approximately 3 months later. For adult cases, a similar operation was performed on the sick side, and if necessary based on the evaluation of cerebral blood flow, the contralateral side was operated on. For adult patients, there was a time when only direct anastomosis was performed, but due to decreased blood flow in the frontal lobe, a vascularized galea synangiosis was added to the procedure. In pediatric cases, bilateral and occipital lobe surgeries were added in 9 cases and in 3 cases, respectively. In adults, 60 patients underwent surgery on the sick side only once, 17 patients underwent surgery on the contralateral side twice, and 6 patients underwent surgery on the third side three times. The ADLs of the patients who were followed up were 1 in 51 cases, 2 in 8 cases, 3 in 4 cases, 4 in 3 cases, and 5 in 1 case. Postoperative complications included postoperative TIA in 3 cases, hyper perfusion in 1 case, postoperative infection in 4 cases(3 cases were experienced in the same year, so some cause was assumed), and STA non-opening in 4 cases.
Conclusion: there was a bias in the number of cases due to the presence or absence of a pediatric department at each hospital, and the age of the patients varied by age group, the results of treatment seemed to be comparatively good by using direct anastomosis and the vascularized galea synangiosis is used.

Keynote Lecture ③

24-1 Four Years Private Practice Management of Moyamoya Surgical Revascularization

BRANDON BURNSED, Andrey Belayev, Russell Margraf, Takanori Fukushima

Raleigh Neurosurgical Clinic

Background:
Moyamoya revascularization surgical sub-specialization techniques implemented in a private practice model piloted under the mentorship of Dr. Fukushima.

Objectives:
Surgical management of moyamoya disease includes a varying range of technical revascularization nuances typically applied within academic/training centers with fellows and residents. Through direct supervision on revascularization cases of moyamoya patients, the superficial temporal artery – middle cerebral artery (STA-MCA) with encephaloarterial galeal synangiosis (EAGAS) technique is feasible under the tutelage of a proficiently experienced, subspecialized cerebrovascular surgeon.

Methods:
4-year retrospective analysis of 14 cases applying Dr. Fukushima's (STA-MCA EAGAS) technique on revascularization of moyamoya disease.

Results:
Successful revascularization of 14 cases without complications.

Conclusions:
The STA-MCA EAGAS technique is an effective technique performed in the private practice setting under the guidance of a qualified cerebrovascular surgeon.

Keynote Lecture ④ : Dementia

25-1 Aging deceleration as the way to prevent dementia

KAZUO HASHI

Shinsapporo Neurosurgical Hospital

Dementia prevention is one of the most required medical policies in Japan, because of the higher population aging and a lack of effective treatment of dementia. For the senior neurosurgeons who still often engaging the out-patient practice in Japan, the scientific knowledges of dementia prevention are indispensable to guide patients and families properly.
In this presentation, I would like to talk the importance of preventing aging itself to achieve effective dementia prevention, and a possibility to decelerate biological aging by changing lifestyle to affect the nutritional sensing mechanisms.

Keynote Lecture ⑤ : Rehabilitation

26-1 Physiatrist and registered therapist operating acute rehabilitation (PROr) improves activities of daily living and home-discharge rate in patients with stroke.

FUMIHIRO TAJIMA, Tokio Kinoshita, Takeshi Nakamura, Takamasa Hashizaki, Daisuke Kojima, Makoto Kawanishi, Hiroyasu Uenishi, Hideki Arakawa, Takahiro Ogawa, Yoshi-Ichiro Kamijo, Takashi Kawasaki, Tatsuya Yoshikawa, Sven P Hoekstra, Yukihide Nishimura

Wakayama Medical University

Back ground: Clinical evidence suggests that early mobilization of patients with acute stroke improves activity of daily living (ADL), however physiatrist and registered therapists did not operate early mobilization in the previous studies. The purpose of the present research was to study the utility of the physiatrist and registered therapist operating acute rehabilitation (PROr) applied early after acute stroke.
Methods: This study was prospective cohort study, assessment design. Patients with acute stroke (n = 227) admitted to Wakayama University hospital were divided into three groups based on the time of start of PROr: within 24 hours (VEM, n = 47), 24-48 hours (EM, n = 77), and more than 48 hours (OM, n = 103) from stroke onset. All groups were assessed for the number of deaths during hospitalization, and changes in the Glasgow Coma Scale (GCS), National Institute of Health Stroke Scale (NIHSS), and Functional Independence Measure (FIM) at hospital discharge. During the 6-month follow-up, home-discharge rates as well as changes in FIM, and rates of recurrence and mortality were assessed.
Interventions: All patients were assessed by physiatrists, who evaluated the specific needs for rehabilitation, and then referred them to registered therapists to provide early mobilization.
Results: The number of deaths encountered during the PROr period was 13 (out of 227, 5.7%), including 2 (4.3%) in the VEM group. GCS improved significantly during the hospital stay in all three groups, but the improvement on discharge was significantly better in the VEM group compared with the EM and OM groups. FIM improved significantly in the three groups, and the gains in total FIM and motor subscale were significantly greater in the VEM than the other groups. A total of 139 patients [VEM (n = 32), EM (n = 43), LM (n = 64)] could be followed throughout the 6-month period. The home-discharge rate was ~80% and significantly higher by ~20% in VEM than EM. The gains in the motor subscale of FIM at 6 months were significantly higher in VEM than LM, while the mortality and recurrent rates were not significantly different among the categories.
Conclusions: PROr seems safe and beneficial rehabilitation to improve ADL in patients with acute stroke. Starting PROr within 24 hrs of new-onset stroke may help to increase home-discharge rates at 6-month follow-up, simultaneously with a higher FIM. Very early mobilization in our hospital did not increase the risks of recurrence or death.

Spine & Peripheral Nerve

27-1 Evolution in management of Hangmans fracture : From C2 Pedicle alignment to C2 pedicle reformation

PANKAJ KUMAR SINGH, Sarat P Chandra, Shashank Sharad Kale

AIIMS, NEW DELHI

Objective:
Opinions vary regarding optimal treatment of unstable hangman's fractures. Upper cervical spine surgery is complex and challenging. Advent of intra operative computed tomography and image guidance has revolutionized its treatment.
Aim is to demonstrate anatomical repair of C2 pedicle in hangman fracture and to do pedicle reformation in old and complicated hangmans fracture.
Method:
This is a prospective observational study. Nine patients operated by single surgeon from 2012 to 2018 were included .In initial seven patients C2 pedicle screw C3 C4 lateral mass screw and rod fixation was done. The last two patients operated were old injuries with no C2 pedicles available for pedicle screw.
Results :
Patients age ranged from 14 years to 60 years with male female ratio of 8:1. All 5 patients having neurological deficit have improvement in power. Initial 7 patients have good healing of fractured C2 pedicle .The last 2 patients were old fractures with one having severe angulation and displacement and other having spondyloptosis with C2 body placed anterior to C4 body. In both of these patients there was no C2 pedicle as it got absorbed. In both these patients direct C2 body screw were placed and pedicle reconstruction was done. Both patient improved and are doing well. C1 C2 joint motion was preserved in all .

Conclusion :
We have first time in world developed technique of C2 pedicle reformation in 2 old hangmans fracture with reabsorbed pedicles .We have not included C1 in any instrumentation which helped us in preservation of motion at C1 C2 joint.

Keynote Lecture ⑥

28-1 1) Nerve transfers for axillary nerve repair in brachial plexus injury: results of 206 adult patients

LIBOR MENCL, Pavel Haninec, Petr Waldauf

3rd Faculty of Medicine, Charles University Prague

Restoration of axillary nerve function is one of the main priorities of brachial plexus surgery. Neurotization, the transfer of a functional but less important donor nerve to a nonfunctional, more important recipient nerve, has recently become a leading treatment option. A variety of donor nerves have been used to reinnervate the axillary nerve with various degrees of success. The aim of this study was to compare the effectiveness of our commonly used donors in brachial plexus injury.

A group of 206 patients with various types of brachial plexus injury was analyzed. All patients underwent axillary nerve reconstruction performed by the senior author (P.H.) and had a minimum follow-up period of 24 months. The thoracodorsal nerve was used as a donor in 69 patients, the triceps branch of the radial nerve in 25 patients, lower subscapular nerve in 19 patients, long thoracic nerve in 38 patients, intercostal nerves in 27 patients and fascicle transfer from the ulnar or median nerve in 23 patients. The median age was 31 years, and the median time between trauma and surgery was 6 months.

Successful deltoid recovery was defined with muscle strength MRC grade above 3, electromyographic signs of reinnervation and by muscle mass increase. The overall success rate was 75,5% but varied greatly between different types of brachial plexus injury and corresponded to available donors. The donor with the highest success rate was triceps branch of the radial nerve (80%), followed by subscapular nerve (78,9%), fascicle transfer from the ulnar or median nerve (73%) and thoracodorsal nerve (71%). Much lower success rate had long thoracic nerve (36%) and intercostal nerves (22%), which were used in complete brachial plexus injury.

28-1 2) Risk factors for obstetrical brachial plexus palsy: can we predict the failure of spontaneous reinnervation?

LIBOR MENCL, Pavel Haninec, Petr Waldauf

3rd Faculty of Medicine, Charles University Prague

INTRODUCTION
Obstetrical brachial plexus palsy (OBPP) represents one of the most serious complications during delivery. Injury is caused by excessive lateral traction to the infants' head during delivery, although cases of OBPP injury after non-traumatic caesarean sections have also described. Generally recognized risk factors include shoulder dystocia, macrosomia, instrument delivery, forceps or vacuum extraction.
METHODS
This retrospective study was formed by a group of 227 patients with OBPP. Gender, side of disability, weight, length, possible instrumental delivery, clavicle and humerus fracture, gestational diabetes, Horner's syndrome and Apgar score were observed for each patient. Another observed parameter was the initial state of movement of the upper limb. The aim of statistical analysis was to determine the occurrence of risk factors for birth injury and define such factors that could predict failure of spontaneous reinnervation.
RESULTS
In 175 patients (77.1%, group 1) good spontaneous recovery was observed, but a severe motor deficit remained in 52 patients (22.9%, group 2) and underwent reconstructive surgery. The median weight was 3970g, length 52cm. Of the 227 patients, 14.9% had clavicle fracture, gestational diabetes was present in 11.8%, Horner's syndrome in 4.8% and instrumental delivery in 14.5. Statistical analysis, univariate and multivariate linear regression, shows the initial state of movement as the main factor predicting the failure of spontaneous regeneration, AMS (cont.var.) adj. OR 0.94, $p < 0.001$. After exclusion of this dominant parameter from analysis, the significant association of Horner's syndrome, macrosomia and humeral fracture with insufficient spontaneous reinnervation was found.
CONCLUSION
The study confirmed the increased occurrence of risk factors in the group of insufficient spontaneous reinnervation. Despite of this findings no such risk factor was found that would clearly predict the failure of regeneration. The most statistically significant parameter predicting the failure of spontaneous regeneration was the movement of the upper limb at 6 weeks. Horner's syndrome, macrosomia and humeral fracture were associated with insufficient spontaneous reinnervation.

28-1 3) Surgical treatment of obstetrical brachial plexus palsy

LIBOR MENCL, Pavel Haninec, Petr Waldauf

3rd Faculty of Medicine, Charles University Prague

INTRODUCTION
Obstetrical brachial plexus palsy displays a stable incidence of approximately 1 per 1,000 live births. Most children show good spontaneous recovery, but in 20% to 30% an important residual motor impairment remains.

METHODS
Between 2000 and 2022, total of 61 patients with obstetrical brachial plexus injury underwent nerve surgery in Department of Neurosurgery, 3rd Faculty of Medicine, Charles University, Prague. The aim of our study was to evaluate the results achieved using various surgical techniques in patients with partial and total obstetrical brachial plexus palsy.

RESULTS
The overall success rate in upper plexus birth injury was 80% in shoulder abduction, 65% in external rotation and 88% in elbow flexion with median follow-ups of 47 months. Success rate in complete paralysis was 70% in finger and wrist flexion, 69% in shoulder abduction, and elbow flexion in 72%, the median follow up was 53 months.

CONCLUSION
Improved function can be obtained in infants with obstetrical brachial plexus injury with early surgical reconstruction. It is possible to achieve functional reinnervation by reconstruction of entire brachial plexus from remaining roots with restoration of hand function

Keynote Lecture ⑦

29-1 LIMITED EXTREME LATERAL INFRAJUGULAR TRANSCONDYLAR TRANSTUBERCULAR EXPOSURE (ELITE) FOR THE MICROSURGICAL MANAGEMENT OF C1-C2 SCHWANNOMA.

LUCIANO MASTRONARDI, Francesco Corrivetti, Guglielmo Cacciotti, Flavia Fraschetti, Carlo Giscobbo Scavo, Ettore Carpineta, Fabio Boccacci, Raffaelino Roperto

Department of Neurosurgery, San Filippo Neri Hospital/ASLRoma1

Objective. Schwannomas of the first and second nerve roots are rare neurosurgical entities, harboring specific surgical features that make surgical resection particularly challenging and deserve specifics dissertations.
Materials and Methods The extreme lateral infrajugular transcondylar-transtubercular exposure (ELITE) is a surgical approach developed in the later '80 by Prof. T. Fukushima and represents the dorsolateral inferior skull base procedure of choice to approach lesion located ventrolaterally at the level of the craniocervical junction (CCJ). This approach consist in a suboccipital craniotomy/craniectomy with partial condylectomy and jugular tubercule drilling that can be extended providing for subtotal condylectomy and vertebral artery (VA) transposition. The "limited" variation of the ELITE approach consist in a lateral suboccipital craniectomy opening the foramen magnum (FM) and removal of at least half of the posterior arch of the atlas without condyle drilling. This surgical technique was recently demonstrated to be particularly suitable for the surgical management of spinal tumor located ventro-laterally in the upper cervical spine.
In the last 6 years, 14 patients underwent neurosurgical resection of high cervical (C1- C2) schwannomas by limited ELITE approach. Patients data regarding clinical presentation, radiological findings and surgical results were retrospectively analyzed
Results. Mean age was 50 years (range 13-74), follow-up mean duration was 43±13.5 (range 24-72 months). Pre-operatively there were no significant differences among different tumor locations (intradural, extradural, dumbbell). Surgical results were excellent: gross total resection (GTR) was achieved in all cases and there were no intraoperative complications or postoperative mortality. All patient presented post-operative clinical improvement except one who remained stable. Karnofsky performance status (KPS), at last follow-up, confirmed a global, statistically significative, clinical improvement. No vertebral artery (VA) injury neither spinal instability occurred; nerve root sacrifice was reported in one case.
Conclusions. Neurosurgical treatment of C1-C2 schwannomas is associated with good outcomes in terms of extent of resection and neurological function. In particular, dumbbell shape and VA involvement does not represent limitations to achieve complete tumor resection and good clinical outcome. In conclusion, microsurgery represents the treatment of choice for C1-C2 schwannomas.
ELITE approach offers a wide and adequate exposure and access to the CCJ, allowing direct visualization and access to the tumor with minimal neural manipulations, early detection of the vertebral artery and , for tumor located at C1-C2 level, without drilling the occipital condyle.
In our experience, ELITE procedure is the preferred surgical approach for resection of tumors located ventrally or ventrolaterally to the first two cervical levels.

Keynote Lecture ⑧ : Smart Operation Room

30-1 Smart Cyber Operating Theater (SCOT) for Information-guided Neurosurgery

YOSHIHIRO MURAGAKI[1,2,3)], Takakazu Kawamata[3)], Ken Masamune[2)]

Professor of Center for Advanced Medical Engineering Research and Development (CAMED)[1)],
Kobe University, Visiting Professor of Faculty of Advanced Techno-Surgery (FATS)[2)],
and Department of Neurosurgery[3)], Tokyo Women's Medical University (TWMU)

High-quality surgical decisions have been made with a wealth of experience and tacit knowledge backed by it. By decomposing this tacit knowledge and converting it into more objective explicit knowledge, we worked on digital transformation of various types of intraoperative biological signals, developed information-guided surgery to support judgment by further computerizing it, and adapted it for glioma resection.

Specifically, three essential types of information - anatomical information indicating the location of the tumor (intraoperative MRI and navigation), functional information on eloquent areas to be protected (motor-evoked potential and awake craniotomy), histological information (intraoperative histology and rapid flowcytometry) of tumor or surroundings has been converted into structural data. In the intelligent operating room, initial incarnation of SCOT, 2023 cases were performed, and the average removal rate was 90% and the 5-year survival rates of grade II, III, and IV were 92%, 77%, and 19%, respectively, for more than 1700 cases of glioma. The mortality rate was extremely low at 0.05% (literature 3%). Furthermore, in the SCOT, we have developed a strategic desk that connects each device of different company products with a network by middleware and displays them in an integrated manner. Since it is IoT, data is time-synchronized and connected by navigation, and decision-making is supported by high-quality multi-type information tagged with time and spatial data. It is also equipped with a communication function, and can be instructed senior doctors from medical offices, and if there is a 5G line, remote Doctor to Doctor support is also possible from a mobile phone.

Currently, we are developing AI with high accuracy using structured digital data and case database. We believe that future surgical treatment will evolve from the current information-guided surgery and expand to "AI Surgery" where AI will support judgment and robots will support treatment. Furthermore, we are developing an AI robot (AIREC) that performs surgery through deep predictive learning, with the aim of commercialization after 2040. This work was partially supported by JST [Moonshot R&D] [Grant Number JPMJMS2031].

Cerebrovascular Disease

31-1 chronic capsulated expanding hematomas after Gamma Knife radiosurgery for intracerebral arteriovenous malformations: report of 3 cases treated by surgical resection

AKINORI ONUKI

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Background
Chronic encapsulated expanding hematomas (CEEH) are rare complication of the intracerebral arteriovenous malformations (AVM) treated after gamma knife radiosurgery (GKRS). The mechanism of these lesions is not well understood. We reported 3 cases of such CEEH treated by surgical resection.
Methods
This is a single-institutional study involving patients with AVM who underwent GKRS between 2004 and 2016. Among 55 patients, 3 patients developed CEEH (5.4%).
Results
Case1 A 25-year-old female presented with left side hemianopsia due to a right occipital AVM (Spetzler-Martin grade 4). She underwent GKRS with a 50% dose of 17Gy to nidus. The nidus was gradually shrunk after 2 years and then second time GKRS was performed with a 60% dose of 18Gy to nidus. The nidus was angiographically disappeared 5 years after first GKRS. CEEH was detected 7 years after first GKRS. The lesion was gradually expanded and then we performed surgical resection of the lesion. She was discharged home with no new neurological deficit.
Case2 A 35-year-old male presented with hemorrhage of right caudate due to a right caudate AVM (Spetzler-Martin grade 3). He underwent GKRS with a 50% dose of 20Gy to nidus. The nidus was angiographically disappeared 4 years after GKRS. CEEH was detected 5 years after GKRS. The lesion was gradually expanded with hematoma formation then we performed surgical resection of the lesion. He was discharged home with no new neurological deficit.
Case3 A 15-year-old female presented with right side visual disturbance due to a left occipital AVM (Spetzler-Martin grade 4). She underwent GKRS with a 50% dose of 15Gy to nidus. The nidus was angiographically disappeared 4 years after GKRS. CEEH was detected 16 years after GKRS. The lesion was suddenly expanded with hemorrhage and she developed right side hemianopsia then we performed surgical resection of the lesion. She was discharged home with no new neurological deficit.
Conclusion
In our experience, the rate of CEEH after GKRS for AVM is 5.4%. This seems to be not a rare complication. We must follow up them for a long time and when CEEH is detected, surgical resection is an optimal treatment.

31-2 Endoscopic intraventriclar hematoma evacuation can decrease the duration of drainage

KEI ITO, Shin Hirota, Ryosuke Sakai, Keitaro Chiba, Shota Takahashi, Juri Kiyokawa, Masataka Yoshimura, Shinji Yamamoto

Tsuchiura Kyodo Hospital

Background:
Standard therapy for acute hydrocephalus due to intraventricular hematoma (IVH) is external ventricular drainage (EVD). However, long-term EVD causes disuse syndrome that may interfere with recovery. Endoscopic hematoma evacuation for IVH can be the therapy that helps to decrease the duration of EVD, however, the effect and safety of this therapy are not apparent yet. Therefore, we evaluate the impact of this therapy from our experience.
Methods:
We reviewed 34 adult patients who had surgical treatment for acute hydrocephalus due to IVH in our hospital during the last five years (from Sep. 2017 to Aug. 2022). We evaluated patients' characteristics, type of surgical treatment, duration of EVD, and outcome at discharge.
Results:
16 of 32 IVHs originated from the thalamus. Other origins were six from the cerebellum, three from the caudate head, two from the putamen, one from the frontal lobe , and five from the unknown origin. 22 cases were treated with only EVD, 11 cases were treated with IVH evacuation as a primary therapy or subsequent therapy to EVD. We excluded one case that had IVH evacuation seven days after EVD. There were no significant differences between the two groups in sex, age, the origin of IVH, modified Rankin scale (mRS) at discharge, and in-hospital mortality rate. Duration of drainage was significantly shorter in the IVH evacuation group (median duration is 2 days vs. 10.5 days, $p = 0.0171$). There was no significance, but hospitalization tended to be shorter in the IVH evacuation group (median duration is 29 days vs. 41 days, $p = 0.126$).
Conclusions:
This study shows that endoscopic IVH evacuation could decrease the duration of EVD. The evacuation could not reduce the disability; however, it might decrease the hospitalization.

31-3 Endovascular Treatment of Internal carotid artery aneurysms less than 15mm using the Pipeline Embolization Device with Shield Technology.

TAKETO KATAOKA, Shinsuke Irie, Kazuki Takahira, Noro Shouhei, Yuzo Terakawa, Koji Saito

Hokkaido Ohno Memorial Hospital

Objectives
The Pipeline Flex Embolization Device with Shield technology (Pipeline Shield) is a third-generation flow diverter. Surface modification of the mesh with phosphorylcholine covalently bound to the metal struts aims to reduce thrombogenicity. Pipeline Shield was approved at May 2019, and treatment indication of aneurysm size was expanded to 5 mm or more from September 2020 in Japan. In the present study, we report the results of patients with internal carotid artery aneurysms less than 15mm treated with the Pipeline Shield.

Methods
We treated 12 patients with 13 internal carotid artery aneurysms with Pipeline Shield from February 2021 to September 2022. Intradural aneurysms were treated using with single coil in combination to prevent postoperative aneurysm rupture, and epidural aneurysms were treated with Pipeline Shield alone. All cases were treated with general anesthesia. Aspirin 100mg and Clopidogrel 75mg were started two weeks before treatment and evaluated with VerifyNow on admission.

Results
Intradural aneurysm was 7 and Extradural aneurysm was 6. Sex was 11 Female and 1 Male. Mean age was 63.3(45-76). Aneurysm size was 3.9mm to 12.1mm (mean; 7.9mm). We used single coil in combination for 6 of 7 intradural aneurysm. All cases were treated with single Pipeline Shield. MRI DWI on the day after treatment showed high intensity spot in 10 cases.
Temporally worsening of oculomotor nerve palsy was appeared one case. No other symptomatic complication was observed. MRI FLAIR showed asymptomatic delayed white matter multiple high signal intensity in two cases. These lesions were disappeared after administration of Prednisolone.

Conclusions
In our initial experience with Pipeline Shield for internal carotid artery aneurysms less than 15mm treatment, the device demonstrated easy to deployment and no major complications. Temporally allergic reaction was observed in two cases. Further studies are required to evaluate the long-term follow-up results and the safety.

31-4 Intracerebral transplantation of autologous bone marrow stem cell (BMSC) for subacute ischemic stroke, phase 1 clinical trial (RAINBOW trial)

MASAHITO KAWABORI, Miki Fujimura

Hokkaido University

Background:
Recent breakthrough in cell therapy is expected to reverse the neurological sequelae of stroke. We investigated the safety and feasibility of intracerebral transplantation of autologous BMSC in the subacute phase of stroke (RAINBOW trial). Several new aspects including cell labeling and tracking, socioecomonic analysis using QALY, and the use of human platelet lysate instead of fetal bovine serum were adopted. (UNIN ID: UMIN000026130))

Methods/Design:
This is a phase 1, open-label, uncontrolled, dose-response study enrolling adults with severe motor deficits (mRS>3) 14 days after stroke. Approximately 50 mL of the bone marrow is extracted from the iliac bone of each patient 15 days or later from the onset, and BMSCs are cultured with allogeneic human platelet lysate (PL) and are labeled with superparamagnetic iron oxide for cell tracking using MRI. BMSCs are stereotactically administered around the area of infarction approximately 2 months from the ischemic stroke. Each patient will be administered a dose of 20 or 50 million cells. Neurological scoring, MRI for cell tracking, ^{18}F-fuorodeoxyglucose positron emission tomography, and ^{123}I-Iomazenil singlephoton emission computed tomography will be performed throughout 1 year after the administration.

Results:
All 7 patients have been successfully finished transplantation, and there was no severe adverse event in any of the patient regarding the surgical procedure nor cell quality. Favorable motor recoveries (change in mRS $\geq$ 1) are seen in 5 of 7 patients, and cell engraftment and migration to ischemic site was also observed.

Discussion:
This is a first-in-human trial to use labelled BMSC to the patients with subacute ischemic stroke. Intracerebral transplantation of autologous BMSC is safe and well tolerated. Cell migration to the ischemic boundary can clarify the therapeutic mechanisms.

31-5 A case of MCA occlusion that was refractory to thrombectomy and performed emergency STA-MCA bypas

YUTO SUZUKI[1)], Takahiro Yamauchi[1)], Osamu Saitoh[1)], Tohru Inagaki[1)], Shinsuke Irie[2)]

[1)] Kushiro Kojinkai Memorial Hospital
[2)] Hokkaido Ohno Memorial Hospital

The case is that a 58-year-old man developed dysarthria and was taken to the emergency room. At the time of admission, his dysarthria had improved and no neurological deficits were observed. Oral administration of clopidogrel 75 mg was started as an antiplatelet agent, but dysarthria and right hemiparesis developed in the evening of the following day. A reexamination of MRA revealed left MCA occlusion, and emergency thrombectomy was performed. As a result, the canal was recanalized, but severe stenosis remained, and reocclusion occurred when angiography was performed after waiting. Percutaneous balloon angioplasty was performed for severe stenosis and recanalization was obtained. Although the right hemiparesis also improved, MMT1/5 right paralysis appeared in the early morning of the next day, and MRA confirmed reocclusion of the same area. It was resistant to endovascular treatment, and an emergency STA-MCA bypass was performed. One week after the operation, the right hemiplegia improved, and after two months of recovery, he became independent in peripheral movements and was discharged from the hospital. Although thrombectomy is the gold standard treatment for acute major cerebral artery occlusion, there are some patients who are resistant to endovascular treatment. Emergency STA-MCA bypass surgery may be an effective option for such cases.

Keynote Lecture ⑨ : AVM

32-1 AVM surgery using intra-arterial ICG videoangiography in hybrid operating room

YASUSHI TAKAGI

Department of Neurosurgery, Tokushima University

Background and aims

After the result of ARUBA trial was published, AVM surgery should be safer than before. We have emphasized the usefulness of non-stick bipolar forceps and intraoperative blood flow analysis to prevent from hemorrhagic complications. In this report, we show the usefulness of intra-arterial ICG videoangiography to assess the nidus flow during AVM surgery.

Methods

In hybrid operating room, we set the catheter in carotid or vertebral artery before surgery. During nidus removal, we check the nidus flow using intra-arterial ICG videoangiography several times.

Results

We show the several illustrative cases using intra-arterial ICG videoangiography. Serial study clearly shows the reduction of the nidus flow during removal. ICG infused from artery is rapidly washed-out. Thus, serial study is possible. Finally usual angiography in hybrid operating room is performed to confirm total removal of the nidus.

Conclusions

Intraoperative blood flow analysis using intra-arterial ICG videoangiography enables us to assess the nidus flow during surgery. This method is useful to avoid hemorrhagic complications during AVM surgery.

Keynote Lecture ⑩

33-1 Current Management of Cerebral Aneurysms Clipping Surgery or Endovascular Repair. Duke 10 years Experience

ALI ZOMORODI

Duke University

Management of giant intracranial aneurysms pose an ongoing challenge to cerebrovascular surgeons. While some of these lesions are easily managed with the latest endovascular techniques, many of these aneurysms are best managed through combined endovascular and open strategies. We will review our institution's experience with giant intracranial aneurysms and present combined management techniques to achieve optimal results.

Master's Lecture ① : Cerebral Aneurysm clipping

34-1 30years Experience of Non-ruptured Aneurysm clipping surgery in Kushiro Area

SHINSUKE IRIE [1)], Koji Saito[2)] , Toru Inagaki[2)], Osamu Saito[2)]

[1)] Hokkaido Ohno Memorial Hospital

[2)] Kushiro Kojinkai Memorial Hospital

The surgery of unruptured aneurysm clipping needs less invasive techniques for the purpose of early come back to normal life. We perform over 2000 unruptured aneurysm surgeries recent 30 years. We introduce the standard less invasive operative techniques with video and examine about the surgical results.

We treated 2261 Non-ruptured Aneurysm Cases (2811 aneurysms, 2423 operations) in 1990.12.4～2020.12.31. We obtained good results (Morbidity rate; 3.36% , Mortality rate; 0.09%). Transient complication were occurred in 242 cases(10.%) , but all of them were cured. Most common transient complication was chronic subdural hematoma , occurred in 116 cases(5.13%). Permanent complication occurred in 76(3.36%) cases. 38cases(1.68%) of them caused by perforator injury.

Surgical treatment of non-ruptured aneurysms may be able to prevent subarachnoid hemorrhage caused by ruptured aneurysms. When we treat unruptured aneurysms ,it is important to use less invasive methods during diagnostic examination and operation. Good operative results and high satisfaction of the patient were obtained by this operative method.

Master's Lecture ② : Cerebral Aneurysm Clipping

35-1 Esoterica of Aneurysm Surgery

HIROTOSHI SANO

Shinkawabashi Hospital

Nowadays, intracranial aneurysms are commonly treated by the endovascular method, however, bifurcation type fusiform shape giant aneurysms are difficult to be treated.
In 1863, in Japan, a subarachnoid aneurysm trial was held comparing Neuro-surgical clipping and Endovascular Coiling where it was found that the patients with ruptured intracranial aneurysms had a better result via clipping, however, it was not proved statistically significant.
The con about neuro-clipping is that surgical training takes longer than IVR training and we must maintain this level of training to upkeep our technique. Therefore, I would like to touch on the esoterica of aneurysm surgery, which is a surgical treatment which is an approach not inside the vessels but from opening the brain. By using an open approach, we have more options available such as changing the shape of the aneurysm by wrapping it, coagulation or even attenuate the flow with or without EC-IC bypass.

Keynote Lecture ⑪ : Exoscope

36-1 Our experiences of neurosurgical operation using exoscope (ORBEYE)

TAKETOSHI MAEHARA, Motoki Inaji, Takashi Sugawara, Hiroto Yamaoka, Yoji Tanaka

Department of Neurosurgery, Tokyo Medical and Dental University

The exoscope is a novel high-definition digital camera system that is recently introduced to neurosurgery. Although few reports indicated its usefulness, we need more information and experiences to realize its real world value. Since April 2021, our department introduced 4K 3-dimensional video microscope system (ORBEYE: Olympus) in neurosurgical operation including cerebrovascular surgery, brain tumor surgery, microvascular decompression, and epilepsy surgery. We analyzed our experiences of exoscope surgery compared to operative microscope (OPMI) surgery, focusing on improved potentials and problems. The improved potentials of ORBEYE are fatigue reduction of operator in a relax and natural position, infinite access, wider color gamut, easy transportation, easy draping, and 3D image shared by everyone that is especially useful as an educational tool. Wide working space are useful for combination surgery with endoscope and navigation system.
Different from OPMI, operation axis is not same as visual axis. However, exoscope skill is easy to acquire for experienced neurosurgeon. On the other hand, special considerations are required for young assistants to make a proper intraoperative support. In addition, intraoperative white saturation that obstructs 3D stereovision is a problem to be solved. We will show cases of cerebrovascular surgery, brain tumor surgery, microvascular decompression, and epilepsy surgery using ORBEYE experienced in our department.

Keynote Lecture ⑫ : MVD

37-1 Operative results of MVD for HFS and TN over the past 5 years

RYAN MILLAR, Russell Margraf, Lori Radcliffe, Takanori Fukushima

Raleigh Neurosurgical Clinic

Since Dr. Fukushima joined Raleigh Neurosurgical Clinic (RNC) in 2018, as well as the use of intra-operative Leica microscopy allowing for face-to-face co-surgeon operations, Prof. Fukushima has been teaching and guiding the principles of skull-based surgery. RNC's attending faculty have been able to gain an enormous amount of technical skill regarding the treatment of aneurysms, brain tumors and microvascular decompressions (MVDs). This presentation will summarize the results of MVDs for HFS and TN by Dr. Fukushima's Keyhole Method over the past 5 years performed by RNC attendings: Drs. Margraf, Khoury, Burnsed and Belayev. Initial operative cure rate, follow up recurrence rate for Keyhole Method and results of re-operative cases from other institutions will be discussed as well.

Keynote Lecture ⑬ : MVD

38-1 A Novel Approach to Microvascular Decompression for Hemifacial Spasm: The Shelter Method and Associated Outcomes

SHINJI NAGAHIRO[1)], Yoshifumi Mizobuchi[2)]

[1)] Department of Neurosurgery, Yoshinogawa Hospital

[2)] Department of Neurosurgery, Kochi Red Cross Hospital

Background: Microvascular decompression (MVD) is the only potential curative treatment for hemifacial spasm (HFS), resulting in a high rate of resolution of HFS. However, traditional techniques such as the interposition method may have limited effect in some cases, depending on the pattern of compression of the responsible artery. Despite the high rate of spasm resolution in the simple type (Type A) in which the anterior inferior cerebellar artery (AICA) or posterior inferior cerebellar artery (PICA) typically compresses the REZ, we reported that there were many unsuccessful or recurrent cases in Type B in which the vertebral artery is involved in compression and Type C in which the AICA coursing between the facial and auditory nerves is involved in compression and also compresses the facial nerve REZ dorsally (J Neurosurg. 1991). In order to improve the surgical outcomes of these types, we have introduced a novel method of decompression, named the "Shelter method" since 1997. The concept of the shelter method is to create a shelter-like space around the facial nerve root exit zone by simple and safe transposition technique.
Methods: Medical records and intraoperative findings of 92 patients with HFS who underwent MVD using the shelter method between April 1997 and March 2017 were retrospectively reviewed. As a historical control group, we included 53 patients who have undergone MVD by the traditional interposition method before March 1989. The patients were divided into 3 subgroups of Type A, B and C, according to the arteries involved and direction of arterial compression to the seventh nerve. Patient outcomes were assessed as excellent, good, fair, and poor according to the MVD scoring system of the Japan Society for MVD Surgery.
Results: In the shelter method group, complete disappearance of HFS was achieved in 87 patients (94.6%). The curative rate of the shelter method group was significantly higher than that of the interposition method group. The overall complication rates were significantly lower in the shelter method group than in the interposition method group.
Conclusions: Our findings indicate high curative and low complication rates of the shelter method, suggesting that it helps treat HFS caused by various types of arterial compression.

Keynote Lecture ⑭ : MVD

39-1 Standardized analysis of the patient satisfaction after trigeminal neuralgia surgery

AKINORI KONDO, Hiroshi Shimano, Souichiro Yasuda, Kouji Takeuchi, Takashi Yoneda, Kousuke Miyake

Shiroyama Hospital

Background

Microvascular decompression (MVD) is useful for the treatment of trigeminal neuralgia. Despite many data reported, they just evaluated postoperative pain relief without measuring patient satisfaction

Objective ;

Measuring subjective satisfaction rate using standardized analysis combining pain relief and complications.

Methods ;

Subjective satisfaction of the patients evaluated : pain score(P), represented residual pain levels ranging from P-0(complete pain relief) to P-1,P-2 and P-3 when pain persisted in variable degrees. The complication score (C) ranged from C-0 (no complication) to C-1, C-2 in which slight or problematic nerve dysfunction remained . Total results (T) are summed P and C scores

Results ;

Among the 94 patients, 81(86.2%) patients were categorized as P-0. In 13(13.3%) patients, pain persisted as P-1, P-2,or P-3. And in14(14.9%) patients, complications occurred at the C-1,or C-2 level. Total analysis results revealed T-0 in 71(75,5%)T-1 in 15(15.9%) T-2 in 5(5.3%), T-3 in 2(2.1%)

Conclusion ;

Based on our single-institute study with long-term follow- up , our method combing separate measures for pain relief and complication occurrence effectively measures the actual subjective satisfaction rate of patients after surgery. The standardized analysis is mandatory to evaluate the actual surgical results of MVD.

Moyamoya Disease 2

40-1 Peri-surgical outcomes of combined revascularization surgery for moyamoya disease with MR-first diagnostic protocol

TOMOHIRO OKUYAMA[1)], Masahito Kawabori[1)], Masaki Ito[1)], Taku Sugiyama[1)], Ken Kazumata[2)], Miki Fujimura[1))]

[1)] Department of Neurosurgery, Hokkaido University Graduate School of Medicine

[2)] Department of Neurosurgery, Hokkaido Medical Center

Background: Moyamoya disease (MMD) is a progressive cerebrovascular disorder characterized by steno-occlusive changes at the terminal portion of the internal carotid artery (ICA) and abnormal vascular network formation at the base of the brain. Cerebral angiography is the gold standard for diagnosing MMD, but possesses the risk of complications during the procedure. Magnetic resonance (MR) imaging/angiography is becoming more popular in the field of cerebrovascular disease due to its low invasiveness. However, the surgical result of perioperative assessment solely performed by MRI for MMD is unknown. Here, we retrospectively reviewed our 10-year experience of MR–first diagnosis and analyzed the perioperative outcomes.

Methods: We analyzed 160 consecutive direct/indirect combined revascularization procedures for MMD preoperatively assessed using MR imaging/angiography alone, with no use of cerebral angiography. Perioperative complications were assessed for up to 2 weeks after surgery. Locations of the lesions responsible for complications were further classified into the surgical field, the ipsilateral hemisphere outside the surgical field, and the contralateral hemisphere, to elucidate the mechanisms of complication.

Results: 64 revascularization procedures were performed in 38 pediatric patients and 96 procedures were performed in 68 adult patients. There was no difference in the incidence of perioperative ischemic complications between adult patients (6.3%) and pediatric patients (4.7%), but hemorrhagic complications were more frequently observed in adult patients (7.3%) than in pediatric patients (0%) ($P < 0.05$). There was no specific lesion deviation for ischemic complications; however, hemorrhagic complications predominantly occurred in the surgical field.

Conclusions: The perioperative complication rates of the MR-first strategy for pediatric patients were acceptable; however, the rate of hemorrhagic complications in adult patients was notably high. The underestimation of pre-existing transdural collateral circulations and dangerous collaterals may related to the hemorrhage, and the validity of the MR-first diagnostic protocol should be carefully considered in adult patients with MMD.

40-2 Chronological Volume Changes of the Temporal Muscle Pedicle Used for Encephalo-Myo-Synangiosis after Combined Revascularization for Moyamoya Disease

MAKOTO MIZUSHIMA[1)], Masaki Ito[1)], Noriyuki Fujima[2)], Haruto Uchino[1)], Taku Sugiyama[1)], Miki Fujimura[1)]

[1)] Department of Neurosurgery, Hokkaido University Graduate School of Medicine
[2)] Department of Diagnostic and Interventional Radiology, Hokkaido University Hospital

Background: Compression of the brain by the swollen temporal muscle pedicle used for encephalo-myo-synangiosis (EMS) is a potential complication after surgical revascularization for Moyamoya disease (MMD). However, chronological volume changes of the temporal muscle pedicle after combined revascularization are not yet documented.
Purpose: This prospective observational study was aimed to investigate the temporal profile and surgical outcome.
Materials and Methods: Consecutive 15 adult MMD patients, except for one adolescent, with ischemic or hemorrhagic symptoms underwent a total of 18 superficial temporal artery (STA) to middle cerebral artery (MCA) single anastomosis followed by encephalo-myo-duro-synangiosis (EDMS) in 2021. To avoid unfavorable effects by the temporal muscle pedicle swelling, we routinely attempted inner layer drilling of the cranial bone flap, making a wide cranial bone window for the pedicle insertion, and splitting temporal muscle to reduce its thickness. Postoperative temporal muscle pedicle volume was quantified using repeated CT scans at postoperative days (POD) 0, 1, 7, 14, and 30. Postoperative neurological events occurred in a month after surgery and the collateral development visually evaluated by MR angiography obtained after 6 months postoperatively were studied.
Results: The mean age was 38.3 years old at the operation (ranging from 14 to 60 years). Postoperative temporal muscle pedicle volume was 9.8 ± 3.3, 11 ± 4.2, 11 ± 3.9, 8.5 ± 3.3, and 4.9 ± 2.2 cm^3 at POD 0, 1, 7, 14, and 30, respectively. The temporal muscle pedicle volume was most significantly increased as much as 112 ± 9.6% at POD 7 ($P<0.001$) and decreased as less as 52 ± 21% at POD 30 ($P<0.0001$), when compared with that at POD 0. No patients suffered postoperative neurological deterioration caused by the swollen temporal muscle pedicle. All patients, except for one case with recurrent hemorrhagic stroke, showed independent outcome at the latest follow-up on POD 290 ± 96. We further confirmed the excellent development of postoperative collaterals via direct and indirect revascularization in 16 (89%) and 12 (67%) hemispheres, respectively. The postoperative collateral developments were observed regardless of the temporal profile of the pedicle volume.
Conclusions: Our observation suggests the potential timing of the temporal muscle pedicle swelling after combined direct and indirect revascularization using temporal muscle with aforementioned routine attempts to avoid surgical complication. Mechanical brain compression by the temporal muscle pedicle swelling can be avoided with effective direct and indirect collateral development by combined STA-MCA anastomosis with EDMS.

40-3 Encephalo-duro-pericranio-synangiosis for the treatment of moyamoya disease with posterior cerebral artery lesions

MOTOKI INAJI, Motoshige Yamashina, Shoko hara, Yoji Tanaka, Tadashi Nariai, Taketoshi Maehara

Tokyo Medical and Dental University

Object: In this report we describe our experience performing encephalo-duro-pericranio synangiosis for the parieto-occipital region (EDPS-p) as a treatment for moyamoya disease (MMD) with hemodynamic disturbances caused by posterior cerebral artery (PCA) lesions.
Methods: From 2004 to 2020, 60 hemispheres of 50 patients with MMD (38 females and 12 males, age 1-55 years) underwent EPDS-p as a treatment for hemodynamic disturbances in the parieto-occipital region. A skin incision was made on the parieto-occipital area to avoid the major skin arteries, and the pericranium was used as the pedicle flap and attached to the dura mater with multiple small incisions under the craniotomy. The surgical outcome was assessed based on the following points: perioperative complications, development of collateral vessels qualitatively assessed by magnetic resonance arteriography, postoperative perfusion improvement quantitatively assessed by mean transit time (MTT) and cerebral blood volume (CBV) on dynamic susceptibility contrast imaging, postoperative improvement of clinical symptoms, and subsequent novel ischemic events during the follow-up period (12-187 months).
Results: Perioperative infarction occurred in 7/60 hemispheres (11.7%). The development of postoperative collateral vessels supplied from the occipital arteries, middle meningeal arteries, and posterior auricular arteries was observed in 56/60 hemispheres (93.3%). Postoperative MTT and CBV showed significant improvement in the occipital, parietal, and temporal areas ($p<0.001$), as well as the frontal area ($p=0.01$). Preoperative transient ischemic symptoms disappeared in 39/41 hemispheres (95.1%), and none of the patients experienced novel ischemic events during the follow-up period.
Conclusions: EDPS-p seem to be an effective surgical treatment for patients with MMD who suffer hemodynamic disturbances caused by PCA lesions.

Others

41-1 Dural closure using inlay fascial graft may be useful to prevent cerebrospinal fluid leak following the key hole surgery of the posterior fossa

YUZO TERAKAWA, Shinsuke Irie, Kazuki Takahira, Shohei Noro, Taketo Kataoka, Koji Saito

Hokkaido Ohno Memorial Hospital

Background

Cerebrospinal fluid leak is one of the most common complications after neurosurgical procedure that can potentially lead to serious morbidities. According to the previous literature, the incidence rate has been reported to range from 0.8 to 13%. In particular, posterior fossa surgery is highly associated with this complication, and the incidence can rise up to be as high as 17%.

In our institution, autologous fascia graft is preferably used to achieve watertight closure of the dura in order to prevent cerebrospinal fluid leak following keyhole surgery of the posterior fossa.

Objectives

Here, we present our recent surgical method of dural closure in the keyhole surgery of the posterior fossa, and assess its outcome with respect to cerebrospinal fluid leak.

Methods

Briefly, our surgical method is as follows. A linear or C-shaped skin incision is made just on the planned craniotomy area, and the fascia of the suboccipital muscles is collected from the surgical site in advance for the dural closure afterwards. After completion of intradural procedure, a piece of prepared fascia is grafted and sutured to close the dura in an inlay fashion using 4-0 braided nylon threads. In addition, absorbable gelatin sponges (Gelform®) or collagen sheets (Duragen®) soaked with fibrin sealant are laid over the dura to reinforce watertight closure. Bony structure is reconstructed with an autologous or artificial bone, and subcutaneous and skin tissues are closed anatomically.

In order to assess the efficacy of the surgical method, medical records of the surgical cases in which keyhole posterior fossa surgery was done between October 2016 and December 2022 were retrospectively reviewed, and information regarding cerebrospinal fluid leak was investigated.

Results

In total, 98 keyhole surgeries of the posterior fossa had been done in 97 patients, 32 men and 65 women, with a mean age of 60.9 ± 13.1 years. These consisted of 54 microvascular decompression, 43 tumor removal, and one clipping surgeries. Either of three attending neurosurgeons was in charge of dural closure. Among these 98 cases, cerebrospinal leak occurred in only one case (1.02%) that needed re-operation for repair 11 days after the initial surgery. There were no patients who underwent continuous spinal drainage after surgery.

Conclusions

Although this study lacks a control group, the low incidence of cerebrospinal fluid leak suggests that the present surgical method may be effective to achieve watertight dural closure in the keyhole posterior fossa surgery.

41-2 Stereotactic electroencephalography with O-arm and Leksell Vantage Stereotactic System

MOTOKI INAJI[1)], Satoshi Kaneko[1)], Kazutaka Kobayashi[2)], Taketoshi Maehara[1)]

[1)] Tokyo Medical and Dental University

[2)] Tanaka Neurosurgical Hospital

Objective:

Detection of seizure onset zone according to ictal electro corticography (ECoG) is gold standard for presurgical evaluation. In this era, SEEG (stereotactic electroencephalography) is introduced in Japan. However, the proceeding technique is not established enough. In this study, we report an accurate and safe SEEG technique, using intraoperative CT-guided O-Arm and Leksell Vantage Stereotactic System.

Material and methods:

The study included 9 drug-resistant localization related epilepsy patients. The mean age was 35.9 years and 5 patients were female. Leksell frame was fixed under the general anesthesia in the operation room. After the registration based on the O-arm CT images, the canulation tract was determined to avoid blood vessels based on T1Gd images. After the small skin incision, we opened a small hole with a twist drill, insert an insertion canula, pull out the inner cylinder and insert the depth electrode. The electrode position was confirmed with the O-arm.

Results:

The number of implanted electrodes per patient were 10.6(9-11). The mean distance between the planned target and the final target was 2.1(0.1-4.1)mm. Two acute epidural hematomas and two small asymptomatic intracranial hematomas were observed as surgically derived complications. Eight of nine patients, seizure onset zone was determined following long-term VIDEO ECoG.

Conclusions:

The implantation of deep brain electrodes for SEEG by using intraoperative CT O-Arm and Leksell Vantage Stereotactic System is effective technique with adequate accuracy under general anesthesia.

41-3 Post Covid Neurosurgical Practice Modifications

MYRIAM THYS

Grand Hopital de Charleroi

Covid 19 period followed by lack of OR nurses and ressources available have modified our pratice.
Total number of nurses still increase, except in 2020, when their cursus change from three years to four in Belgium. Burn out and carrier reorientation lowers the really active people number in the hospitals and operating rooms.
Type of pathology treated were slightlly modified.
A period of prioritization related to emergency during covid 19 pics was followed by another type of case prioritization.
In brain, radiosurgery increased regularly. Stereotactic biopsies that were declining before reincreased in 2020 and 2021. Other brain pathologies were nearly stable in proportion and absolute numbers.
In spine, in percentage, numbers of arthrodesis declined and simple procedures as lumbar discus hernia raised in proportion, or spinal stenosis in a lesser proportion. Cervical arthrodesis or arthroplasty declined but came back to previous proportions in 2021, but absolute numbers were 15 % less in 2020 but still are 7 % less than 2019.
Nurse students and professionals must be better supported psychologically, logistically and financially to take care for a population getting older and having more medical needs.

Master's Lecture ③

42-1 Surgery for jugular foramen tumors

MICHIHIRO KOHNO

Tokyo Medical University

【Background】
Surgery for jugular foramen tumors is very difficult to obtain good surgical results. Selecting an appropriate approach and strict intraoperative nerve monitorings are mandatory for excellent surgical results.
【Patients】
The author surgically treated 192 patients with jugular foramen tumors, including 88 jugular foramen schwannomas, 17 hypoglossal schwannomas, 47 meningiomas, 23 glomus jugulare tumors and 17 others. Intraoperative continuous vagus nerve monitoring by direct electrical stimulation of vagus nerve was used in surgery for these tumors.
【Results】
Vagus nerve function after surgery was generally good and hearing improvement was observed in about 40% of patients with jugular foramen schwannomas.
【Conclusions】
Using intraoperative continuous vagus nerve monitoring is useful in surgery for jugular foramen tumors. Postoperative hearing improvement was frequently observed in patients with jugular foramen schwannomas.

Master's Lecture ④ : Acoustic Neurinoma

43-1 Microsurgery of Koos Grade I-II Vestibular Schwannomas: A Case Series Of 100 Consecutive Patients and Technical Video.

LUCIANO MASTRONARDI, Alberto Campione, Fabio Boccacci, Guglielmo Cacciotti, Ettore Carpineta, Carlo Giacobbo Scavo, Raffaelino Roperto, Giovanni Stati, Amer Alomari

Department of Neurosurgery, San Filippo Neri Hospital/ASLRoma1

Background: Treatment of small vestibular schwannomas (VS) depends on: size, growth pattern, age, symptoms, co-morbidities. Watchful waiting, stereotactic radiosurgery and microsurgery are three valid options.
Objective: The goal of this study was to analyze clinical, surgical data and results of 100 consecutive patients with small VS operated on in our Department of Neurosurgery.
Settings: One-hundred patients underwent retrosigmoid microsurgical removal of Koos Grade I-II VS between September 2010 and July 2021.
Methods: Surgical removal was assessed as total, near-total and subtotal. Course of facial nerve (FN) was classified as anterior (A), anterior-inferior (AI), anterior-superior (AS) and dorsal (D). Facial nerve function was assessed according to House-Brackmann (HB) scale and hearing level according to AAO-HNS classification.
Results: Mean tumor size was 1,52cm. FN course was mainly AS (46,0%); in Koos I VS, facial was AS in 83,3%. Postoperative facial nerve function was HBI in 97% and HB II in 3%. Hearing preservation (HP: Class A-B) was possible in 63,2%. Total/near-total removal was possible in 98%. Postoperative mortality was zero. Transient complications were observed in 8% of patients; permanent complications never occurred. A recurrence was observed in one case, 5 years after subtotal removal.
Conclusion: Microsurgery represents a valid option for management of VS, including Koos I-II grades, with acceptable complications. In particular, in small VS long-term FN results, HP and total/near-total rates removal are favorable.

Master's Lecture ⑤ : Acoustic Neurinoma

44-1 Vestibular schwannoma surgery - monitoring, dissection and hemostasis -

MICHIHIRO KOHNO

Department of Neurosurgery, Tokyo Medical University

[Background]

Surgery for large vestibular schwannomas is very difficult to obtain good surgical results, and it requires tips and devices to achieve both high resection rate and high preservation ratio of facial and/or hearing function.

[Patients and methods]

The author's personal surgical experience is 1703 patients (Koos IV: 1062). I have been using intraoperative continuous facial nerve monitoring with direct electrical stimulation on the root exit zone, which is a method for checking facial EMGs during tumor excision in real time. Regarding the tumor dissection, being concious of '3 dissection planes' which include facial or cochlear nerve it self, the membrane derived from the vestibular nerve (very thin tumor capsule), and the residual tumor, makes high functional preservation rates of facila and cochlear nerves. Surgicel® cotton balls are very useful for hemostasis from vestibular schwannomas.

[Results]

Overall functional preservation rate of the facial nerve (House and Brackmann grade 1 or 2 at 1 year after surgery) was 97.7% and hearing preservation ratio was 63.2% with a 96.9% mean resection rate.

[Conclusions]

Under a real-time intraoperative continuous facial nerve monitoring with direct electrical stimulation, conciousness of 3 dissection planes and hemostasis with Surgicel cotton balls® are very useful to increase the tumor excision rate while avoiding severe postoperative facial nerve palsy in vestibular schwannoma surgery.

Honored Guest Special Lecture ①

45-1 Removal of large vestibular schwannomas (VS) by retrosigmoid approach: results of a cumulative series and criticism of "planned" partial resection followed by SRS

MARTIN SAMES[1)], Luciano Mastronardi[2)]

[1)] Masaryk Hospital, University J.E.Purkinje
[2)] San Filippo Neri Hospital, Neurosurgery

Objective:

Evaluate safety and efficacy of removing Samii's grade IV vestibular schwannomas (VS) by retrosigmoid approach (RSA) in a series of patients operated on from 2008 to 2017.

On the basis of literary research compare the long-term results after the "planned" partial resection followed by Stereotactic Radiosurgery (SRS).

Methods:

Large VS (mean diameter 39,8mm ± 6mm) were excised from 57 consecutive patients by RSA. The strategic goal of the operation was radical resection. Surgical excision consisted of debulking of extrameatal portion, followed by removal of intrameatal part. Last pieces of VS were removed by blunt or sharp dissection. In cases of strong tumor adherence to surrounding structures, a millimetric film remnant of tumor capsule was left, thus yielding a near-total or subtotal resection.

Results:

Postoperative mortality was zero. Total or near total (>95%) removal was possible in 41 cases (72%). FN was anatomically preserved in 94,7% and 84,2% of cases had good FN function (House-Brackmann grade I-II) at 6-month follow-up. VP shunt for hydrocephalus was necessary in 5 cases (8,8%).

Discussion:

The mean follow-up was 41,8 months, 3 cases showed recurrence or progression of residuals (5%); and one had NF2.

We compare a different philosophy "planned" partial surgery followed by SRS, which has appeared in the literature since 2003. However, the longest published median follow-up is only 5 years. Residual volume greater than $6cm^3$ before radiosurgery had a tumor regrow of 37,7%.

Conclusions:

In this series of large VS retrosigmoid approach allowed zero mortality, high rate of functional FN preservation (84,2% HB I-II) and low recurrence rate 5%.

The longest published follow-up after planned partial surgery followed by SRS is surprisingly quite short (median 5 years) and shows a regrow in up to 37.7%.

There is still a reason to seek a safe radical or near total tumor removal.

Honored Guest Special Lecture ②

46-1 Extent of resection for meningiomas: Copenhagen grading

MATHIESEN TIIT, Jeppe Haslund Vinding, Andrea Maier, Bjarne Winther Kristensen, David Scheie, Ian Law

University Hospital of Copenhagen

Background:
Knowledge of extent of resection (EOR) is fundamental for management of follow-up and evaluation of need for additional treatment after resection of meningiomas. An objective, sensitive and specific tool to describe EOR is lacking.
Objectives: To develop and implement a tool to evaluate EOR of meningiomas

Methods:
We have prospectively implemented "Copenhagen grading" for EOR of meningiomas. The grading comprises pathology evaluation of resection margins from surgery combined with positron emission tomography (PET) for type-2 somatostatin receptors with 68Ga-DOTATOC 3 months after surgery. A positive finding is scored one and negative is scored 0 for a combined score of 0/0, 0/1, 1/0 or 1/1

Results:
It has been possible to implement Copenhagen scoring into surgical workflow. Approximately 30 % of patients or expected to have had gross total removal of meningiomas scored positive with Copenhagen grading, approximately 1/3 each for 0/1, 1/0 or 1/1.

Conclusions:
Copenhagen grading allowed a better objective evaluation of extent of resection of meningioma than EANO or Simpson grading.

Master's Lecture ⑥

47-1 Surgical Management of Large and Giant Craniopharyngiomas in Children

MICHAEL LEVY, Michael Brandel, Rob Rennert

Rady Children's Hospital of San Diego - UCSD

Introduction:
Despite benign histology, pediatric craniopharyngiomas are challenging to manage and associated with hypopituitarism, hypothalamic dysfunction, and cognitive/behavioral changes. This is particularly true for larger craniopharyngiomas.

Objective:
We present our institutional approach with the nuances of selecting a surgical approach, goal of GTR, minimizing radiation, and techniques to preserve hypothalamic function in patients with large and giant craniopharyngiomas.

Methods:
Retrospective institutional study of craniopharyngioma patients age ≤ 18 years between 2002-2021. Tumor size was defined as large (>2 cm) or giant (>5 cm).

Results:
38 pediatric craniopharyngioma patients met inclusion criteria (14 giant, 24 large). Mean age was 8.7 years and 42% were female. Patients presented with headache (62%), vision changes (59%), nausea/vomiting (43%), and pituitary dysfunction (14%). All histology was adamantinomatous, 34% of tumors extended into the third ventricle, and 50% of patients had hydrocephalus.

For large tumors, surgical approach was 46% transsphenoidal and 54% transcranial (e.g. orbitozygomatic craniotomy). For giant tumors, approach was 21% transsphenoidal and 79% transcranial. Gross-total or near-total resection was achieved in 97.4% of patients.

Median follow-up was 62 months. Complication rate was 18%, including a 5% rate of cerebrospinal fluid leak. Panhypopituitarism occurred in 84%. Forty-six percent were overweight or obese preoperatively; 54% were obese postoperatively. Forty-two percent of patients experienced progression (recurrence or growth of residual), and 32% underwent reoperation. Five-year progression-free survival was 61%, 12% received adjuvant radiation, and only 16% of patients required shunt placement. One patient had asymptomatic recurrence 108 months after GTR, detected on surveillance MRI.

Conclusion:
Preservation of hypothalamic function is key amongst the goals in craniopharyngioma treatment. The hypothalamus is exquisitely radiosensitive in children. Therefore, we favor maximal surgical resection involving careful dissection and variable suction to respect the tumor-hypothalamus interface. GTR may also reduce the need for shunt placement. Long-term surveillance is necessary to detect recurrence.

Keynote Lecture ⑮

48-1 Neurosurgical management of petrous bone lesions: classification system and selection of surgical approaches

UDOM BAWORNVARAPORN[1)], Ali R. Zomorodi[2)], Allan H. Friedman[2)], Takanori Fukushima[2)]

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[2)] Duke University Medical Center

Background Surgery of petrous bone lesions (PBLs) is challenging for neurosurgeons. Selection of the surgical approach is an important key for success. In this study, the authors present an anatomical classification for PBLs that has been used by our group for over the past 26 years. The objective of this study is to investigate the benefits and applicability of this classification. Methods Between 1994 and 2019, 117 patients treated for PBLs were retrospectively reviewed. Using the V3 and arcu- ate eminence as reference points, the petrous bone is segmented into 3 parts: petrous apex, rhomboid, and posterior. The pathological diagnoses, selection of the operative approach, and the extent of resection (EOR) were analyzed and correlated using this classification.
Results This series included 22 facial nerve schwannomas (18.8%), 22 cholesterol granulomas (18.8%), 39 chordomas/chondrosarcomas (33.3%), 6 trigeminal schwannomas (5.1%), 13 epidermoids/dermoids (11.1%), and 15 other pathologies (12.8%). PBLs were most often involved with the petrous apex and rhomboid areas (46.2%). The extradural subtemporal approach (ESTA) was most frequently used (57.3%). Gross total resection was achieved in 58.4%. Symptomatic improve- ment occurred in 92 patients (78.6%). Our results demonstrated a correlation between this classification with each type of pathology ($p < .001$), selection of surgical approaches ($p < 0.001$), and EOR ($p = 0.008$). Chordoma/chondrosarcoma, redo operations, and lesions located medially were less likely to have total resection. Temporary complications occurred in 8 cases (6.8%), persistent morbidity in 5 cases (4.3%), and mortality in 1 case.
Conclusion In this study, we proposed a simple classification of PBLs. Using landmarks on the superior petrosal surface, the petrous bone is divided into 3 parts, apex, rhomboid, and posterior. Our results demonstrated that chordoma/chondrosarcoma, redo operations, and lesions involving the tip of the petrous apex or far medial locations were more difficult to achieve total resection. This classification could help surgeons understand surgical anatomy framework, predict possible structures at risk, and select the most appropriate approach for each patient.

Brain Tumor

49-1 Primary Intraosseous Cavernous Hemangioma of the Clivus: Case Report and Review of the Literature

YUTA KOBAYASHI,[1)], Daichi Fujimori[1)], Shunsuke Satoh[1)], Hiromi Goto[1)], Kazuo Watanabe[1)], Noriaki Tomura[2)]

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[Introduction] Primary intraosseous cavernous hemangiomas (PICHs) are rare, benign, and osteolytic tumors of vascular origin. PICHs usually occur in adults, and patients are predominantly in female fifth decade of life. PICHs of the skull account for 0.2% of all bone neoplasms. Involvement of the skull base is exceedingly rare. The radiographic presentation of the PICHs is nonspecific. PICHs appear as a radiolucent unilocular or multilocular lesion with reticulated, honeycomb, or sunburst appearance. Most cases can be diagnosed with characteristic radiographic findings. However, this classic feature may be absent in many cases, which present only as osteolytic or expanding dense bone masses. A rare case of PICHs is presented with literature view.
[Case presentation] A 57-year-old woman came to our hospital with diplopia from a few days ago. She presented transient diplopia at right lateral gaze and upper gaze with normal eye movement. The symptoms disappeared spontaneously in a week later. She had no other compliments or neurological deficits. CT demonstrated the intraosseous mass lesion and bone erosion of the middle and lower clivus, extending laterally to the right occipital condyle. MRI revealed hypointense on T1-weighted and hyperintense components on T2-weighted image in this lesion. Compared with the initial MRI study performed 10 years ago, the lesion obviously increased in size. Both "C-methionine PET and ^{18}F-fluorodeoxy glucose PET showed no significant accumulation. Chordoma or chondroma was possibly diagnosed before surgery. The tumor was removed by endoscopic transsphenoidal approach. In the operating view, the lesion appeared as "moth-eaten" bony interstices filled with vascular soft tissue. Histologically, intraosseous cavernous hemangioma was diagnosed.
[Discussion and conclusions] A case of the PICHs of the clivus, mimicking chordoma was experienced. PICHs of the skull base could mimic other more common skull base lesions. It could be difficult to diagnose before surgery without characteristic radiopraphic findings. PICHs should be considered in the differential diagnosis of malignant skull lesions.

49-2 A case of choroid plexus carcinoma in adult

TAKAHIRO YAMAUCHI[1)], Yuuto Suzuki[1)], Manabu Sumiyoshi[1)], Toshiyuki Okazaki[1)], Osamu Saito[1)], Toru Inagaki[1)], Yuuzo Terakawa[2)], Shinsuke Irie[2)], Koji Saito[1)]

[1)] Kushiro Kojinkai Memorial Hospital
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Background: Choroid plexus carcinoma is a rare malignant brain tumor mainly occurs in children. We experienced the tumor in adult case and performed tumor removal surgery less invasively with supplementary radiation therapy. The aim of this report is to show the case and review articles reported in the past.
Case report: Sixty-one years old female with a headache and depressive state received brain imaging. There was an irregular-shaped mass lesion showing Gadolinium contrast enhancement in her right posterior tip of lateral ventricle and we performed tumor removal surgery via lower parietal trans-cortical approach. She showed minor cognitive disturbance post-operatively and pathological report revealed choroid plexus carcinoma or metastatic brain tumor on choroid plexus. We promoted additional scanning including gastric and colorectal fibers, systemic PET-CT, and no evidence of primary malignant lesions systemically, so we concluded choroid plexus carcinoma. She received IMRT 50Gy and there was no recurrence during eighteen months until another new lesion appeared in her right inferior tip of lateral ventricle. We performed second surgery via temporal trans-cortical approach. Pathological report showed same characteristics as that of first time and patient enjoyed daily life until another recurrence appeared at her temporal tip after five months. We performed third surgery by removing right lateral temporal lobe and additional IMRT 60Gy was applied. Nine months later, forth surgery was performed because another new recurrence was seen at her right frontal convexity area, and she received additional radiation therapy. She showed no motor deficit with modified ranking scale 2 at the moment.
Conclusions: We experienced extremely rare case of adult choroid plexus carcinoma. Its symptoms, imaging, diagnosis, operative management, prognosis, and adjuvant therapy were controversial because of its rarity. Some reports say gross total removal is the most effective treatment for progression and overall survival, and no conformable effectiveness of adjuvant chemotherapy is reported in adult case. We performed appropriate less-invasive trans-cortical approach and additional radiation therapy, and patient survived longer with no major motor and cognitive deficits.

49-3 Meningitis and secondary hydrocephaly as presenting symptoms for olfactory groove meningioma invading bone: case report

MYRIAM THYS, Denis Glorieux, Marc Gobert, Dan Gusu

Grand Hopital de Charleroi

BACKGROUND:
A sixty nine year old woman was admitted in ICU for confusion and drowsiness, than coma after complaining of fever since a few days. She needed to be intubated and showed nuchal stiffness, left mydriasis and upper flexion mouvements to pain stimulation.
METHODS:
Cerebral Scanner showed frontobasal oedema and ventriculomegaly. A frontobasal meningioma was spontaneously visible, measuring 3 x 2 x 1,5 cm, with no bone defect visible.
Lumbar puncture showed 1460 white cells/ mm3, glycorrhachia under 5 mg/dl and CSF protein concentration at 4,32 gr/ l. Culture, microbial and viral PCR were all negative...
Meningitis remains even after 10 days under gentamicin during 7 days and rocephine and amoxicillin during ten days. Ventriculitis and maxillary sinusitis signs were present at MRI. Frontal oedema increased. Maxillary sinus was drained at day 15.
Patient was extubated but was readmitted in ICU 3 days later for drowsiness and then coma on progressive hydrocephalus.
Right ventricle was drained, then one week later left one, which was not communicating.
Meningitis remained, with now germs in common between nose and CSF, even after both drains renewal 11 days later.
As infection stayed incontrolled, we decide to explore and repair frontal skull base, and resect olfactory groove meningioma.
RESULTS:
A very small hole in right olfactory groove bone was visible and repaired by bone fragment, bone powder and glue and fascia lata aponeurosis. Meningitis resolved slowly.
CONCLUSIONS:
Meningitis, ventriculitis and hydrocephalus may be the presenting symptoms of a basifrontal CSF fistula induced by an olfactory grove meningioma with very focal bone invasion.

49-4 Long-term surgical outcome of the skull base meningioma. The role of post-operative radiotherapy

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Introduction: Skull base meningiomas are close to critical neurovascular structure and difficult to resect totally. We analyze the role of surgery and gamma knife surgery and proton beam therapy for skull base meningiomas based on the long-term follow up.
material and methods: We retrospectively reviewed our surgical experience of skull base meningiomas at our institute from Jun 2004 to December 2012. We use the gamma knife or proton beam therapy for the residual skull base meningioma according to the pathological findings and residual tumor location and size. We analyze the incidence of cranial nerve related complication, resection rate, recurrence or progression rate and clinical outcomes.
Result: There were 130 skull base meningiomas. Gross total resection was performed in 92 patients (71%). Sixteen of 38 patients (42%) with residual tumor underwent gamma knife (14 patients) or proton beam therapy (2 patients). The incidence of cranial nerve related complication was observed in 12.3% patients. There was no operative mortality. Operative morbidity was 0.7%. Recurrence or tumor progression was observed in 23 patients (17.7%) at medium follow up 160 months. Among these 23 patients, 6 patients were who underwent Simpson grade 2 resection, 5 patients Simpson grade 3&4 resection with postoperative gamma knife, 12 patient Simpson grade 3&4 resection without postoperative radiotherapy. The mean recurrence time on Simpson grade 2 patients is 78 months, 130 months in Simpson grade 3&4 resection with postradiotherapy, 50 months in Simpson grade 3&4 resection without radiotherapy. Two sphenoidal ridge and one tuberclum meningiomas with postoperative gamma knife therapy patients had progressed the tumor and visual disturbance at 40 month,134 months, and 153 months after the gamma knife. One sphenoidal meningioma patient Simpson grade 3 resection with postoperative proton beam therapy developed visual disturbance at 74 months after the therapy and pituitary dysfunction at 118 months after the therapy.
Conclusion: Postoperative radiotherapy for the residual skull base meningioma is effective to prevent the tumor progression. But after more than 60 months, the radiation therapy for surrounding optic nerve meningioma may cause tumor progression due to the limited radiation dose. In addition, even a limited dose may cause optic nerve injury and pituitary dysfunction. Long-term follow up is necessary for the skull base meningioma treated with post-operative radiotherapy.

49-5 A phase II clinical trial using accelerator-based BNCT system for refractory recurrent high-grade meningioma

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Background: Recurrent high-grade meningiomas after X-ray treatment showed 5.2 months as progression free survival (PFS) and only 24.6 months as overall survival (OS) from the literatures. Recently we have applied reactor-based BNCT for 46 cases of refractory and recurrent high-grade meningioma (HGM, WHO grade 2 or 3). These data showed mOS as 29.6 months and PFS-6months as 80.6%.
Objectives: Based on these data, we proposed "*A phase II clinical trial using accelerator-based BNCT system for refractory recurrent high-grade meningioma"* for Japan Agency for Medical Research and Development (AMED) which is similar to NIH in USA.
Methods: Pharmaceutical and Medical Devices Agency (PMDA) in Japan which is a counter part of FDA in USA suggested the importance of randomized controlled trial (RCT) even for this exploratory clinical trial for rare tumors, such as HGMs. Along to this suggestion, we prepared 2 study groups, BNCT test treatment group (12 subjects) and control best supportive care group (6 subjects). PFS judged by 3rd-party committee was set-up as primary endpoint and PFS judged by investigators and OS were set-up as secondary endpoint. To diminish ethical problems of this RCT, rescue BNCT is permitted for control group patients, if they showed progress disease during the observation period. 2-dimensional modified Macdonald criteria is adopted for assessment. Patients eligibility criteria is as following, recurrent HGM after some radiotherapy (less than 65 Gy as fractionated X-ray treatment, daily 2Gy fraction), aged more than 20 and less than 75. KPS should be more than 60%. SPM-011 as BPA is administrated 500mg/kg in 3 hours intravenously. Cyclotron-based accelerator system is used for neutron source. Neutron-irradiation time is determined not to exceed to 7.5 Gy-Eq for scalp dose, which was referencing preceding phase I and II trials for malignant gliomas. Our proposal was adopted by AMED and the trial started in August 2019.
Interim results of this trial:The last patient-in was August 2021. Three and two Grade 3 subjects were included in BNCT and control arm, respectively.Others were grade 2 subjects. Primary endpoint (PFS judged by 3rd-party committee) has not been decided. PFS judged by investigators (one of the secondary endpoints) as of end of August 2022 showed 64 weeks and 8 weeks as mPFS for BNCT and control arm, respectively. P-value of which was 0.0004 as log-rank test.
Conclusion: Based on these results, we will prepare the regulatory affairs application of accelerator-based BNCT for recurrent high-grade meningiomas.

49-6 Mid-frontal Interhemispheric Precallosal Trans-septal Approach for Third Ventriclular Tumors

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Surgical treatment of tumors located at suprasellar region is still formidable challenge. This lesion is surrounded by many vital structures such as optic chiasma, anterior communicating artery and its branches, hypothalamus, and pituitary. Most are craniopharyngiomas, rarely optic – hypothalamic gliomas, and so on. Various approaches have been tried to treat these tumors. In the last decade, endoscopic endonasal approach has been increased. However, due to diverse location and extent of tumors, optimal approach differs from each tumor.

As for craniopharyngioma, we emphasize that tumors located entirely in the third ventricle are only approached via trans-laminar terminalis corridor, because the floor of the third ventricle is intact. As the most favorable approach to use this entry, we propose mid-frontal interhemispheric precallosal trans-septal approach. Cadaveric study reveals advantage of this approach anatomically. And some clinical cases and an operative video show the actual treatment.

49-7 Extra wide sphenoidotomy for transnasal skull base surgery

HIROAKI MOTEGI, Shigeru Yamaguchi, Sogo Oki, Ryosuke Sawaya, Michinari Okamoto, Sumire Echizenya, Yukitomo Ishi, Miki Fujimura

Hokkaido University

Background: Indications for transnasal endoscopic surgery for skull base (SB) lesions are expanding. To ensure surgical safety, it is essential to open the sphenoid sinus more widely and reduce interference with instruments. Resection of a middle turbinate (MT) would provide a sufficient corridor for surgical manipulation at the SB but could lead to dysfunction of the nasal physiology.

Objectives: We report the usefulness of an extra wide sphenoidotomy with preserving nasal structures (EW sphenoidotomy) as much as possible in endonasal SB surgery.

Methods: In this retrospective cohort study, 114 cases who underwent endoscopic transnasal SB surgery from January 2019 to November 2022 at Hokkaido University Hospital and affiliated hospitals were examined for degree of bone removal around the sphenopalatine foramen and Vidian canal (VC) between normal approach group and EW sphenoidotomy group. EW sphenoidotomy procedure: Otolaryngologists open the ethmoid and maxillary sinuses from the lateral of the MT. After that, the bones of the orbital process and sphenoidal process, which constitute the posterior wall of the maxillary sinus, are removed from the lateral and medial of the MT while preserving the sphenopalatine artery by neurosurgeons to obtain a sufficient surgical field for manipulation around the internal carotid artery.

Results: EW-sphenoidotomy was performed in 15 cases. There were 7 pituitary adenomas with cavernous sinus invasion, 3 craniopharyngiomas, and 5 others. In all cases, surgical instruments could be inserted smoothly lateral of the internal carotid artery. The length of enlargement of sphenoid sinus at the sphenopalatine foramen and VC levels were 19.9 mm (±2.7) and 17.4 mm (±4.6) in the normal TSS, whereas in the EW sphenoidotomy they were 25.67 mm (±5.2) and 22.8 mm respectively. A significantly wide corridor ($p<0.001$) was obtained in EW sphenoidotomy group. No internal carotid artery injury, cerebrospinal fluid leakage and anosmia was observed.

Conclusions: E-TSS was considered an effective approach to safely perform extended sphenoid sinus surgery.

49-8 Variation of the surgical approaches for orbital tumors

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The orbit is an anatomically complex region that contains various structures, including the ocular globe, nerves, vessels, muscles, fat tissue, lacrimal gland. As the result of these variety of structures and unique anatomy surrounded by the paranasal sinus and cranial cavity, many pathologies can occur within and around orbit.

Different transcranial and orbital approaches are performed in order to manage orbital tumors, depending on the location and size of the lesion within the orbit, relationship with surrounding structures, preoperative diagnosis. These approaches provide a satisfactory view of the superior and lateral aspects of the orbit and the optic canal, but have limitation of the approach to the medial and inferior aspects. Recently, usefulness of the endoscopic anterior approach for the orbital tumor located medially and inferiorly to the optic nerve has been reported.

We have performed surgical treatment for 19 orbital tumor cases and 20 operations since 2005. Majority of the tumor pathology was cavernous hemangioma, followed by neurinoma and meningioma. Transcranial approach was used most frequency (15/19), followed by endoscopic anterior approach (3/19), transorbital approach (2/19).

In this presentation, we discuss the current surgical approaches and techniques for orbital tumors removal, focusing on the key anatomic principles to follow for safe tumor resection.

Poster Session

P1 Superficial Siderosis of the central nervous system secondary to Capillary Hemangioma of the cauda equina: a case report

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Background
Superficial siderosis of the central nervous system is an infrequent pathology secondary to chronic bleeding into the cerebrospinal fluid. Spinal tumors are infrequent cause and intradural extramedullary capillary hemangiomas of the cauda equina are extremely rare.
Methods
We report the case of a 65-year-old man who presented with sudden cognitive disturbance, diagnosed with superficial siderosis complicated by a mild ventricular enlargement on brain magnetic resonance imaging (MRI). His medical history was the intradural extramedullary lesion at L1-2 level 20 months ago, however, he had no previous history of axial back pain or radicular leg pain, or bowel or bladder incontinence. The intracranial pressure was high after admission. A preoperative physical examination showed cerebellar ataxia and myelopathy and he needed regular lumbar punctures to remove excess fluid. MRI of the lumbar spine demonstrated a no gadolinium-enhanced intradural mass, iso- and partial hyperintense in T1-weighted and iso- and hypointense in T2-weighted images. After laminectomy and dura opening, a mulberry-like soft mass with minor bleeding was completely resected.
Results
Based on microscopic examination and immunohistochemistry of the specimen, a diagnosis of the capillary hemangioma was made. The postoperative intracranial pressure was normal and the progression of the neurological deterioration was prevented. According to the results, the symptoms, in this case, may have been associated with increased intracranial pressure secondary to acute bleeding of capillary hemangioma.
Conclusions
Although rare and sometimes indistinguishable from more common lesions, capillary hemangioma should be in the differential diagnosis of intradural extramedullary mass of cauda equina. Our report demonstrates the importance of early diagnosis of superficial siderosis and surgical management, with imaging examination of the brain and whole spine to identify the source of bleeding, prevent disease progression, and improve prognosis even in asymptomatic patients. Moreover, any tumoral lesion even without signs of bleeding should be considered for resection.

P2 A case of delayed cerebral infarction in the posterior circulation region after a Distractive Flexion injury

SHINJI KUMAMOTO

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Introduction:
We present a delayed cerebral infarction in the posterior circulation region after a Distractive Flexion (DF) injury in a subaxial cervical spine injury.
Case report:
The patient is a 34-year-old male. He was 172 cm tall and weighed 84.4 kg. He fell from 3 m at a construction site. An 8 cm long wound and a palm-sized subcutaneous hematoma were observed on the left parietal region. He complained of severe neck pain and lumbar back pain, and his right upper extremity showed a 4/5 MMT level of weakness and sensory disturbance. X-rays demonstrated swelling of the soft tissue at the anterior vertebral body. CT showed a widening of the interspinous process at C5/6 and subluxation of bilateral facet joints. MRI showed C5/6 intervertebral disc injury and interspinous ligament injury.
Based on these findings, the case was considered to be a DF injury stage 3 or a spontaneous reduction case of DF stage 4.
In addition, T7,8 vertebral body fractures, T12 burst fracture, and T11/12 interspinous ligament injury were observed.
The day after the injury, C5/6 posterior fusion, T12 vertebroplasty, and T11-12-L1 posterior fusion were performed. On the 22nd day after the surgery, the patient presented with drowsiness and right inadequate hemiparalysis, and MRI revealed disruption of the left PCA and fresh infarcts in the left basal ganglia and brainstem. 3DCT Angiography showed bilateral vertebral artery occlusion at C5/6.
The vertebral artery injury was not evaluated preoperatively, and it was not possible to determine when the bilateral vertebral arteries were occluded.
Conclusion:
We reflected on the necessity to evaluate vertebral artery injuries concurrently with the internal fixation for cervical instability.
In addition, cerebral infarction may occur even 22 days after the surgery and requires caution.

P3 Pathological considerations of chronic expanding hematomas after stereotactic radiosurgery for cerebral arteriovenous malformations

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Background
Stereotactic radiosurgery (SRS) has become one of the common management options for cerebral arteriovenous malformations (AVMs). Chronic encapsulated expanding hematomas (CEIHs) despite angiographic evidence of AVM obliteration are known as delayed complications after SRS, and surgical treatment is required in some cases. The mechanism of CEIHs were still unclear. We examined pathological findings of surgically removed CEIHs, and considered the mechanism of hematoma formation.
Method
54 patients had undergone Gamma knife radiosurgery between 2004 and 2016 and 37 patients had undergone Cyber knife radiosurgery between 2016 and 2022. Nidus volume was 0.1-46.9ml (median 5.23ml), and the prescription dose at the nidus margin was 14-20Gy. CEIH formation was detected in 2 cases and surgical treatment was performed in each case. Surgically removed specimens were pathologically examined.
Result
Two of 91 cases (2.1%) revealed CEIHs. One male and 1female aged 34,42 years revealed CEIH formation 113 and 51months after initial SRS, required surgical treatment 6 and 32months after CEIH formation. Nidus volume at pre-SRS was 3.6, 2.9ml, marginal dose was 20, 18 Gy. Angiographic findings of both cases are indicated complete occlusion of the nidus 52, 119m. after SRS. Histologic findings of the excised specimen showed degeneration and occlusion of the nidus vessels. Within a well-defined hematoma surrounded by fibrous tissue, there were clusters of dilated capillaries with fibrosis, wall defects, and rupture. These findings suggested that the hematoma was formed by hemorrhage from dilated capillaries. Angiomatous lesions were also observed within the parenchyma adjacent to the irradiated nidus.
Discussion
We previously reported that dilated capillaries were exist in perinidal parenchyma and they connected to nidal vessels. It was also reported that these vessels are revealed expression of angiogenic factor. The common histopathological characteristics of radiation necrosis include dilated, leaky, and fragile capillaries and marked angiogenesis. We considered that CEIHs enlarge mainly because of repeated minor hemorrhage from these dilated vessels in parenchyma around the nidus.
Conclusions
The formation of CEIHs was thought to involve the dilated capillaries that originally existed around the nidus and connecting with the nidus, which were injured by radiation and resulted in the growth of fragile vessels, causing hemorrhage and increased vascular permeability. In addition, occlusion of nidus vessels by SRS could alter the hemodynamics of these vessels, and excessive pressure on the vessels surrounding the nidus could also be a factor in the hemorrhage.

P4 Treatment of giant unruptured aneurysm on cavernous part of the internal carotid artery by direct puncture of the dissected common carotid artery

MASAYUKI MORIKAWA, Akari Machida, Tetsuya Nagayama

Medical Corporation Jifukai Atsuchi Neurosurgical Hospital

Background: The flow diverter (FD) is developed as a new approach for treating aneurysms. However, FD embolization is challenging when access to the aneurysm is difficult due to dissection of the thoracic aorta. For FD embolization, when a transfemoral approach is too difficult, we perform a direct puncture of the common carotid artery (CCA) under direct visualization by making a small incision. Herein, we report our experience using this approach.
Objective: A 70-year-old woman became aware of double vision, and magnetic resonance imaging revealed that symptoms were caused by a giant unruptured aneurysm in the right internal carotid artery (ICA). The symptoms gradually worsened and the aneurysm enlarged, so we decided to treat with FD embolization. However, she suffered an aortic dissection and she has a residual dissection from the right brachiocephalic artery to the CCA. We considered access to the aneurysm challenging, so we decided to access it by direct puncture of the right CCA.
Method: After inducing general anesthesia, a transverse incision (approximately 3 cm) was made along the skin crease in the right neck. After exposure of the CCA, an X-shaped wall stitch using 7-0 GORE-TEX for complete post-procedure closure of the puncture site. The CCA was then punctured with a needle under direct visualization, a guidewire was advanced to the CCA, and a 4-Fr sheath was placed and it was exchanged for a parent catheter: 6 Fr Destination (Terumo, 45 cm). From the 6-Fr catheter, a distal support catheter (Navien) and a microcatheter (Phenom 27) advanced distally beyond the aneurysm using a microguidewire (Synchro). The FD deployment was performed as usual. After the operation, the guiding catheter was slowly removed, and hemostasis was achieved using the 7-0 GORE-TEX suture that had been applied before puncture. A Penrose drain was inserted into the wound until the next day.
Result: Postoperatively, bleeding from the wound was observed, but it was possible to stop with wound dressing (KALTOSTAT) and manual compression. The patient did not develop any complications, symptoms improved, and she was subsequently discharged.
Conclusion: Direct puncture of the CCA, under direct visualization for FD embolization using 6 Fr Destination (Terumo, 45 cm) is useful when access to the aneurysm is challenging because of aortic dissection.

P5 Clinical experience of intravenous clazosentan in preventing cerebral vasospasmafter aneurysmal subarachnoid hemorrhage in our institution

MASAHIRO SHIMIZU, Nobuo Senbokuya

Kanto Neurological Hospital

Introduction

Aneurysmal subarachnoid hemorrhage (aSAH) may lead to cerebral vasospasm (VS) and is associated with significant morbidity and mortality.

It represents a major unmet medical need due to few treatment options with limited efficacy.

The role of endothelin-1 (ET-1) and its receptor ET_A in the pathogenesis of aSAH-induced VS suggests antagonism of this receptor as promising asset for pharmacological treatment.

We report our clinical experience of intravenous endothelin receptor antagonist (clazosentan) in preventing VS-related ischemic events after aSAH in our institusion.

Discusions

Our series showed only 7.7% of severe VS.

The incidence of VS in Phase III Japanese trial (AC504-305,AC504-306) was reported in 24.8～28.4%

It seemed to be that multiple therapies were performed for preventing VS compared to the trial. And our series included of more elderly population than the trial, therefore, severe VS seemed to be hard to occur.

The degree of VS could not be exactly evaluated because DSA was not performed routinely for the assessment of VS.

Conclusion

Clazosentan is effective for preventing VS.

We need larger series with same protocol to clarify the effect of multiple therapies for preventing VS.

P6 Dural Arteriovenous Fistula Involving the Inferior Petroclival Vein Treated by Transvenous Embolization: A Case Report

TOMOKI FUCHIZAKI, Yasuyuki Tatsuta, Tatsuya Ogino, Hideki Endo, Suguru Sakurai, Kohei Ishikawa, Tomoaki Ishiduka, Kenji Kamiyama, Toshiaki Osato, Hirohiko Nakamura

Nakamura Memorial Hospital

Background: The inferior petroclival vein (IPCV) is connected to the posterior inferior surface of the cavernous sinus (CS) and flows from the foramen lacerum into the anterior condylar confluence through the anterior surface of the junction of the clivus and the petrous part of the temporal bone.

Objective: Dural arteriovenous fistula (DAVF) involving the IPCV (IPCV-DAVF) is very rare and can develop with ocular manifestations similar to CS-DAVF.

Methods: We report a rare case of IPCV-DAVF that was successfully treated with selective coil embolization.

Results: A 72-year-old man suffered from diplopia and the left chemosis. Radiological imaging examinations demonstrated DAVFs involving the left IPCV and the left anterior condylar confluence (ACC). The main venous drainage flow refluxed retrogradely from the left IPCV through the left IPS to the CS and the superior orbital vein. Therefore, his clinical symptoms were similar to those of CS-DAVF. We performed transvenous coil embolization (TVE) of the shunt point in the IPCV. IPCV-DAVF completely disappeared. ACC-DAVF remained, but was classified as Borden type 1 and was followed up. The patient's symptoms recovered promptly after the TVE. Follow-up MRI/MRA at 1month post-TVE confirmed the disappearance of residual ACC-DAVF.

Conclusions: Herein, we reported a very rare case of IPCV-DAVF presenting ocular manifestations. TVE through IPS achieved favorable angiographic and clinical outcomes. It is important to understand angioarchitecture for diagnosis and treatment of IPCV-DAVF.

P7 Three-fraction stereotactic radiotherapy with Cyberknife for eloquent arteriovenous malformations

YASUHIRO KIKUCHI, Sonomi Sato, Masahiro Oinuma, Kazuomi Horiuchi, Ryoji Munakata, Zenichiro Watanabe, Takashi Yoshimoto, Kazuo Watanabe

Southern Tohoku General Hospital

Background

It is controversial which treatment is appropriate for eloquent arteriovenous malformations (AVMs) when considering maintenance of quality of life (QOL). It should be considered case by case including conservative treatment.

Objectives

Eloquent AVMs irradiated with 3-fraction stereotactic radiotherapy (SRT) using Cyberknife were retrospectively examined.

Methods

Since 2016, there were 6 eloquent cases (2 females; age range, 17-77 years; mean 44.5 years) treated by 3-fraction SRT out of 37 cases of AVM treated by Cyberknife. The locations were the hypothalamus, basal ganglia, lateral ventricle and occipital lobe in one each and the brainstem in 2. Maximum diameter were from 8.5 to 31 mm; median 21 mm. Three patients (basal ganglia, lateral ventricle and hypothalamus) had suffered bleeding. The dose was delivered from 18 to 27 Gy in 3 fractions. Median follow-up was 27.5 months.

Results

In all cases nidus volume was reduced on MRI images. In brainstem cases of 2, trigeminal neuralgia disappeared in one, and ventricle enlargement improved in the other. No patient had bleeding during follow-up period. One suffered treatment-related complication of asymptomatic perinidal edema.

Conclusions

Cyberknife 3-fraction SRT seems useful for eloquent AVMs from the viewpoint of preservation of QOL maintenance.

P8 Prevention of late vasospasm after subarachnoid hemorrhage (SAH) Now and in the future, based on our experience

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Southern TOHOKU Research Institute for Neuroscience Southern TOHOKU General Hospital

Background and Purpose: Prevention of vasospasm is a key priority in the treatment of subarachnoid hemorrhage (SAH). We studied the outcome of our SAH treatment strategy and discuss the present problems.

Methods: To prevent late vasospasm, we applied various combinations of cisternal irrigation therapy with urokinase (UK) and ascorbic acid (AsA), cisternal drainage, spinal drainage, fasudil hydrochloride, statins and cilostazol. The incidence of cerebral infarction caused by late vasospasm with each prevention method was investigated in Fisher Group 3 SAH cases.

Results and Discussion: At our hospital, between January 2004 and September 2022, 472 Fisher Group 3 SAH cases were treated within 72 h from SAH onset. Aneurysmal neck clipping, along with UK and AsA cisternal irrigation, was performed in 328 cases. Fifteen of them (4.6%) developed cerebral infarction caused by late vasospasm. On the other hand, 15 of 144 cases (10.4%) without UK and AsA cisternal irrigation developed cerebral infarction. The results indicated that UK and AsA irrigation therapy significantly reduced the occurrence of cerebral infarctions caused by vasospasm ($p<0.05$). In our previous study, none of the combination therapies were revealed as being better than UK and AsA irrigation therapy for the prevention of vasospasm. We believe that UK and AsA irrigation therapy has reliable preventive effects against late vasospasm in SAH. Unfortunately, UK production was discontinued in the spring of 2022, hopefully only temporarily.

Recently, the preventive effects of endothelin antagonists (e.g., clazosentan sodium) against late vasospasm of SAH was reported. Clazosentan is a newly developed anti-spasm agent, and is expected to be a decisive factor in the prevention of late vasospasm.

Conclusion: UK and AsA cisternal irrigation therapy is one of the best preventive therapies against late vasospasm. Given the effectiveness of UK, we hope that it will be available again soon. We also hope that the preventive effect of clazosentan against vasospasm will be more widely proven in actual clinical settings.

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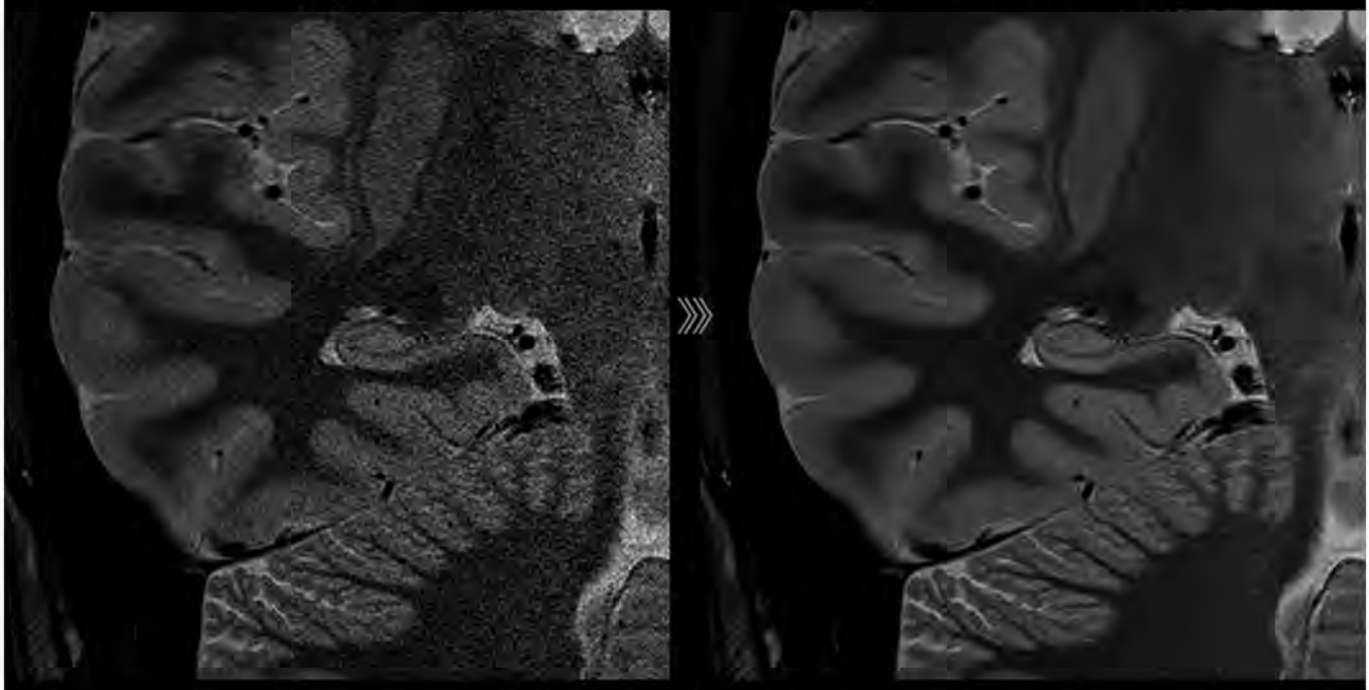

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