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6th BNS Bi-Neurovascular Symposium

September 23(Fri) – 25(Sun), 2022

BEXCO, Busan, Korea

Bi-Neurovascular Symposium

대한신경외과학연구재단
THE KOREAN NEUROSURGICAL RESEARCH FOUNDATION

KoNES
Korean NeuroEndovascular Society

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THE KOREAN NEUROSURGICAL RESEARCH FOUNDATION

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Invitation

Dear colleagues and friends,

Since its founding in 2016, Bi-Neurovascular Symposium (BNS) has endeavored to expand and enrich our knowledge in many aspects of neurovascular treatment by hosting series of monthly meetings and annual conferences. After setting the official language to English, we were able to exchange valuable experiences with physicians from different parts of the world, especially from the Asian-Pacific region. This year, BNS was formally recognized as an international organization in Korea and we are excited to further contribute in this field.

It is my great honor to welcome you to the 6th BNS Conference set to be held this year in Busan, Korea from September 23rd to the 25th. Under this year's theme of "Review the old and learn the new," we aim to assist physicians in obtaining new knowledge and staying on top of current trends while still incorporating the original style that has proven to be effective. You will be able to participate in distinguished lectures by globally renowned speakers to jointly explore the past and the future of neurovascular treatment. The event will also offer an opportunity to build a network of peers with a diverse range of experience and to engage in dynamic discussions.

I am certain that all participants will have the most enjoyable and valuable experience at the 6th BNS Conference 2022. We look forward to welcoming you at the beautiful harbor city of Busan!

Sincere regards,

Yong-Sam Shin, MD, PhD
President, Bi-Neurovascular Symposium (BNS) Foundation
Professor, Department of Neurosurgery
Seoul St. Mary's Hospital, The Catholic University of Korea

Invitation

This is Chul Hoon Chang, the president of KoNES (Korean Neurovascular Society).

It is my great pleasure to invite all of you to the 6th Bi-Neurovascular Symposium(BNS) to be held from September 23rd to 25th at Busan Exhibition & Convention Center (BEXCO) in Busan, Korea.

Through the past years, it is without doubt that we have made big progress and contributed to the clinical performance and research activities by sharing our experiences and up-to-date knowledge with world-renowned international physicians and audiences in the Neurovascular field.

In particularly, this BNS 2022 is the first year to be promoted officially to an international symposium in cooperation with KoNES. Therefore, we expect that this BNS 2022 will be the place that brings marvelous result through the well organized and efficiency operation with the cooperation.

I all look forward to seeing you in beautiful port city Busan in September 2022.

Thank you.

Chul Hoon Chang, MD
President, Korean Neuroendovascular Society
Director/Professor, Department of Neurosurgery Yeungnam University
Director, Stroke Center in Yeungnam University Medical Center

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Symposium Chair

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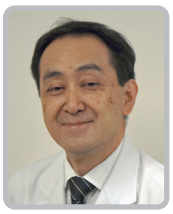

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Shinrakuen Hospital, Niigata University, Japan

Khairul Azmi Abd Kadir
University of Malaya Medical Centre, Malaysia

Michael T. Lawton
Barrow Neurological Institute (BNI), USA

Seon-Kyu Lee
Albert Einstein College of Medicine, USA

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National Neuroscience Institute, Singapore

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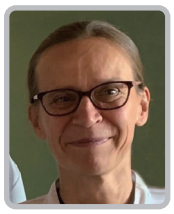

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Turku University Hospital, Finland

Marc Ribo
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Kenji Sugiu
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Sook Young, Sim	Inje University
Seok-Mann, Yoon	Soon Chun Hyang University

Scientific Program

2022.9.23. (Friday) BNS sponsored symposia			
13:00-15:00	120′	**Medtronic Pre-conference interactive learning [Room A]**	**Chair: Hyun-Seung Kang** (Seoul National University, Korea) **Soon Chan Kwon** (Ulsan University Hospital, Korea)
13:00-13:45	45′	Flow-diversion treatment strategy on various indication	**Joonho Chung** (Yonsei University Gangnam Severance Hospital, Korea)
13:45-14:30	45′	Faster Decision for Optimal Strategy in AIS: Collaboration of AI & Physicians	**Myeong Jin Kim** (Gachon University Gil Medical Center, Korea)
14:30-15:00	30′	Endovascular therapy for acute stroke with a large ischemic region *Virtual presentation	**Shinichi Yoshimura** (Hyogo College of Medicine, Kobe City Medical Center, Japan)
15:00-16:00	60′	**Kaneka coil launching symposium [Room A]**	**Chair: Kenji Sugiu** (Okayama University, Japan) **Yong-Sam Shin** (BNS President, Seoul St. Mary's Hospital, Korea)
15:00-15:20	20′	Kaneka coil experience in Japan	**Kenji Sugiu** (Okayama University, Japan)
15:20-15:40	20′	Korean first experience of Kaneka coil	**Sukh Que Park** (Soon Chun Hyang University, Korea)
15:40-16:00	20′	Kaneka coil experience in Japan	**Masaru Hirohata** (Kurume University Hospital, Japan)
16:00-17:30	90′	**Microvention WEB symposium [Room A]**	**Chair: Yong-Sam Shin** (BNS President, Seoul St. Mary's Hospital, Korea) **Markus Holtmannspötter** (Nuremberg Hospital, Germany)
16:00-16:20	20′	Juntendo experiences *Virtual presentation	**Hidenori Oishi** (Juntendo University, Japan)
16:20-16:35	15′	Yonsei University experiences	**Keun Young Park** (Yonsei University Severance Hospital, Korea)
16:35-16:55	20′	Treatment of wide neck aneurysm by WEB device. Experience sharing from Vietnam	**Dang Luu VU** (Bach Mai Hospital, Vietnam)
16:55-17:10	15′	Korean WEB Registry	**Hyun-Seung Kang** (Seoul National University, Korea)
17:10-17:30	20′	WEB: Key Indications and Best Practices – European Experience	**Markus Holtmannspötter** (Nuremberg Hospital, Germany)
16:00-17:40	100′	**Siemens Healthineers Japan/Korea ICONO user meeting [Room B]**	**Chair: Yasushi Ito** (Shinrakuen Hospital, Niigata University, Japan) **Bum-soo Kim** (Seoul St. Mary's Hospital, Korea)
16:00-16:15	15′	Icono experience in aneurysm treatment	**Kenji Sugiu** (Okayama Univ., Japan)
16:15-16:30	15′	User feedback after setting up the new ARTIS icono	**Bum-soo Kim** (Seoul St. Mary's Hospital, Korea)
16:30-16:45	15′	Icono experience in stroke treatment	**Yasushi Ito** (Shinrakuen Hospital, Niigata University, Japan)
16:45-17:00	15′	Artis ICONO for evaluation and treatment of intracranial vascular malformation: usefulness of image fusion	**Jai Ho Choi** (Seoul St. Mary's Hospital, Korea)
17:00-17:15	15′	Advanced Imaging with ARTIS icono biplane	**Richard Obler** (Siemens Healthineers, Germany)
17:15-17:30	15′	Discussion	**All presenters**
17:30-17:40	10′	Interactive survey	**Siemens Healthineers**
18:00		Welcome Dinner - sponsored by MicroVention	

Scientific Program

2022.9.24. (Saturday)			
07:00-08:00	60'	**Breakfast seminar**	**Chair: Lau Jia Him** (Hospital of Kuala Lumpur, Malaysia) **Yong Cheol Lim** (Ajou University, Korea)
07:00-07:30	30'	FD procedure from A-Z	**Hyun-Seung Kang** (Seoul National University Hospital, Korea)
07:30-08:00	30'	WEB procedure from A-Z	**Yong-Sam Shin** (Seoul St. Mary's Hospital, Korea)
08:10-08:30	20'	Congratulatory and opening remarks	**In Sup Choi** (Incheon Sejong Hospital, Korea) **Min-Woo Baik** (NEW Korea Hospital, Korea) **Chul Hoon Chang** (KoNes President, Korea) **Yong-Sam Shin** (Seoul St. Mary's Hospital, Korea)
08:30-09:25	55'	**Session 1. Ischemic Stroke**	**Chair: Dong Ik Kim** (President, CHA University, Korea) **Shigeru Miyachi** (Aichi Medical University, Japan)
08:30-08:50	20'	A comprehensive stroke solution with React aspiration catheter and Solitaire X	**Marc Ribo** (Vall d'Hebron University Hospital, Spain)
08:50-09:10	20'	SSGH Experience with VECTA *Virtual presentation	**Timothy Phillips** (NIISwa, Australia)
09:10-09:25	15'	Rescue Stenting for failed Endovascular Thrombectomy in acute ischemic stroke (ReSET)	**Byung Moon Kim** (Yonsei University Severance Hospital, Korea)
09:25-10:40	75'	**Session 2. Flow Disruptor / Coating**	**Chair: Seon-Kyu Lee** (Albert Einstein College of Medicine, USA) **Dang Luu VU** (Bach Mai Hospital, Vietnam)
09:25-09:45	20'	The novel Contour neurovascular system, the generation of intra-saccular flow disruptor for bifurcation aneurysms *Virtual presentation	**Thomas Liebig** (Ludwid-Maximilians-Univeristy Hospital, Germany)
09:45-10:00	15'	Korean Registry of WEB	**Hyun-Seung Kang** (Seoul National University, Korea)
10:00-10:20	20'	Intrasaccular devices in aneurysm therapy	**Jens Fiehler** (University Medical Center Hamburg-Eppendorf, Germany)
10:20-10:40	20'	Coating Technologies – Biomimicry and Beyond – Preclinical Publication and Blood Flow Loop Data on Mystique	**Matthew J. Gounis** (University of Massachusetts Medical School, USA)
10:40-10:55	15'	Coffee Break	
10:55-11:45	50'	**Session 3. Masterpiece Surgery in the era of neuro-intervention**	**Chair: Young-Gyun Jeong** (Inje University, Korea) **Yong Bae Kim** (Yonsei University Severance Hospital, Korea)
10:55-11:20	25'	The Beauty of Cerebrovascular Surgery: 25-Year Retrospective *Virtual presentation	**Michael T. Lawton** (Barrow Neurological Institute, USA)
11:20-11:45	25'	Vascular Reconstructions and Microsurgical Approach *Virtual presentation	**Rokuya Tanikawa** (Sapporo Teishinkai Hospital, Japan)
11:45-12:00	15'	Intermission	
12:00-13:00	60'	**Luncheon Seminar A [Microvention/ Siemens Healthineers] [Room A]**	**Chair: Yong-Sam Shin** (Seoul St. Mary's Hospital, Korea) **Bum-soo Kim** (Seoul St. Mary's Hospital, Korea)
12:00-12:30	30'	LVIS EVO: Key Indications and Best Practices – European Experience	**Markus Holtmannspötter** (Nuremberg Hospital, Germany)

Scientific Program

2022.9.24. (Saturday)			
12:30-12:45	15′	Imaging with ARTIS icono biplane	**Richard Obler** (Siemens Healthineers, Germany)
12:45-13:00	15′	Balancing the radiation dose and image quality: experience of sequential application for dose-reduction protocols at Seoul St Mary's Hospital	**Bum-soo Kim** (Seoul St. Mary's Hospital, Korea)
12:00-13:00	60′	**Luncheon Seminar B [Stryker/ Balt] [Room B]**	**Chair Chul Hoon Chang** (Yeungnam University Medical Center, Korea) **Jun Seok Koh** (Kyung Hee University, Korea)
12:00-12:30	30′	The Surpass Evolve Flow Diverter: Clinical Experiences and Multi-Center Data	**Alexander Lewis Coon** (St. Joseph's hospital, USA)
12:30-13:00	30′	Balt: 45 years of inspiring neurovascular innovation	**Yilmaz Onal** (University of Health Sciences, Turkey)
13:00-13:20	20′	Coffee Break	
13:20-14:50	90′	**Session 4A. Aneurysms / Flow diverter session [Room A]**	**Chair: Alexander Lewis Coon** (St. Joseph's hospital, USA) **Chang-Young Lee** (Keimyung University, Korea)
13:20-13:35	15′	Flow diverter: beyond indications *Virtual presentation	**Adnan H. Siddiqui** (SUNY University of Buffalo, USA)
13:35-13:50	15′	2 year's Pipeline Shield experience sharing after Premier indication in JAPAN *Virtual presentation	**Hidenori Oishi** (Juntendo University, Japan)
13:50-14:05	15′	Proximal-to-distal-telescopic implantation of multiple Pipelines for large intracavernous aneurysm *Virtual presentation	**Akira Ishii** (Kyoto University, Japan)
14:05-14:20	15′	SCGH experience with Evolve *Virtual presentation	**Timothy Phillips** (NIISwa, Australia)
14:20-14:35	15′	Early experience sharing of Pipeline Vantage *Virtual presentation	**Riitta Rautio** (Turku University Hospital, Finland)
14:35-14:50	15′	Acute flow diversion: a journey from controversial to mainstream	**Gopinathan Anil** (National University Hospital, Singapore)
13:20-14:50	90′	**Session 4B. Ischemic Stroke [Room B]**	**Chair: Khairul Azmi Abd Kadir** (University of Malaya Medical Center, Malaysia) **Hae Woong Jeong** (Inje University, Korea)
13:20-13:35	15′	Do we need IV tPA combined with thrombectomy?	**Jens Fiehler** (University Medical Center Hamburg-Eppendorf, Germany)
13:35-13:50	15′	Direct transfer to angiography suite(DTAS) protocol with RADIP ANGIO for acute ischemic stroke	**Yasushi Ito** (Shinrakuen Hospital, Niigata University, Japan)
13:50-14:05	15′	Complications of Ischemic stroke thrombectomy	**Seon-Kyu Lee** (Albert Einstein College of Medicine, USA)
14:05-14:20	15′	Do we still need TPA for LVO?	**Yuji Matsumaru** (University of Tsukuba, Japan)
14:20-14:35	15′	The practical usefulness of mechanical thrombectomy without tPA within 4.5 hrs after symptom onset	**Sung-Chul Jin** (Inje University, Korea)

Scientific Program

2022.9.24. (Saturday)			
14:35-14:50	15′	Discussion	
14:50-16:05	75′	**Session 5A. Aneurysm session [Room A]**	**Chair: Bum Tae Kim** (Soon Chun Hyang University, Korea) **Masaru Hirohata** (Kurume University, Japan)
14:50-15:05	15′	Pulse rider-assisted coil embolization *Virtual presentation	**Nobuyuki Sakai** (Kobe City Medical Center, Japan)
15:05-15:20	15′	Kaneka coil experiences	**Kenji Sugiu** (Okayama University Hospital, Japan)
15:20-15:35	15′	Optima coil experiences	**Kangmin Kim** (Seoul National University, Korea)
15:35-15:50	15′	Challenge with Endovascular Approach for Difficult Cerebral Aneurysm	**Shigeru Miyachi** (Aichi Medical University, Japan)
15:50-16:05	15′	Flow divertertherapy for recurrent aneurysms	**Keun Young Park** (Yonsei University Severance Hospital, Korea)
14:50-16:05	75′	**Session 5B. Dural AVF and others [Room B]**	**Chair: Seok-Mann Yoon** (Soon Chun Hyang University, Korea) **Winston Lim Eng Hoe** (Singapore General Hospital, Singapore)
14:50-15:05	15′	Endovascular Treatment of Intracranial Arteriovenous fistula	**Khairul Azmi Abd Kadir** (University of Malaya Medical Center, Malaysia)
15:05-15:20	15′	Middle Cerebral Artery Dissection Presenting As Large Vessel Occlusion: Use of Stentplasty And Integrilin Combination Therapy	**Winston Lim Eng Hoe** (Singapore General Hospital, Singapore)
15:20-15:35	15′	Trans SOV approach for indirect CCF	**Dilok Tantongtip** (Thammasat University Hospital, Thailand)
15:35-15:50	15′	Endovascular Therapy of Direct Carotid Cavernous Fistula - A Review of Current Treatment Strategies	**Wickly Lee** (National Neuroscience Institute, Singapore)
15:50-16:05	15′	Focused coiling and preserving cavernous sinus in treatment of Carotid Cavernous Dural Fistulas	**Tran Quoc Tuan** (University Medical Center, Ho Chi Minh City, Vietnam)
16:05-16:15	10′	Coffee Break	
16:15-17:04	49′	**Session 6A. BNS Free papers [Room A]**	**Chair: Hyon-Jo Kwon** (Chungnam National University, Korea) **Sook-Young Sim** (Inje Paik Univ., Korea)
16:15-16:22	7′	Angioarchitectural analysis of AV shunts in dural AVFs and its clinical implications	**Jun Hyung Kim** (Yonsei Univ. Gangnam Severance Hosp., Korea)
16:22-16:29	7′	Basilar artery trunk aneurysm: clinical and angiographic outcomes of endovascular treatment	**Sook-Young Sim** (Inje Paik Univ., Korea)
16:29-16:36	7′	Outcome and Complication of using Flow Diverter Treatment for Intracranial Aneurysm: Single Center Experience	**Zharifah Fauziyyah Nafisah** (Ciptp National Hospital, Jakarta, Indonesia)
16:36-16:43	7′	ENDOVASCULAR SERVICES IN SILOAM HOSPITALS	**Harsan Harsan** (Siloam Hospitals, Indonesia)
16:43-16:50	7′	Initial experience of Woven EndoBridge (WEB) embolization in unruptured bifurcation aneurysms	**Dae Won Kim** (Wonkwang University Hospital, Korea)

Scientific Program

2022.9.24. (Saturday)			
16:50-16:57	7'	Transdural revascularization by multiple burr hole after erhtyropoietin in Stroke patients with cerebral hypoperfusion	**Yong Cheol Lim** (Ajou Univ., Korea)
16:57-17:04	7'	ICA pseudoocclusion vs true occlusion	**Jai Ho Choi** (Seoul St. Mary's Hospital, Korea)
16:15-17:04	49'	**Session 6B. BNS Free papers [Room B]**	**Chair: Wickly Lee** (National Neuroscience Institute, Singapore) **Seong-Rim Kim** (Bucheon St. Mary's Hospital, Korea)
16:15-16:22	7'	Hybrid Operating Theatre for Neurovascular Cases in Indonesia National Referral Hospital: Single Center Experience	**Affan Priyambodo Permana** (Ciptp National Hospital, Jakarta, Indonesia)
16:22-16:29	7'	Predictive Factors of Recurrence after Endovascular Treatment of Unruptured Vertebrobasilar Fusiform Aneurysms	**Chang-Hyun Kim** (Keimyung Univ., Korea)
16:29-16:36	7'	Endovascular Management of Intracranial Dural Arteriovenous Fistula Presenting Like Longitudinal Extensive Transverse Myelitis: A Case Report	**NIA YULIATRI PURBA** (Mayapada Hospital, Jakarta, Indonesia)
16:36-16:43	7'	Spinal Epidural Arteriovenous Fistulas with Involvement of Intradural Venous Drainage at a Remote Level: Case Report	**Ahmad Sulaiman Alwahdy** (Fatmawati General Hosp., Indonesia)
16:43-16:50	7'	Spinal arterial aneurysms and vascular malformations: Review and own experience	**Mohamed Deniwar** (MANSOURA UNIVERSITY HOSP., Egypt, Korea)
16:50-16:57	7'	The quantitative comparison between high wall shear stress and high strain in the formation of paraclinoid aneurysms	**JUNG-JAE KIM** (Yonsei Univ. Severance Hosp., Korea)
16:57-17:04	7'	Mixed Reality Intraoperative Simulation in Neurovascular and Neuroendovascular Aneurysm Treatment	**Wonki Yoon** (Korea University Guro Hospital, Korea)
18:00		Gala Dinner - Nurimaru, APEC House	

Scientific Program

2022.9.25. (Sunday)			
07:30-08:30	60′	**Breakfast seminar**	**Chair: Sang-Weon Lee** (Pusan National University Yangsan Hospital, Korea) **Hyun-Seung Kang** (Seoul National University, Korea)
07:30-08:00	30′	Spinal vascular anatomy	**In Sup Choi** (Incheon Sejong Hospital, Korea)
08:00-08:30	30′	Functional vascular anatomy *Virtual presentation	**Yuji Matsumaru** (University of Tsukuba, Japan)
08:30-08:50	20′	Coffee Break	
08:50-09:20	30′	**Session 7. Special lecture**	**Chair: Jin-Young Jung** (Yonsei S Hospital, Korea)
08:50-09:20	30′	Future Perspectives of Intracranial Aneurysm Treatment *Virtual presentation	**Adnan H. Siddiqui** (SUNY University of Buffalo, USA)
09:20-10:50	90′	**Session 8. My BNS Cases (Case presentation)**	**Chair: Yong Cheol Lim** (Ajou University, Korea) **Myeong Jin Kim** (Gachon University Gil Medical Center, Korea)
09:20-09:26	6′	Staged treatment of blood blister-like aneurysm with multiple stents followed by flow diverter	**Hyeong Jin Lee** (Seoul St. Mary's Hosp., Korea)
09:26-09:32	6′	Flow diversion of the unruptured fusiform aneurysm in vertebral artery: case series	**Sung-Tae Kim** (Inje University, Korea)
09:32-09:38	6′	Feasibility of Gamma Knife radiosurgery for brain arteriovenous malformations according to nidus type	**Jaho Koo** (Ajou university, Korea)
09:38-09:44	6′	COVID-19: Neurovascular Manifestations	**Fitra Fitra** (Universitas Syiah Kuala, Indonesia)
09:44-09:50	6′	Comparison of intraoperative blooding volume in juvenile nasopharyngeal angiofibroma patients that have been embolized with glue and coil in general hospital dr. Hasan Sadikin Bandung	**Rizki AdriYudha** (General Hospital dr. Hasan Sadikin Bandung, Indonesia)
09:50-09:56	6′	Recurrent Massive Epistaxis After Coil Embolization : Case Report of Traumatic Pseudoaneurysm with CCF	**Muhammad Ari Irsyad** (Universitas Sumatera Utara, Indonesia)
09:56-10:02	6′	Cerebellar Cavernoma Excision With Preserved Venous Anomaly : A Case Report	**Firman Adi Sanjaya** (Blambangan Regional Hospital, Indonesia)
10:02-10:08	6′	Surgical Obliteration for Anterior Cranial Fossa Dural Arteriovenous Fistula Presenting As Subdural Hematoma: A Case Report	**Ingrid Widjaya** (Mayapada Hospital Jakarta Selatan, Indonesia)
10:08-10:14	6′	Primary mechanical thrombectomy for anterior circulation stroke in children : Case report	**Zaky Bajamal** (Surabaya Neuroscience Institute, Indonesia)
10:14-10:20	6′	Direct Cannulation of a Calvarial Diploic Vein for Embolization of a Symptomatic Intraosseous Arteriovenous Fistula	**TaeWon Choi** (Kyung hee university, Korea)
10:20-10:26	6′	Transorbital Penetrating Brain Injury by Metal Grinder: Neuro-ophthalmologic Emergency and Literature Purpose: Review	**Mohammad zakaria Shahab** (RSUD Iskak Tulungagung, Indonesia)

Scientific Program

2022.9.25. (Sunday)			
10:26-10:32	6′	Giant Serpentine Aneurysm Arising From the Middle Cerebral Artery Successfully Treated with Microsurgical Technique	**Jung Keun Lee** (Yonsei University, Severance Hospital, Korea)
10:32-10:38	6′	Flow Diverting Stent for recanalized blister like aneurysm with SAH during acute period	**Jung Hyun Park** (Dongtan Sacred Heart Hospital, Korea)
10:38-10:44	6′	Alternate Simultaneous Bilateral Carotid Angiography in Y-stent Assisted Coil Embolization for An Anterior Communicating Artery Aneurysm with Triplicate A2 Variant	**Dong-Kyu Jang** (The Catholic University, Incheon St. Mary's Hospital, Korea)
10:44-10:50	6′	Flow diversion treatment for dorsal wall aneurysms	**Jung Koo Lee** (Seoul St. Mary's Hospital, Korea)
11:00		Closing Remark & Adjourn	**Yong-Sam Shin** (Seoul St. Mary's Hospital, Korea)

Contents

DAY 1 SEPTEMBER 23 (Fri)

Medtronic Pre-conference interactive learning [Room A]

Kaneka coil launching symposium [Room A]

Microvention WEB symposium [Room A]

Siemens Healthineers Japan/Korea ICONO user meeting [Room B]

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DAY 2 SEPTEMBER 24 (Sat)

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Session 5A. Aneurysm session [Room A]

Session 5B. Dural AVF and others [Room B]

Session 6A. BNS Free papers [Room A]

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Session 6B. BNS Free papers [Room B]

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DAY 3 SEPTEMBER 25 (Sun)

Breakfast seminar

Session 7. Special lecture

Session 8. My BNS Cases (Case presentation)

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Contents

E-Poster

DAY 1

Friday, September 23, 2022 (13:00-15:00)

Medtronic Pre-conference interactive learning [Room A]

Chair: Hyun-Seung Kang (Seoul National University, Korea)
Soon Chan Kwon (Ulsan University Hospital, Korea)

- Flow-diversion treatment strategy on various indication
  Joonho Chung (Yonsei University Gangnam Severance Hospital, Korea)
- Faster Decision for Optimal Strategy in AIS: Collaboration of AI & Physicians
  Myeong Jin Kim (Gachon University Gil Medical Center, Korea)
- Endovascular therapy for acute stroke with a large ischemic region ***Virtual presentation***
  Shinichi Yoshimura (Hyogo College of Medicine, Kobe City Medical Center, Japan)

Medtronic Pre-conference interactive learning [Room A]

Flow-diversion treatment strategy on various indication

Joonho Chung

Yonsei University Gangnam Severance Hospital, Korea

Professional Appointments

- 2022.3 - Present Associate Professor, Cerebrovascular & Endovascular surgery, Stroke Center, Department of Neurosurgery, Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Republic of Korea
- 2018.3 - 2022.2 Associate Professor, Cerebrovascular & Endovascular surgery, Stroke Center, Department of Neurosurgery, Severance Hospital, Yonsei University College of Medicine, Seoul, Republic of Korea
- 2017.8 - 2018.2 Assistant Professor, Cerebrovascular & Endovascular surgery, Stroke Center, Department of Neurosurgery, Severance Hospital, Yonsei University College of Medicine, Seoul, Republic of Korea

Education

- 2005 - 2010 Doctor of Philosophy, Medical Science
  INHA University School of Medicine, Incheon, Republic of Korea
- 2004 - 2005 Master's Degree of Medical Science
  INHA University School of Medicine, Incheon, Republic of Korea
- 1996 - 2002 Bachelor Degree (Doctor of Medicine)
  INHA University School of Medicine, Incheon, Republic of Korea

Professional Acctivities

- 2022 President of the 14th Annual Symposium of Young Neurovascular Surgeons, Korean Society of Cerebrovascular Surgeons
- 2020 - present Director of Medical Insurance Committee, Korean Society of Cerebrovascular Surgeons
- 2020 - present Director of Medical Insurance Committee, Korean Neuroendovascular Society
- 2017 - present Secretary General, Society of Korean Endovascular Neurosurgeons

Medtronic Pre-conference interactive learning [Room A]

Flow-diversion treatment strategy on various indication

Joonho Chung, M.D., Ph.D.

Department of Neurosurgery, Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Republic of Korea

Flow diversion has become a well-accepted option for the treatment of unruptured intracranial aneurysms. However, uptake of flow-diverting technology is rapidly outpacing the availability of clinical evidence. Most of the evidence is based on Pipeline Embolization Device and its evolution Pipeline flex, which used to be FDA-approved only for wide-necked ICA aneurysms, whereas only recently indication was extended to small aneurysms as well. Other flow diverting devices have European approval for use in distal anatomy. In the clinical practice, use of flow diverters has been extended to other kind of aneurysms and, even though there are neither prospective trials nor strong evidence, initial results appear to be encouraging. Flow diversion is being more broadly applied to small aneurysms, anterior cerebral artery aneurysms, M3–M4 aneurysms, recurrent aneurysms, dissecting aneurysms, ruptured aneurysms, and posterior circulation aneurysms. Recommendations on the suitability and choice of a device for bifurcation or ruptured aneurysms or for anatomically complex lesions cannot be made on the basis of current evidence. The appropriateness of flow-diverting treatment must be decided on a case-by-case basis, considering experience and the relative risks against standard approaches or observation. Therefore, a comprehensive overview of technical specifications alongside key outcome data is essential both for clinical decision-making and to direct further investigations. Here, the author reviews flow-diversion treatment strategy on various indications and speculates possible future directions of flow diversion.

Medtronic Pre-conference interactive learning [Room A]

Faster Decision for Optimal Strategy in AIS: Collaboration of AI & Physicians

Myeong Jin Kim

Gachon University Gil Medical Center, Korea

Education

- 2021 PhD. Degree from Gachon University Postgraduate School
- 2013 MS. Degree from Ajou University School of Medicine
- 2010 - 2013 Fellowship, Department of Neurosurgery & Radiology, Seoul St. Mary's Hospital, Catholic University
- 2002 - 2007 Residency, Department of Neurosurgery, Ajou University School of Medicine

Profile

- 2019 - Present Associate Professor, Cerebrovascular & Endovascular Surgery, Department of Neurosurgery
- 2013 - 2019 Assistant Professor, Cerebrovascular & Endovascular Surgery, Department of Neurosurgery
- 2007 - 2010 Korean Army Neurosurgeon

Certification

- 2013 Certification of the Society of Korean Endovascular Neurosurgeons
- 2013 Certification of Fellowship of Neurosurgery, Seoul St. Mary's Hospital, Catholic University
- 2012 Certification of Fellowship of Radiology, Seoul St. Mary's Hospital, Catholic University
- 2007 Korean Board of Neurosurgery

Medtronic Pre-conference interactive learning [Room A]

Faster Decision for Optimal Strategy in AIS: Collaboration of AI & Physicians

Myeong Jin Kim

Gachon University Gil Medical Center, Korea

Medtronic Pre-conference interactive learning [Room A]

Endovascular therapy for acute stroke with a large ischemic region

Shinichi Yoshimura

Hyogo College of Medicine, Kobe City Medical Center, Japan

Education

- 2001 Certified Endovascular Neurosurgeon (Senior Instructor)
- 1996 Certified Neurosurgeon (Specialist of Neurosurgery)
- 1989 Medical Doctor
- 1983 - 1988 Medical School, Gifu University, Japan

Academic appointments

- 2004- Associate Professor, Dept. of Neurosurgery, Gifu University
- 2013- Professor & Chairman, Dept. of Neurosurgery, Hyogo College of Medicine
- 2014- Chairman, Stroke Center, Hyogo College of Medicine

Academic society

- 2017- World Academy of Neurological Surgery (WANS): active member
- 2015- Councilor, The Japanese Society on Surgery for Cerebral Stroke
- 2014- Chief Editor, Journal of NeuroEndovascular Therapy
- 2013- Councilor, The Japan Stroke Society
- 2012- Education Chairman, The Japanese Neurosurgical Congress

Medtronic Pre-conference interactive learning [Room A]

Endovascular therapy for acute stroke with a large ischemic region

Shinichi Yoshimura

Hyogo College of Medicine, Kobe City Medical Center, Japan

DAY 1

Friday, September 23, 2022 (15:00-16:00)

Kaneka coil launching symposium [Room A]

Chair: Kenji Sugiu (Okayama University, Japan)
Yong-Sam Shin (BNS President, Seoul St. Mary's Hospital, Korea)

- Kaneka coil experience in Japan
  Kenji Sugiu (Okayama University, Japan)
- Korean first experience of Kaneka coil
  Sukh Que Park (Soon Chun Hyang University, Korea)
- Kaneka coil experience in Japan
  Masaru Hirohata (Kurume University Hospital, Japan)

Kaneka coil launching symposium [Room A]

Kaneka coil experience in Japan

Kenji Sugiu

Okayama University, Japan

Educational Background

- 1978.4-1981.3 Okayama Prefectural Soja High School
- 1981.4-1987.3 Kurume University Medical School (premedical and medical)
- Medical License : Doctor of Medical Science 307330-Japan, Received in May 1987
- Japanese Board of Neurological Surgery : Passed in July 1994
- Degree of Medical Science : Received in March 1996
- Consulting specialist of Japanese Society for NeuroEndovascular Therapy board certification system : Passed in June 2001

Professional Training and Employment

- 1999.11-2003.3 Assistant Professor of Neurological Surgery at Okayama University Hospital
- 2003.4-2012.7 Senior Assistant Professor of Neurological Surgery at Okayama University Hospital
- 2012.8-present Associate Professor of Neurological Surgery, Vice President of IVR center at Okayama University Hospital
- 2015 President of the 31st Annual Meeting of the Japanese Society for NeuroEndovascular Therapy (JSNET)

Rewards

- 1996.6 Sunada Prize of Okayama University
- 1996.11 Special Prize of Neurovascular section of the Japan Neurosurgical Society
- 1999.6 Exhibit Award (Poster Prize) of Swiss Society of Radiology, 86. Annual Meeting

Kaneka coil launching symposium [Room A]

Kaneka coil experience in Japan

Kenji Sugiu

Okayama University, Japan

The Dream to Children 子供達に夢を！ We shoulder Okayama!（大人達にも！）

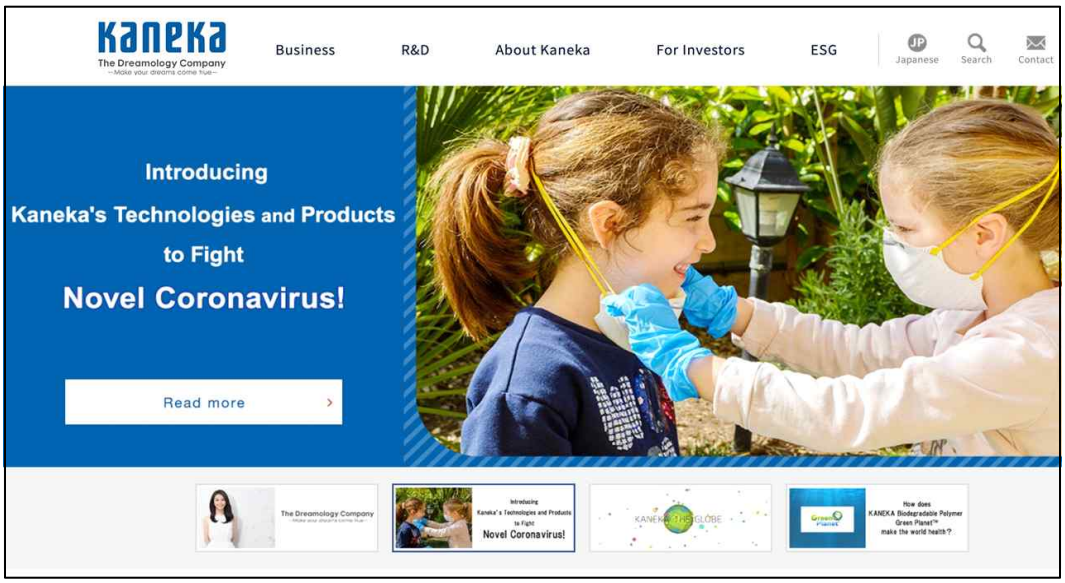
Introduction of KANEKA coil

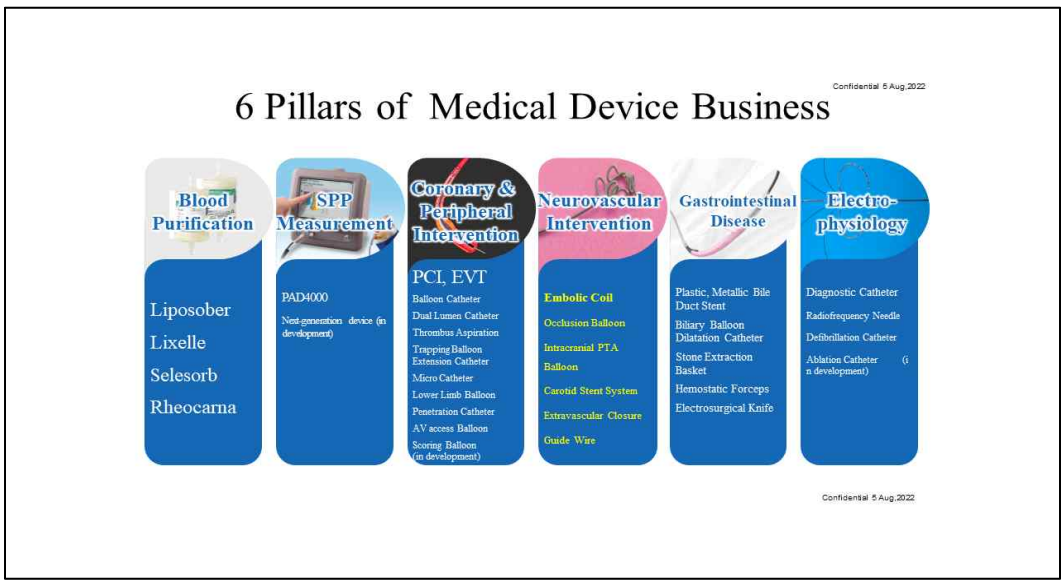
Department of Neurological Surgery,
Okayama University Graduate School of Medicine

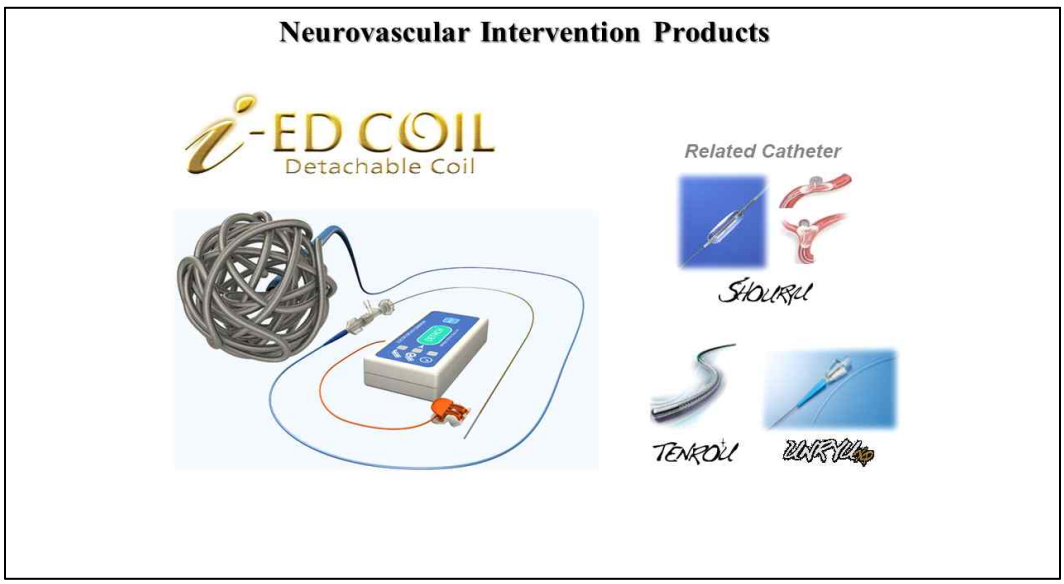
Kenji Sugiu, Tomohito Hishikawa, Masafumi Hiramatsu, Jun Haruma, Kazuhiko Nishi, Yoko Yamaoka, Kazuhiko Nishi, Yuki Ebisudani, Ryu Kimura, Hisanori Edaki, Masato Kawakami, Isao Date

We, Okayama University, supports
FAGiANO Okayama Football Club

Corporate Information
kaneka
The Dreamology Company
—Make your dreams come true—


kaneka
The Dreamology Company
Business
R&D
About Kaneka
For Investors
ESG
Japanese
Search
Contact
Introducing
Kaneka's Technologies and Products
to Fight
Novel Coronavirus!
Read more

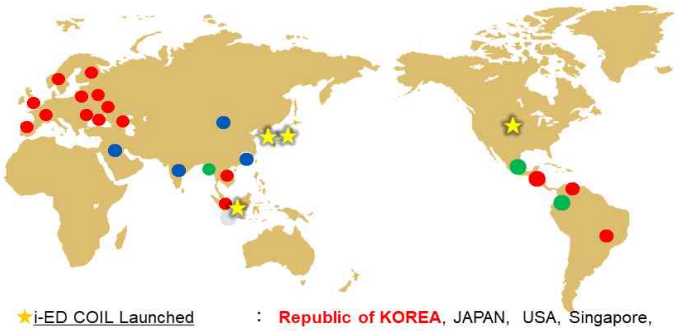

Confidential 5 Aug.2022
6 Pillars of Medical Device Business
Blood Purification
Liposober
Lixelle
Selesorb
Rheocarna
SPP Measurement
PAD4000
Next-generation device (in development)
Coronary & Peripheral Intervention
PCI, EVT
Balloon Catheter
Dual Lumen Catheter
Thrombus Aspiration
Trapping Balloon Extension Catheter
Micro Catheter
Lower Limb Balloon
Penetration Catheter
AV access Balloon
Scoring Balloon (in development)
Neurovascular Intervention
Embolic Coil
Occlusion Balloon
Intracranial PTA Balloon
Carotid Stent System
Extravascular Closure
Guide Wire
Gastrointestinal Disease
Plastic, Metallic Bile Duct Stent
Biliary Balloon Dilatation Catheter
Stone Extraction Basket
Hemostatic Forceps
Electrosurgical Knife
Electro-physiology
Diagnostic Catheter
Radiofrequency Needle
Defibrillation Catheter
Ablation Catheter (in development)
Confidential 5 Aug.2022


Neurovascular Intervention Products
i-ED COIL
Detachable Coil
Related Catheter
SHOURYU
TENKOU
UNRYU

History of ED/i-ED COIL

1980	Prof.Taki presented Electric Detachable Balloon catheter.
1991	R&D on ED Coil was initiated with Prof. Taki
1997-1999	Pivotal Clinical Trial in Japan
2002	MHLW approval, Launched ED Coil "18type"
2006	Launched ED Coil "ExtraSoft"
2009-2011	Launched ED Coil "∞ Infini", "Standard α-spiral "
2015	Launched ED Coil "Complex",
2015	CE approval of ED Coil
2019	**Launched "i-ED Coil" in Japan**
2020	FDA approval of "i-ED COIL"
2022	**Launched "i-ED COIL" in KOREA**

Global Marketing to spread ED/i-ED COIL



★i-ED COIL Launched : **Republic of KOREA**, JAPAN, USA, Singapore, Vietnam
●ED COIL Launched : Germany, France, UK, Spain, Italy, Nordics, Poland, Brazil etc
●Regulatory Process : China, Taiwan, Middle East
●Preparation for regulatory : Mexico, Peru , India

i-ED COIL Line-up in KOREA

Complex

Coil diameter (mm)	Coil length (cm)	Coil Dia. (inch)	Softness	
3	4	0.010	ES	Extra Soft
	6			
3.5	8			
4	10		S	Soft
5	10	0.012		
	15			
6	20			
7	30			
8	40	0.014		
9	40			
10	40		MS	Medium Soft
12	50			
14	50		STD	Standard
16	50			

Framing ~ Filling Line

Complex Infini

Coil diameter (mm)	Coil length (cm)	Coil Dia. (inch)	Softness	
2 - 3	4	0.012	SS	Silky Soft
	6			
	10			
3 - 5	15			
	20			

Framing ~ Filling ~ Finishing Line

Complex Silky Soft

Coil diameter (mm)	Coil length (cm)	Coil Dia. (inch)	Softness	
1	2	0.010	SS	Silky Soft
	3			
1.5	2			
	3			
2	3			
	4			
	6			
	8			
2.5	4			
	6			
3	4			
	6			
	8			

Finishing Line

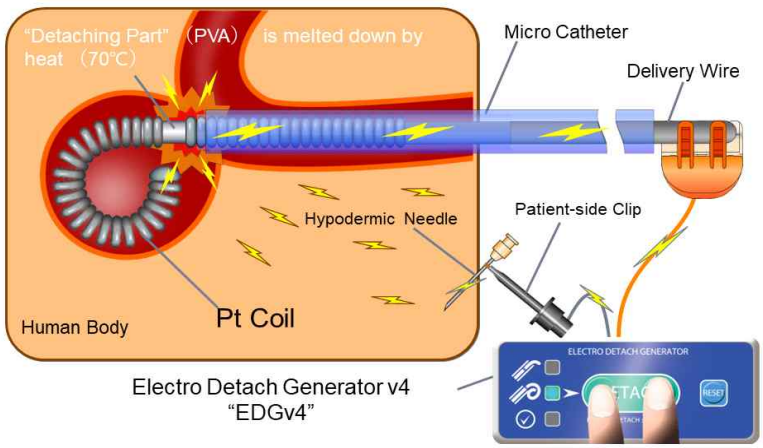
i-ED COIL System

Unique Features

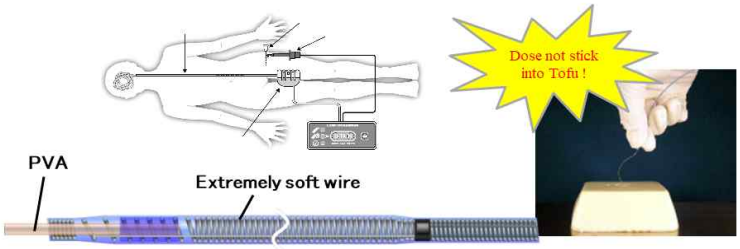
1. Precise Detachment Detection System
2. Less-kickback with Flexible Delivery Wire & Waving Inner Wire
3. "SilkySoft"; Soft coil optimal for finishing
4. "Complex Infini"; Low memory shape coil Designed to fit into space for filling
5. "Complex Frame"; Designed to fit into space

Monopolar Electrode System

Quick and secure coil detachment by melting down the detaching part (PVA rod) with Joule heat generated by high-frequency electric current



Monopolar Electrode System



- The Monopole electrode detachment system increases softness of the distal delivery wire
- Super Flexible Delivery Wire prevents "kickback" of micro catheter from the neck of the aneurysm.

Complex SilkySoft Design

Complex Silky Soft SS

Large coil loops find open space and small coil loops follow to fill them !

Complex SilkySoft

Complex Silky Soft SS

Recommended diameter to be placed(mm)	Coil length (cm)	Coil Dia. (inch)	Softness	
1	2	0.010	SS	SilkySoft
	3			
1.5	2			
	3			
2	3			
	4			
	6			
	8			
2.5	4			
	6			
3	4			
	6			
	8			

Complex Infini
Silky Soft
SS

Complex Infini

- ✓ Low Shape Memory with Loop
- ✓ High Conformability
- ✓ **0.012 Coil**
- ✓ **Softness ; SilkySoft**
- ✓ For small space
- ✓ Easier MC control

Outward behavior results in more complete fusiform aneurysm filling !
More volume with fewer coils by selection on length !

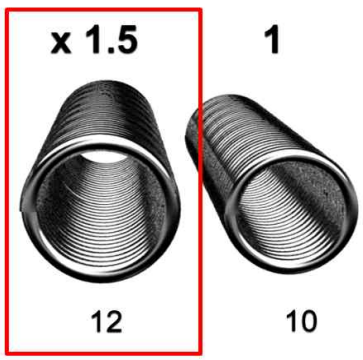
Complex Infini
Silky Soft
SS

Complex Infini

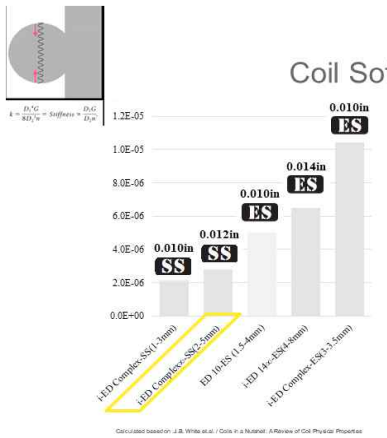
Recommended diameter to be placed (mm)	Coil length (cm)	Coil Dia. (inch)	Softness	
2 - 3	4	0.012	SS	SilkySoft
	6			
	10			
3 - 5	15			
	20			

Ease of size selection by coil length & softness only !
More volume with fewer coils by selection on length !

Coil Cross-section Comparison



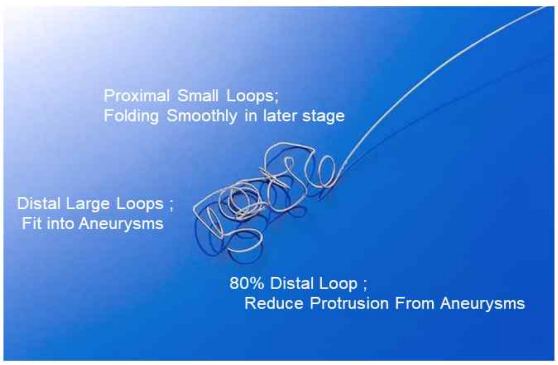
Coil Softness



symbol	coil	k P³/D⁴n
SS	i-ED Complex-SS(1-3mm)	2.2E-06
SS	i-ED Complexe-SS 12 (3-5, 2-8)	2.8E-06
ES	ED 10-ES (1.5-4mm)	5.0E-06
ES	i-ED 14∞-ES (4-8)	6.5E-06
ES	i-ED Complex-ES 10(3, 3.5)	1.0E-05

Complex Coil Design

Complex
Extra Soft ES
Soft S
Medium Soft MS
Standard STD



The distal coil loops spreads along the aneurysm wall & the proximal coil loops provides support from the inside !

Complex

Complex
Extra Soft ES
Soft S
Medium Soft MS
Standard STD

Recommended diameter to be placed (mm)	Coil length (cm)	Coil Dia. (inch)	Softness	
3	4	0.010	ES	ExtraSoft
	6			
3.5	8			
4	10		S	Soft
5	10	0.012		
	15			
6	20			
7	30			
8	40	0.014		
9	40			
10	40		MS	MediumSoft
12	50			
14	50		STD	Standard
16	50			

Coil designs optimized according to size !

iED from our experience

- ✓ Excellent delivery wire
- ✓ -14, -12, -10 size variation
- ✓ Unique complex Infini shape can seek the space in filling stage
- ✓ SilkySoft can make tight and safe finishing
- ✓ You can detach the coil when second marker was hidden
- ✓ Available through Marathon catheter for AVM

Made in JAPAN

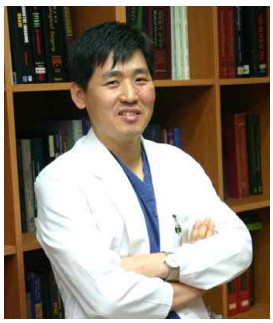
Penetrate to South Korea then Europe？！

Kaneka coil launching symposium [Room A]

Korean first experience of Kaneka coil

Sukh Que Park

Soon Chun Hyang University, Korea



Professional Experience

- 2015 ~ present Professor, Soonchunhyang University Seoul Hospital
- 2010 ~ 2015 Associate Professor, Soonchunhyang University Seoul Hospital
- 2008 ~ 2010 Attending Physician, Korean Cancer Center Hospital, Seoul, South Korea
- 2006 ~ 2007 Assistant Professor, Seoul National University Bundang Hospital, Seongnam, South Korea

Medical Education & Training

- 1995 ~ 2000 Neurosurgery Residency, Soonchunhyang University Hospital
- 2005 ~ 2006 Neurovascular fellowship, Department of Neurosurgery, Seoul National University Bundang Hospital
- 2013 ~ 2014 Barrow Neurological Institute, St. Joseph Hospital and Medical Center, Phoenix, Arizona, US (2006)
- 2014 University of Texas Medical School at Houston, Houston, Texas, US

Board Certification Ans Licensure

- 1995 Medical License – Korean Medical Association
- 2000 Board Certified - Korean Board of Neurological Surgery
- 2009 Subspecialty Board of Critical Care Medicine - Korean Society of Critical Care Medicine
- 2013 Subspecialty Board of Neuroendovascular Surgery – Korean Neuroendovascular Society

Kaneka coil launching symposium [Room A]

Korean first experience of Kaneka coil

Sukh Que Park

Department of Neurosurgery, Soon Chun Hyang University Seoul Hospital, Seoul, Korea

The Kaneka ED- coil was first released 20 years ago in Japan. It is currently used across the globe. Recently, it was introduced to Korea. The Kaneka has developed a product that brings the flexibility of coils up to the highest level in the world through optimizing the diameter of the metal wire, which is the raw material for embolization coils, and incorporating special construction techniques. The Kaneka said the use of this coils not only allows the coil to be more densely packed into the aneurysm but also treats aneurysms of irregular shapes, which contributes to lowering the risk of rupture.

In this presentation, I would like to share my initial experience about the new coil.

Kaneka coil launching symposium [Room A]

Kaneka coil experience in Japan

Masaru Hirohata

Kurume University Hospital, Japan

Professor of department of Neurosurgery, Kurume University hospital

- 1995 - 1996 Department of Neurosurgery& Micro-biology, New York University
- 1997 - Department of Neurosurgery, Kurume University hospital.
- 1998 - 2004 Assistant Professor
- 2005 - 2016 Associate professor
- 2017 - Professor

Certification

- Japanese Board of Neurosurgery,
- Japanese Board of Neuro Endovascular Therapy,
- Japanese Board of Stroke

Professional Organization & Societies

- Member of Japan Neurosurgical Society
- Member of Japanese Congress of Neurological Surgeons
- Member of Japanese Society for NeuroEndovascular Therapy President: (2019 annual meeting)
- Member of Japanese Society on Surgery for Cerebral Stroke
- Member of Japan Stroke Society
- Member of Japanese Society of Neuropathology
- Member of World Federation of Interventional and Therapeutic Neuroradiology
- Member of Japanese Society of Neuropathology

Kaneka coil launching symposium [Room A]

Kaneka (ED) coil experience in Japan

Masaru Hirohata, Kimihiko Orito, Yasuharu Takeuchi*, Shin Yamashita, Yukihiko Nakamura***, Motohiro Morioka**

Department of Neurosurgery, Kurume University
*Department of Neurosurgery, Saiseikai Futukaishi Hospital
**Department of Neurosurgery, Omuta City Hospital
***Department of Neurosurgery, Saiseikai Fukuoka Hospital

ED coil is made by Maneka Medics (a Japanese company) and launched in Japan in 2002.

This coil has lots of unique features. We can identify the coil completely out of the microcatheter by sound and light indication (Two marker catheter is not necessary), and this coil could be used from 0.013 microcatheter (MARATHON). Moreover, this coil and delivery wire are very soft, so the kickback of the catheter tip is minimum. Three types of coils, which have different characteristics (Silky soft, Infini & complex Infini, and Complex Frame) are available, so in aneurysm treatment, we can use this coil from framing to finish. From 2001 to 2021, we have used this coil for 1928 cases including 1620 aneurysms, 214 dural AVFs, 36 tumors, 29 AVMs, and 29 other diseases). From our clinical experience, we will show the usefulness and safety of this coil.

Key wards: ED coil, electro-detachable, Neuro intervention

DAY 1

Friday, September 23, 2022 (16:00-17:30)

Microvention WEB symposium [Room A]

Chair: Yong-Sam Shin (BNS President, Seoul St. Mary's Hospital, Korea)
Markus Holtmannspötter (Nuremberg Hospital, Germany)

- Juntendo experiences ***Virtual presentation***
  Hidenori Oishi (Juntendo University, Japan)
- Yonsei University experiences
  Keun Young Park (Yonsei University Severance Hospital, Korea)
- Treatment of wide neck aneurysm by WEB device. Experience sharing from Vietnam
  Dang Luu VU (Bach Mai Hospital, Vietnam)
- Korean WEB Registry
  Hyun-Seung Kang (Seoul National University, Korea)
- WEB: Key Indications and Best Practices – European Experience
  Markus Holtmannspötter (Nuremberg Hospital, Germany)

Microvention WEB symposium [Room A]

Juntendo experiences

Hidenori Oishi

Juntendo University, Japan

Education

- 1991 M.D. Juntendo University School of Medicine, Tokyo, Japan
- 2002 Ph.D. Juntendo University School of Medicine, Tokyo, Japan

Postgraduate career

- 1997/9-1998/7 Assistant Professor in Radiology, Juntendo University Hospital
- 2000/11-2003/3 Assistant Professor in Neurosurgery, Mito National Hospital
- 2007/4 -2012/10 Assistant Professor in Neurosurgery, Juntendo University Hospital
- 2012/11-Present Chairman in Neuroendovascular Therapy, Juntendo University Professor in Neurosurgery, Juntendo University

License and Certificates

- 1991 Japanese National Medical License
- 1997 Board Certified Member of the Japan Neurosurgical Society
- 2002 Board Certified Member of the Japanese Society for Neuroendovascular Therapy
- 2005 Board Certified Member of the Japan Stroke Society

Microvention WEB symposium [Room A]

Juntendo Experience of Intrasaccular Flow Disruptor, W-EB

Hidenori Oishi

Department of Neuroendovascular Therapy, Juntendo University, Tokyo, Japan

Purpose: Purpose is to evaluated the safety and efficacy of W-EB devices for intracranial bifurcation aneurysms.

Methods: We retrospectively review our university experience of WEB device embolization for intracranial bifurcation aneurysms.

Results: So far, over 50 aneurysms, including 2 acutely ruptured aneurysms, treated with W-EB device. Complete occlusion achieved about 45%. Procedure-related complication was zero.

Conclusions: W-EB device embolization is able to be first treatment of choice for intracranial bifurcation aneurysms.

Microvention WEB symposium [Room A]

Yonsei University experiences

Keun Young Park

Yonsei University Severance Hospital, Korea

Educations & Training & Employment

- 1997 - 2003 Bachelor's degree Yonsei University College of Medicine
- 2005 - 2009 Master's degree Yonsei University College of Medicine
- 2012 - 2015 Doctor's degree Korea University College of Medicine

Professional Training & employment

- 2019 - 2020 Research Fellow, Department of Medical Imaging Toronto Western Hospital, University Health Network University of Toronto, Canada
- 2021 - present Associate professor, Department of Neurosurgery, Severance Hospital, Yonsei University College of Medicine
- 2021 - present Proctorship of WEB device, Microvention Terumo
- 2022 - present Consultant of Medtronic

Professional Membership

- Korean Neurosurgical Society
- Korean Society of Cerebrovascular Surgeons
- Korean Neuroendovascular Society
- Korean Society of Interventional Neuroradiology
- Korean Stroke Society
- World Federation of Interventional and Therapeutic Neuroradiology

Microvention WEB symposium [Room A]

Yonsei University experiences

Keun Young Park

Yonsei University Severance Hospital, Korea

Microvention WEB symposium [Room A]

Treatment of wide neck aneurysm by WEB device. Experience sharing from Vietnam

Dang Luu VU

Bach Mai Hospital, Vietnam

Education

- 1994 - 2000 Student of Ha noi Medical University
- 2001 - 2005 Resident of Radiology at Ha noi Medical University
- 2008 - 2012 PhD- Ha noi Medical University

Graduate Training

- 2009 Hand-on workshop of Neurointerventional in Tokyo
- 2010 Live Interventional Neuroradiology & Neurosurgery Course
- 2010 Symposium of Brainstorm in Island, UK.
- 2016 LINNC ASIA, Singapore
- 2017 Workshop of thrombectomy using Trevor Provue Stent in Douseldorf, Germany

Certification

- 2009 AFS 2005 and AFSA
- 2012 PhD- Ha noi Medical University
- 2016 Associated Professor of Radiology

Microvention WEB symposium [Room A]

Treatment of wide neck aneurysm by WEB device. Experience sharing from Vietnam

Dang Luu VU

Bach Mai Hospital, Vietnam

Microvention WEB symposium [Room A]

Korean WEB Registry

Hyun-Seung Kang

Seoul National University, Korea

Microvention WEB symposium [Room A]

WEB: Key Indications and Best Practices – European Experience

Markus Holtmannspötter

Nuremberg Hospital, Germany

Since 2019 Head of Interventional and Diagnostic Neuroradiology at Nuremberg Hospital, Paracelsus Medical University, received his medical licence in Hannover, Germany from the “Medizinische Hochschule Hannover” in 1996. Starting his medical training for 2.5 years as a Fellow in the Department of Neurosurgery and the Department for Surgical Research in Großhadern University Hospital of the Ludwig Maximilians University in Munich, he continued his Training in the Department of Neuroradiology in the same Hospital. Focussing on Interventional Neuroradiology he consecutively specialized in Radiology and Neuroradiology.
2008 he became Senior Consultant for Interventional Neuroradiology in the same Department. Between 2011 and 2019 he worked as Senior Interventional Neuroradiologist at the Rigshospital, University Hospital Copenhagen, Denmark, before accepting his present position as Head of Interventional and Diagnostic Neuroradiology at Nuremberg Hospital, Paracelsus Medical University, Nuremberg, Germany.
He Participated as local Principal Investigator PI in several international multicenter studies, Swift Prime being one of them. He is regular reviewer for several scientific Journals like JNIS, AJNR – American Journal of Neuroradiology, CVIR; Clinical Neuroradiology, Acta Radiologica and others. Over more than 10 years, he’s been internationally active as Invited Speaker at conferences and as Consultant and Proctor for several medical device companies. Dr. Markus Holtmannspötter is active member of following professional societies: DGNR, BDNR, DRG, DeGIR, ESMINT, ESNR, WFITN and the Danish neuroradiological Society.

Microvention WEB symposium [Room A]

WEB: Key Indications and Best Practices - European Experience

Markus Holtmannspötter

Nuremberg Hospital, Germany

DAY 1

Friday, September 23, 2022 (16:00-17:40)

Siemens Healthineers Japan/Korea ICONO user meeting [Room B]

Chair: Yasushi Ito (Shinrakuen Hospital, Niigata University, Japan)
Bum-soo Kim (Seoul St. Mary's Hospital, Korea)

- Icono experience in aneurysm treatment
  Kenji Sugiu (Okayama Univ., Japan)
- User feedback after setting up the new ARTIS icono
  Bum-soo Kim (Seoul St. Mary's Hospital, Korea)
- Icono experience in stroke treatment
  Yasushi Ito (Shinrakuen Hospital, Niigata University, Japan)
- Artis ICONO for evaluation and treatment of intracranial vascular malformation: usefulness of image fusion
  Jai Ho Choi (Seoul St. Mary's Hospital, Korea)
- Advanced Imaging with ARTIS icono biplane
  Richard Obler (Siemens Healthineers, Germany)

Siemens Healthineers Japan/Korea ICONO user meeting [Room B]

Icono experience in aneurysm treatment

Kenji Sugiu

Okayama Univ., Japan

Educational Background

- 1978.4-1981.3 Okayama Prefectural Soja High School
- 1981.4-1987.3 Kurume University Medical School (premedical and medical)
- Medical License : Doctor of Medical Science 307330-Japan, Received in May 1987
- Japanese Board of Neurological Surgery : Passed in July 1994
- Degree of Medical Science : Received in March 1996
- Consulting specialist of Japanese Society for NeuroEndovascular Therapy board certification system : Passed in June 2001

Professional Training and Employment

- 1999.11-2003.3 Assistant Professor of Neurological Surgery at Okayama University Hospital
- 2003.4-2012.7 Senior Assistant Professor of Neurological Surgery at Okayama University Hospital
- 2012.8-present Associate Professor of Neurological Surgery, Vice President of IVR center at Okayama University Hospital
- 2015 President of the 31st Annual Meeting of the Japanese Society for NeuroEndovascular Therapy (JSNET)

Rewards

- 1996.6 Sunada Prize of Okayama University
- 1996.11 Special Prize of Neurovascular section of the Japan Neurosurgical Society
- 1999.6 Exhibit Award (Poster Prize) of Swiss Society of Radiology, 86. Annual Meeting

Siemens Healthineers Japan/Korea ICONO user meeting [Room B]

Icono experience in aneurysm treatment

Kenji Sugiu

Okayama Univ., Japan

The Dream to Children 子供達に夢を！ We shoulder Okayama!（大人達にも！）

icono experience in aneurysm treatment

Department of Neurological Surgery,
Okayama University Graduate School of Medicine

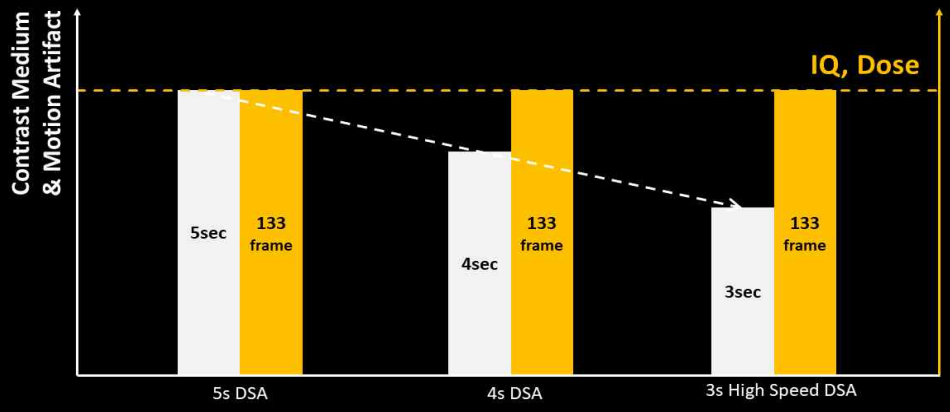
Kenji Sugiu, Tomohito Hishikawa, Masafumi Hiramatsu, Jun Haruma, Kazuhiko Nishi, Yoko Yamaoka, Kazuhiko Nishi, Yuki Ebisudani, Ryu Kimura, Hisanori Edaki, Masato Kawakami, Isao Date

We, Okayama University, supports
FAGiANO Okayama Football Club

From Artis zee to ARTIS icono

System installation in Nov. 2021

ARTIS icono D-Spin Dyna3D



Biplane Automap

Automatic setting from images on both planes simultaneously

Biplane automatic stand positioning depending on the selected reference image.

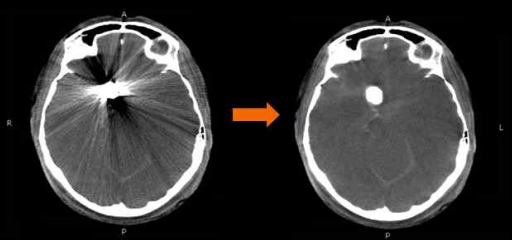
- **angle for neck of aneurysm**
- **angle for access route**

syngo DynaCT SMART

Metal Artifact Reduction Algorithm on Conebeam CT

DynaCT SMART reduces metal artifacts

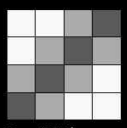
- **Better detection of contrast media and blood close to metallic implants**
- **Reducing artifacts from coils with Stent Assist**
- **Fully automatic and manual processing**



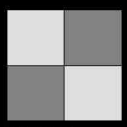
DynaCT Micro

1x1 pixel reconstruction
with very fine resolution for

- very small vessels
- stent structures
- high spatial resolution of about 0.14 mm

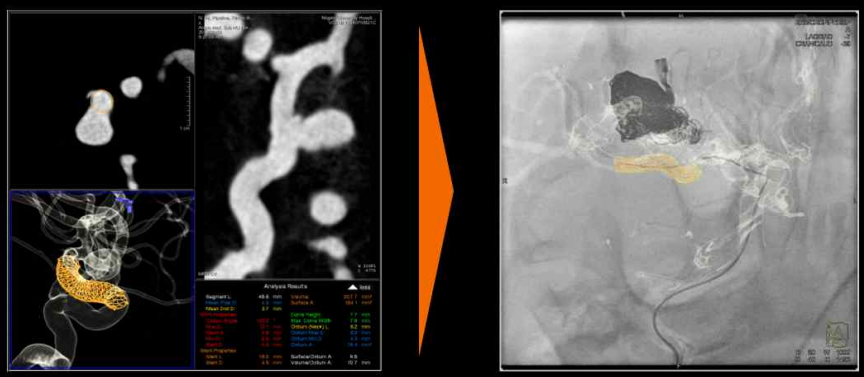


DynaCT Micro

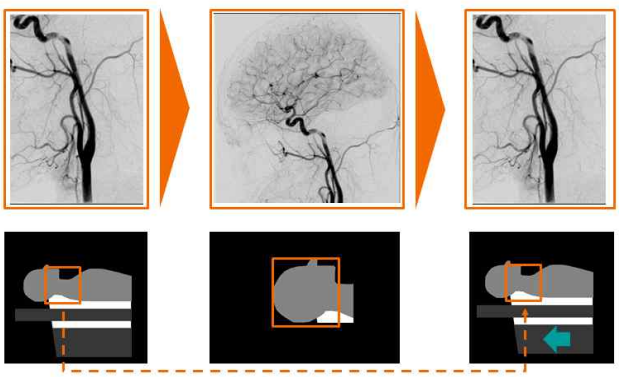


2x2 binning

Virtual Stent



Roadmap with multi-tilt table system position recall from previous mask image



- Table position is fully connected to reference images
- Roadmap mask image can recall table position
- Reduce additional acquisition and contrast media

Siemens Healthineers Japan/Korea ICONO user meeting [Room B]

User feedback after setting up the new ARTIS icono

Bum-soo Kim

Seoul St. Mary's Hospital, Korea

Siemens Healthineers Japan/Korea ICONO user meeting [Room B]

Icono experience in stroke treatment

Yasushi Ito

Shinrakuen Hospital, Niigata University, Japan

Education

- 1977 - 1983 School of Medicine, Niigata University, Niigata JAPAN

Professional career

- 2001 Assistant Lecturer, Department of Neurosurgery, Niigata University
- 2006 Assistant Professor, Department of Neurosurgery, Niigata University
- 2008 Associate Professor, Department of Neurosurgery, Niigata University
- 2008 Professor, Division of Neuroendovascular Therapy, Niigata Universit
  Division Director, Department of Neurosurgery, Shinrakuen Hospital
- 2016- Research Director, Department of Neurosurgery, Shinrakuen Hospital

Membership in Professional & Scientific Societies

- Japanese Society for Neuroendovascular Therapy (JSNET)
- Past President (2013), Annual meeting of JSNET
- Japan Neurosurgical Society
- Congress of Japanese Neurosurgical Surgeons
- Japan Stroke Society
- Japanese Society on Surgery for Cerebral Stroke
- Society of Tohoku Neuroendovascular Therapy
- Past President (2015, 2018), Annual meeting of Society of Tohoku Neuroendovascular Therapy
- WFITN member
- East Asian Conference of Neurointervention (EACoN), Past President (2016, 2019)
- President, Niigata Neuroendovascular Seminar (Naeba Seminar)

Siemens Healthineers Japan/Korea ICONO user meeting [Room B]

Icono experience in stroke treatment

Yasushi Ito

Shinrakuen Hospital, Niigata University, Japan

Siemens Healthineers Japan/Korea ICONO user meeting [Room B]

Artis ICONO for evaluation and treatment of intracranial vascular malformation: usefulness of image fusion

Jai Ho Choi

Seoul St. Mary's Hospital, Korea

Education

- 1998 - 2004 The Catholic University of Korea College of Medicine, B.S. (Medicine)
- 2012 - 2019 The Catholic University of Korea Postgraduate School, Ph.D. (Medicine)

Postgraduate Training

- 2004 - 2005 Intern, Kangnam St. Mary's Hospital, Seoul
- 2005 - 2009 Resident in Neurosurgery, Kangnam St. Mary's Hospital, Seoul

Academic And Hospital Appointment

- 2021 - present Associate Professor, Department of Neurosurgery, Seoul St. Mary's Hospital, The Catholic University of Korea College of Medicine, Seoul, Korea
- 2017 - 2021 Clinical Assistant Professor, Department of Neurosurgery, Seoul St. Mary's Hospital, The Catholic University of Korea College of Medicine, Seoul, Korea
- 2016 - 2017 Clinical Assistant Professor, Chungbuk National University Hospital
- 2015 - 2016 Staff, Bundang Jesaeng General Hospital

Siemens Healthineers Japan/Korea ICONO user meeting [Room B]

Artis ICONO for evaluation and treatment of intracranial vascular malformation: usefulness of image fusion

Jai Ho Choi, Bum-soo Kim, Yong Sam Shin

From the Department of Neurosurgery (J.H.C, Y.S.S) and Radiology (B.K), Seoul St Mary's Hospital, The Catholic University of Korea College of Medicine, Seoul, Republic of Korea

BACKGROUND AND PURPOSE: This study aimed to investigate the efficacy of flat detector computed tomography-based rotational angiography (FDCT-RA) and image fusion (IF) technique using Artis ICONO to evaluate preprocedural angioarchitecture and to aid the navigation during transvenous embolization (TVE) for intracranial dural arteriovenous fistula (DAVF).

MATERIALS AND METHODS: For FDCT-RA & IF technique, initial dual-rotation angiography was performed to obtain subtraction, mask, and native fill images. During the navigation of microcatheter, we conducted single-rotation angiography with reduced field of view without contrast media and fused with initial subtraction image to identify the microcatheter going to the right direction or placing in the targeted shunt pouch. We retrospectively reviewed clinical and radiological features of fifty-three DAVFs treated by TVE between January 2009 and February 2020 in a single institute.

RESULTS: This technique was used in 18 out of 53 DAVFs. DAVF location (p=0.001), sinus occlusion status (p=0.001), and access route (p=0.005) were significantly different between the two groups. In DAVFs involving anterior condylar confluence and cavernous sinus with ipsilateral inferior petrosal sinus (IPS) occlusion, we mainly used this technique. We could easily navigate occluded IPS or alternative access route including facial or superficial temporal vein by use of our technique. Complete occlusion rate was higher in cases with this technique (17 of 18 DAVFs, 94.4%) than without this technique (28 of 35 DAVFs, 80%, p=0.163).

CONCLUSION: FDCT-RA and IF can be an effective and helpful technique for navigation of microcatheter into the targeted shunt pouch.

Siemens Healthineers Japan/Korea ICONO user meeting [Room B]

Advanced Imaging with ARTIS icono biplane

Richard Obler

Siemens Healthineers, Germany

Vocational experience

- 2019 - 2022 Global Senior Product Manager, Image Quality (2D) for Interventional Radiology
- 2016 - 2019 Global Clinical Consultant, Image Quality (2D)
- 2008 - 2016 Solution Consultant, Image Quality (2D) Algorithms, R&D

University degrees

- 2007 Diploma Thesis Mathematics, Leibniz Universit¨at, Hannover, Diplom-Mathematiker Title: “Optimierung der dynamischen 3D CE-MRA” (Final mark: 1,0)
- 1999 Promotion, Medizinische Hochschule, Hannover, Doktor der Medizin Title: “Objektiver Promontorialtest – MRT-kompatibler Nervenstimulator” (Final mark:magna cum laude) cooperation of MHH and Institut f¨ur Grundlagen der Elektrotechnik und Messtechnik
- 2000 Graduation as Medical Doctor, Medizinische Hochschule, Hannover, State Exam III Licensed physicians with approbation

Awards

- 2000 Kurt-Decker-Preis, Deutsche Gesellschaft f¨ur Neuroradiologie “Objektiver Promontorialtest mittels funktioneller Magnetresonanztomographie. Entwicklung eines MRT-kompatiblen Nervenstimulators.”
- 2000 EXPO 2000 Neuroradiology Award, ”Medicine meets Millenium” Congress, Hannover Brain Functional Imaging of Sexual Arousal
- 2000 Participation at EXPO-Themenpark, Topic: Knowledge, Hannover, EXPO 2000 3D-Visualization of Activated Brain Areas

Siemens Healthineers Japan/Korea ICONO user meeting [Room B]

Advanced Imaging with ARTIS icono biplane

Richard Obler

Senior Global Product Manager, Siemens Healthineers Advanced Therapies
Clinical Segment Interventional Radiology

Summary

Demonstration of the clinical benefits of the latest Neuro platform ARTIS icono by Siemens Healthineers. Focus on new 2D imaging (OPTIQ) and advanced 3D imaging with selected imaging examples. Explanation of some technical aspects.

DAY 2

Saturday, September 24, 2022 (07:00-08:00)

Breakfast seminar

Chair: Lau Jia Him (Hospital of Kuala Lumpur, Malaysia)
Yong Cheol Lim (Ajou University, Korea)

- FD procedure from A-Z
  Hyun-Seung Kang (Seoul National University Hospital, Korea)
- WEB procedure from A-Z
  Yong-Sam Shin (Seoul St. Mary's Hospital, Korea)

Breakfast seminar

FD procedure from A-Z

Hyun-Seung Kang

Seoul National University Hospital, Korea

Breakfast seminar

WEB procedure from A-Z

Yong-Sam Shin

Seoul St. Mary's Hospital, Korea

DAY 2

Saturday, September 24, 2022 (08:30-09:25)

Session 1. Ischemic Stroke

Chair: Dong Ik Kim (President, CHA University, Korea)
Shigeru Miyachi (Aichi Medical University, Japan)

- A comprehensive stroke solution with React aspiration catheter and Solitaire X
  Marc Ribo (Vall d'Hebron University Hospital, Spain)
- SSGH Experience with VECTA ***Virtual presentation***
  Timothy Phillips (NIISwa, Australia)
- Rescue Stenting for failed Endovascular Thrombectomy in acute ischemic stroke (ReSET)
  Byung Moon Kim (Yonsei University Severance Hospital, Korea)

Session 1. Ischemic Stroke

A comprehensive stroke solution with React aspiration catheter and Solitaire X

Marc Ribo

Vall d'Hebron University Hospital, Spain

EDUCATION/TRAINING

- 2004 - 2005 Vascular Neurology fellowship University of Texas-Houston, Stroke Program
- 2004 Ph.D. Universitat Autonoma Barcelona
- 2003 Stroke Fellowship Hospital Vall d'Hebron Barcelona, Spain
- 2003 Residency Hospital Vall d'Hebron/ Univ Autonoma Barcelona

Professional experience

- 2015 Member of the European Board of Neurointervention (EBNI)
- 2014 co-founder: Anaconda Biomed
- 2014 Member of European Society of Minimally Invasive Neurological Therapy
- 2013 Board of directors Member Society of Vascual Interventional Neurology

Certifications

- 2019 Neurointerventionalist by the EUROPEAN BOARD OF NEUROINTERVENTION (EBNI)
- 2005 Vascular Neurology Fellowship, University of Texas-Houston.
- 2005 Educational Commission for Foreign Medical Graduates, USA
- 2004 Ph.D. Medicine. Universitat Autonoma de Barcelona, Spain

Session 1. Ischemic Stroke

A comprehensive stroke solution with React aspiration catheter and Solitaire X

Marc Ribo

Vall d'Hebron University Hospital, Spain

Session 1. Ischemic Stroke

SSGH Experience with VECTA

Timothy Phillips

NIISwa, Australia

Session 1. Ischemic Stroke

Rescue Stenting for failed Endovascular Thrombectomy in acute ischemic stroke (ReSET)

Byung Moon Kim

Yonsei University Severance Hospital, Korea

DAY 2

Saturday, September 24, 2022 (09:25-10:40)

Session 2. Flow Disruptor / Coating

Chair: Seon-Kyu Lee (Albert Einstein College of Medicine, USA)
Dang Luu VU (Bach Mai Hospital, Vietnam)

- The novel Contour neurovascular system, the generation of intra-saccular flow disruptor for bifurcation aneurysms ***Virtual presentation***
  Thomas Liebig (Ludwid-Maximilians-Univeristy Hospital, Germany)
- Korean Registry of WEB
  Hyun-Seung Kang (Seoul National University, Korea)
- Intrasaccular devices in aneurysm therapy
  Jens Fiehler (University Medical Center Hamburg-Eppendorf, Germany)
- Coating Technologies – Biomimicry and Beyond – Preclinical Publication and Blood Flow Loop Data on Mystique
  Matthew J. Gounis (University of Massachusetts Medical School, USA)

Session 2. Flow Disruptor / Coating

The novel Contour neurovascular system, the generation of intra-saccular flow disruptor for bifurcation aneurysms

Thomas Liebig

Ludwid-Maximilians-Univeristy Hospital, Germany

Session 2. Flow Disruptor / Coating

Korean Registry of WEB

Hyun-Seung Kang

Seoul National University, Korea

Session 2. Flow Disruptor / Coating

Intrasaccular devices in aneurysm therapy

Jens Fiehler

University Medical Center Hamburg-Eppendorf, Germany

Current position

- 2009 - now: Professor and Chairman, Diagnostic and Interventional Neuroradiology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany

Education

- 2006: PhD (Habilitation, Privatdozent), Diagnostic and Interventional Neuroradiology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany
- 2005 - 2007: Board certifications for Radiology, Neuroradiology, and Quality Management in Medicine
- 2001: Master (Dissertation, Dr. med.), Department for Pathophysiology, University of Jena, Jena, Germany

Teaching activities

- 2017 - now: Faculty at ESMINT webinars and EXMINT stroke courses, Prague, Czech Republic
- 2014 - 2018: Faculty at ECMINT, Oxford, United Kingdom
- 2009 - now: Professor and Chair, Diagnostic and Interventional Neuroradiology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany
- 2008 - 2016: Visiting Professor, Department of Neuroradiology, Oxford University, United Kingdom

Session 2. Flow Disruptor / Coating

Intrasaccular devices in aneurysm therapy

Jens Fiehler

University Medical Center Hamburg-Eppendorf, Germany

Session 2. Flow Disruptor / Coating

Coating Technologies - Biomimicry and Beyond - Preclinical Publication and Blood Flow Loop Data on Mystique

Matthew J. Gounis

University of Massachusetts Medical School, USA

Education

- 2004 Ph.D., Bioengineering, University of Miami, Coral Gables, FL/USA Thesis Title: *Angiographic quantification of gene therapy induced angiogenesis* Advisor: Baruch B. Lieber, Ph.D.
- 2001 M.S., Mechanical Engineering *(AHA Pre-doctoral Fellow)*, State University of New York at Buffalo, Buffalo, NY/USA
  Thesis Title: *Polymerization kinetics of liquid adhesive mixtures for endovascular embolization of cerebral AVMs*
  Advisor: Baruch B. Lieber, Ph.D.
- 1997 B.S., Mechanical Engineering *(Magna Cum Laude)*, State University of New York at Buffalo, Buffalo, NY/USA
- 1993 Rotary Exchange Scholar, Physics, Lycée Lamartine, Mâcon, France

Academic Appointments

- 2017 - present Professor with Tenure Department of Radiology, University of Massachusetts Medical School, Worcester, MA
- 2012 - 2017 Associate Professor (Award of Tenure, 2014) Department of Radiology, University of Massachusetts Medical School, Worcester, MA
- 2007 - present Associated Faculty Department of Biomedical Engineering, Worcester Polytechnic Institute, Worcester, MA
- 2007 - present Adjunct Professor Biomedical Engineering and Biotechnology Program, University of Massachusetts, Lowell, MA

Professional Memberships and Activities

- 2000 - present American Society of Mechanical Engineers, Bioengineering Division (2,500 members)
- 2017 *Member, Skalak Best Paper Selection Committee*
- 2015 - 2021 *Member, YC Fung Young Investigator Committee*
- 2016 - 2022 *Member, Savio Woo Translational Biomechanics Medal Committee*

Session 2. Flow Disruptor / Coating

Coating Technologies - Biomimicry and Beyond - Preclinical Publication and Blood Flow Loop Data on Mystique

Matthew J. Gounis

University of Massachusetts Medical School, USA

DAY 2

Saturday, September 24, 2022 (10:55-11:45)

Session 3. Masterpiece Surgery in the era of neuro-intervention

Chair: Young-Gyun Jeong (Inje University, Korea)
Yong Bae Kim (Yonsei University Severance Hospital, Korea)

- The Beauty of Cerebrovascular Surgery: 25-Year Retrospective
  Virtual presentation
  Michael T. Lawton (Barrow Neurological Institute, USA)

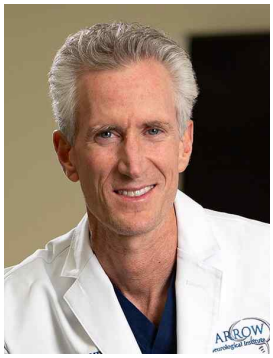
- Vascular Reconstructions and Microsurgical Approach ***Virtual presentation***
  Rokuya Tanikawa (Sapporo Teishinkai Hospital, Japan)

Session 3. Masterpiece Surgery in the era of neuro-intervention

The Beauty of Cerebrovascular Surgery: 25-Year Retrospective

Michael T. Lawton

Barrow Neurological Institute, USA



Michael T. Lawton, MD, is the president and chief executive officer of Barrow Neurological Institute, as well as its chairman of the Department of Neurological Surgery and the Robert F. Spetzler Endowed Chair in Neurosciences. Additionally, he is the chief of vascular and skull base neurosurgery at Barrow. He specializes in the surgical treatment of aneurysms, arteriovenous malformations, arteriovenous fistulas, cavernous malformations, and cerebral revascularization, including carotid endarterectomy. As the leader of the largest cerebrovascular center in the country, he has experience in surgically treating more than 5,050 brain aneurysms and over 990 AVMs. He also practices skull base tumor surgery and is trained in the endovascular treatment of aneurysms.

Dr. Lawton co-directs and conducts his research at the Barrow Aneurysm and AVM Research Center (BAARC), a collaborative research group funded by grants from the National Institutes of Health that investigates the physiology of cerebral circulation and the pathophysiology of vascular malformations. His basic science investigations focus on the formation, underlying genetics, and rupture of brain AFVMs, as well as the hemodynamics, rupture, and computational modeling of brain aneurysms. His clinical investigations study the anatomy of microsurgical approaches to vascular lesions and the outcomes of aneurysm, AVM, and bypass surgery. He is the principle investigator of a NIH U54 grant and program director of the Brain Vascular Malformation Consortium (BVMC), a multicenter group studying malformations associated with hereditary hemorrhagic telangiectasia, cavernous malformations, and Sturge-Weber syndrome.

He has published over 700 peer-reviewed articles, over 100 book chapters, and six textbooks, including *Seven AVMs: Tenets and Techniques for Resection, Seven Bypasses: Tenets and Techniques for Revascularization,* and *Seven Aneurysms: Tenets and Techniques for Clipping,* which has won numerous awards and sold more copies than Yasargil's Microneurosurgery. Dr. Lawton's accolades include the Young Neurosurgeon Award from the World Federation of Neurological Societies, the Harold Rosegay Teaching Award, the Diane Ralston Clinical and Basic Science Teaching Award, and an Impact Award as Exceptional Innovator from the Greater Phoenix Chamber (2019). He has given over 1,000 invited lectures nationally and internationally, including visiting professorships at over 60 neurosurgical institutions. He has been active in resident teaching, directing the CNS Anatomy Course for Senior Residents, co-directing the AANS Vascular Skills Course, and directing industry-sponsored anatomy courses. He sponsors an observership in vascular neurosurgery that has hosted more the 200 neurosurgeons and residents nationally and internationally. He co-founded Mission:BRAIN, a teaching mission to raise the level of neurosurgery practiced in developing countries, and has conducted eight missions in Mexico, the Philippines, and Peru.

Session 3. Masterpiece Surgery in the era of neuro-intervention

The Beauty of Cerebrovascular Surgery: 25-Year Retrospective

Michael T. Lawton

Barrow Neurological Institute, USA

Session 3. Masterpiece Surgery in the era of neuro-intervention

Vascular Reconstructions and Microsurgical Approach

Rokuya Tanikawa

Sapporo Teishinkai Hospital, Japan

Education

- 1981.4 - 1988.3 Asahikawa Medical College, Asahikawa, Hokkaido, Japan
- 1988.5 M.D. degree

Membership in Professional Societies

- 1988 Japan Neurosurgical Society
- 1988 Japanese Society on Surgery for Cerebral Stroke
- 1988 Japan Stroke Society
- 2001 Japanese Congress of Neurological Surgeons

Postgraduate Training

- 1988.6 - 1993.3 Resident in the Department of Neurosurgery, Asahikawa Medical College Hosptal(Director Prof. Y Yonemasu), including 3 year rotation in the Department of Neurosurgery, Department of Aneasthesia, Department of Neurology in Kyushu University.
- 1992.4 - 1993.3 Clinical and research assistant in the Department of Neurosurgery, Asahikawa Medical College Hospital (Director Prof. Y Yonemasu).
- 1993 - 1994 Resident in Asahikawa Red Cross Hospital (Director, Dr. Hiroyasu Kamiyama)
- 1995.7.13 Japanese Board of Neurological surgeon

Session 3. Masterpiece Surgery in the era of neuro-intervention

Vascular Reconstructions and Microsurgical Approach

Rokuya Tanikawa

Sapporo Teishinkai Hospital, Japan

DAY 2

Saturday, September 24, 2022 (12:00-13:00)

Luncheon Seminar A [Microvention/ Siemens Healthineers] [Room A]

Chair: Yong-Sam Shin (Seoul St. Mary's Hospital, Korea)
Bum-soo Kim (Seoul St. Mary's Hospital, Korea)

- LVIS EVO: Key Indications and Best Practices – European Experience
  Markus Holtmannspötter (Nuremberg Hospital, Germany)
- Imaging with ARTIS icono biplane
  Richard Obler (Siemens Healthineers, Germany)
- Balancing the radiation dose and image quality: experience of sequential application for dose-reduction protocols at Seoul St Mary's Hospital
  Bum-soo Kim (Seoul St. Mary's Hospital, Korea)

Luncheon Seminar A [Microvention/ Siemens Healthineers] [Room A]

LVIS EVO: Key Indications and Best Practices - European Experience

Markus Holtmannspötter

Nuremberg Hospital, Germany

Since 2019 Head of Interventional and Diagnostic Neuroradiology at Nuremberg Hospital, Paracelsus Medical University, received his medical licence in Hannover, Germany from the "Medizinische Hochschule Hannover" in 1996. Starting his medical training for 2.5 years as a Fellow in the Department of Neurosurgery and the Department for Surgical Research in Großhadern University Hospital of the Ludwig Maximilians University in Munich, he continued his Training in the Department of Neuroradiology in the same Hospital. Focussing on Interventional Neuroradiology he consecutively specialized in Radiology and Neuroradiology.
2008 he became Senior Consultant for Interventional Neuroradiology in the same Department. Between 2011 and 2019 he worked as Senior Interventional Neuroradiologist at the Rigshospital, University Hospital Copenhagen, Denmark, before accepting his present position as Head of Interventional and Diagnostic Neuroradiology at Nuremberg Hospital, Paracelsus Medical University, Nuremberg, Germany.
He Participated as local Principal Investigator PI in several international multicenter studies, Swift Prime being one of them. He is regular reviewer for several scientific Journals like JNIS, AJNR – American Journal of Neuroradiology, CVIR; Clinical Neuroradiology, Acta Radiologica and others. Over more than 10 years, he's been internationally active as Invited Speaker at conferences and as Consultant and Proctor for several medical device companies. Dr. Markus Holtmannspötter is active member of following professional societies: DGNR, BDNR, DRG, DeGIR, ESMINT, ESNR, WFITN and the Danish neuroradiological Society.

Luncheon Seminar A [Microvention/ Siemens Healthineers] [Room A]

LVIS EVO: Key Indications and Best Practices - European Experience

Markus Holtmannspötter

Nuremberg Hospital, Germany

Luncheon Seminar A [Microvention/ Siemens Healthineers] [Room A]

Imaging with ARTIS icono biplane

Richard Obler

Siemens Healthineers, Germany

Vocational experience

- 2019-2022 Global Senior Product Manager, Image Quality (2D) for Interventional Radiology
- 2016-2019 Global Clinical Consultant, Image Quality (2D)
- 2008-2016 Solution Consultant, Image Quality (2D) Algorithms, R&D

University degrees

- 2007 Diploma Thesis Mathematics, Leibniz Universit¨at, Hannover, Diplom-Mathematiker Title: “Optimierung der dynamischen 3D CE-MRA” (Final mark: 1,0)
- 1999 Promotion, Medizinische Hochschule, Hannover, Doktor der Medizin Title: “Objektiver Promontorialtest - MRT-kompatibler Nervenstimulator” (Final mark:magna cum laude) cooperation of MHH and Institut f¨ur Grundlagen der Elektrotechnik und Messtechnik
- 2000 Graduation as Medical Doctor, Medizinische Hochschule, Hannover, State Exam III Licensed physicians with approbation

Awards

- 2000 Kurt-Decker-Preis, Deutsche Gesellschaft f¨ur Neuroradiologie “Objektiver Promontorialtest mittels funktioneller Magnetresonanztomographie. Entwicklung eines MRT-kompatiblen Nervenstimulators.”
- 2000 EXPO 2000 Neuroradiology Award, ”Medicine meets Millenium” Congress, Hannover Brain Functional Imaging of Sexual Arousal
- 2000 Participation at EXPO-Themenpark, Topic: Knowledge, Hannover, EXPO 2000 3D-Visualization of Activated Brain Areas

Luncheon Seminar A [Microvention/ Siemens Healthineers] [Room A]

Imaging with ARTIS icono biplane

Richard Obler

Senior Global Product Manager, Siemens Healthineers Advanced Therapies
Clinical Segment Interventional Radiology

Summary

Introduction of the latest Neuro platform ARTIS icono of Siemens Healthineers. Demonstration of its clinical benefits for a new 2D imaging (OPTIQ) and advanced 3D imaging with various impressive 2D and 3D image examples. Explanation, why the new platform ARTIS icono is an enabler for the future.

Luncheon Seminar A [Microvention/ Siemens Healthineers] [Room A]

Balancing the radiation dose and image quality: experience of sequential application for dose-reduction protocols at Seoul St Mary's Hospital

Bum-soo Kim

Seoul St. Mary's Hospital, Korea

DAY 2

Saturday, September 24, 2022 (12:00-13:00)

Luncheon Seminar B
[Stryker/ Balt] [Room B]

Chair: Chul Hoon Chang (Yeungnam University Medical Center, Korea)
Jun Seok Koh (Kyung Hee University, Korea)

- The Surpass Evolve Flow Diverter: Clinical Experiences and Multi-Center Data
  Alexander Lewis Coon (St. Joseph's hospital, USA)
- Balt: 45 years of inspiring neurovascular innovation
  Yilmaz Onal (University of Health Sciences, Turkey)

Luncheon Seminar B [Stryker/ Balt] [Room B]

The Surpass Evolve Flow Diverter: Clinical Experiences and Multi-Center Data

Alexander Lewis Coon

St. Joseph's hospital, USA

Current Appointment

- 2019 - Present Director of Endovascular and Cerebrovascular Neurosurgery, Vice-Chairman of Department of Neurosciences, Director of Neurointerventional Fellowship Program, Carondelet Neurological Institute, St. Joseph's Hospital, Carondelet Medical Group – Western Neuro, Tucson, Arizona, USA

Education And Training

- 2003 - 2004 Intern, Surgery, The Johns Hopkins Hospital, Baltimore, MD
- 2004 - 2007 Resident, Neurosurgery, The Johns Hopkins Hospital, Baltimore, MD
- 2007 - 2009 Fellow, Endovascular Neurosurgery and Interventional Neuroradiology, The Johns Hopkins Hospital, Baltimore, MD
- 2009 - 2010 Chief Resident and Assistant Chief of Service, Neurosurgery, The Johns Hopkins Hospital, Baltimore, MD

Professional Experience

- 2018 - 2019 Adjunct Assistant Professor of Neurosurgery, Neurology, and Radiology and Radiological Science, The Johns Hopkins University School of Medicine, Baltimore, Maryland
- 2010 - 2018 Assistant Professor of Neurosurgery, Neurology, and Radiology and Radiological Sciences, The Johns Hopkins University School of Medicine, Baltimore, MD
- 2010 - 2018 Attending Physician, Director of Endovascular Neurosurgery, The Johns Hopkins Hospital and the Johns Hopkins Bayview Medical Center

Luncheon Seminar B [Stryker/ Balt] [Room B]

The Surpass Evolve Flow Diverter: Clinical Experiences and Multi-Center Data

Alexander Lewis Coon

Department of Neurosciences, Carondelet Neurological Institute St. Joseph's Hospital, Tucson, Arizona, USA

Purpose: The Surpass Evolve flow diverter is the world's first 64-strand single-layer cobalt chromium flow diversion device. It utilizes a high mesh-density to offer safe and highly effective single-device flow diversion for a host of cerebral aneurysm locations. Since its CE Mark and FDA approval in 2018, the device has gained broad popularity in Europe, North America, Australia, and Asia. In this presentation, the presenter reports clinical cases from his own experience using the device as well as multi-center data from around the globe to demonstrate the features, benefits, and effectiveness of this next-generation flow diversion device.

Methods: Cases from the presenting author's personal experiences using the Surpass Evolve flow diverter were collected for presentation to the congress. Details of the deployment techniques and strategies were collected for presentation. Multi-center Surpass Evolve data was regressed from a multi-center database including sites from the US, UK, and Australia.

Results: The Surpass Evolve flow diverter was demonstrated to be reproducibly utilized across a wide range of cerebral aneurysm locations (ICA, MCA, ACA, Basilar). Techniques for placement, resheathing, device opening, and wire recapture are highlighted. Analysis of multi-center prospective data demonstrate safety profiles and efficacy comparable or superior to other flow diverting devices.

Conclusions: Flow diversion for the treatment of cerebral aneurysms using the Surpass Evolve flow diverter is safe and effective. Its design enhancements and features allow it use in a variety of cerebral aneurysm locations throughout the cerebrum.

Luncheon Seminar B [Stryker/ Balt] [Room B]

Balt: 45 years of inspiring neurovascular innovation

Yilmaz Onal

University of Health Sciences, Turkey

Graduate Training

- 2004 - 2011 Ankara University Medical Faculty
- 2011 - 2016 Istanbul University Istanbul Medical Faculty Radiology Department

Radiology Specialist

- 2016 - 2017 University of Health Sciences, Sultan Abdulhamid Han Teaching and Research Hospital Department of Radiology
- 2018- University of Health Sciences, Fatih Sultan Mehmet Teaching and Research Hospital Department of Radiology

Member of the following organizations

- Turkish Neuroradiology Society
- Turkish Interventional Radiology Society
- Turkish Radiology Society
- ESMINT
- CIRSE

Luncheon Seminar B [Stryker/ Balt] [Room B]

Balt: 45 years of inspiring neurovascular innovation

Yilmaz Onal

University of Health Sciences, Turkey

DAY 2

Saturday, September 24, 2022 (13:20-14:50)

Session 4A. Aneurysms / Flow diverter session [Room A]

Chair: Alexander Lewis Coon (St. Joseph's hospital, USA)
Chang-Young Lee (Keimyung University, Korea)

- Flow diverter: beyond indications ***Virtual presentation***
  Adnan H. Siddiqui (SUNY University of Buffalo, USA)
- 2 year's Pipeline Shield experience sharing after Premier indication in JAPAN ***Virtual presentation***
  Hidenori Oishi (Juntendo University, Japan)
- Proximal-to-distal-telescopic implantation of multiple Pipelines for large intracavernous aneurysm ***Virtual presentation***
  Akira Ishii (Kyoto University, Japan)
- SCGH experience with Evolve ***Virtual presentation***
  Timothy Phillips (NIISwa, Australia)
- Early experience sharing of Pipeline Vantage ***Virtual presentation***
  Riitta Rautio (Turku University Hospital, Finland)
- Acute flow diversion: a journey from controversial to mainstream
  Gopinathan Anil (National University Hospital, Singapore)

Session 4A. Aneurysms / Flow diverter session [Room A]

Flow diverter: beyond indications

Adnan H. Siddiqui

SUNY University of Buffalo, USA

Education

- 2003 Ph.D: University of Rochester School of Medicine and Dentistry, Neuroscience
- 1997 M.S.: University of Rochester School of Medicine and Dentistry, Neuroscience
- 1992 M.B, B.S.: Aga Khan University Medical College, Medicine, Surgery
- 2005 - 2006 Fellow in Cerebrovascular Surgery Interventional Neuroradiology and Neurocritical Care, Thomas Jefferson University Department of Neurosurgery
- 2004 - 2005 Chief Resident in Neurosurgery, SUNY Upstate Medical University
- 2004 MA, Resident in Pediatric Neurosurgery, Children's Hospital, Boston
- 2003 Ph.D Neuroscience, University of Rochester School of Medicine and Dentistry

Professional Licensure

- 2005 - Present State of New York Medical Licensure #237148
- 2005 - 2016 Commonwealth of Pennsylvania Medical Licensure MD 426656

Session 4A. Aneurysms / Flow diverter session [Room A]

Flow diverter: beyond indications

Adnan H. Siddiqui

SUNY University of Buffalo, USA

Session 4A. Aneurysms / Flow diverter session [Room A]

2 year's Pipeline Shield experience sharing after Premier indication in JAPAN

Hidenori Oishi

Juntendo University, Japan

Education

- 1991 M.D. Juntendo University School of Medicine, Tokyo, Japan
- 2002 Ph.D. Juntendo University School of Medicine, Tokyo, Japan

Postgraduate career

- 1997/9-1998/7 Assistant Professor in Radiology, Juntendo University Hospital
- 2000/11-2003/3 Assistant Professor in Neurosurgery, Mito National Hospital
- 2007/4 -2012/10 Assistant Professor in Neurosurgery, Juntendo University Hospital
- 2012/11-Present Chairman in Neuroendovascular Therapy, Juntendo University Professor in Neurosurgery, Juntendo University

License and Certificates

- 1991 Japanese National Medical License
- 1997 Board Certified Member of the Japan Neurosurgical Society
- 2002 Board Certified Member of the Japanese Society for Neuroendovascular Therapy
- 2005 Board Certified Member of the Japan Stroke Society

Session 4A. Aneurysms / Flow diverter session [Room A]

2 year's Pipeline Shield experience sharing after Premier indication in JAPAN

Hidenori Oishi

Department of Neuroendovascular Therapy, Juntendo University, Tokyo, Japan

Purpose: Purpose is to evaluated the safety and efficacy of flow diverter (FD) therapy using pipeline shield for small (≤10 mm) unruptured intracranial aneurysms (UIAs).

Methods: We retrospectively review our university experience of FD therapy using pipeline shield for small (≤10 mm) unruptured intracranial aneurysms.

Results: So far, over 100 patients with small (≤10 mm) UIAs underwent FD therapy using pipeline shield. Complete occlusion (OKM D) achieved about 80% with the mean follow-up period about 9 months. Procedure-related complication was zero.

Conclusions: Flow diverter therapy using pipeline shield is able to be first treatment of choice for small (≤10 mm) unruptured intracranial aneurysms.

Session 4A. Aneurysms / Flow diverter session [Room A]

Proximal-to-distal-telescopic implantation of multiple Pipelines for large intracavernous aneurysm

Akira Ishii

Kyoto University, Japan

Education and Training

- 2003 Ph.D. Neuroscience, Kyoto University, Kyoto, Japan
- 1996 M.D. Faculty of Medicine, Kyoto University Kyoto,Japan

Certification/Medical Licensure/License/Approval to conduct Clinical Research

- 1996 Medical License
- 2002 Japanese Board of Neurosurgery
- 2003 Japanese Board of Neuroendovascular Therapy
- 2003 Japanese Board of Neuroendovascular Therapy, 163
- 2007 Instructor, Japanese Board of Neuroendovascular Therapy, 88
- 2017 Instructor, Japanese Board of Surgery for Cerebral Stroke, A-2017-0028

Professional Experience

- 2016.4 - Present Associate Professor Department of Neurosurgery, Kyoto University Hospital 54 Kawahara-cho, Shogoin, Sakyo-ku Kyoto, Japan
- 2016.3 - 2015.4 Director, Neurosurgery, Kokura Memorial Hospital 3-2-1, Asano, Kokurakita-ku, Kitakyushu-shi, Fukuoka, Japan
- 2015.3 - 2014.10 Assistant professor Department of Neurosurgery, Kyoto University 54 Kawahara-cho, Shogoin, Sakyo-ku Kyoto, Japan

Session 4A. Aneurysms / Flow diverter session [Room A]

Proximal-to-distal-telescopic implantation of multiple Pipelines for large intracavernous aneurysm

Akira Ishii

Kyoto University, Japan

Session 4A. Aneurysms / Flow diverter session [Room A]

SCGH experience with Evolve

Timothy Phillips

NIISwa, Australia

Session 4A. Aneurysms / Flow diverter session [Room A]

Early experience sharing of Pipeline Vantage

Riitta Rautio

Turku University Hospital, Finland

Education

- 2020 Docent in Interventional radiology, Turku University
- 2010 Specialist in Interventional Radiology, Tampere University
- 2005 PhD degree, Faculty of Medicine, Tampere University
- 2001 - present Board certified radiologist

Working experience

- 2020 - present Head of the Department of Interventional Radiology
- 2001 - present Consultant neurointerventional radiologist, Turku University Hospital neurointerventional radiology

Positions of responsibility

- 2020 to present President of the Finnish Society of Neurointerventionalists
- 2015 to present Member of the Executive committee of Finnish Society of Angiology
- 2008-2012 President of the Finnish Society of Interventional Radiologist

Session 4A. Aneurysms / Flow diverter session [Room A]

Early experience sharing of Pipeline Vantage

Riitta Rautio

Department of Interventional Radiology, Turku University Hospital, Turku, Finland

Purpose: To present the safety and radiological follow-up outcomes using the new Pipeline Vantage with Shield technology in the treatment of intracranial aneurysms.

Methods: Consecutive patients with intracranial aneurysm treated with Pipeline Vantage flow diverter between February 2020 and May 2022 at our hospital were reviewed. Procedure-related complications, aneurysm occlusion and clinical outcomes are assessed.

Results: 29 patients were analyzed. 28 patients were treated electively and one patient suffered from acute SAH. The patient who was suffering from SAH died two months after the endovascular procedure before any scheduled radiological follow-up. Complete occlusion at last imaging follow-up (O'Kelly Marotta grading scale D) was achieved in 22/28 (79%) aneurysms. Six (21%) aneurysms had OKM B at last FU. All these aneurysms had a sidebranch from the aneurysm neck or were bifurcation aneurysms. Two patients had visual disturbance after the procedure, but were both symptomless at 3rd post op day. One patient had visual disturbance but showed no findings in repeated MRI. One patient suffered from slight hemiparesis and there were small infarcts after the procedure but had recovered to normal at two months clinical control.

Conclusions: We found that occlusion rate with Pipeline Vantage with Shield is comparable to other flow diverters. Distal opening of the device was faster and more reliable compared to Pipeline Flex with Shield. There was less force and manipulation needed when opening Pipeline Vantage with Shield. The new 021 system was found useful when treating aneurysms in distal anatomic locations.

Session 4A. Aneurysms / Flow diverter session [Room A]

Acute flow diversion: a journey from controversial to mainstream

Gopinathan Anil

National University Hospital, Singapore

Educational Background

- MD, FRCR (UK), FAMS

Professional Career

- Dr Anil serves as the Head and Senior Consultant (Neurovascular and Interventional Radiology) for the Division of Interventional Radiology, National University Hospital, Singapore (NUHS). He has been a consultant interventionist at NUHS since 2010 and has previously worked as an honorary Consultant Radiologist at the Leeds Teaching Hospitals. His special interest is in minimally invasive neuro-vascular therapies and has established this as an in-house service at NUHS. He has been among the pioneers for new neuorinterventional services such as intra-arterial chemosurgery for retinoblastoma, dural venous sinus stenting for idiopathic intracranial hypertension, middle meningeal artery embolisation for chronic SDH and intrasaccular flow disruption for cerebral aneurysms in Singapore.

Research Field

- Dr Anil has 121 scientific publications with 1250 citations and h-index of 23 and i10 index 35. He is currently serving on the Editorial board of Interventional Radiology and regularly reviews manuscripts for well-known journals like European Radiology, AJNR and Cancer Imaging. He is also involved in several national and international research projects. He has organized several workshops in neuorinterventional & vascular interventional therapies, has been an invited faculty at several international and regional meetings as well as organized a few international conferences in Singapore.

Session 4A. Aneurysms / Flow diverter session [Room A]

Acute flow diversion: a journey from controversial to mainstream

Gopinathan Anil

National University Hospital, Singapore

DAY 2

Saturday, September 24, 2022 (13:20-14:50)

Session 4B. Ischemic Stroke [Room B]

Chair: Khairul Azmi Abd Kadir (University of Malaya Medical Center, Malaysia)
Hae Woong Jeong (Inje University, Korea)

- Do we need IV tPA combined with thrombectomy?
  Jens Fiehler (University Medical Center Hamburg-Eppendorf, Germany)
- Direct transfer to angiography suite(DTAS) protocol with RADIP ANGIO for acute ischemic stroke
  Yasushi Ito (Shinrakuen Hospital, Niigata University, Japan)
- Complications of Ischemic stroke thrombectomy
  Seon-Kyu Lee (Albert Einstein College of Medicine, USA)
- Do we still need TPA for LVO?
  Yuji Matsumaru (University of Tsukuba, Japan)
- The practical usefulness of mechanical thrombectomy without tPA within 4.5 hrs after symptom onset
  Sung-Chul Jin (Inje University, Korea)

Session 4B. Ischemic Stroke [Room B]

Do we need IV tPA combined with thrombectomy?

Jens Fiehler

University Medical Center Hamburg-Eppendorf, Germany

Current position

- 2009 - now: Professor and Chairman, Diagnostic and Interventional Neuroradiology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany

Education

- 2006: PhD (Habilitation, Privatdozent), Diagnostic and Interventional Neuroradiology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany
- 2005 - 2007: Board certifications for Radiology, Neuroradiology, and Quality Management in Medicine
- 2001: Master (Dissertation, Dr. med.), Department for Pathophysiology, University of Jena, Jena, Germany

Teaching activities

- 2017 - now: Faculty at ESMINT webinars and EXMINT stroke courses, Prague, Czech Republic
- 2014 - 2018: Faculty at ECMINT, Oxford, United Kingdom
- 2009 - now: Professor and Chair, Diagnostic and Interventional Neuroradiology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany
- 2008 - 2016: Visiting Professor, Department of Neuroradiology, Oxford University, United Kingdom

Session 4B. Ischemic Stroke [Room B]

Do we need IV tPA combined with thrombectomy?

Jens Fiehler

University Medical Center Hamburg-Eppendorf, Germany

Session 4B. Ischemic Stroke [Room B]

Direct transfer to angiography suite(DTAS) protocol with RADIP ANGIO for acute ischemic stroke

Yasushi Ito

Shinrakuen Hospital, Niigata University, Japan

Education

- 1977 - 1983 School of Medicine, Niigata University, Niigata JAPAN

Professional career

- 2001 Assistant Lecturer, Department of Neurosurgery, Niigata University
- 2006 Assistant Professor, Department of Neurosurgery, Niigata University
- 2008 Associate Professor, Department of Neurosurgery, Niigata University
- 2008 Professor, Division of Neuroendovascular Therapy, Niigata Universit
  Division Director, Department of Neurosurgery, Shinrakuen Hospital
- 2016- Research Director, Department of Neurosurgery, Shinrakuen Hospital

Membership in Professional & Scientific Societies

- Japanese Society for Neuroendovascular Therapy (JSNET)
- Past President (2013), Annual meeting of JSNET
- Japan Neurosurgical Society
- Congress of Japanese Neurosurgical Surgeons
- Japan Stroke Society
- Japanese Society on Surgery for Cerebral Stroke
- Society of Tohoku Neuroendovascular Therapy
- Past President (2015, 2018), Annual meeting of Society of Tohoku Neuroendovascular Therapy
- WFITN member
- East Asian Conference of Neurointervention (EACoN), Past President (2016, 2019)
- President, Niigata Neuroendovascular Seminar (Naeba Seminar)

Session 4B. Ischemic Stroke [Room B]

Direct transfer to angiography suite(DTAS) protocol with RADIP ANGIO for acute ischemic stroke

Yasushi Ito

Department of Neurovascular, Shinrakue Hospital, Niigata, Japan

Purpose: Mechanical thrombectomy (MT) for acute ischemic stroke needs recanalization as fast as possible. There are several attempts for reducing recanalization time. Direct transfer to angio suite (DTAS) is a protocol which skips regular CT/MRI and directly transfer patients to angio suite. Some papers which support effectiveness of DTAS are reported recently. DTAS protocol was started in our institute and result was evaluated retrospectively.

Methods: DTAS was performed in day time (8:30-17:15) for patients with suspect of large vessel occlusion (LVO) within 24 hours of last known well, with NIHSS≧6. In DTAS protocol, CT/MRI was skipped and patient was transferred to angio suite directly from emergency room. Cone beam CT (CB-CT) was performed first. After neglecting bleeding, Rapid Angio using multiphase CB-CT was performed. MT was performed for case with mismatch of ischemic core and penumbra.

Results: 17 cases of DTAS were performed during period of 2021.7.1~2022.4.25. 11 cases were diagnosed as bleeding and received regular treatment. 6 cases received Rapid Angio. Excluding one case with large ischemic core with poor mismatch, 5 cases were treatment with MT. Average door to puncture (D2P) time of 5 cases was 36.4 min (25~45min). Time reduction tends to be prominent in later cases as stroke team became familiar with DTAS protocol. D2P time of non DTAS protocol during same period was 94.3 min in average. No post procedural symptomatic bleeding was observed in DTAS. mRS at discharge were 0 in 2 cases, 1, 3, 4 in 1 case respectively.

Conclusions: D2P time was shortened with DTAS protocol comparing regular protocol. Contribution for clinical outcome of DTAS needs further accumulation of cases. As judgement of ASPECTS with CB-CT was difficult, perfusion study with Rapid Angio is important. To be accustomed for DTAS protocol, simulation with whole stroke team is essential, which may lead to further reduction of D2P time and expansion of DTAS protocol in night period.

Session 4B. Ischemic Stroke [Room B]

Complications of Ischemic stroke thrombectomy

Seon-Kyu Lee

Albert Einstein College of Medicine, USA

Session 4B. Ischemic Stroke [Room B]

Do we still need TPA for LVO?

Yuji Matsumaru

University of Tsukuba, Japan

Education

- 1981 - 1987 School of Medicine, University of Tsukuba
- 1993 - 1997 Doctral Program in Medical Science, University of Tsukuba
- 2003 International Master Degree in Neurovascular diseases sponsored by Paris Sud University (France) and Mahidol University (Thailand)

Professional experience

- 1997 - 2000 Department of Neurosurgery, Mito National Hospital
- 2000 - 2005 Associate Professor, Department of Neurosurgery, University of Tsukuba
- 2005 - 2016 Director, Department of Neurological Endovascular Therapy, Toranomon Hospital
- 2016 - Professor, Division of stroke prevention and treatment, Department of Neurosurgery, University of Tsukuba

Speciality

- Endovascular treatment for stroke
- Endovascular treatment for cerebrovascular diseases and spinal cord diseases

Specialist

- Board certified instructor of Japanese Society of Neuroendovascular Therapy
- Board certified specialist of Japanese Neurosurgical Society
- Board certified specialist of Japanese Stroke Society

Session 4B. Ischemic Stroke [Room B]

Do we still need TPA for LVO?

Yuji Matsumaru

University of Tsukuba, Japan

Session 4B. Ischemic Stroke [Room B]

The practical usefulness of mechanical thrombectomy without tPA within 4.5 hrs after symptom onset

Sung-Chul Jin

Inje University, Korea

Education

- 2004.3 - 2006.8 Master Degree from Korea University, Neurosurgery Graduate School, Seoul, Korea
- 2007.3 - 2012.2 Ph.D. Course from Korea University, Neurosurgery Graduate School, Seoul, Korea

Carrier

- 2009.3 - 2010.2 Clinical Fellowship, Department of Neurosurgery Seoul National University, Bundang Hospital
- 2010.3 - 2015.2 Assistant professor, Inje University, Haeundae Paik Hospital
- 2015.3 - 2020.3 Assocciate professor, Inje University, Haeundae Paik Hospital
- 2020.4 - Professor, Inje University, Haeundae Paik Hospital

Academic Membership

- The Korean Medical Association
- The Korean Neurosurgical Society
- The Korean Society of cerebrovascular Surgery
- The Korean neuroendovascular society

Session 4B. Ischemic Stroke [Room B]

The practical usefulness of mechanical thrombectomy without intravenous t-PA as a bridge therapy for acute large artery occlusion within 4.5 hours after symptom onset

Sung-Chul Jin

Department of Neurosurgery, Inje University Haeundae Paik Hospital, Busan, Republic of Korea

Purpose: Intravenous tissue plasminogen activator (IV t-PA) is limited because it contra-indicates for adjuvant antiplatelet medication, and there is the possibility of unexpected distal migration of thrombi. We evaluated the clinical outcome of IAT only by comparing the IAT plus bridging therapy of IV t-PA within 4.5 hours after symptom onset.

Methods: From January 2018 to December 2020, 190 patients who had acute large cerebral artery occlusion within 4.5 hours after symptom onset were included in this study. The patients were divided into two groups: the IAT only (n=135, 71.1%) and IAT plus bridging therapy of IV t-PA (n=55, 28.9%) groups.

Results: The door-to-puncture time was significantly faster in the IAT only group (median, IQR 103 minutes, 76-136) than in the IAT plus IV t-PA group (median, IQR 132 minutes, 90-165) (p=0.010). The successful recanalization rate was not different between IAT only and IAT plus IV t-PA (n=120 (88.9%) vs. n=49 (89.1%), p=0.968). Good clinical outcome (3-month modified Rankin Scale [mRS], 0 to 2) was not significantly different between the IAT only and IAT plus IV t-PA (n=73 (54.1%) vs. n=34 (61.8%), p=0.329) groups. On multivariable analysis, good clinical outcome was significantly independently associated with the National Institute of Health Stroke Scale score on arrival (adjusted OR, 0.863 [95% CI, 0.806-0.924]; $p < 0.001$), age (adjusted OR, 0.968 [95% CI, 0.942-0.995]; p =0.021), and the door-to-puncture time (adjusted OR, 0.996 [95% CI, 0.993-1.000]; $p = 0.032$).

Conclusions: In our study, the clinical outcome of IAT is not inferior to that of IAT plus bridging therapy of IV t-PA in patients with large artery occlusion within 4.5 hours of stroke onset with no statistical difference of successful recanalization.

DAY 2

Saturday, September 24, 2022 (14:50-16:05)

Session 5A. Aneurysm session [Room A]

Chair: Bum Tae Kim (Soon Chun Hyang University, Korea)
Masaru Hirohata (Kurume University, Japan)

- Pulse rider-assisted coil embolization ***Virtual presentation***
  Nobuyuki Sakai (Kobe City Medical Center, Japan)
- Kaneka coil experiences
  Kenji Sugiu (Okayama University Hospital, Japan)
- Optima coil experiences
  Kangmin Kim (Seoul National University, Korea)
- Challenge with Endovascular Approach for Difficult Cerebral Aneurysm
  Shigeru Miyachi (Aichi Medical University, Japan)
- Flow divertertherapy for recurrent aneurysms
  Keun Young Park (Yonsei University Severance Hospital, Korea)

Session 5A. Aneurysm session [Room A]

Pulse rider-assisted coil embolization

Nobuyuki Sakai

Kobe City Medical Center, Japan

Educational Background and Academic Titles

- 2017 - present Director, Neurovascular Research, Kobe City General Hospital, Kobe, Japan
- 2020 - present Visiting Professor, Ehime University, Matsuyama, Japan
- 2021 - 2022 Chief Deputy Director of Hospital, Kobe City Medical Center General Hospital
- 2021 - present Visiting Professor, Yamaguchi University, Yamaguchi, Japan
- 2022 - present Deputy Director of Hospital Innovation, Kobe City Medical Center General Hospital, Kobe, Japan

Board certificated faculty

- Japan Neurosurgical Society, 1991
- Japanese Society for Neuroendovascular Therapy, 1991
- JSNET senior trainer, 1991
- Japanese Society of Stroke, 2003
- Japanese Society of Angiology, 2010

Session 5A. Aneurysm session [Room A]

Pulse rider-assisted coil embolization

Nobuyuki Sakai

Department of Neurosurgery and Neurovascular Research, Kobe City Medical Center General Hospital, Kobe, Japan

Purpose: The PulseRider is neck-bridge device for use in the treatment of wide-neck bifurcation aneurysms (WNBA). We would like to present our results of PulseRider assisted coil embolization.

Material and Methods: We introduced PulseRider to treat 8 cases before approve under IRB agreement since 2015, and 10 cases after approval in 2019. First 8 cases completed 3-year imaging and clinical follow up. Second 8 of 10 cases completed 6 months imaging and clinical follow up. And, post-market surveillance in Japan is going.

Results: We treated 18 cases, mean age of 65.0 years (range 44-74), female is 77.8%, 17 of 18 aneurysm is incidentally diagnosed. Mean aneurysm size was 7.8mm (range 4.6-13.5), mean neck size was 5.4mm (range 3.1-12.3). 8 aneurysms were located at the basilar apex and 3 at the anterior communicating artery. 17 of 18 cases successfully treated with PulseRider assisted coil embolization. There are no clinical worsened nor ischemic complication, but 1 hemorrhagic complication. Angiographic occlusion at 6 months were Raymond I: 11/16 (68.8%), Raymond II: 4/16 (25%) and Raymond III: 1/16.

Conclusions: The results from our experience demonstrate that the PulseRider device is safe and have probable benefit for the treatment of WNBA. It provides a useful addition to the treatment of WNBA for neuroendovascular specialist.

Session 5A. Aneurysm session [Room A]

Kaneka coil experiences

Kenji Sugiu

Okayama University Hospital, Japan

Educational Background

- 1978.4-1981.3 Okayama Prefectural Soja High School
- 1981.4-1987.3 Kurume University Medical School (premedical and medical)
- Medical License : Doctor of Medical Science 307330-Japan, Received in May 1987
- Japanese Board of Neurological Surgery : Passed in July 1994
- Degree of Medical Science : Received in March 1996
- Consulting specialist of Japanese Society for NeuroEndovascular Therapy board certification system : Passed in June 2001

Professional Training and Employment

- 1999.11-2003.3 Assistant Professor of Neurological Surgery at Okayama University Hospital
- 2003.4-2012.7 Senior Assistant Professor of Neurological Surgery at Okayama University Hospital
- 2012.8-present Associate Professor of Neurological Surgery, Vice President of IVR center at Okayama University Hospital
- 2015 President of the 31st Annual Meeting of the Japanese Society for NeuroEndovascular Therapy (JSNET)

Rewards

- 1996.6 Sunada Prize of Okayama University
- 1996.11 Special Prize of Neurovascular section of the Japan Neurosurgical Society
- 1999.6 Exhibit Award (Poster Prize) of Swiss Society of Radiology, 86. Annual Meeting

Session 5A. Aneurysm session [Room A]

Kaneka coil experiences

Kenji Sugiu

Okayama University Hospital, Japan

The Dream to Children 子供達に夢を！ We shoulder Okayama!（大人達にも！）

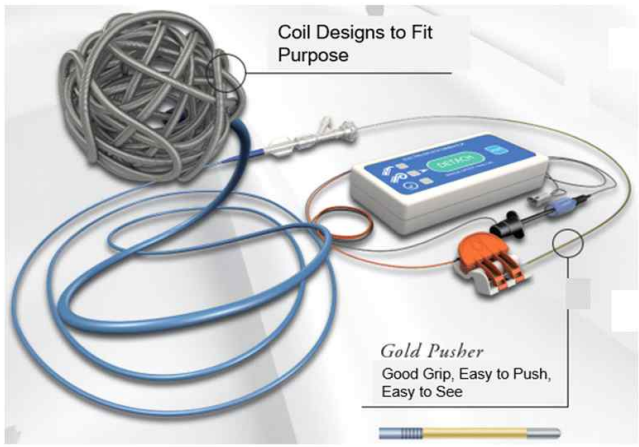
KANEKA coil experience in Okayama

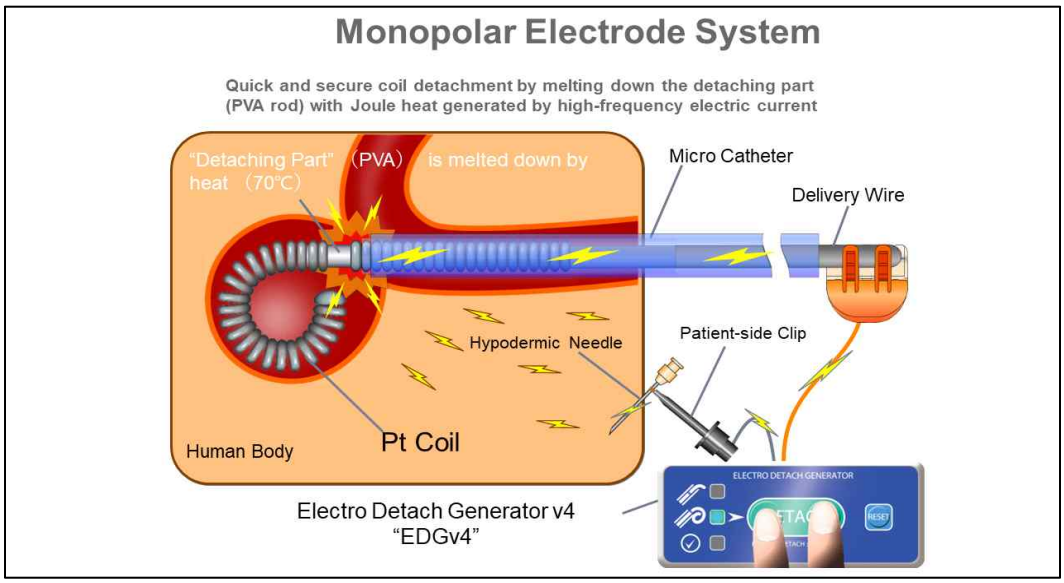
Department of Neurological Surgery,
Okayama University Graduate School of Medicine

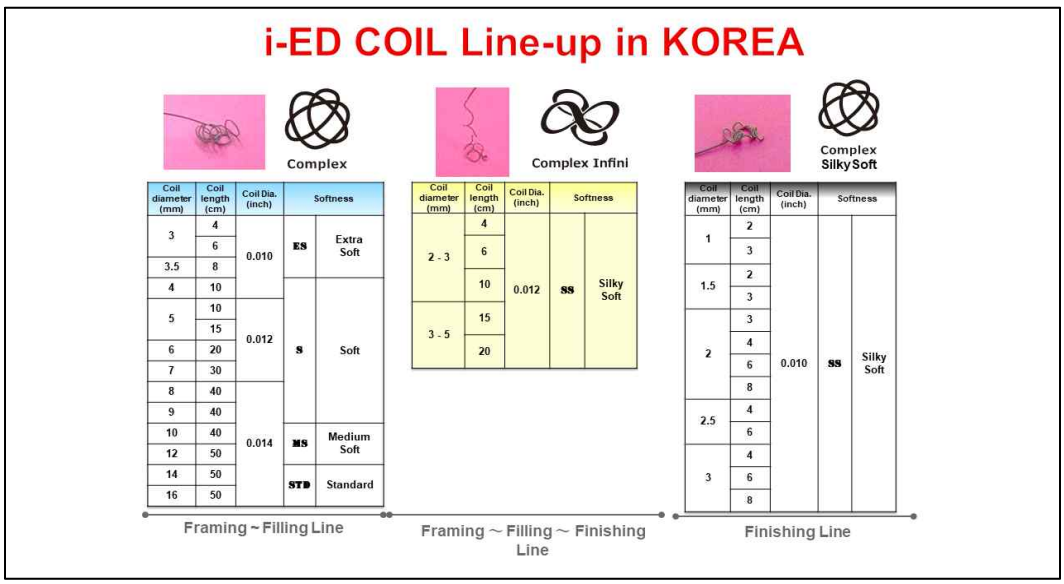
Kenji Sugiu, Tomohito Hishikawa, Masafumi Hiramatsu, Jun Haruma, Kazuhiko Nishi, Yoko Yamaoka, Kazuhiko Nishi, Yuki Ebisudani, Ryu Kimura, Hisanori Edaki, Masato Kawakami, Isao Date

We, Okayama University, supports
FAGiANO Okayama Football Club

i-ED COIL System



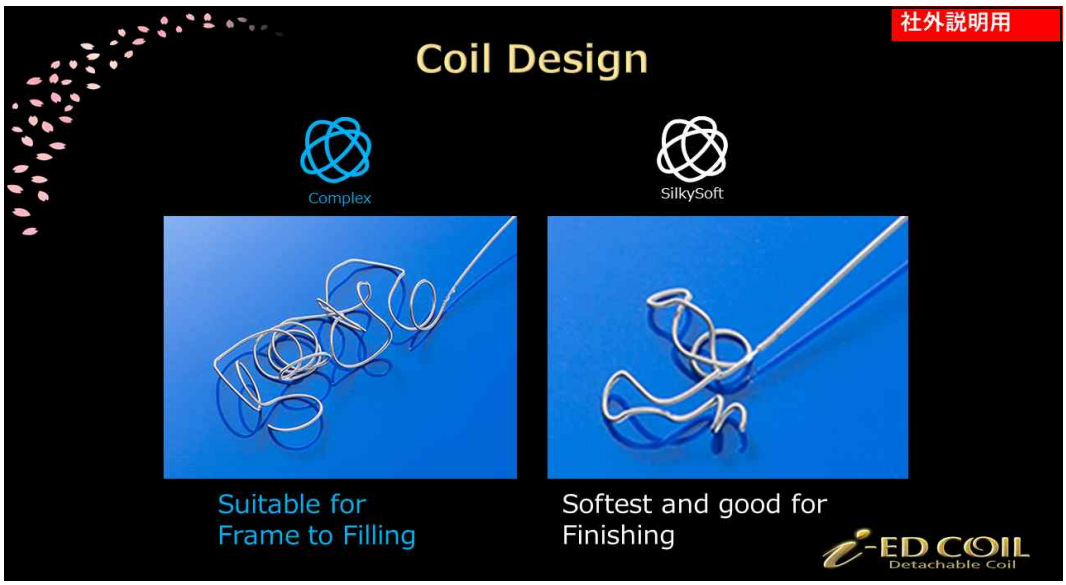




Coil diameter (mm)	Coil length (cm)	Coil Dia. (inch)	Softness	
3	4	0.010	ES	Extra Soft
	6			
3.5	8			
4	10		S	Soft
5	10	0.012		
	15			
6	20			
7	30			
8	40	0.014		
9	40			
10	40		MS	Medium Soft
12	50			
14	50		STD	Standard
16	50			

Coil diameter (mm)	Coil length (cm)	Coil Dia. (inch)	Softness	
2 - 3	4	0.012	SS	Silky Soft
	6			
	10			
3 - 5	15			
	20			

Coil diameter (mm)	Coil length (cm)	Coil Dia. (inch)	Softness	
1	2	0.010	SS	Silky Soft
	3			
1.5	2			
	3			
2	3			
	4			
	6			
	8			
2.5	4			
	6			
3	4			
	6			
	8			

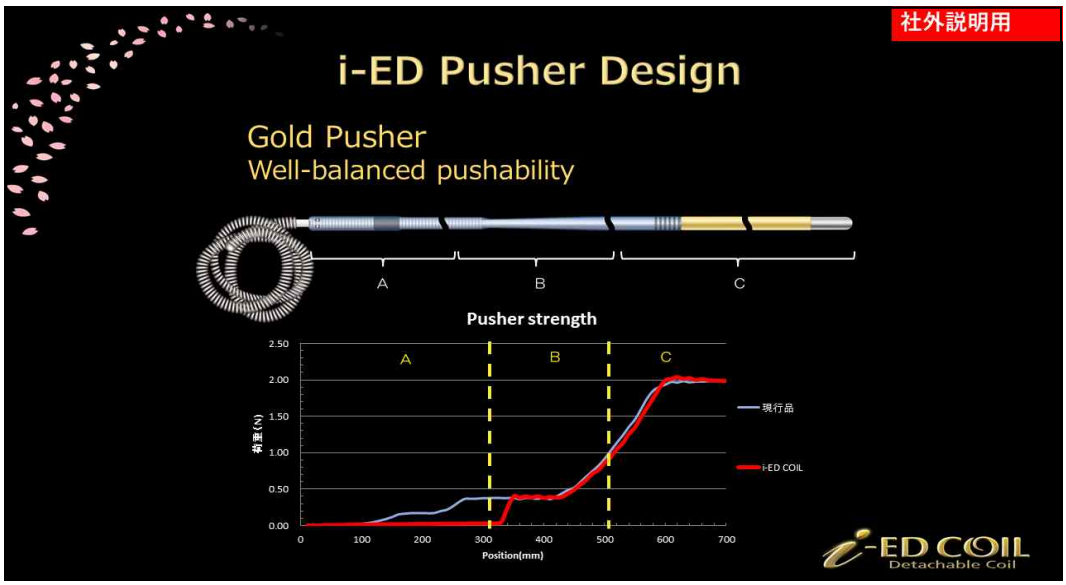


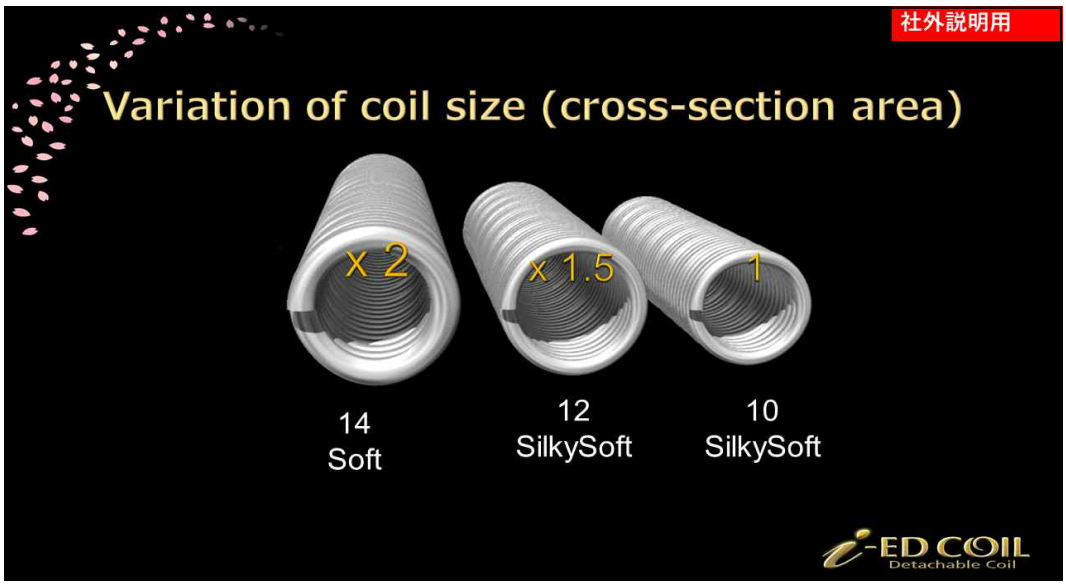
iED from our experience

- ✓ Excellent delivery wire
- ✓ -14, -12, -10 size variation
- ✓ Unique complex Infini shape can seek the space in filling stage
- ✓ SilkySoft can make tight and safe finishing
- ✓ You can detach the coil when second marker was hidden
- ✓ Available through Marathon catheter for AVM

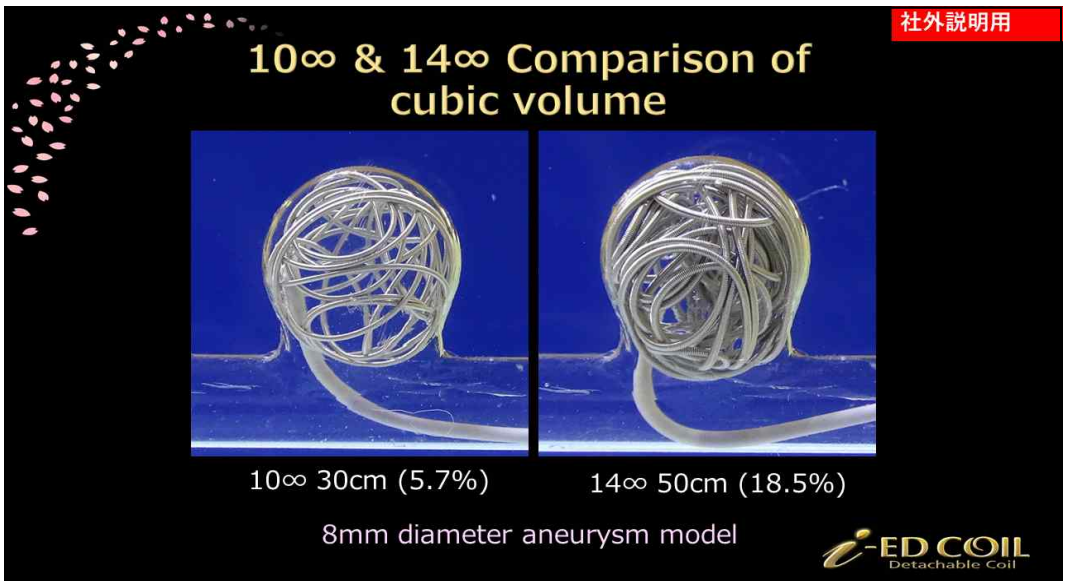
Made in JAPAN

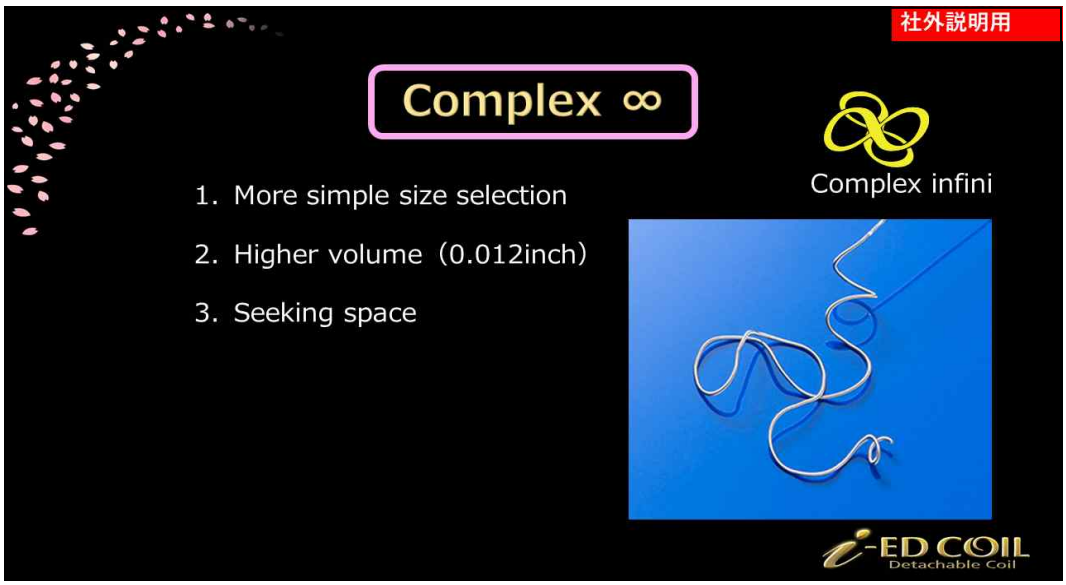
Penetrate to South Korea then Europe？！

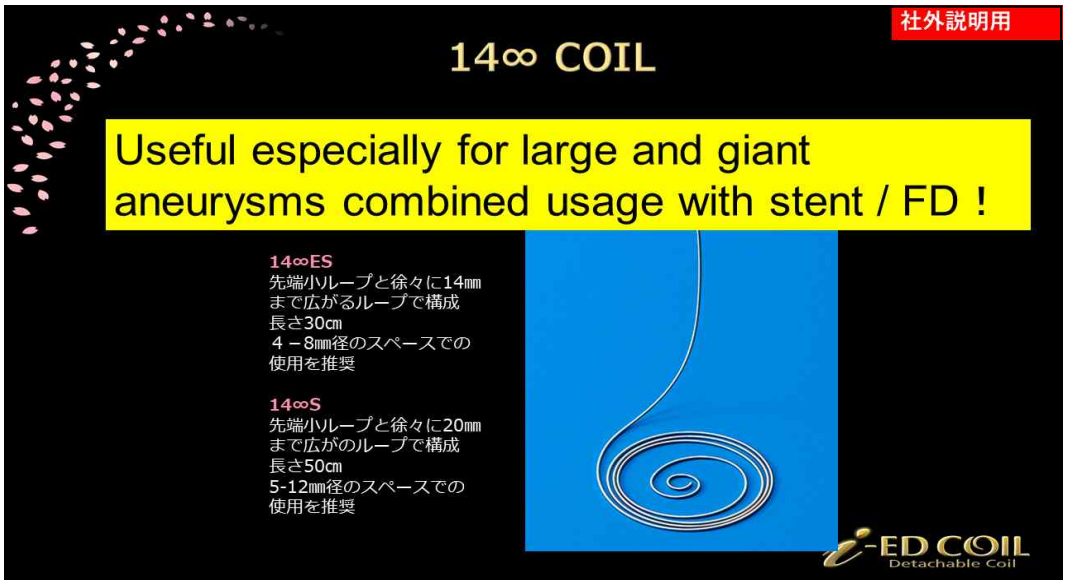


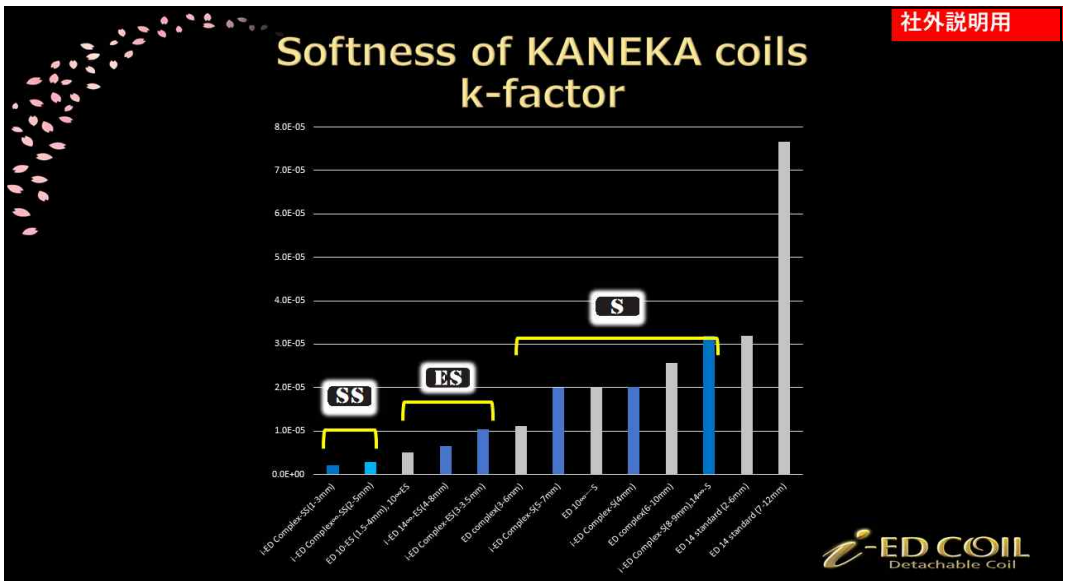


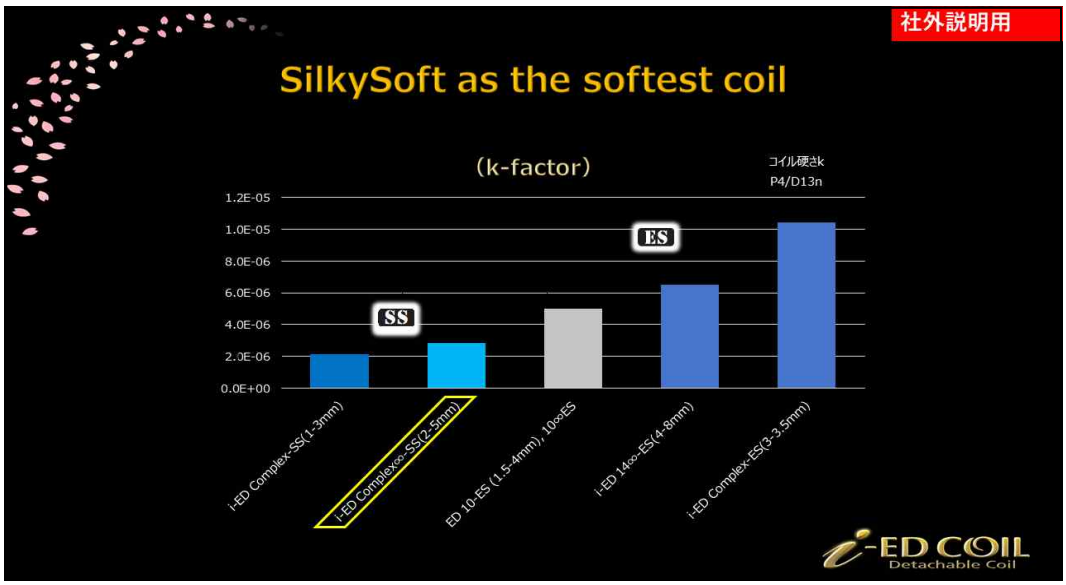

社外説明用
10∞ & 12∞ Comparison of cubic volume
10∞ 20cm (15.5%)
12∞ 20cm (22.3%)
5mm diameter aneurysm model
i-ED COIL Detachable Coil


社外説明用
10∞ & 14∞ Comparison of cubic volume
10∞ 30cm (5.7%)
14∞ 50cm (18.5%)
8mm diameter aneurysm model
i-ED COIL Detachable Coil

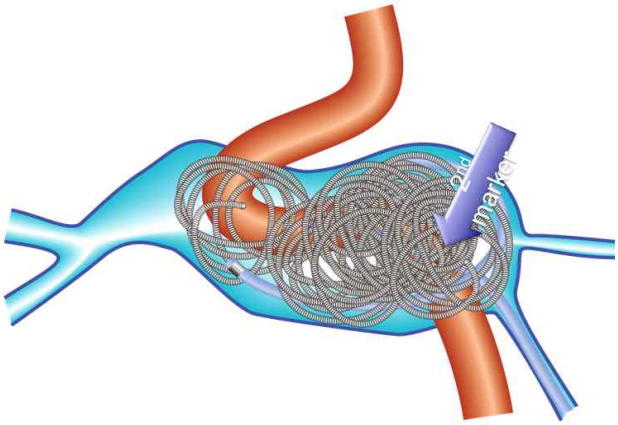

社外説明用
Complex ∞
1. More simple size selection
2. Higher volume (0.012inch)
3. Seeking space
Complex infini
i-ED COIL Detachable Coil


社外説明用
14∞ COIL
Useful especially for large and giant aneurysms combined usage with stent / FD !
14∞ES
先端小ループと徐々に14㎜まで広がるループで構成
長さ30㎝
４－8㎜径のスペースでの使用を推奨
14∞S
先端小ループと徐々に20㎜まで広がのループで構成
長さ50㎝
5-12㎜径のスペースでの使用を推奨
i-ED COIL
Detachable Coil


社外説明用
Softness of KANEKA coils
k-factor
8.0E-05
7.0E-05
6.0E-05
5.0E-05
4.0E-05
3.0E-05
2.0E-05
1.0E-05
0.0E+00
SS
ES
S
i-ED Complex-SS(1-3mm)
i-ED Complex∞-SS(2-5mm)
ED 10-ES (1.5-4mm), 10∞ES
i-ED 14∞-ES(4-8mm)
i-ED Complex-ES(3-3.5mm)
ED compliant(3-6mm)
i-ED Complex-S(5-7mm)
ED 10∞-S
i-ED Complex-S(4-8mm)
ED complex(6-10mm)
i-ED Complex-S(8-8mm),14∞-S
ED 14 standard (2-6mm)
ED 14 standard (7-12mm)
i-ED COIL
Detachable Coil


社外説明用
SilkySoft as the softest coil
(k-factor)
コイル硬さk
P4/D13n
1.2E-05
1.0E-05
8.0E-06
6.0E-06
4.0E-06
2.0E-06
0.0E+00
SS
ES
i-ED Complex-SS(1-3mm)
i-ED Complex∞-SS(2-5mm)
ED 10-ES (1.5-4mm), 10∞ES
i-ED 14∞-ES(4-8mm)
i-ED Complex-ES(3-3.5mm)
i-ED COIL
Detachable Coil

When the 2nd marker was hidden by coils



Session 5A. Aneurysm session [Room A]

Optima coil experiences

Kangmin Kim

Seoul National University, Korea

Position

- 2020.6. – present. Clinical assistant professor, Department of Neurosurgery, Seoul National University Hospital
- 2019.3. – 2020.5. Clinical assistant professor, Department of Neurosurgery, Incheon St. Mary's Hospital, The Catholic University of Korea
- 2017.3. – 2019.2. Clinical assistant professor, Department of Neurosurgery, Boramae Medical Center
- 2013.3. – 2017.2. Clinical assistant professor, Department of Neurosurgery, Kangwon National University Hospital

Education

- 2017.3. – 2021.8. Seoul National University College of Medicine, Neurosurgery, Ph.D.
- 2006.3. – 2012.2. Seoul National University College of Medicine, Neurosurgery, M.S.
- 1997.3. – 2003.2. Seoul National University College of Medicine, B.S., M.D.

Interesting field

- Cerebrovascular and endovascular neurosurgery

Session 5A. Aneurysm session [Room A]

Optima coil system for cerebral aneurysms: SNUH experience

Kangmin Kim

Department of Neurosurgery, Seoul National University Hospital, Seoul, Korea

Since the detachable coil for cerebral aneurysms was developed in the 1990s, many studies have demonstrated its safety and effectiveness. Although new devices such as flow diverters and WEBs have recently been introduced and widely used to treat cerebral aneurysms, coil embolization is still the most important treatment modality for cerebral aneurysms.

Compared to surgical clipping, coil embolization has an advantage in that it is less invasive but has a disadvantage in that its long-term durability is relatively low. Numerous types of coils have been developed to overcome these shortcomings. The most important thing to improve the durability of coil embolization is to increase the packing density by deploying more coils in the cerebral aneurysm. There are two ways to increase the packing density: to improve the coil itself or to use a device such as a stent or a balloon.

The development of coil technology to increase packing density has been made in two directions. One is to add a hydrogel-like material to the coil, and the other is to improve the physical properties of the coil so that more coils can be deployed in the cerebral aneurysm. Hydrogel coils showed good results in early clinical trials but are not widely used recently due to difficulties in use due to poor physical properties.

The Optima coil is a coil system that mainly focuses on improving physical properties and was introduced to Korea in 2020. This presentation aims to present the results of evaluating the safety and effectiveness of The Optima coil system by analyzing the clinical and radiologic outcomes of about 500 cases in which the Optima coils were used at Seoul National University Hospital.

Session 5A. Aneurysm session [Room A]

Challenge with Endovascular Approach for Difficult Cerebral Aneurysm

Shigeru Miyachi

Aichi Medical University, Japan

Session 5A. Aneurysm session [Room A]

Flow divertertherapy for recurrent aneurysms

Keun Young Park

Yonsei University Severance Hospital, Korea

Educations & Training & Employment

- 1997 - 2003 Bachelor's degree Yonsei University College of Medicine
- 2005 - 2009 Master's degree Yonsei University College of Medicine
- 2012 - 2015 Doctor's degree Korea University College of Medicine

Professional Training & employment

- 2019 - 2020 Research Fellow, Department of Medical Imaging Toronto Western Hospital, University Health Network University of Toronto, Canada
- 2021 - present Associate professor, Department of Neurosurgery, Severance Hospital, Yonsei University College of Medicine
- 2021 - present Proctorship of WEB device, Microvention Terumo
- 2022 - present Consultant of Medtronic

Professional Membership

- Korean Neurosurgical Society
- Korean Society of Cerebrovascular Surgeons
- Korean Neuroendovascular Society
- Korean Society of Interventional Neuroradiology
- Korean Stroke Society
- World Federation of Interventional and Therapeutic Neuroradiology

Session 5A. Aneurysm session [Room A]

Flow divertertherapy for recurrent aneurysms

Keun Young Park

Yonsei University Severance Hospital, Korea

DAY 2

Saturday, September 24, 2022 (14:50-16:05)

Session 5B. Dural AVF and others [Room B]

Chair: Seok-Mann Yoon (Soon Chun Hyang University, Korea)
Winston Lim Eng Hoe (Singapore General Hospital, Singapore)

- Endovascular Treatment of Intracranial Arteriovenous fistula
  Khairul Azmi Abd Kadir (University of Malaya Medical Center, Malaysia)
- Middle Cerebral Artery Dissection Presenting As Large Vessel Occlusion: Use of Stentplasty And Integrilin Combination Therapy
  Winston Lim Eng Hoe (Singapore General Hospital, Singapore)
- Trans SOV approach for indirect CCF
  Dilok Tantongtip (Thammasat University Hospital, Thailand)
- Endovascular Therapy of Direct Carotid Cavernous Fistula - A Review of Current Treatment Strategies
  Wickly Lee (National Neuroscience Institute, Singapore)
- Focused coiling and preserving cavernous sinus in treatment of Carotid Cavernous Dural Fistulas
  Tran Quoc Tuan (University Medical Center, Ho Chi Minh City, Vietnam)

Session 5B. Dural AVF and others [Room B]

Endovascular Treatment of Intracranial Arteriovenous fistula

Khairul Azmi Abd Kadir

University of Malaya Medical Center, Malaysia

Administrative Duties

- 2015 - present Head of Department, Universiti Malaya
- 2012 - 2011 Committee Member for the First Hybrid Neuro, Spine and Head and Neck Operation Theatre in Malaysia, University Malaya
- 2011 Acting Head of Department, Faculty
- 2011 Committee Member for Intracranial Aneurysm Management, National

Academic Qualification

- NIR(TUR), Neurointerventional Radiology, Hacettepe University, Turki
- MRAD(UM)(2004), Radiologi, Universiti Malaya (UM)
- MBBS(UM)(1997), Perubatan Dan Pembedahan, Universiti Malaya (UM)

Research Project

- 2012 - 2013 The Role of Hyoscine-N-Butylbromide as an Aid in Ureteral Stenting, Consultant (National)
- 2010 - 2012 Functional Magnetic Resonance Imaging of The Brain Activation before and After Starting Methadone Maintenance Treatment During Cue-Induce Heroin Craving, Principal Investigator(PI), 2 (National)
- 2009 - 2011 Phase II Clinical Trial assessing safety and efficacy of ex vivo expanded allogenic mesenchymal stem cells for chronic limb ischaemia , Consultant (National)
- 2009 - 2011 Comparison of 3D rotational DSA with 2D DSA in the evaluation of intracranial aneurysm. Consultant (National)

Session 5B. Dural AVF and others [Room B]

Endovascular Treatment of Intracranial Arteriovenous fistula

Khairul Azmi Abd Kadir

University of Malaya Medical Center, Malaysia

Session 5B. Dural AVF and others [Room B]

Middle Cerebral Artery Dissection Presenting As Large Vessel Occlusion: Use of Stentplasty And Integrilin Combination Therapy

Winston Lim Eng Hoe

Singapore General Hospital, Singapore

- Dr Winston Lim studied locally at the National University of Singapore, graduating in 1985. After obtaining his fellowship in Radiology he went on to sub-specialise in Neuroradiology and Neurointervention in Oxford UK in 1996, returning to establish the Neurointerventional service at the Singapore General Hospital.
- He is currently employed at the Singapore General Hospital, having been there since he qualified as a radiologist. At SGH he is Deputy Head Acacademic and immediate past Director of Neuroradiolgy and Head and Neck Radiology. He is also Associate Professor at the Duke-NUS Medical School, NUS YLL School of Medicine Singapore. He is the immediate past Programme Director for the Singhealth Diagnostic Radiology Residency Programme and was appointed Director of the Singapore General Hospital, post graduate medical school in July 2021.
- Dr Lim holds concurrent appointments as Visiting Consultant at the National Heart Centre, Changi General Hospital, KK Women's and Children's Hospital, National Neuroscience Institute and National University Hospital.
- He is a past President of Singapore Radiological Society (2006 – 2009), and serves in the Executive committee of the Asian Oceanian Society of Radiology and is a member of the WFITN.
- Dr Lim's research interest is in Neurointervention and Functional brain imaging.

Session 5B. Dural AVF and others [Room B]

Middle Cerebral Artery Dissection Presenting As Large Vessel Occlusion: Use of Stentplasty And Integrilin Combination Therapy

Winston Lim Eng Hoe

Department of Diagnostic Radiology, Singapore General Hospital, SINGAPORE

Purpose: Middle cerebral artery dissection (MCAD) is a rare cause of acute ischaemic stroke (AIS) with predilection for younger adults and Asian populations. Given its rarity, optimal standard of care is currently not well established. We present a small series of 5 patients with MCAD manifesting as AIS, who received urgent EVT and temporary stent-retriever angioplasty (stentplasty) +/- Integrilin (eptifibatide) bolus and infusion.

Methods: Patients who presented to the Neurointerventional team, Singapore General Hospital with AIS were identified. They were screened with computed tomography (CT) Brain and CT Angiography for large vessel occlusion, and initially managed with intravenous Alteplase and standard EVT. Upon subsequent suspicion of MCAD, stentplasty was performed via deployment of a stent-retriever across the presumed dissected segment for 10-15min, with administration of intra-arterial bolus of Integrilin in 4 patients. Stent-retriever was then removed and vessel was assessed for patency on serial angiograms. Intravenous infusion of Integrilin was continued in 2 patients. After confirmation of absence of significant intracranial haemorrhage on follow-up CT Brain, bridging with single agent oral antiplatelets, either aspirin or clopidogrel, was given.

The treatment strategy was adopted as there was a preference by attending neurologists against permanent stent placement and the need for double antiplatelet treatment post procedure.

Results: Five male patients aged 38-67, with NIHSS at presentation ranging 7-22 were identified. ASPECTS scores ranged 6-10 and degree of collaterals were good to moderate. Combination EVT and stentplasty was performed for all patients, but 2 did not receive intravenous Alteplase and 1 did not receive Integrilin due to out-of-window presentation. Final TICI scores were 2A(x2) / 2B(x2) / 2C(x1). Four patients demonstrated vessel patency on follow-up, while 1 had subsequent total occlusion of the dissected vessel. NIHSS significantly decreased from admission to discharge, and 3 out of 4 patients followed-up demonstrated favourable functional outcome of 90-day mRS <2.

Conclusions: The use of stentplasty augmented with intra-procedural Integrilin bolus and continuous infusion may be useful in maintaining vessel patency, especially when contraindications to stent placement are present.

Session 5B. Dural AVF and others [Room B]

Trans SOV approach for indirect CCF

Dilok Tantongtip

Thammasat University Hospital, Thailand

Education

- 1993-1996 Secondary school, Mahidol wittayanusorn school, Nakornprathom, Thailand
- 1996-2002 M.D., Srinakarin Hospital, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand
- 2004-2009 Neurosurgery, Siriraj Hospital, Faculty of Medicine, Mahidol University, Bangkok, Thailand
- 2012-2014 Clinical fellowship program of neurovascular surgery and neuroendovascular intervention, Klinikum Karlsruhe, Karlsruhe, Germany

Working Experiences

- 2002-2003 Internship, Roi-ed General Hospital, Roi-ed, Thailand 2003-2004! General practitioner, Pochai Hospital, Pochai, Roi-ed, Thailand
- 2004-2008 Resident training of Neurosurgery, Siriraj Hospital, Faculty of medicine, Mahidol University, Bangkok, Thailand

Current Position

- 2009 - Present Neurosurgeon, Thammasat University Hospital, Department of Surgery, Faculty of Medicine, Thammasat University
- 2018 - Present Secretary General of Thai Association of Neurovascular Surgeons (TANS)

Professional Affiliation

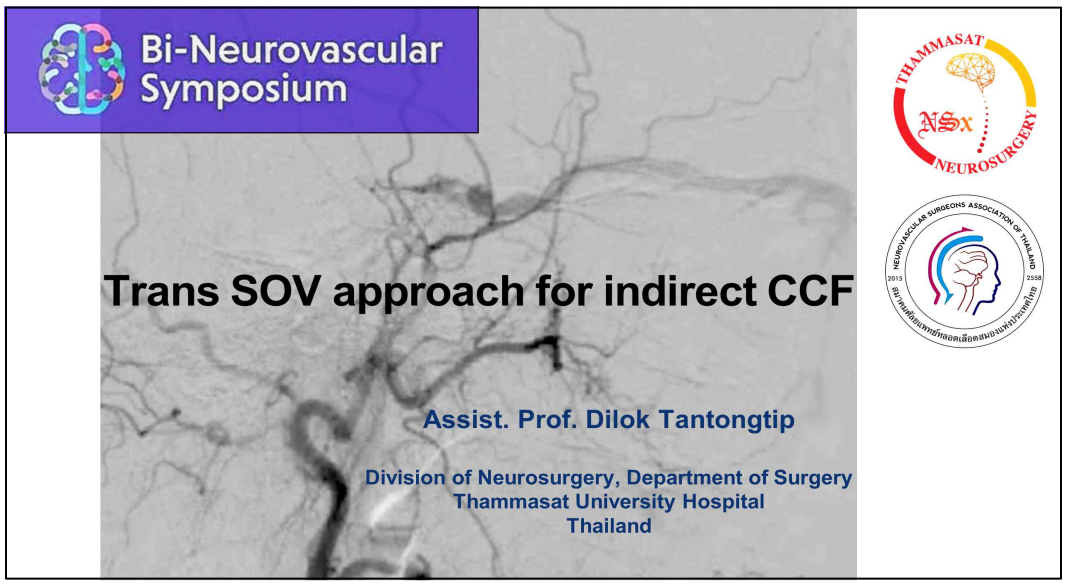
- Member, The Royal College of Physician of Thailand
- Member, The Royal College of Neurological Surgeons of Thailand
- Member, Thai-German neurological society
- Secretary of Thai association of neurovascular surgeon
- General Committee of Royal College of Neurological Surgeons of Thailand

Session 5B. Dural AVF and others [Room B]

Trans SOV approach for indirect CCF

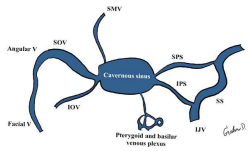
Dilok Tantongtip

Thammasat University Hospital, Thailand



Cavernous sinus approach

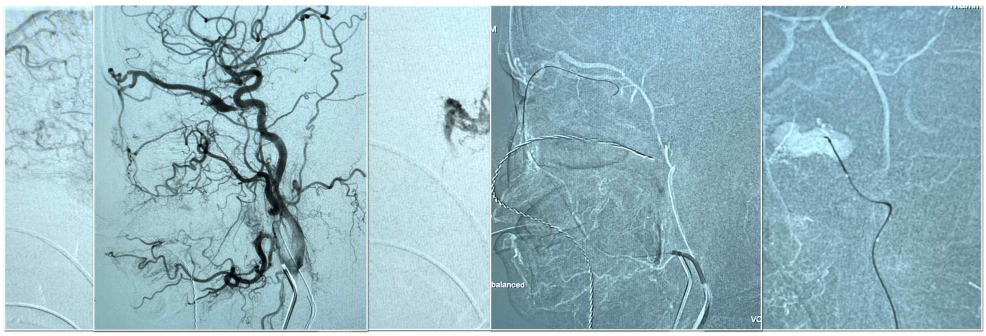
- Endovascular therapy: primary treatment option for CS-DAVF
- Trans-venous embolization: obliteration and recurrence are favorable compared to other routes
- **Cavernous sinus venous drainage**
  - Inferior petrosal sinus
  - Facial vein
  - Superior ophthalmic vein: direct puncture, surgical approach



Direct SOV approach for CS-DAVF

Bi-Neurovascular Symposium

Cavernous sinus approach

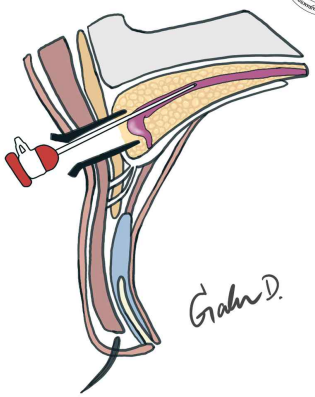


Direct SOV approach for CS-DAVF

Bi-Neurovascular Symposium

Trans-SOV approach

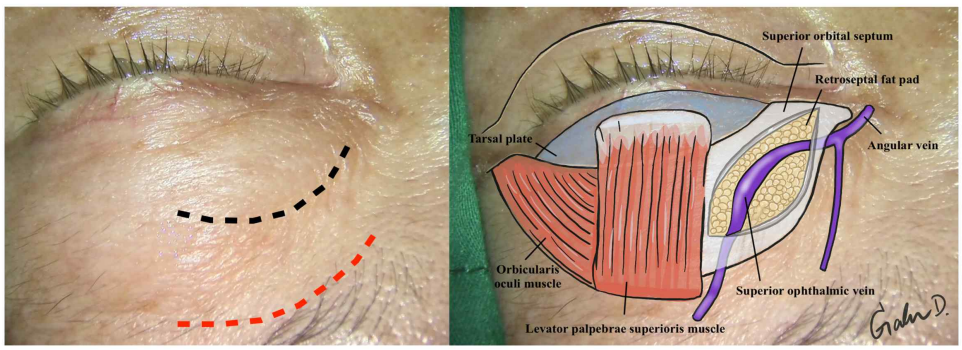
- Proposed as an alternative option
- Limited to case series with few using the microscope for dissection
- Embolic materials: limit data on the n-BCA



Direct SOV approach for CS-DAVF

Bi-Neurovascular Symposium

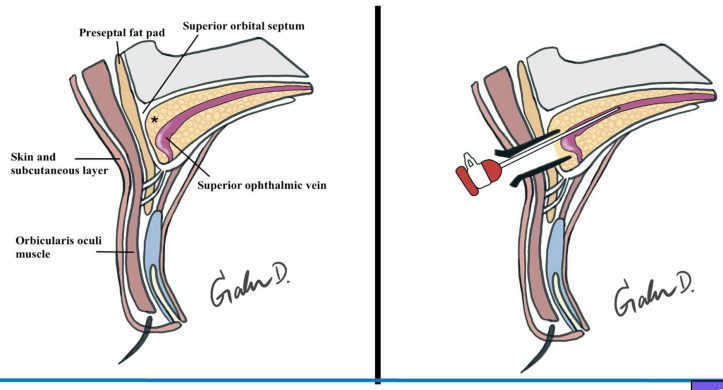
Operative techniques



Direct SOV approach for CS-DAVF

Bi-Neurovascular Symposium

Operative techniques



Direct SOV approach for CS-DAVF

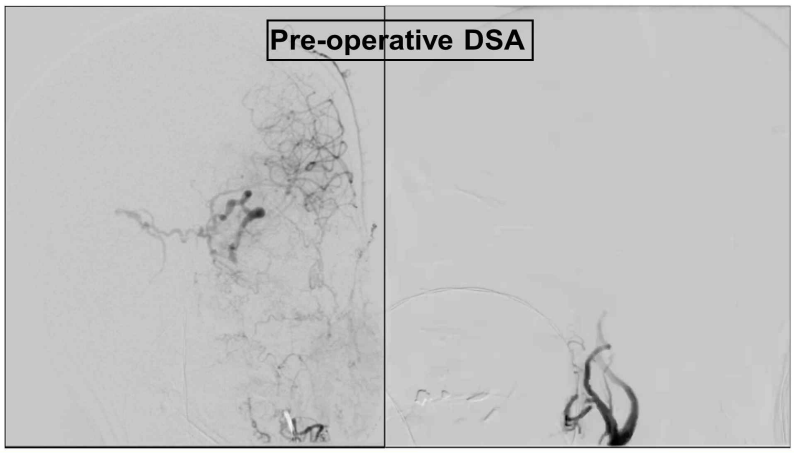
Bi-Neurovascular Symposium

Example case

- An 80 years-old women with hypertension
- Progressive conjunctival congestion with IIOP
- Visual acuity (Snellen chart): right 20/40, left 20/70
- IOP: 25 mmHg

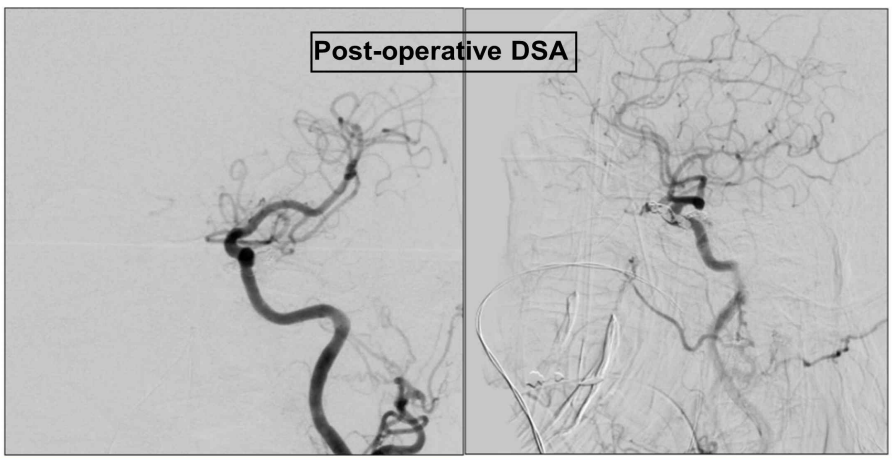
Direct SOV approach for CS-DAVF

Bi-Neurovascular Symposium



Direct SOV approach for CS-DAVF

Bi-Neurovascular Symposium



Direct SOV approach for CS-DAVF

Bi-Neurovascular Symposium

Pre & post treatment

Preoperative

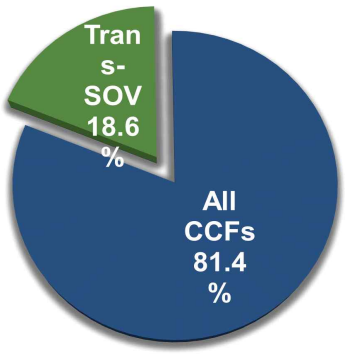
Postoperative

Direct SOV approach for CS-DAVF

Bi-Neurovascular Symposium

Thammasat Hospital Cases

- January 2015 - February 2021
- 86 patients with CCFs
- 16 cases were treated via the trans-SOV approach using microsurgical dissection
- Embolic materials:
  - n-BCA: solely in 12 cases
  - Coils: 4 cases

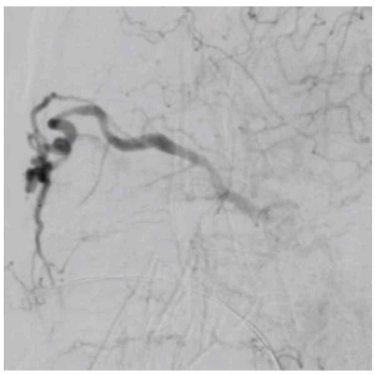


Direct SOV approach for CS-DAVF

Bi-Neurovascular Symposium

Thammasat Hospital Cases

- **Of 16 patients**
  - Five patients had previous intervention (2 of TAE and failed access via a facial vein, 3 of failed IPS access)
  - 11 patients underwent the trans-SOV approach as a first-line treatment
    - All had dilated SOV
    - Small and tortuous angular or facial vein
    - fainted or non visualized of the IPS

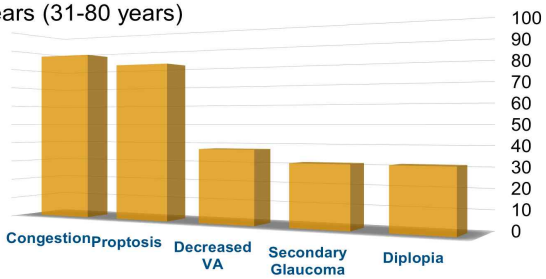


Direct SOV approach for CS-DAVF

Bi-Neurovascular Symposium

Results

- **CS-DAVF**: 16 patients
- 12 women (75%), 4 men (25%)
- Mean age of 54 years (31-80 years)



Embolic materials

- **Coils**
  - Large or complex fistulas
- **n-BCA**
  - Small and simple fistulas, Concentration 1 : 2 (n-BCA/Lipiodol) (In 2 cases, 1:1 was used due to high-flow lesions)
  - Quick administration, less fluoroscopy time compared to EVOH
  - Cost-effectiveness in our region
  - Challenging to control, aware of embolic migration in high-flow lesions

Results

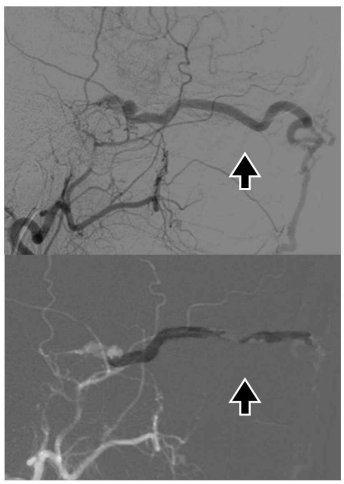
- All CCFs were obliterated in a single session
  - 15 cases (94%) had immediate fistula obliteration
  - 100% had complete fistula obliteration at 3 months follow-up
- No recurrence at a mean follow-up of 26 months (6-79 months)
- Excellent cosmetic results

Complications

- One patient (6.3%): subtle and transient ptosis
  - Resolved at 3-month follow-up
- One patient had delayed conjunctival congestion after complete fistula obliteration
  - Spontaneously resolved on postoperative day 45

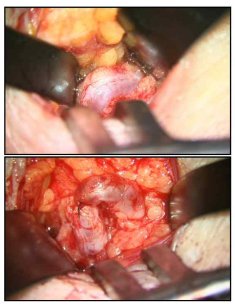
SOV preservation

- In our series: 13 cases had no material migrated into SOV
  - 3 had SOV thrombosis: transvenous catheterization, reflux of the glue cast
  - Coils: more favorable in terms of SOV preservation
  - Thickened SOV wall: meticulous suture technique for SOV preservation



Conclusion

- Microsurgical dissection for SOV exposure with direct cannulation is safe and effective for CS-DAVF embolization
- Could be the treatment option in selected patients
- High successful catheterization and occlusion rate
- Low-complication rates
- Less fluoroscopy time



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Original Article

Operative Cannulation of the Superior Ophthalmic Vein for Embolization of Cavernous Sinus Dural Arteriovenous Fistulas: Surgical Techniques and Clinical Outcomes

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Direct SOV approach for CS-DAVF

Bi-Neurovascular Symposium

Thank You

Bi-Neurovascular Symposium

Session 5B. Dural AVF and others [Room B]

Endovascular Therapy of Direct Carotid Cavernous Fistula - A Review of Current Treatment Strategies

Wickly Lee

National Neuroscience Institute, Singapore

Brief Biography

• After completing a one year neurointerventional fellowship in Budapest, Hungary, Dr Lee is currently a Senior Consultant in the Neuroradiology department of National Neuroscience Institute, specialised in the field of neurointervention. He is also the Director, Joint Neurovascular Service at National Neuroscience Institute of Singapore. Besides neuroimaging, he has a professional interest in the treatment of cerebral and spinal vascular diseases, including aneurysms, arterio-venous malformations, dural arteriovenous fistulas and interventional treatment of head and neck vascular abnormalities. He has also a special interest in acute stroke intervention.

Besides his interest in clinical service and research, he is passionate about resident and fellow teaching.

Educational & Training Qualifications

• 2005	MSc (Neurovascular Diseases), Master of Science (Neurovascular Diseases), Paris Sud/Mahidol University
• 2002	FRCR, Fellow, Royal College of Radiologists, UK
• 2002	Master of Medicine (Diagnostic Radiology), National University of Singapore

Appointments & Positions (Employment History)

• 2014.4 - Present	Neuroradiology, National Neuroscience Institute Senior Consultant
• 2014.9 - Present	Diagnostic Radiology Singapore General Hospital Visiting Consultant
• 2014.11 - Present	Diagnostic Radiology Khoo Teck Puat Hospital Visiting Consultant
• 2014.10 - Present	Diagnostic Radiology Ng Teng Fong Hospital Visiting Consultant
• 2014 - Present	Diagnostic Radiology National University Hospital Visiting Consultant

Session 5B. Dural AVF and others [Room B]

Endovascular Therapy of Direct Carotid Cavernous Fistula - A Review of Current Treatment Strategies

Wickly Lee

Department of Neuroradiology, Endovascular Centre National Neuroscience Institute, Singapore

Purpose: Endovascular treatment strategies for treatment of direct carotid cavernous fistula (dCCF) has evolved over the years, in tandem with the evolution and advancement of endovascular tools. Current treatment strategies range from detachable balloons to combined techniques using flow diversion, coiling and liquid embolics. The purpose of this presentation is to share our single centre experience with endovascular treatment of patients with dCCF.

Methods: Cases of dCCF performed in our institution over the last 15 years have been reviewed. Assessment of the vasculature, fistula morphology and venous drainage patterns was performed on cross – sectional imaging and angiogram.

Results: DCCF cases were largely categorized into simple small hole fistula vs complex fistula. Fistula morphology, location, venous drainage patterns, access routes are important considerations when deciding the mode of treatment. Although detachable balloon is still regarded as the gold standard of treatment, limitations of their use with regards to situations of availability, failure or recurrence is now mitigated with the use of combined techniques using flow diversion devices, coils and liquid embolics, performed via trans-arterial and/or transvenous routes. There was low morbidity with no mortality reported in our experience.

Conclusions: Current endovascular treatment strategies for dCCF have been proven to be effective in complete cure of these high flow lesions. Careful angiographic analysis and proper treatment planning are key to successful treatment outcome.

Session 5B. Dural AVF and others [Room B]

Focused coiling and preserving cavernous sinus in treatment of Carotid Cavernous Dural Fistulas

Tran Quoc Tuan

University Medical Center, Ho Chi Minh City, Vietnam

Education and Work experience

- 2012 Fellowship, Interventional Surgical Neurology, Neurology department, Froedtert Hospital, the Medical College of Wisconsin, Milwaukee, USA.
- 2015 - 2022 Chief of Endovascular Neurosurgery Unit, Neurosurgery department, University Medical Center, Ho Chi Minh City, Viet Nam.
- 2018.09 Training course on WEB device for Aneurysms, Toulous, France.
- 2018 - 2022 Chief Endovascular Neurological Surgery Consultant for a network of up to 10 different hospitals in Southern Viet Nam, in the developing programs between University Medical Center and those hospitals. Director of Endovascular Neurological Surgery, Neuroscience Center, University of Medicine and Pharmacy, Ho Chi Minh city.

International Faculty

- 2017 NICE-VR, Dehli, India
- 2018. Workshop on Endovascular Approach for aneurysms_WFNS Symposium, Malaysia
- 2018 - 2019. Coiling Workshops for Intracranial Vascular Lesions, University Medical Center, Ho Chi Minh City, Viet Nam
- 2022 Flow-diverter workshop for brain Aneurysms, University Medical Center, HCMC, Viet Nam

Leadership positions

- Chief of Endovascular Neurosurgery Unit, Neurosurgery department, University Medical Center, Ho Chi Minh City, Viet Nam
- Director of Endovascular Neurological Surgery, Neuroscience Center, University of Medicine and Pharmacy, Ho Chi Minh city.
- INR Consultant Board, Vinmec Hospital, HCMC, Viet Nam.

Session 5B. Dural AVF and others [Room B]

Focused coiling and preserving cavernous sinus in treatment of Carotid Cavernous Dural Fistulas

Tran Quoc Tuan

University Medical Center, Ho Chi Minh City, Vietnam

DAY 2

Saturday, September 24, 2022 (16:15-17:04)

Session 6A. BNS Free papers [Room A]

Chair: Hyon-Jo Kwon (Chungnam National University, Korea)
Sook-Young Sim (Inje Paik Univ., Korea)

- Angioarchitectural analysis of AV shunts in dural AVFs and its clinical implications
  Jun Hyung Kim (Yonsei Univ Gangnam Severance Hosp., Korea)
- Basilar artery trunk aneurysm: clinical and angiographic outcomes of endovascular treatment
  Sook-Young Sim (Inje Paik Univ., Korea)
- Outcome and Complication of using Flow Diverter Treatment for Intracranial Aneurysm: Single Center Experience
  Zharifah Fauziyyah Nafisah (Ciptp National Hospital, Jakarta, Indonesia)
- ENDOVASCULAR SERVICES IN SILOAM HOSPITALS
  Harsan Harsan (Siloam Hospitals, Indonesia)
- Initial experience of Woven EndoBridge (WEB) embolization in unruptured bifurcation aneurysms
  Dae Won Kim (Wonkwang University Hospital, Korea)
- Transdural revascularization by multiple burr hole after erhtyropoietin in Stroke patients with cerebral hypoperfusion
  Yong Cheol Lim (Ajou Univ., Korea)
- ICA pseudoocclusion vs true occlusion
  Jai Ho Choi (Seoul St. Mary's Hospital, Korea)

Session 6A. BNS Free papers [Room A]

Angioarchitectural analysis of AV shunts in dural AVFs and its clinical implications

Jun Hyung Kim

Yonsei Univ Gangnam Severance Hosp., Korea

Education

- 2003.9 - 2010.6 Bechelor of Science in Biomedical Engineering, Northwestern University, Evanston, Illinois, USA
- 2011.3 - 2015.2 Master's Degree of Medical Science, Yonsei University College of Medicine, Seoul, Korea
- 2017.9 - current Ph.D. Course of Medical Science, Yonsei University College of Medicine, Seoul, Korea

License

- 2015 Licensed to Practice Medicine in Korea. #120903
- 2020 Korean Board of Neurosurgery #3274

Training & Employment

- 2015.3 - 2016.2 Internship, Severance Hospital, Yonsei University College of Medicine, Seoul, Korea
- 2016.3 - 2020.2 Residency, Severance Hospital, Department of Neurosurgery, Yonsei University College of Medicine, Seoul, Korea
- 2020.3 - 2021.2 Clinical and Research Fellowship, Severance Hospital, Division of Cerebrovascular Surgery, Department of Neurosurgery, Yonsei University College of Medicine, Seoul. Korea
- 2021.3 - 2022.2 Clinical and Research Fellowship, Severance Hospital, Division of Neurointervention, Department of Radiology Yonsei University College of Medicine, Seoul. Korea
- 2022.3- Clinical associate professor, Department of Neurosurgery Gangnam Severance Hospital, Yonsei University Health System, Seoul, Korea

Session 6A. BNS Free papers [Room A]

Angioarchitectural analysis of AV shunts in dural AVFs and its clinical implications

Jun Hyung Kim

Department of Neurosurgery, Gangnam Severance Hospital, Seoul, Korea

Purpose: To analyze shunt patterns and their clinical implications in transverse-sigmoid sinus and superior sagittal sinus DAVFs.

Methods: A total of 48 DAVFs treated with endovascular embolization between January 2010 and June 2021 were investigated. The preprocedural and intraprocedural digital subtraction angiograms were examined to characterize the shunt patterns of DAVFs in terms of anatomic relations to the sinuses and cortical veins. Treatment characteristics and outcomes were evaluated.

Results: The shunt patterns were categorized into 4 types: the direct sinus fistula (n = 8/48, 16.7%), compartmental sinus channel (n = 14/48, 29.1%), mural channel (n = 13/48, 27.1%), and bridging vein shunt (n = 13/48, 27.1%). Mural channel lesions revealed direct (n = 4/13, 30.8%) and indirect (n = 6/13, 46.2%) cortical venous connections. Multiple shunt types were seen in 7 patients. Overall, complete or near-complete occlusion was achieved in 43 patients (89.6%) after the final embolization. Patients with mural channels received the most embolization sessions (1.4 sessions per patient). Procedural venous drainage-related complications occurred in patients with multiple shunt types including mural channel shunts (n = 3). All bridging vein shunts were completely occluded during a single transarterial embolization session.

Conclusions: The 4 shunt patterns of DAVFs demonstrate distinct characteristics for the fistula, sinus and cortical vein connection. Meticulous analysis of the angioarchitectural characteristics and clinical implications is warranted for safe and effective treatment.

Session 6A. BNS Free papers [Room A]

Basilar artery trunk aneurysm: clinical and angiographic outcomes of endovascular treatment

Sook-Young Sim

Inje Paik Univ., Korea

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• 1999.2	계명대학교 의과대학 졸업
• 2012.2	아주대학교 대학원 의학과 박사
• 1999.3 - 2004.2	아주대학교병원 인턴 및 신경외과 레지던트
• 2004.3 - 2006.2	아주대학교 의과대학 신경외과 연구강사
• 2006.3 - 2012.2	국립중앙의료원 신경외과 전문의
• 2012.3 - 현재	인제대학교 의과대학 신경외과 부교수
• 2002.8	Fudan university Hwashan hospital 신경외과 단기연수
• 2003.9	Cleveland clinic 신경외과 단기연수
• 2012.5	Medical college of Wisconsin Froedtert hospital interventional neurology 단기연수
• 2018 - 2019	Medical University of South Carolina 연수

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• 대한뇌혈관외과학회 정회원 및 국제교류 실행이사
• 대한뇌혈관내수술학회 정회원 및 여의사회 상임이사
• 대한뇌졸중학회 정회원
• 대한외상학회 평생회원
• 대한신경중환자의학회 정회원
• 대한신경외과학회지 (JKNS) 심사위원
• 국가대표보상심의위원회 정부위원
• 국방부연금심의위원회 자문의
• 대한의학회(KAMS) International Liaison Board 위원

Session 6A. BNS Free papers [Room A]

Basilar artery trunk aneurysm: clinical and angiographic outcomes of endovascular treatment

Sook Young Sim,[1] Joonho Chung,[2] Jai Ho Choi,[3] Myeong Jin Kim,[4] Yong Sam Shin,[3] Yong Cheol Lim[5]

[1]Department of Neurosurgery, Inje University Ilsan Paik Hospital, Goyang, Korea
[2]Department of Neurosurgery, Yonsei University Hospital, Seoul, Korea
[3]Department of Neurovascular, Seoul St. Mary's Hospital, Seoul, Korea
[4]Department of Neurosurgery, Gachon University Gil Medical Center, Incheon, Korea
[5]Department of Neurosurgery, Ajou University Hospital, Suwon, Korea

Purpose: Basilar artery (BA) trunk aneurysms are rare, and the clinical characteristics and outcomes of endovascular treatment (EVT) remain unclear. The purpose of this study was to report clinical and angiographic outcomes of BA trunk aneurysm treated with EVT and to analyze risk factors for unfavorable outcomes.

Methods: From October 2004 to December 2020, a total of 40 patients with BA trunk aneurysms underwent EVT. Clinical characteristics and outcomes were evaluated retrospectively from a prospectively collected database. Of the 40 enrolled patients, nine were treated by coiling without stents, 17 were treated by stent assisted coiling, six by stent only, five by flow diverters, and three by vertebral artery occlusion. (OR 8.14, 95% CI 1.88 to 27.46; p=0.047) and long lesion (OR 14.25, 95% CI 1.48 to 69.80; p=0.013) were independent risk factors for unfavorable angiographic outcomes during follow-up.

Results: In total, 27 (67.5%) patients had subarachnoid hemorrhage as an initial presentation, and 20 (50.0%) had large/giant aneurysms. Procedure-related complications occurred in five patients (12.5%); favorable clinical outcome was achieved in 27 patients (67.5%); and six patients (15.0%) died. Favorable angiographic outcome was achieved in 26 (83.9%) of 31 patients who underwent follow-up angiography. Poor initial Hunt-and-Hess grade (OR 7.67, 95% CI 1.55 to 37.80; p=0.018) was the only independent risk factor for unfavorable clinical outcome. Large/giant aneurysm.

Conclusions: EVT might be a feasible option for this rare disease entity. Unfavorable angiographic outcome might be expected in a large/giant aneurysm or a long lesion. It can be difficult to treat BA trunk aneurysms by EVT, needing multiple procedures or various techniques due to diverse clinical and angiographic features.

Session 6A. BNS Free papers [Room A]

Outcome and Complication of using Flow Diverter Treatment for Intracranial Aneurysm: Single Center Experience

Zharifah Fauziyyah Nafisah[1], Affan Priyambodo Permana[1]

[1]Department of Neurosurgery, Faculty of Medicine, Universitas Indonesia – dr. Cipto Mangunkusumo National General Hospital, Jakarta, Indonesia

Purpose: Intracranial aneurysm prevalence is 0,5-6% in population, with most of the patients were asymptomatic which cause underdiagnosed. However, when ruptured, the mortality rate range from 65-100% in 2-years follow up. Flow diverter gained widespread acceptance in the world especially in case of large and giant intracranial aneurysms. However, the risk of post operative hemorrhage and cerebral infarct should be considered. This study aims to share outcome and complication after flow diverter for intracranial aneurysm cases.

Method: This is a retrospective study, including all intracranial aneurysm treated with flow diverter in Neurosurgery Department of dr. Cipto Mangunkusumo National General Hospital from 2019-2022. Clinical and radiological data were collected through medical record and PACS, and endovascular report is conducted from our cathlab and hybrid OT.

Result: Seven patients included in this study, with 6 of 7 patients (86%) were female, with average age mean 48 (15-65) year-old. The most common risk factors were hypertension (38%), clinical sign and symptoms were cranial nerve compression (71,4%) and headache (57%). One patient had multiple aneurysm and 75% were unruptured case. ICA is the most common anatomical site (62,5%), with other located in posterior communicating, choroid anterior, and basilar trunk artery. Average of the aneurysm height, dome, and neck were 9,8 mm, 10,5 mm, and 5,1 mm respectively, with 2 of our cases were giant aneurysm (23,7 x 23,7 mm and 20,7 x 19,6 mm). The outcome were complete occlusion in 50% cases with reduced residual filling in others. Mortality rate were 25% with one patient dead due to prolong ventilator use and one postoperative rupture. Thrombosis parent artery were found in one patient, but collateral filling were found, therefore no neurological deficit residual symptoms found.

Conclusion: Flow diverter is a reliable endovascular treatment for intracranial aneurysm. Case selection should be made before treatment and complication following treatment must be considered.

Session 6A. BNS Free papers [Room A]

Endovascular Services In Siloam Hospitals

Harsan Harsan

Department of Neurosurgery, Siloam Hospitals /
Pelita Harapan University Medical School Tangerang - Indonesia

Purpose: Endovascular services in Siloam hospitals were started about 12 years ago. At the beginning the facility was so limited that only cerebral angiography was done. Catheterization Laboratorium was owned by Cardiology Department, so the Neurosurgical procedures only can be done after work hour, with extra cost. Angiography machine that used was the one that dedicated for cardiology service, with a single plane camera. Later on we have connection with the company that willing to provide endovascular tools and equipments. At the beginning, we did embolization for meningioma and closing traumatic CCF with detachable balloon. Than after our cases were increased we can start doing coiling procedures and other endovascular procedures

Methods: Serial Cases

Results: In Siloam hospitals, until now we have done 407 procedures, including 234 (58 %) DSA and 172 (42 %) endovascular procedures. The spectrum of our cases are : SAB / Aneurysm 46 %, AVM 27 %, AVF & %, Ischemic stroke 6 %, hemorrhagic stroke 5 % and dural sinuses pathology 2 %.

Conclusions: Problematic in Indonesia were “cost” of treatment, availability of tool and equipment, and human resources. Nowadays we have more surgeons that doing endovascular and trained in other developed country. Also, the coverage from our national insurance is increased.

Session 6A. BNS Free papers [Room A]

Initial experience of Woven EndoBridge (WEB) embolization in unruptured bifurcation aneurysms

Dae-Won Kim, Sung-Don Kang

Department of Neurosurgery, Wonkwang University Hospital, Iksan, Korea

Purpose: The Woven EndoBridge (WEB) device is an intra-saccular, oblate, braided-wire embolization device designed to provide flow disruption at the aneurysm neck-parent artery interface. The purpose of this study was to evaluate feasibility and efficacy of the WEB device in beginner's point of view.

Methods: Patients with aneurysms treated with the WEB device were evaluated retrospectively. The technical feasibility, procedural complications, aneurysm occlusion, and clinical outcome were studied.

Results: Nine patients and aneurysms treated with the WEB device were included. The mean aneurysm size was 6 ± 2.9 mm. Aneurysm locations were the following: anterior communicating artery (6 patients), MCA (2 patients), and basilar tip (1 patients). The WEB devices were successfully delivered in all cases. Two patients suffered embolic infarction within 1 month, but, there were no permanent deficit. Short-term (2 months) angiographic complete occlusion was obtained in all cases.

Conclusions: Aneurysm embolization with the WEB device appears technically feasible and effective for the treatment of unruptured wide neck bifurcation aneurysms. However, beginners should be better to try easy cases considering the deviation of the aneurysm axis to the inlet flow line. Also, some cases need adequate antiplatelet drug medication after procedure to prevent thromboembolic complications.

Session 6A. BNS Free papers [Room A]

Transdural revascularization by multiple burr hole after erhtyropoietin in Stroke patients with cerebral hypoperfusion

Yong Cheol Lim

Ajou Univ., Korea

Education

- 1997 B.S. & M.D. Chosun University College of Medicine
- 2006 M.S. Ajou University, School of Medicine

Postgraduate Professional Training

- 1997 - 2002 Internship and Residencies in Department of Neurosurgery, Ajou University Hospital, Suwon, Korea
- 2005 - 2008 Clinical Fellowship in Department of Neurosurgery and Radiology, Ajou University Hospital, Suwon, Korea

Professional Appointments

- 2010 - 2013 Assistant professor
- 2014 - 2020.2 Associate professor
- 2022.3 - present Professor and Chairman in Department of Neurosurgery, Ajou University Hospital, Suwon, Korea

Session 6A. BNS Free papers [Room A]

Transdural revascularization by multiple burr hole after erhtyropoietin in Stroke patients with cerebral hypoperfusion

Yong Cheol Lim

Department of Neurosurgery, Ajou University Hospital, Suwon, Korea

Purpose: In patients with acute symptomatic stroke, reinforcement of transdural angiogenesis using multiple burr hole (MBH) procedures under local anesthesia and intravenous erythropoietin (EPO) pretreatment has rarely been addressed. We aimed to investigate the feasibility, efficacy and safety of cranial MBH procedures under local anesthesia for augmenting transdural revascularization after EPO treatment in patients with stroke with perfusion impairments.

Methods: In the feasibility study, perfusion-impaired patients presenting with transient ischemic attack or acute cerebral infarction were assessed in patients with acute symptomatic moyamoya (<2 weeks). In the efficacy and safety, the prospective, randomized, blinded-end point trial recruited patients with acute ischemic stroke with a perfusion impairment of grade ≥2 within 14 days of symptom onset, steno-occlusive mechanisms on imaging examinations, and absence of transdural collaterals on transfemoral cerebral angiography. The primary and secondary outcomes were revascularization success (trans-hemispheric and trans-burr hole) at 6 months and adverse events, respectively.

Results: In the feasibility study, fifty hemispheres from 37 patients were included. Majority had successful revascularization: trans-burr hole arteriogenesis (89.5%), transhemispheric arteriogenesis (98.0%), and sufficient revascularization (52.0%). There was no significant pre burr hole or post burr hole complication. In the efficacy and safety study, we evaluated 42 of the 44 targeted patients, with 2 patients lost to follow-up. Significantly, more cases of trans-hemispheric (19/21 [90.5%] versus 12/21 [57.1%]) and trans-burr hole (42/58 [72.4%] versus 30/58 [51.7%]) revascularization and significant improvements in perfusion parameters were observed in the combined group relative to the MBH-only group.

Conclusions: The combination of MBH and EPO is safe and feasible for reinforcing transdural revascularization in acute steno-occlusive patients with perfusion impairments.

Session 6A. BNS Free papers [Room A]

ICA pseudoocclusion vs true occlusion

Jai Ho Choi

Seoul St. Mary's Hospital, Korea

Education

- 1998 - 2004 The Catholic University of Korea College of Medicine, B.S. (Medicine)
- 2012 - 2019 The Catholic University of Korea Postgraduate School, Ph.D. (Medicine)

Postgraduate Training

- 2004 - 2005 Intern, Kangnam St. Mary's Hospital, Seoul
- 2005 - 2009 Resident in Neurosurgery, Kangnam St. Mary's Hospital, Seoul

Academic And Hospital Appointment

- 2021 - present Associate Professor, Department of Neurosurgery, Seoul St. Mary's Hospital, The Catholic University of Korea College of Medicine, Seoul, Korea
- 2017 - 2021 Clinical Assistant Professor, Department of Neurosurgery, Seoul St. Mary's Hospital, The Catholic University of Korea College of Medicine, Seoul, Korea
- 2016 - 2017 Clinical Assistant Professor, Chungbuk National University Hospital
- 2015 - 2016 Staff, Bundang Jesaeng General Hospital

Session 6A. BNS Free papers [Room A]

Multiphasic computed tomography angiography findings for identifying pseudo-occlusion of the internal carotid artery

Jai Ho Choi, M.D.[1], Jinhee Jang, M.D., Ph.D.[2], Jaseong Koo, M.D., Ph.D.[3], Kook-Jin Ahn, M.D., Ph.D.[2], Yong Sam Shin, M.D., Ph.D.[1], Bum-soo Kim, M.D., Ph.D.[2]

[1]Department of Neurosurgery, [2]Radiology, and [3]Neurology, Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea

Background and Purpose: Pseudo-occlusion of the internal carotid artery (ICA) is an important caveat for patients with acute ischemic stroke (AIS), especially candidates for mechanical thrombectomy. We compared the findings of multiphasic computed tomography angiography (mCTA) between cervical ICA pseudo-occlusion and true occlusion at the cervical ICA in patients with AIS of anterior circulation to determine their diagnostic value.

Methods: Thirty patients with non-visualization of the proximal ICA were included. Diagnosis of pseudo- or true occlusion of the ICA was made based on digital subtraction angiography. Diagnostic performances of mCTA findings—(a) a flame-shaped stump and (b) delayed contrast filling at the cervical ICA— were evaluated and compared. The Fisher exact test, chi-square test, or Wilcoxon rank-sum test and McNemar test were used in the data analysis.

Results: Twelve patients had true proximal ICA occlusion and 18 had pseudo-occlusion. Delayed contrast filling at the cervical ICA on mCTA was found in all patients with pseudo-occlusion of the ICA, while 1 case of true occlusion showed delayed contrast filling (P<.001). The presence of a flame-shaped stump was not significantly different between the pseudo- and true occlusion groups. The sensitivity of delayed contrast filling (0.94, 95% confidence interval [CI] 0.73-1) was significantly higher than that of flame-shaped stump (0.75, 95% CI 0.36-0.83).

Conclusion: We demonstrated that the delayed filling sign on mCTA could be a useful and readily available finding for differentiating proximal ICA pseudo-occlusion from true occlusion

DAY 2

Saturday, September 24, 2022 (16:15-17:04)

Session 6B. BNS Free papers [Room B]

Chair: Wickly Lee (National Neuroscience Institute, Singapore)
Seong-Rim Kim (Bucheon St. Mary's Hospital, Korea)

- Hybrid Operating Theatre for Neurovascular Cases in Indonesia National Referral Hospital: Single Center Experience
  Affan Priyambodo Permana (Ciptp National Hospital, Jakarta, Indonesia)
- Predictive Factors of Recurrence after Endovascular Treatment of Unruptured Vertebrobasilar Fusiform Aneurysms
  Chang-Hyun Kim (Keimyung Univ., Korea)
- Endovascular Management of Intracranial Dural Arteriovenous Fistula Presenting Like Longitudinal Extensive Transverse Myelitis: A Case Report
  NIA YULIATRI PURBA (Mayapada Hospital, Jakarta, Indonesia)
- Spinal Epidural Arteriovenous Fistulas with Involvement of Intradural Venous Drainage at a Remote Level: Case Report
  Ahmad Sulaiman Alwahdy (Fatmawati General Hosp., Indonesia)
- Spinal arterial aneurysms and vascular malformations: Review and own experience
  Mohamed Deniwar (MANSOURA UNIVERSITY HOSP. Egypt, Korea)
- The quantitative comparison between high wall shear stress and high strain in the formation of paraclinoid aneurysms
  JUNG-JAE KIM (Yonsei Univ. Severance Hosp., Korea)
- Mixed Reality Intraoperative Simulation in Neurovascular and Neuroendovascular Aneurysm Treatment
  Wonki Yoon (Korea University, Guro Hospital, Korea)

Session 6B. BNS Free papers [Room B]

Hybrid Operating Theatre for Neurovascular Cases in Indonesia National Referral Hospital: Single Center Experience

Affan Priyambodo Permana[1], Zharifah Fauziyyah Nafisah[1], Setyo Widi Nugroho[1], Riyadh Firdaus[2]

[1]Department of Neurosurgery, Faculty of Medicine, Universitas Indonesia – dr. Cipto Mangunkusumo National General Hospital, Jakarta, Indonesia

[1]Department of Anesthesia and Intensive Care, Faculty of Medicine, Universitas Indonesia – dr. Cipto Mangunkusumo National General Hospital, Jakarta, Indonesia

Purpose: Hybrid operating theatre (OT) is a surgical theatre that combine endovascular intervention and open surgery approach in one time. As a top referral hospital in Indonesia for varied neurosurgical cases, hybrid OT which fully equipped with digital substraction angiography (DSA) is useful for complex management of neurovascular cases. Hybrid OT in our hospital has been established for one year, and we already had several complex and interesting cases done using the facility. This study aims to share our experience in management of neurovascular surgery cases in Hybrid OT.

Methods: This is a restrospective study using our data from Hybrid OT in dr. Cipto Mangunkusumo National General Hospital from 2021-2022. All clinical and radiology data were collected through the medical record, while the intraoperative data collected from the OT. Surgeries conducted by Neurosurgery Department, specifically for neurovascular cases were included in this study.

Results: There were 11 cases included in this study. Four cases (36%) were intracranial aneurysm, 3 cases (27%) were vascular malformation intracranial and spinal (DAVF/CCF), 2 cases (18%) were foreign bodies extraction guided with angiographic intraoperative, and 2 cases (18%) were embolization and tumor removal. In aneurysm cases we combined DSA, clipping, and decompressive hemicraniectomy or continuous lumbar drainage placement. For vascular malformation cases, we combine DSA, embolization, and fistula clipping. And for foreign body extraction Hybrid OT were useful for angiographic guidance as a favor to craniotomy for extraction and abscess debridement.

Conclusion: Hybrid OT is useful for management of neurosurgical cases, especially neurovascular disease. Angiographic guidance and endovascular management is important as an adjunct therapy for open microsurgical approach. It can provide a safe and precise treatment for neurovascular disease and minimalize transportation related risk between regular OT and cathlab. Therefore, hybrid OT will continue to develop in the future as more complicated cases were referred.

Session 6B. BNS Free papers [Room B]

Predictive Factors of Recurrence after Endovascular Treatment of Unruptured Vertebrobasilar Fusiform Aneurysms

Kim Jae-Hyun, Kim Chang-Hyun, Lee Chang-Young

Department of Neurosurgery, Keimyung University Dongsan Hospital, Daegu, Korea

Purpose: This study aimed to investigate the predictive factors of recurrence after endovascular treatment (EVT) for unruptured vertebrobasilar fusiform aneurysms (VBFA).

Methods: This single-center retrospective study evaluated 36 patients who underwent EVT of unruptured VBFA between 2008 and 2020. Variables influencing recurrence, such as size, type, thrombus, preoperative symptoms, and treatment methods, were analyzed. All patients were followed up using vessel imaging.

Results: In total, 7 of 36 patients (19.4%) developed recurrence. The mean time from EVT to recurrence was 9.2 months (range 2–26.9 months). Maximum aneurysmal diameter on magnetic resonance imaging was decreased, increased, and remained unchanged in 1, 7, and 28 patients, respectively. Transitional type VBFA, brain compression symptoms, large aneurysmal diameter and length, preoperative modified Rankin Scale (mRS) score≥ 2, sole stenting technique, and intra-aneurysmal thrombus significantly influenced the risk of recurrence. Post-EVT, 7 (19.4%) patients showed complete occlusion of the aneurysm on the immediate postoperative angiogram, and 22 (61.1%) patients showed complete occlusion on the 1-year follow-up imaging. Good outcomes were observed in 32 patients (88.9%) at the last follow-up, with a mRS score of 0–1 after EVT.

Conclusions: EVT achieves good outcomes in unruptured VBFA. Transitional type VBFA, brain compression symptoms, large aneurysmal diameter and length, preoperative mRS score≥ 2, sole stenting technique, and intra-aneurysmal thrombus are risk factors for aneurysm recurrence after EVT.

Session 6B. BNS Free papers [Room B]

Endovascular Management of Intracranial Dural Arteriovenous Fistula Presenting Like Longitudinal Extensive Transverse Myelitis: A Case Report

Nia Yuliatri[1], Affan Priyambodo[2], Ingrid Ayke Widjaya[1], Alphadenti Harlyjoy[1], Gibran Aditiara Wibawa[1], Satyanegara[1]

[1]Department of Neurosurgery, Mayapada Hospital Jakarta Selatan, Jakarta, Indonesia
[2]Department of Neurosurgery, Cipto Mangunkusumo General Hospital, Jakarta, Indonesia

Purpose: Rarely, intracranial dural arteriovenous fistula (dAVF) drain into spinal perimedullary veins generating longitudinally extensive myelopathy transverse myelitis (LETM) – like lesion. Unfamiliarity with these disorders and their pathophysiologic mechanisms often lead to diagnostic and treatment delay. To emphasize this point, here we present our case of arteriovenous shunt at the craniospinal junction.

Methods: 50-year old man referred to our institution with acute-onset progressive myelopathy. Whole spine contrast MRI showed abnormal longitudinally extensive T2/FLAIR hyperintensity at cervical region, which was further extended rostrally to the medulla. Prominent flow voids were also seen in the subarachnoid space throughout spinal canal. Right external carotid cerebral angiography confirmed several branches of the middle meningeal artery and accessory meningeal artery draining into cervical perimedullary vein.

Results: Embolization of external carotid feeding vessels was performed. Post treatment angiography showed complete occlusion of the fistula without any backflow. Clinical improvement was seen afterward.

Conclusions: Intracranial dAVF should be considered as a differential diagnosis of LETM-like lesion because it is surgically treatable. Early clinical consideration, prompt diagnosis and treatment are mandatory to optimize outcomes.

Session 6B. BNS Free papers [Room B]

Spinal Epidural Arteriovenous Fistulas with Involvement of Intradural Venous Drainage at a Remote Level: Case Report

Ahmad Sulaiman Alwahdy[1], Hastari Soekardi[2], Dieby Adrisyel[3], Mochammad Evodia Slamet[4]

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[3]Department of Radiology, Interventional Radiology subdivision,
Fatmawati General Central Hospital, Jakarta, Indonesia
[4]Department of Neurosurgery, Endovascular Surgery subdivision,
Fatmawati General Central Hospital, Jakarta, Indonesia

Purpose: Spinal epidural arteriovenous fistulas (SEDAVFs) are a rare type of spinal arteriovenous fistulas. Because of the limited cases, understanding of the etiology, demography and pathophysiology of these problems are limited. Two types of extradural or epidural arteriovenous fistulas are known, where the venous drainage in thype 1 with involvement of intradural venous drainage and type 2 without intradural venous drainage. We report case of type 1 SEDAVFs treated by transarterial glue embolization without complications.

Methods: A 36-year-old woman presented with progressive weakness of the lower extremities for almost 3 years and bladder/bowel dysfunction. Magnetic resonance imaging of the whole spine showed spinal cord congestion in the level of thoracic region, and single dilated flow void running from lumbar area to conus medullaris and continued cranial drainage up to C5 level through perimedullary vein through the enlarged vein of the filum. Spinal, cranial, lateral sacral arteries and medial sacral artery angiography performed to find the fistula point. The only fistula point that we found only where the epidural venous sac was seen at right L2 region. After multidisciplinary team meetings, and discussion with the patient, transarterial embolization with glue was performed.

Results: Filling of venous sac technique was performed with glue in this case to achieve total obliteration of the SEDAVF, including intradural reflux without any complications. After two months of the clinical follow-up showed improvement of motoric function eventhough is mild. In many literatures regarding the mean clinical follow-up duration after treatment was 1 to 2 years, and we still expecting further improvement.

Conclusions: Endovascular treatment for SEDAVF type 1 might have achieved a total obliteration without any procedural complications. Yet the hardest in the fistula case is establishing the diagnosis and findingthe fistula point. Venous congestive myelopathy due to intradural reflux in SEDAVF often occurred from the remote level.

Session 6B. BNS Free papers [Room B]

Spinal arterial aneurysms and vascular malformations: Review and own experience

Mohamed Deniwar

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Fellow of department of Radiology, Asan medical center, Seoul, Korea

Purpose: • Although spinal vascular anomalies are uncommon, it is crucial to be aware of them since, if undetected and mistreated, they can cause major consequences. The four basic forms include cavernous malformations, arteriovenous fistulae, and capillary telangiectasia.

• Spinal aneurysms (SAs) are even rare lesions. The clinical presentation, associated comorbid conditions, imaging findings, and outcomes of their management by microsurgical and endovascular techniques have not been clearly defined.

• We report our experience with the treatment of these lesions and review the literature trying to scope out their diagnostic and therapeutic protocols.

Methods: • A review of the literature was done, all papers that described SAs were considered (case reports, reviews, and etc..)

• Retrospective review of our archives since 2016 was done.

• We reported 2 cases of spinal arterial aneurysms at the cervical region and 3 other cases of spinal Vascular malformations.

Results: 5 cases of spinal vascular lesions. 2 females and 3 males with mean age 55 years old. The cases were summarized in table (1). Fig (1,2,3,4) (case 1,2,3,4)

Case Number	Presentation	Digital subtraction angiographic (DSA) finding	Treatment procedure
1	Sever headache and Fisher grade 3 subarachnoid hemorrhage	Cervical Isolated aneurysm originating from anomalous communication between the left posterior spinal artery and the anterior spinal artery	Surgical clipping and trapping of the anomalous parent Artery using far-lateral approach
2	Neck pain, left brachialgia and spastic gait.	Cervical AVM with multiple feeders mainly from left posterior spinal artery and descending branch of left vertebral artery with intra-nidal aneurysm	Surgical excision of the AVM and clipping of the aneurysm using lateral suboccipital approach
3	Sensory level and paraparesis	Dorsal dural arteriovenous fistula with single radicular feeder arising at dorsal 8 intercostal.	Surgical transection and Obliteration.

4	Low back pain, sciatica and saddle shape area hypothesia.	Sacral arteriovenous malformations supplied mostly with the left lateral sacral artery and to less extent with median sacral artery.	Perioperative endovascular particles embolization followed by surgical excision.
5	Low back pain and paraparesis	Lumbar dural arteriovenous fistula with double radicular feeder arising at lumbar artery on both sides	Surgical transection and Obliteration.

Conclusions: DSA remains the gold standard for diagnosis as it provides detailed angio-architecture for spinal vascular malformations. Surgery still can be sought beside recently applied endovascular therapy nowadays.

Figures:

Figure 1: Case 1:

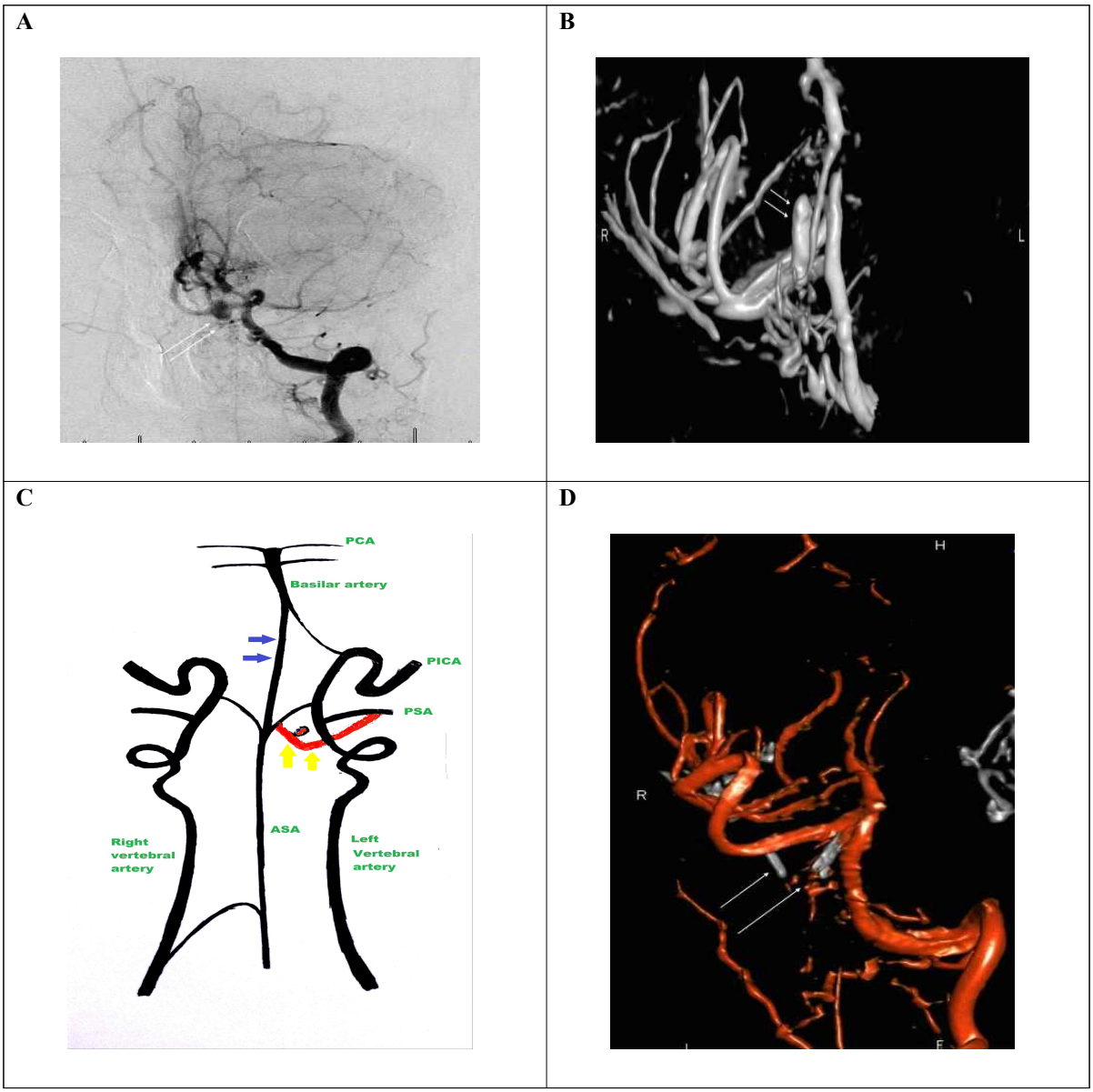


Figure 2: Case 2:

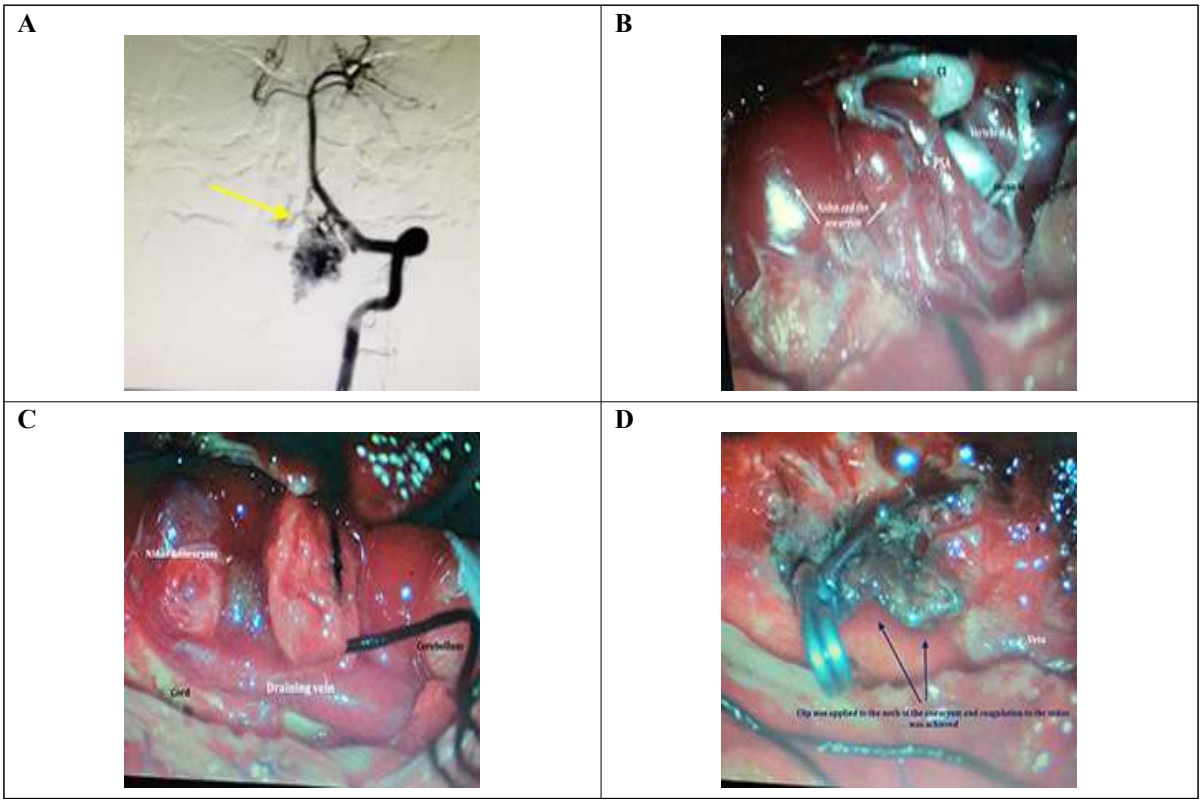


Figure 3: Case 3:

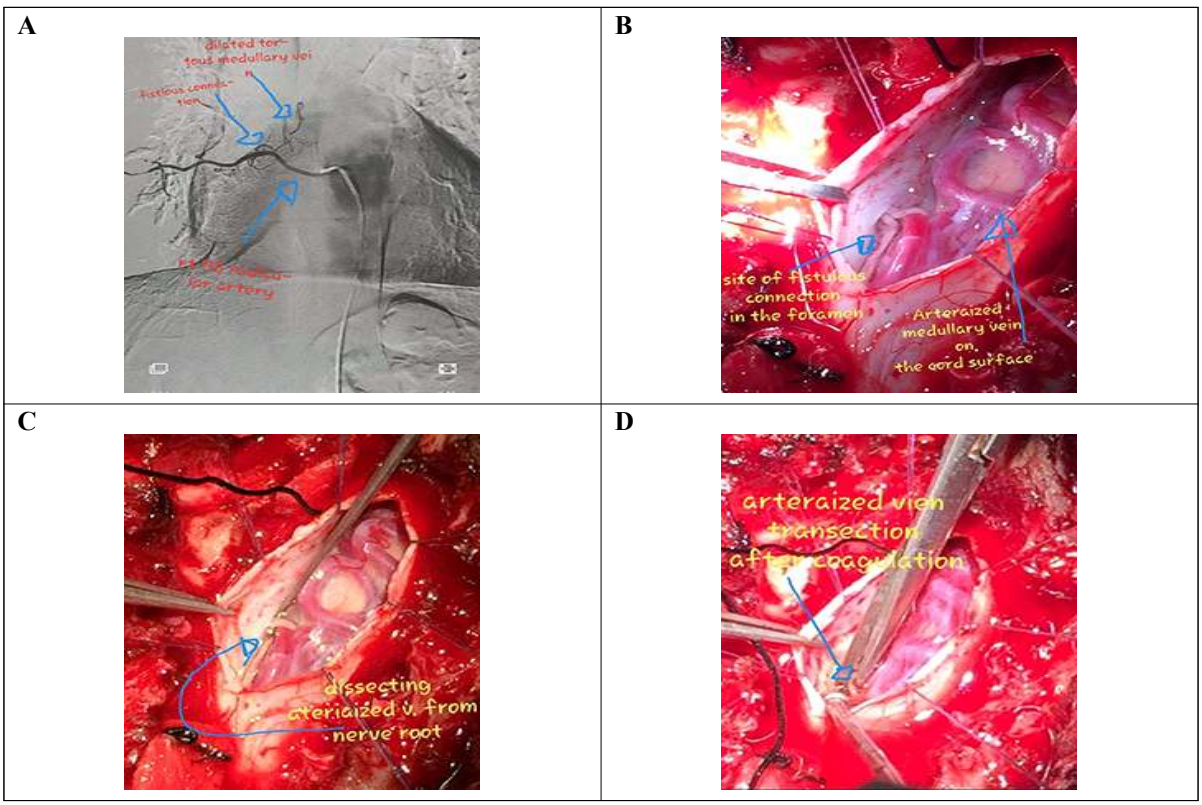
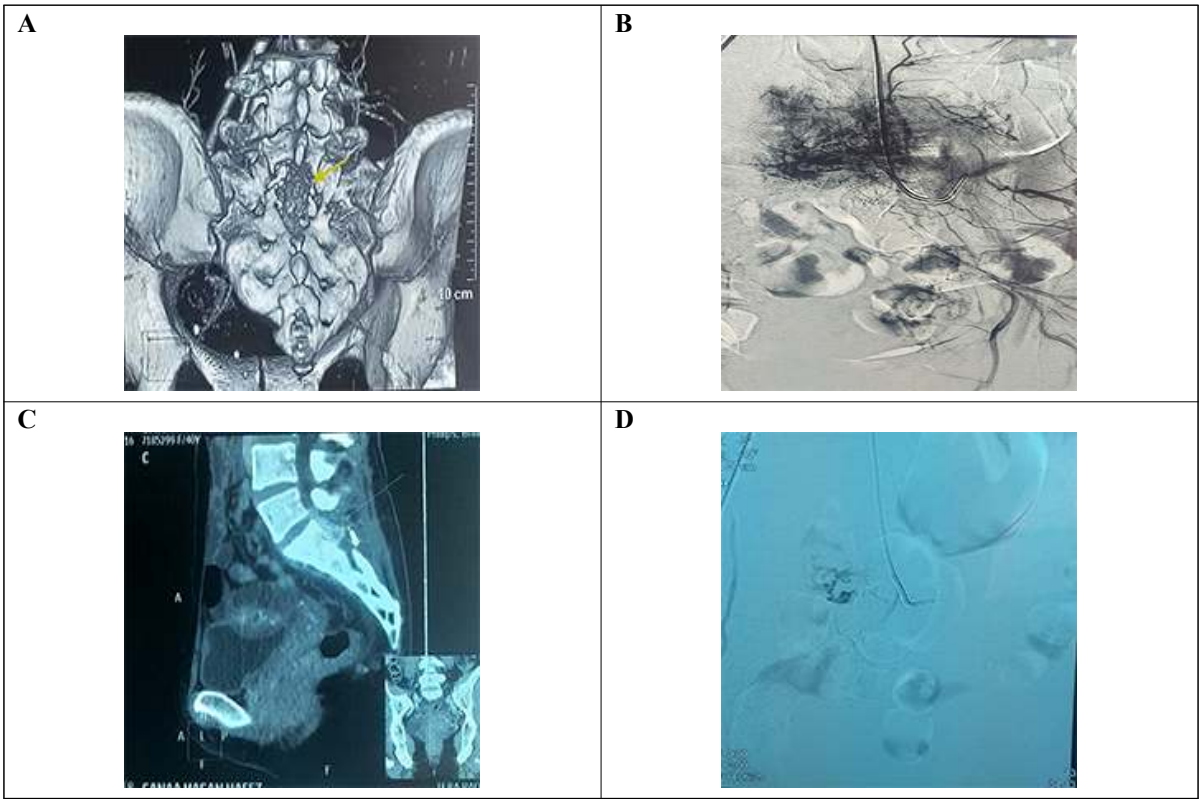


Figure 4: Case 4:



Session 6B. BNS Free papers [Room B]

The quantitative comparison between high wall shear stress and high strain in the formation of paraclinoid aneurysms

Jung-Jae Kim, Hyeondong Yang, Yong Bae Kim, Kwang-Chun Cho, Je Hoon Oh

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[2]Department of Neurosurgery, Yonsei University Yongin Severance Hospital, Yongin, Korea
[3]Department of Mechanical Engineering, Hanyang University, Ansan, Korea

Purpose: In the hemodynamic study, computational fluid dynamics (CFD) analysis has shown that high wall shear stress (WSS) is an important parameter in cerebral aneurysm formation. However, CFD analysis is not more realistic than fluid–structure interaction (FSI) analysis given its lack of considering the involvement of vascular structures. We sought to determine the importance of strain in the formation of paraclinoid aneurysms through FSI analysis.

Methods: A total of 37 intracranial paraclinoid aneurysms were enrolled. The aneurysms were manually removed using computer-aided design. Additionally, the dura mater was modeled to facilitate realistic results in FSI analysis. The locations of high WSS and high strain were extracted from the CFD and FSI analyses. Finally the distances between the aneurysm formation site and the locations of high WSS and high strain were calculated for quantitative comparison.

Results: The average distance from the location of the aneurysm formation site to the high strain (1.74 mm ± 1.04 mm) was smaller than the average distance to the high WSS (3.33 mm ± 1.18 mm). The presence of dura mater also influenced the findings in the aneurysm formation site.

Conclusions: High strain extracted by FSI analysis is an important hemodynamic factor related to the formation of cerebral aneurysms. Strain parameter could help to predict the formation of aneurysms and elucidate the appropriate treatment.

Session 6B. BNS Free papers [Room B]

Mixed Reality Intraoperative Simulation in Neurovascular and Neuroendovascular Aneurysm Treatment

Wonki Yoon

Professor, Department of Neurosurgery, Guro hospital, Korea University, Seoul, Korea

Purpose: This is a preliminary report of single institutional experience of mixed reality (MR) simulation. The authors share nuances and merits of the MR simulation as an additional vivid 3-dimensional image guidance and discuss its future role in neurovascular disease treatment.

Methods: Retrospective analysis of prospectively collected data in neuroendovascular treatment of intracranial aneurysms using MR intraoperative simulation was performed during the past one year period. And educational purpose intraoperative simulation during surgical clipping of intracranial unruptured aneurysms was reviewed.

Results: Total 23 aneurysms of 23 patients were treated with coil embolization using intraoperative MR simulation. Total time of treatment sessions, dose of radiation and contrast used were similar with other regular procedures. However, vivid 3-dimensional real-time simulation enhanced visuospatial awareness and decreased anatomical confusion in complex aneurysm treatment. 2-dimensional road-map used frequently during endovascular treatment obscures anatomical details. With aid of intraoperative MR simulation, this short comings of 2-dimensional image guidance could be overcome. Other cases of intraoperative MR simulation during clip ligation of unruptured aneurysms were very educational and enhanced trainees' understanding about the microsurgical vascular anatomy and surgical orientation.

Conclusions: MR intraoperative simulation seems very helpful in neuroendovascular aneurysm coil embolization in the aspect of anatomical confidence and real-time feedback for each stage of procedure. And for trainee's stiff learning curve about intraoperative microsurgical anatomy, MR simulation seems to be beneficial.

DAY 3

Sunday, September 25, 2022 (07:30-08:30)

Breakfast seminar

Chair: Sang-Weon Lee (Pusan National University Yangsan Hospital, Korea),
Hyun-Seung Kang (Seoul National University, Korea)

- Spinal vascular anatomy
  In Sup Choi (Incheon Sejong Hospital, Korea)
- Functional vascular anatomy ***Virtual presentation***
  Yuji Matsumaru (University of Tsukuba, Japan)

Breakfast seminar

Spinal vascular anatomy

In Sup Choi

Incheon Sejong Hospital, Korea

Breakfast seminar

Functional vascular anatomy

Yuji Matsumaru

University of Tsukuba, Japan

Education

- 1981 - 1987 School of Medicine, University of Tsukuba
- 1993 - 1997 Doctral Program in Medical Science, University of Tsukuba
- 2003 International Master Degree in Neurovascular diseases sponsored by Paris Sud University (France) and Mahidol University (Thailand)

Professional experience

- 1997 - 2000 Department of Neurosurgery, Mito National Hospital
- 2000 - 2005 Associate Professor, Department of Neurosurgery, University of Tsukuba
- 2005 - 2016 Director, Department of Neurological Endovascular Therapy, Toranomon Hospital
- 2016 - Professor, Division of stroke prevention and treatment, Department of Neurosurgery, University of Tsukuba

Speciality

- Endovascular treatment for stroke
- Endovascular treatment for cerebrovascular diseases and spinal cord diseases

Specialist

- Board certified instructor of Japanese Society of Neuroendovascular Therapy
- Board certified specialist of Japanese Neurosurgical Society
- Board certified specialist of Japanese Stroke Society

Breakfast seminar

Functional vascular anatomy

Yuji Matsumaru

University of Tsukuba, Japan

DAY 3

Sunday, September 25, 2022 (08:50-09:20)

Session 7. Special lecture

Chair: Jin-Young Jung (Yonsei S Hospital, Korea)

- Future Perspectives of Intracranial Aneurysm Treatment ***Virtual presentation***
  Adnan H. Siddiqui (SUNY University of Buffalo, USA)

Session 7. Special lecture

Future Perspectives of Intracranial Aneurysm Treatment

Adnan H. Siddiqui

SUNY University of Buffalo, USA

Education

• 2003	Ph.D: University of Rochester School of Medicine and Dentistry, Neuroscience
• 1997	M.S.: University of Rochester School of Medicine and Dentistry, Neuroscience
• 1992	M.B, B.S.: Aga Khan University Medical College, Medicine, Surgery
• 2005 - 2006	Fellow in Cerebrovascular Surgery Interventional Neuroradiology and Neurocritical Care, Thomas Jefferson University Department of Neurosurgery
• 2004 - 2005	Chief Resident in Neurosurgery, SUNY Upstate Medical University
• 2004	MA, Resident in Pediatric Neurosurgery, Children's Hospital, Boston
• 2003	Ph.D Neuroscience, University of Rochester School of Medicine and Dentistry

Professional Licensure

• 2005 - Present	State of New York Medical Licensure #237148
• 2005 - 2016	Commonwealth of Pennsylvania Medical Licensure MD 426656

Session 7. Special lecture

Future Perspectives of Intracranial Aneurysm Treatment

Adnan H. Siddiqui

SUNY University of Buffalo, USA

DAY 3

Sunday, September 25, 2022 (09:20-10:50)

Session 8. My BNS Cases (Case presentation)

Chair: Yong Cheol Lim (Ajou University, Korea)
Myeong Jin Kim (Gachon University Gil Medical Center, Korea)

- Staged treatment of blood blister-like aneurysm with multiple stents followed by flow diverter
  Hyeong Jin Lee (Seoul St. Mary's Hosp., Korea)
- Flow diversion of the unruptured fusiform aneurysm in vertebral artery: case series
  Sung-Tae Kim (Inje University, Korea)
- Feasibility of Gamma Knife radiosurgery for brain arteriovenous malformations according to nidus type
  Jaho Koo (Ajou university, Korea)
- COVID-19: Neurovascular Manifestations
  Fitra Fitra (Universitas Syiah Kuala, Indonesia)
- Comparison of intraoperative blooding volume in juvenile nasopharyngeal angiofibroma patients that have been embolized with glue and coil in general hospital dr. Hasan Sadikin Bandung
  Rizki AdriYudha (General Hospital dr. Hasan Sadikin Bandung, Indonesia)
- Recurrent Massive Epistaxis After Coil Embolization : Case Report of Traumatic Pseudoaneurysm with CCF
  Muhammad Ari Irsyad (Universitas Sumatera Utara, Indonesia)

- Cerebellar Cavernoma Excision With Preserved Venous Anomaly : A Case Report
  Firman Adi Sanjaya (Blambangan Regional Hospital, Indonesia)

- Surgical Obliteration for Anterior Cranial Fossa Dural Arteriovenous Fistula Presenting As Subdural Hematoma: A Case Report
  Ingrid Widjaya (Mayapada Hospital Jakarta Selatan, Indonesia)

- Primary mechanical thrombectomy for anterior circulation stroke in children : Case report
  Zaky Bajamal (Surabaya Neuroscience Institute, Indonesia)

- Direct Cannulation of a Calvarial Diploic Vein for Embolization of a Symptomatic Intraosseous Arteriovenous Fistula
  TaeWon Choi (Kyung Hee University, Korea)

- Transorbital Penetrating Brain Injury by Metal Grinder: Neuro-ophthalmologic Emergency and Literature Purpose: Review
  Mohammad zakaria Shahab (RSUD Iskak Tulungagung, Indonesia)

- Giant Serpentine Aneurysm Arising From the Middle Cerebral Artery Successfully Treated with Microsurgical Technique
  Jung Keun Lee (Yonsei University, Severance Hospital, Korea)

- Flow Diverting Stent for recanalized blister like aneurysm with SAH during acute period
  Jung Hyun Park (Dongtan Sacred Heart Hospital, Korea)

- Alternate Simultaneous Bilateral Carotid Angiography in Y-stent Assisted Coil Embolization for An Anterior Communicating Artery Aneurysm with Triplicate A2 Variant
  Dong-Kyu Jang (The Catholic University, Incheon St. Mary's Hospital, Korea)

- Flow diversion treatment for dorsal wall aneurysms
  Jung Koo Lee (Seoul St. Mary's Hospital, Korea)

Session 8. My BNS Cases (Case presentation)

Staged treatment of blood blister-like aneurysm with multiple stents followed by flow diverter

Hyeong Jin Lee

Department of Neurovascular, Seoul St. Mary's Hospital, Seoul, Korea

Purpose: It is known that treatment of blood blister-like aneurysm is challenging due to fragile false wall. The aim of this study is to introduced staged treatment of blood blister-like aneurysm in dorsal wall of ophthalmic segment internal carotid artery with multiple stents followed by flow diverter.

Methods: A 30-year-old female patient with subarachnoid hemorrhage showed blood blister-like aneurysm on digital subtraction angiography. Initially, the patient was treated with multiple stents, but aneurysm was recurred on follow-up angiography. The recurrent aneurysm was treated with flow diverter.

Results: The patient treated with multiple stents followed by flow diverter showed stable angiographic outcome without complications.

Conclusions: Multiple stents followed by flow diverter would be considered as staged treatment in ruptured blood blister-like aneurysm. Further studies are needed to evaluate the safety and efficacy of this staged treatment.

Session 8. My BNS Cases (Case presentation)

Flow diversion of the unruptured fusiform aneurysm in vertebral artery: case series

Sung-Tae Kim[1], Jin Wook Baek[2], Hae Woong Jeong[2], Young Gyun Jeong[1]

[1]Department of Neurosurgery, and [2]Diagnostic Radiology
Inje University Busan Paik Hospital

Purpose: It is unclear not only natural history of fusiform aneurysm in vertebral artery (VA) but also outcome of flow diversion of it. In this study, we evaluated clinical and angiographic outcome of flow diversion in cases of unruptured symptomatic fusiform aneurysm in VA.

Methods: Between May 2016 and March 2022, 13 unruptured fusiform aneurysm in VA of 13 patients (55.1 year-old; Male,9) underwent flow diversion. 6 patients had uncontrolled occipital headache, another 1 patient had repeated syncope, another 2 patients had brainstem compression symptom, and the other 4 patients had aneurysm growing in follow-up image. One of them was retreatment after double stenting. Length of the VADAs was 14.97 mm (ranged from 7.5 mm to 30 mm), outer diameter was 12.49 mm (ranged from 7 mm to 25 mm), and inner diameter was 8.98 mm (ranged from 5.6 mm to 15 mm). In 8 patients, partial thrombosis of the aneurysm was detected. In 6 patients, branching artery, like PICA or AICA, was involved with the aneurysm. Angiographic outcomes were evaluated using O'Kelly-Marotta (OKM) grading scale, and evaluated status of branching artery.

Results: Two flow diverters were deployed in one case. In 6 aneurysms, Pipeline (Medtronic) was deployed. (Flex 2, Shield 4) In 7 aneurysms, Surpass (Striker) was deployed. (Streamline 3, Evolve 4) In all 6 branching artery-involved type, flow diverter stent was laid covering branch origin. Immediately, 7 patients presented A3 grade, 1 patient presented A2, and other 5 patients showed B3 or B2 grade. There was no periprocedural issue or failure of deployment.

For follow-up study, DSA (mean 19.2 months, 6 – 40 months) was possible in 7 patients, and HRMRI (mean 14 months, 6 – 19 months) in 5 patients. DSA follow-up showed improvement of OKM grade. In HRMRI, definite reduction of the aneurysm was detected. Although, the branching artery was well preserved in all 3 patients, aneurysmal sac remained near branching artery origin. Interestingly, one of them, who was initially not showed the PICA due to infarction, recanalization occurred after flow diversion. Clinical follow-up was possible about 30 months after procedure. (From 6 months to 63 months) Embolic infarction occurred in 1 patient. Most of patients had good clinical outcome. (mRS 0 in 5 patients, 1 in 5 patients) The other 2 remained mRS 2, and another one scored mRS 6 because of other underlying disease.

Conclusions: After flow diversion, all patients had good clinical outcome, remarkable improvement about aneurysm reduction including mass effect, and no severe complication. Flow diversion seems to be one of treatment option for unruptured fusiform aneurysm having symptom or changing size in intradural vertebral artery.

Session 8. My BNS Cases (Case presentation)

Feasibility of Gamma Knife radiosurgery for brain arteriovenous malformations according to nidus type

Jaho Koo

Ajou University, Korea

Purpose: Gamma knife radiosurgery (GKRS) is an effective and less invasive treatment option for surgically high-risk or complex arteriovenous malformation (AVM)s. The purpose of this study is to evaluate the feasibility and safety of the GKRS according to the nidus type in patients with brain AVM.

Material and method: We conducted a retrospective study on a group of patients diagnosed with AVM and subjected to GKRS from 2008 to 2021 in a single-center. We classified the study group into compact and diffuse nidus according to the nidus type. We excluded the patients who did not perform follow-up or imaging tests less than 12 months after undergone GKRS.

Result: A total of 154 cases (136 patients) were included in this study. 131 cases (85.1%) were identified as compact type nidus AVM and 23 cases (14.9%) were identified as diffuse type nidus AVM. Of these, 89 cases (57.8%) were unruptured AVM and 65 cases (42.2%) were ruptured AVM. The mean age was 32.14 ± 17.17 years, and the mean follow-up time was 52.11 ±33.67 months (range, 12.0-149.7). The mean Spetzler-Martin (SM) grade score was 2.03 ±0.95 for compact type AVM group and 3.39 ±1.23. for diffuse type AVM group. (p=0.03) During the follow-up time, AVM-related hemorrhage had occurred in 6 cases (3.9%). Of these, 3 cases were compact type nidus AVM, and 3 cases were diffuse type nidus AVM. Significant radiosurgery-induced edema and cyst formation in 15 (9.7%) and 1(0.6%) case, respectively. The AVM complete obliteration rate was 46.10%. There were no significant differences in the occurrence of post-GKRS complication (p=0.091) and complete obliteration rate (p=0.227) in two groups. In the case of diffuse type nidus AVM, large AVM volume (p=0.001), high radiation dose (p=0.001), distributed eloquent area location (p=0.015), and high SM grade score (p=0.001) were shown compared to compact type nidus AVM.

Conclusion: GKRS is a safe and feasible treatment of brain AVMs in the case of diffuse nidus type AVM.

Session 8. My BNS Cases (Case presentation)

COVID-19: Neurovascular Manifestations

Fitra Fitra[1], Zaky Bajamal[2], Nur Setiawan Suroto[3], Asra Al Fauzi[3], Abrar Arham[4]

[1]Faculty of Medicine, Universitas Syiah Kuala / dr. Zainoel Abidin General hospital Banda Aceh, Indonesia

[2]Neurosurgery Department, PHC Hospital Surabaya, Indonesia

Neurosurgery Department, Faculty of Medicine, Universitas Airlangga/ dr Soetomo General Academic Hospital Surabaya, Indonesia

[3]Neurosurgery Department Prof. Dr. mahar Mardjono National Brain Center Hospital Jakarta, Indonesia

Purpose: Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) leads to multi-system dysfunction with emerging evidence suggesting that COVID-19 had manifestations of neurovascular diseases. We study the effect of COVID-19 that had manifestation in patients with neurovascular diseases.

Methods: We reported one case of a carotid cavernous fistula disease patient with COVID-19and arteriovenous fistula after COVID-19vaccine, and we reviewed other cases reported in the English language citing neurovascular diseases associated with COVID-19 infection.

Results: In our small series, vascular thrombosis was suspected of playing a major role in neurovascular patients exposed to Covid-19 infection. The universality and clinical implications of our observations require further research to define

Conclusions: The COVID-19 pandemic has drastically altered our way of life and will certainly continue to do so in the near future. It is unquestionably necessary to conduct more research on the cellular and molecular pathways behind COVID-19 and neurovascular disease.

Session 8. My BNS Cases (Case presentation)

Comparison of intraoperative blooding volume in juvenile nasopharyngeal angiofibroma patients that have been embolized with glue and coil in general hospital dr. Hasan Sadikin Bandung

Rizki AdriYudha

General Hospital dr. Hasan Sadikin Bandung, Indonesia

Purpose: To determine the difference in the amount of intraoperative bleeding in Juvenile nasopharyngeal angiofibroma patients with embolization preoperative using glue compared to coils at general hospital dr. Hasan Sadikin Bandung.

Methods: This study is a retrospective analytic study. The research subjects were JNA patients who had undergone preoperative embolization using glue and coil at general hospital dr. Hasan Sadikin Bandung in January 2018 - January 2022. The Mann Whitney Test was conducted to compare the amount of intraoperative bleeding in JNA patients with embolization using glue compared to coils.

Results: This study involved 24 male JNA patients with an average age of 16.42 ± 4,863 years with a range of <10 years as much as 1 or 4.2%, 11-20 years as many as 19 or 79.2% and 21-30 years as many as 4 or 16.7%. embolization using glue and preoperative coil and as many as 24 people. The amount of intraoperative bleeding in JNA patients who were embolized using preoperative glue, the average amount of bleeding was 494.17±108.415 cc with the lowest bleeding volume being 350 cc and the highest being 650 cc. 816.67±105.169 cc with the lowest bleeding volume of 600 cc and the highest of 950 cc. There was a significant difference in the amount of intraoperative bleeding with embolization using glue compared to coils in JNA patients ($p<0.001$).

Conclusions: There is a significant difference in the amount of intraoperative bleeding in Juvenile Nasopharyngeal Angiofibroma (JNA) patients with preoperative glue and coil embolization at general hospital dr. Hasan Sadikin Bandung Bandung with $p <0.001$ (with a 95% confidence degree).

Session 8. My BNS Cases (Case presentation)

Recurrent Massive Epistaxis After Coil Embolization : Case Report of Traumatic Pseudoaneurysm with CCF

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Introduction: Traumatic carotid-cavernous fistula (CCF) is the most common type of all CCFs. This condition generally presents as fatally massive and recurrent epistaxis with a mortality rate reaching up to 50%. In addition, pseudoaneurysm caused by cavernous segment injury of the internal carotid artery (ICA) might also accompany CCF. Many reports that pseudoaneurysm post traumatic may be treated with endovascular techniques. In this study, we reported cases of patient with a recurrent epistaxis after embolization of traumatic pseudoaneurysm.

Case Report: We reported two cases of traumatic pseudoaneurysm presenting as massive epistaxis. The first patient underwent angiography and multiple aneurysms was revealed. We did coiling on the biggest aneurysm, which located in ICA segment and observed another two aneurysms located surrounding it. Second patient had symptom of massive epistaxis causing patient to have massive blood loss and hypovolemic shock. Patient also had CCF sign with exophthalmos on contralateral lesion. Patient underwent angiography, pseudoaneurysm and CCF were found on cavernous sinus. Contralateral flow after balloon occlusion test was revealed, thus total parent occlusion was done with occlusion on cavernous segment of ICA and the sphenopalatine artery of ECA.

Discussion: The two patients underwent endovascular coiling as management of massive epistaxis. Early post operatively, the patient recovered well and epistaxis was completely resolved. After 3 weeks, patient complained recurrent epistaxis, but not as much as before. From the reported case, we took 6 cases of pseudoaneurysm with CCF and treated with endovascular coiling. From this case, all cases have no recurrent symptoms of epistaxis after procedure. All cases also reported that there is no complication of symptoms postoperatively. In our case, author postulated that in first case another microaneurysm cause the epistaxis in the patient. In second case, author thought that there is still direct flow from ipsilateral posterior communicating artery into the pseudoaneurysm, causing recurrent epistaxis

Conclusions: Traumatic pseudoaneurysm and carotid-cavernous fistula may present with massive epistaxis requiring immediate and appropriate treatment. Clincical history and accurate angiographic study can determine the cause of massive epistaxis and prevent any recurrent symptom.

Session 8. My BNS Cases (Case presentation)

Cerebellar Cavernoma Excision With Preserved Venous Anomaly : A Case Report

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Purpose: Cavernous malformations are congenital or acquired vascular abnormalities. They are uncommon entities with an incidence of 0.5% of the general population and usually are unnoticed until a hemorrhagic event occurs. Cerebellar cavernomas (CCMs) account for 1.2 to 11.8% of all intracranial cases and 9.3 to 52.9% of all infratentorial cases. Cavernomas can be concurrently seen with developmental venous anomalies (DVAs) in 20% (range 20%-40%) of cases, in which case they are known as mixed vascular malformations.

Methods: We report a case of a healthy young adult who presented with acute onset of headache, with characteristics of chronic headache that gets progressively worse. The patient complains of frequent dizziness when sitting and standing for a long time. Complaints have been felt for two years and have worsened for the past two weeks. Additional complaints are dizziness and nausea with intermittent episodes of vomiting for four days. Magnetic resonance imaging (MRI) revealed an underlying cavernoma that had bled and a coexisting DVA. The patient was discharged home with no deficits. Outpatient follow-up two months later showed no symptoms or neurologic deficits.

Results: Cavernous malformations are congenital or acquired vascular anomalies that occur in approximately 0.5% of the general population. Patients are usually asymptomatic but may present after an acute or recurrent haemorrhage, usually around 40 to 60 years. Initial presenting features may include seizures, headaches, and neurologic deficits. Our patient likely had dizziness due to localization of the bleeding of the cavernoma on the left side of the cerebellum. Patient underwent diagnostic and cavernoma was diagnosed, and operative procedure as done to excise the cavernoma. The tumour has 5-6 feeders originating from the venous anomaly and is coagulated and cut one by one. Excision at the base of tumour follows the plane of the venous anomaly. After tumour excision, proper hemostasis is performed. Post operatively patient has no symptom after procedure and one month after follow up.

Conclusions: A cavernous malformation is an uncommon entity that might coexist with deep venous anomalies, making management more challenging

Session 8. My BNS Cases (Case presentation)

Surgical Obliteration for Anterior Cranial Fossa Dural Arteriovenous Fistula Presenting As Subdural Hematoma: A Case Report

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Purpose: Management of anterior cranial fossa (ACF) dural arteriovenous fistula (dAVF) tends to be related with highly-organized and multimodality care systems. We describe our experience in DAVF case presented with acute spontaneous subdural haemorrhage (aSDH). This is aiming to increase awareness regarding its diagnosis and treatment strategies particularly in low- and middle-income countries

Methods: We performed an angiography to a 40 year-old male that underwent left side decompression craniectomy for aSDH) at previous hospital. Computed tomography showed aSDH, thickest at the lower convexity, accompanied with intracerebral hemorrhage at frontobasal region. dAVF from anterior cranial fossa drained to superior sagittal sinus via dilated frontal cortical veins with retrograde flow (Cognard classification Type III) was found. Considering a pre-aneurysm at ophthalmic artery, a direct surgical closure via bifrontal craniotomy was chosen.

Results: Fistular point was obliterated using straight curved clips and cautery. Contralateral fistula was disconnected by incising the falx. No neurological deficits after surgery.

Conclusions: ACF dAFV is uncommon, but clinicians should be aware of the possibility of its presence in non-traumatic aSDH case. Surgical obliteration generally considered as the treatment of choice. Although less invasive surgical approaches has been considered, we still choose this approach to provide sufficient microscopic views to remove all related vascular malformations.

Session 8. My BNS Cases (Case presentation)

Primary mechanical thrombectomy for anterior circulation stroke in children : Case report

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Purpose: Pediatric acute ischemic stroke is a rare but devastating condition with substantial rates of morbidity and mortality. Endovascular treatment is standard acute revascularization therapy for stroke in adults, but it is not well-studied in pediatrics. We report the successful treatment of two pediatric cases of anterior circulation stroke with primary mechanical thrombectomy

Methods: Two Asian children, aged 13 and 8 years, presented to Dr. Soetomo General Academic Hospital in September 2020 and April 2021, respectively, with hemiplegia and significant Pediatric National Institutes of Health Stroke Scale (Ped NIHSS) scores. Head CT scans demonstrated hyperdense middle cerebral artery signs, suggesting large-vessel occlusion stroke. Both patients underwent emergent thrombectomy within 5 and 10 h after initial onset, and successful recanalization was achieved within an hour. Both demonstrated good neurological recovery and there was no recurrent stroke during follow-up

Results: Thrombectomy has appeal for childhood acute ischemic stroke (AIS) due to a longer post-stroke time window for intervention. As the short-term outcome, a significantly reduced Ped NIHSS score is achieved. Long-term outcomes are measured by modified Rankin Scale (mRS) scores. A literature review from 2016 to 2021 yielded 21 pediatric case reports of primary mechanical thrombectomy for anterior circulation stroke (including the present cases). We compare our cases with the published literature to discuss the short-term and long-term outcomes.

Conclusions: Mechanical thrombectomy holds promise as a treatment modality in pediatric AIS. These case reports described successful primary mechanical thrombectomy for AIS treatment in children.

Session 8. My BNS Cases (Case presentation)

Direct Cannulation of a Calvarial Diploic Vein for Embolization of a Symptomatic Intraosseous Arteriovenous Fistula

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Purpose: Describe the direct access of the calvarial DV for the treatment of a diploic AVF located along the left frontal bone.

Methods: Under the CT-based navigation system, the left frontal craniotomy was performed to access the dilated DV in the frontal bone. We performed direct cannulation of the diplotic vein using a mobile C-arm.

Results: Immediately after embolization, angiography showed obliteration of the cortical venous reflux and stagnation of contrast media at the proximal segment of the anterior temporal DV. Six months after embolization, the patient was symptom-free with no reported neurologic deficits.

Conclusions: Direct cannulation of the diploic AVF for embolization can be a safe and useful adjunct in diploic AVF therapy when percutaneous transarterial or transvenous approaches are not possible.

Session 8. My BNS Cases (Case presentation)

Transorbital Penetrating Brain Injury by Metal Grinder: Neuro-ophthalmologic Emergency and Literature Purpose: Review

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Purpose: The goal of treatment for a transorbital penetrating injury is to save lives immediately by controlling persistent bleeding and intracranial hypertension, preventing infection by debriding all contaminated and necrotic tissues, preserving as much nervous tissue as possible, and restoring anatomic structures through accurate dura and scalp closure.

Methods: The patient was taken to the operating room straight away for emergency exploration. The wound was explores both transorbital and transcranial. Emergency craniectomy decompressive was needed to remove the metal grinder. The metal grinder was carefully removed without causing any further brain damage. With the help of an ophthalmologic team, bone fragments, hair and other debris were removed, followed by a skin flap and tarsorrhaphy of the left oculi.

Results: The prognosis is determined by the extent of damage to main vessels and important brain centers at the time of involvement. Patients with higher GCS scores have been shown to benefit from early intervention. In contrast to diffuse closed head injury, the clinical status following penetrating trauma is frequently excellent with a high GCS. This is because the extent of brain damage can be focused in the location of stab injury. As a result, in cases where there are no major sequelae, the prognosis of such injuries might be quite favorable. The degree of brain tissue laceration is the primary limiting factor. A favorable outcome depends on early diagnosis and treatment. In cases of timely surgical treatment, the death rate is 33% and this percentage rises to 53% in cases of delayed surgery.

Conclusions: Transorbital penetrating brain injury is an uncommon and life-threatening condition. Emergency clinicians must have a high index of suspicion for the presence of foreign bodies in patients with a transorbital penetrating injury and use appropriate imaging modalities for the identifications and evaluation of an orbital foreign body. Early diagnosis, surgical intervention, and application of intravenous antibiotics can improve the prognosis and quality of life of patients.

Session 8. My BNS Cases (Case presentation)

Giant Serpentine Aneurysm Arising From the Middle Cerebral Artery Successfully Treated with Microsurgical Technique

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Purpose: We report a case of GSA of the right middle cerebral artery treat with microsurgical technique successfully to reveal that microsurgical technique is a reliable and safe.

Methods: We reviewed a case of GSA of the middle cerebral artery treated with microsurgical technique at our institution.

Results: Giant serpentine aneurysms (GSAs) are a subgroup of giant intracranial aneurysms that are defined as partially thrombosed giant aneurysms with tortuous internal vascular channel. The rarity, large size, complex anatomy and hemodynamic characteristics of giant serpentine aneurysms make treatment difficult. The patient was a 33-year-old man, previously healthy, who presented with seizure. Computed tomography scan showed a giant heterogeneous lesion compatible with a thrombosed MCA aneurysm. Conventional angiography showed the false lumen and the filling of the distal MCA branches with a certain degree of arterial delay. The lesion was located between M2 and M3 segments of MCA. After extracranial-intracranial STA-MCA bypass was performed, we clipped the proximal M2 flowing to the GSA. Then we opened the aneurysm sac for decompression.. Postoperative cerebral computed tomography angiography revealed good patency from the STA to the MCA. The patient was neurologically intact without complains.

Conclusions: We conclude that microsurgical technique;STA-MCA bypass and aneurysm excision is a successful treatment method for a giant serpentine aneurysm.

Session 8. My BNS Cases (Case presentation)

Flow Diverting Stent for recanalized blister like aneurysm with SAH during acute period

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Purpose: To introduce flow diverting stent for recanalized blister like aneurysm.

Methods: Two cases for flow diverting stents with recanlized blister like aneurysm. Both patients were presented for SAH with blister like aneurysms. Initial treatments were stent-assisted coil embolization. After 1 week, recanalized blister aneurysms were detected by TFCA. Flow diverting stents were done for both patients.

Results: 6month followed angiogram showed complete occlusion of aneurysms.

Conclusions: Flow diverting stent would be a option for recanalized blister like aneurysm.

Session 8. My BNS Cases (Case presentation)

Alternate Simultaneous Bilateral Carotid Angiography in Y-stent Assisted Coil Embolization for An Anterior Communicating Artery Aneurysm with Triplicate A2 Variant

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Purpose: One of anomalies of the anterior cerebral artery, the triplicate A2 variant is not rare. An anterior communicating artery aneurysm involving a median/accessary anterior cerebral artery around aneurysm neck is challenging to treat because of potential unilateral/bilateral corpus callosum or parietal lobe infarction. Alternate simultaneous bilateral carotid angiography can differentiate triplicate A2 branches through time-difference alternate injection of contrast into bilateral carotid arteries and enhance anatomical understanding of complex anterior communicating artery aneurysms during complex endovascular treatment.

Methods: A 61-year-old woman presented with multiple unruptured aneurysms including anterior communicating artery (AcomA) aneurysm, left A1 and anterior choroidal aneurysms, and bilateral middle cerebral artery hypoplasia/occlusion on the catheter angiography. Simultaneous alternate bilateral carotid angiography through bifemoral access revealed an AcomA aneurysm having the wide neck of 6.33mm and a small bleb and involving a median/accessary anterior cerebral artery (Med/AccACA) (diameter 1.72mm) which originated from aneurysm neck and fed right superior internal parietal and inferior internal parietal arteries. Y-stent-assisted coil embolization was planned for this AcomA aneurysm treatment to preserve a Med/AccACA after 7-day pre-medication (daily aspirin100mg and plavix 75mg).

Results: A 6F Envoy DA guiding catheter (Cerenovus, Miami, FL, USA) was positioned up to left petrous internal carotid artery (ICA) and 5F diagnostic catheter was simultaneously positioned into right ICA. Initially, the first microcatheter (Excelsior SL-10 Pre-shaped 90, Stryker, Kalamazoo, Michigan, USA) over a Synchro-14 microwire (Stryker, Kalamazoo, Michigan, USA) was positioned up to left A2 and the second microcatheter (Excelsior SL-10 Pre-shaped 45) was inserted into aneurysm sac under the roadmap of left dominant simultaneous bilateral carotid angiography. The first Neuroform atlas stent 4x21mm (Stryker, Kalamazoo, Michigan, USA) was deployed from left A2 to left A1. Subsequently, the first microcatheter was reloaded into the deployed stent and passed through the stent struts up to a Med/AccACA under another simultaneous right dominant bilateral carotid angiogram. The second Neuroform atlas 3x21mm was deployed through the first microcatheter from a Med/Acc ACA to left A1 forming Y configuration. The first microcatheter was retrieved and complete coil embolization through thesecond microcatheter was conducted successfully. She had no event at 6-month follow-up without complications nor recurrence.

Conclusions: Our case showed that alternate simultaneous bilateral carotid angiography using time-difference contrast injection might be a crucial procedural enhancer during Y-stent assisted coil embolization for complex AcomA aneurysms like involving triplicate A2 variant.

Session 8. My BNS Cases (Case presentation)

Flow diversion treatment for dorsal wall aneurysms

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Purpose: To compare the treatment outcome of dorsal wall aneurysms between flow diversion and conventional coiling.

Methods: Case series of endovascular treatment of dorsal wall aneurysms.

Results: Selective cases show better outcome when treated with flow diversion.

Conclusions: Selective cases show better outcome when treated with flow diversion.

E-poster

- The Efficacy and Safety of Diagnostic Catheter for Cerebrovascular Disease using GENOSS Initiator™
  Giyong Yun (Soon Chun Hyang University, Korea)
- Endovascular treatment for large (>10 mm) basilar tip aneurysms: a retrospective case series
  Min Jeoung Kim (Severance hospital, Korea)
- Coil Embolization of Intracranial Aneurysms using Accero Stent
  Hee Chang Lee (Seoul National University Hospital, Korea)
- Added predictive values of Proton density MR on Posterior communicating artery aneurysm and surrounding soft tissues with simple classification
  Sun Yoon (Severance hospital, Korea)
- Continuous intravenous tissue plasminogen activator injection via superior sagittal sinus for cerebral venous sinus thrombosis
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- Single Institutional Experience of Minipterional Approach for Clipping of Anterior Circulation Aneurysms
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- Longitudinal observation of the aneurysm size after flow diversion: Potential role in the evaluation of the treatment response
  YunHyeok Choi (Asan Medical Center, Korea)

- Blood blister-like aneurysms at the posterior circulation; cases review of single-center experiences
  Eun Ji Moon (Asan medical center, Korea)

- Surgical construction of wide-neck bifurcation experimental aneurysm in canine model
  Hongbum Kim (Gangneung Asan Hospital, Korea)

- Mechanical thrombectomy of M2-3 occlusion: A single-center retrospective study
  Hyuntaek Rim (Seoul National University Hospital, Korea)

- Watershed shift phenomenon in MCA occlusion patients after direct revascularization surgery
  Sol Hooy Oh (Seoul St. Mary's Hospital, Korea)

- Lens Dose Reduction by Table Height Adjustment During Three-dimensional Cerebral Angiography
  Jae-Chan Ryu (Asan Medical Center, Korea)

- Comparison of vacuum pressures and suction forces generated by different pump systems for aspiration thrombectomy
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- Delayed coil migration from anterior communicating aneurysm
  Min Park (Jeon-ju jesus hospital, Korea)

- Neurogenic pulmonary edema and Tako-tsubo cardiomyopathy in aneurysmal subarachnoid hemorrhage
  Eui-Hyun Hwang (Ajou University hospital, Korea)

E-poster P-01

The Efficacy and Safety of Diagnostic Catheter for Cerebrovascular Disease using GENOSS Initiator™

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Purpose: Unlike others, there is distinctive aspects of diagnostic catheter for cerebrovascular disease. The diagnostic catheter for cerebrovascular approach can navigate and advance to the distal arteries through acute angle and multi-branched small arteries. Ultimately, it should have these features; 1) Axial rigidity for pushing and penetration purpose, 2) Torsional rigidity for controlled and proper manipulation, 3) Flexible rigidity for distal access. So, this study is designed to confirm the efficacy and safety of GENOSS Initiator™ as a diagnostic catheter for cerebrovascular disease comparing with the universal catheter.

Methods: This study was a multicentered prospective randomized control trial of 420 patients from June 2021 to January 2022. Experimental group of 211 patients was diagnosed with GENOSS catheter and control group of 209 patients was diagnosed with universal catheter. (COOK, etc.) The physicians are all neurosurgeon of stroke intervention certificated by KoNES. (Korean Neuro-Endovascular Society) So, the result of study would be very reliable at comparing the new device with universal catheter. Moreover, the safety of experimental group would be guaranteed. The patient needed cerebral DSA (digital subtraction angiography) to diagnose the cerebrovascular disease was included. Age criteria was older than 18 years old and less than 80 years old. The exclusion criteria were as follows; 1) More over moderate neurological disorder (modified Rankin Scale score 3), 2) Previous history of open heart surgery or percutaneous coronary intervention, 3) Ongoing stroke patient who could not distinguish procedure-related infarction form original infarction, 4) High risk of vascular injury on congenital disease, (Sickle cell disease, Marfan's syndrome, Polycystic kidney disease, Ehlers-Danlos syndrome) 5) Extreme tortuosity or severe stenosis of iliac artery, abdominal aorta, aortic arch, common carotid artery, vertebral artery. The primary endpoint for efficacy was procedural success rate. The second endpoint of efficacy was device success rate. The flexibility of catheter tip at iliac artery, aortic arch, carotid bifurcation was evaluated, and torsional rigidity on manipulation was also evaluated with scoring system. The primary endpoint for safety was major adverse cerebrovascular events and permanent complications including death. The second endpoint for safety was vascular injury like dissection, perforation, thromboembolic event.

Results: Torsional rigidity of GENOSS catheter was superior to universal catheter. (GENOSS catheter; 4.877±0.462, Universal catheter; 2.732±0.661, GENOSS-control Mean difference 95% Cl 2.145, P-value<0.001) Primary endpoint for efficacy was achieved from both groups. (over 98%) Also, primary and secondary endpoint for safety were achieved from both groups. (100%)

Conclusions: The domestic GENOSS catheter verifies better torsional rigidity than universal catheter. So, it will be expected to the alternatives for the foreign-made catheter. Of course, its safety is guaranteed without a doubt.

E-poster P-02

Endovascular treatment for large (>10 mm) basilar tip aneurysms : a retrospective case series

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Purpose: To report the long-term clinical and angiogrphic outcomes of the endovascular treatment of large/giant basilar tip aneurysms (BTAs) in our institutions.

Methods: We retrospectively reviewed cases of BTA larger than 10 mm that received endovascular treatment between January 2009 and December 2019. Data on the demographic and clinical characteristics and radiologic severity were obtained from the patients' medical records. The collected clinical follow-up data included neurological evaluation. Magnetic resonance angiography (MRA) was performed 6 to 12 months after the procedure, followed by once every 1 to 2 years as needed.

Results: A total of 12 patients with BTA were included in this study. The median age was 60.08 years (27–80 years), and the mean clinical follow-up was 66.78 months (19.00–142.87 months). Almost half of the patients presented with unruptured BTAs (58.33%, n=7). The median maximum aneurysm diameter was 13.00 mm (10.46–20.90 mm) and the mean neck size was 8.34 mm (4.82–13.04 mm). A Modifed Raymond Roy Classifcation (MRRC1) of 1 or 2 was observed in 66.67% of the patients (n=8) immediately after the frst procedure. Procedural morbidity and mortality were 33.33% and 8.33%, respectively. Major recanalization occurred in two patients, one of whom underwent additional coiling with the other being merely observed due to older age.

Conclusions: It is very difcult to cure a large BTA completely at once and recanalization occurred often after endovascular treatment. Conducting long-term follow-up studies at short intervals is warranted, as well as improving existing treatment methods and developing new approaches.

E-poster P-03

Coil Embolization of Intracranial Aneurysms using Accero Stent

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Purpose: Stent-assisted coiling is an effective method of treating intracranial aneurysms, especially in case of wide-necked aneurysms. Accero stent is a novel, self-expandable braided stent with a closed-cell design. We present procedural outcome and follow-up results of patients who were treated with stent-assisted coiling with Accero stent.

Methods: In this retrospective single-center study, clinical and radiological outcomes were analyzed for 27 patients with 29 aneurysms suitable for stent-assisted coil embolization between November 2020 and August 2022. Magnetic resonance angiography was performed to evaluate midterm follow-up results, when available.

Results: Among the 29 unruptured aneurysms treated with Accero-assisted coiling, 22 aneurysms were previously untreated aneurysms and the other 7 aneurysms were recanalized aneurysms. Aneurysm location was internal carotid artery (14 cases), posterior communicating artery (10 cases), ophthalmic artery (3 cases), and anterior choroidal artery (2 cases). At the evaluation of Raymond-Roy occlusion classification (RROC) immediately after the procedure, class I was achieved in 24 aneurysms and class III in 5 aneurysms. Segmental incomplete expansion of Accero was observed in 3 patients: 2 of them finally acquired the adequate stent expansion after the stentoplasty performed with balloon catheter, and the other 1 of them didn't need to perform additional rescue procedures to expand the stent because the stent functioned well to stabilize the coils. On midterm follow-up imaging 6 months after the procedure, available for 15 patients (15 aneurysms), all aneurysms were completely obliterated (RROC class I), including 2 aneuryms which were initially evaluated as RROC class III at the procedure. No patients had thromboembolic complications or newly detected neurologic deficits.

Conclusions: Stent-assisted coiling with the Accero stent seemed to be effective and safe in treating wide-necked aneurysms, even though there is an occasional issue about segmental incomplete expansion of stent.

E-poster P-04

Added predictive values of Proton density MR on Posterior communicating artery aneurysm and surrounding soft tissues with simple classification

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Purpose: Preoperative evaluation of posterior communicating artery (PCoA) aneurysms with relation to the surrounding anatomical structures is essential to determine adjuvant surgical procedures. However, there is a lot of ambiguity in the presentation of this relation in the previously reported image-based literature. Therefore, we aimed to present this association using preoperative high-resolution three-dimensional proton density-weighted turbo spin-echo *magnetic* resonance (PDMR) imaging with simple classification.

Methods: *A* total of 84 patients underwent microsurgical clipping for unruptured PCoA aneurysm in a single institution from January 2020 to April 2022. Among them, thirty patients underwent PDMR before surgery. We retrospectively reviewed the radiographic images and operative data of these thirty patients. The structural relationship described by PDMR and intraoperative findings were compared. Then, we classified aneurysms into two groups and compared the rate of adjuvant surgical procedures and contact with the surrounding structures.

Results: Correlation between preoperative PDMR and intraoperative findings for oculomotor nerve contact (27/30, 90.0%), temporal uncus adhesion (26/30, 86.7%), and anterior petroclinoid fold (APCF) contact (27/30, 90.0%) reported a sensitivity of 0.92, 0.83, and 0.90 and specificity of 0.88, 0.88, and 0.89, respectively. In twelve patients (40.0%), an aneurysm dome was placed on the oculomotor triangle and classified as the infratentorial group. Compared to the rest, adjuvant procedures were required more frequently (66.7% vs. 22.2%, p=0.024) for infratentorial type PCoA aneurysms.

Conclusions: Preoperative PCoA aneurysm categorization using PDMR can be useful for predicting surgical complexity and planning of microsurgical clipping.

E-poster P-05

Continuous intravenous tissue plasminogen activator injection via superior sagittal sinus for cerebral venous sinus thrombosis

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Purpose: Cerebral venous sinus thrombosis (CVST) can cause venous infarction. Anticoagulation is optimal treatment for CVST. However, some of the patients does not response for medical treatment, leading to progressive neurological deterioration. We aimed to report a continuous intravenous injection of tissue plasminogen activator (tPA) via superior sagittal sinus for medically intractable cerebral venous sinus thrombosis.

Methods: A 40-year-old woman presented with seizure. Initial magnetic resonance imaging scan showed acute ischemic infarction with focal microbleeding on left parietal lobe due to superior sagittal sinus (SSS) thrombosis. Digital subtraction angiography (DSA) showed occlusion involving posterior half of the SSS. The patient underwent intravenous mechanical thrombectomy but minimal recanalization of SSS was achieved. On the next day, the patient was deteriorated consciousness with stuporous mentality, and follow-up computed tomography showed increased extent of hypodense areas in both parietal lobes. Follow-up angiography showed occlusion of SSS again. We performed additional intravenous mechanical thrombectomy but partially recanalized. So, we performed continuous intravenous injection of tPA for 24hrs via microcatheter which was located on the SSS.

Results: After procedure, SSS was partially recanalized and not fully occluded. The lesion of venous infarction was not extended. And the consciousness of the patient was recovered with alertness. A right sided hemiparesis was remained immediately (mRS 5), but slowly recovered after 1 month (mRS 3).

Conclusions: Anticoagulation is optimal treatment for cerebral venous sinus thrombosis. However, in case of medically intractable CVST, continuous intravenous injection of tPA may a role to prevent the progress the venous infarction.

E-poster P-06

Single Institutional Experience of Minipterional Approach for Clipping of Anterior Circulation Aneurysms

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Objective: To evaluate the feasibility and safety of minipterional semi-key-hole approach for anterior circulation aneurysm clipping.

Materials and methods: Retrospective review of anterior circulation intracranial aneurysms treated with minipterional approach (MPA) during the period from 2016 to 2021 was performed. Variables of aneurysm size, rupture risk prediction with PHASES score, morphological irregularity, craniotomy size and complications were evaluated. All the lesions were evaluated for the completeness of clipping with cerebral angiography.

Results: Total 56 patients with 58 aneurysms were treated with MPA. The mean age of patients was 62.43 years. Majority of cases were unruptured ones except 8 cases. The location of aneurysms was various with predominance of middle cerebral artery (MCA) of 41 cases. Mean value of PHASES score was 6.22 (range 4-13), aspect ratio was 1.07 (range 0.54-3.08), and length of the aneurysm was 4.29 mm (range 2.02-12.06). Forty aneurysms had irregular morphology and 32 cases had one or more blebs. Temporary clipping was performed in 23 cases and motor evoked potential decrement during temporary clipping was observed in 11 cases, which resulted in no ischemic symptom after surgery. Mean craniotomy size was 4.64x3.44 cm^2. There was a case of parent artery laceration during sylvian fissure dissection which was repaired with primary suture without any clinical deterioration. There was no postoperative rebleeding nor any type of intracranial hemorrhage. Three patients showed frontal facial nerve palsy. Angiographic follow-up revealed complete exclusion of aneurysm in 54 cases (93.1%) and partial neck remnant in 4 cases (6.9%).

Conclusion: Clipping of anterior circulation of intracranial aneurysm via MPA was effective in the aspect of completeness of clipping. It was safe with acceptable complication rate. Especially, the unruptured MCA aneurysm seems to be the most suitable candidate for this approach.

Key words: aneurysm, clip, minipterional approach

MCA: middle cerebral artery, MPA: minipterional approach, PHASES: Predict risk of rupture for asymptomatic intracranial aneurysms Population/Hypertension/Age/Size of aneurysm/Earlier subarachnoid hemorrhage/Site of aneurysm.

E-poster P-07

Longitudinal observation of the aneurysm size after flow diversion: Potential role in the evaluation of the treatment response

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Purpose: After flow diversion(FD) therapy for the cerebral aneurysms, the current gold standard for the evaluation of the treatment response is DSA by observing the occlusion status of the aneurysm neck although other imaging tools, such as CTA or MRA are also commonly used for that purpose. We thought that cross-section imaging tools might serve more information since they would reveal associated morphologic changes such as the aneurysm sac itself. The purpose of this study was to observe a longitudinal volume change of the treated aneurysm sac after FD and to reveal any association of aneurysm volume change and aneurysmal occlusion status.

Methods: A total of 84 patients initial treated with FD of unruptured aneurysms at Asan Medical Center between 2014 and 2021 and having longer than 12 months of imaging follow-up were enrolled . We calculated the aneurysm size by simple measurement of X-and Y- axis diameter on the most representative section on the axial CT or MR images obtained before FD, right after FD, and thereafter for the imaging follow-ups. The trend of longitudinal aneurysm size change and aneurysm obliteration was analyzed.

Results: Patients were a median age of 53 years and the majority were women. The mean follow up period was 24.3 months. 53 patients (63%) was sorted to obliteration of the aneurysm during the follow up period. Other 31 patients was thought to be in the endothelizing status. And we used various flow diverter stents; fourty nine Pipeline, twenty nine FRED and six others group(S urpass Evolve and Surpass Streamline). We analyzed datas using Random Intercepts and Trend Model using linear mixed model. Overall outcome was that the size of the aneurysm decreases -0.1392mm per day ($P<0.001$). And there was significant decreasing size trend between the Pipeline group and FRED group($Pr>F$ 0.03).

Conclusions: Not only the angiographic obliteration of the aneurysm neck but also the volume reduction on the cross-sectional imaging could also be the good indicators of appropriate aneurysmal healing.

E-poster P-08

Blood blister-like aneurysms at the posterior circulation; cases review of single-center experiences

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Purpose: Blood blister-like aneurysms are rare but crucial prognosis. Even after proper treatment for this condition, recurrence with rebleeding have frequently led to catastrophic outcomes. Three cases of pseudoaneurysm formation following rupture of intracranial aneurysms on the posterior circulation were treated by endovascular management in our single institute between 2018 and 2022. In light of the rarity and deadly prognosis of this blood blister-like aneurysms on the posterior circulation, we want to share our experiences.

Methods: Between January 2018 and June 2022, three cases of blood blister-like aneurysms on the posterior circulation, especially on superior cerebellar artery (SCA) origin that ruptured few days after were reviewed.

Results: In all cases, early imaging studies revealed subarachnoid hemorrhage (SAH) without definite aneurysmal lesion. Following evaluation, a newly developed pseudoaneurysm on the posterior circulation, particulary incorporate with SCA, was discovered. Case 1: A 65-year-old male who had a severe headache, thin SAH at basal cistern without any aneurysmal lesion was identified. Repeated DSA performed after 10 days and 17 days showed growing pseudoaneurysm at the left SCA. LVIS blue stent was sole deployed at the left PCA to the basilar trunk in this case. Case 2: A 39-year-old female with non-aneurysmal SAH arrived with a severe headache. Chemical angioplasty for vasospasm was performed after 10 days, and it unintentionally discovered a new saccular aneurysm at the left SCA. Fortunately, these patients were discharged with good mRS scales (0 to 1). The last case was a 69-year-old female who had ruptured aneurysm at the left SCA with diffuse, thick SAH. Emergent endovascular treatment with coil was carried out. She regained alertness without experiencing any neurologic deficit. But after a few days, a sudden intense headache with mentality alteration was occurred. There was SAH with ICH, and at the previously treated left SCA aneurysm, pseudoaneurysm was developed. Additional coil insertion was performed, and decompressive suboccipital craniectomy was performed. Despite of serial treatment, she was remained in vegetative status.

Conclusions: Blood blister-like aneurysm is extremely rare, especially in posterior circulation. We should aware of recurrence and rebleeding with dismal prognosis even after receiving adequate endovascular treatment.

E-poster P-09

Surgical construction of wide-neck bifurcation experimental aneurysm in canine model

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Purpose: Stents are increasingly used for coiling of difficult aneurysms, to reduce the risk of recurrences, or to modify blood flow. Currently available bifurcation aneurysm models are ill-suited to assess stent performance before clinical use. We designed a new animal model of wide-neck canine Y-type bifurcation aneurysm (such as middle cerebral artery (MCA) bifurcation) and previously reported one of T-type (such as basilar bifurcation). Its potential value as a training tool as well as in the evaluation of new techniques or stent or embolic agents was assessed.

Methods: Seven canine aneurysms were created (three: Y-type, four: T-type). Aneurysms were followed by trans-femoral cerebral angiography (TFCA) and computed tomography angiography (CTA). We performed TFCA and self-expandable stent placement for parent artery adjoined to aneurysmal neck in one month's follow-up. We assessed long-term patency of parent artery with CTA and euthanasia and got a specimen for pathologic study at 6 months' follow-up.

Results: In six models except one (T-type), wide-neck bifurcation aneurysm was created successfully and they showed good long-term patency at 6 months' follow-up. Stent placement was technically difficult in these cases, but did not lead to aneurysm thrombosis in CTA or neo-intimal closure of the aneurysm neck in pathologic finding at post-operative 6 months later.

Conclusions: This model may be suitable for studying the effects of endovascular treatment on aneurysm and branch occlusion rates, for preclinical testing of stents and other intravascular devices and for training students of endovascular technique.

E-poster P-10

Mechanical thrombectomy of M2-3 occlusion: A single-center retrospective study

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Purpose: Mechanical thrombectomy (MT) has become a safe and effective treatment for large vessel occlusion. But treatment and efficacy of mechanical thrombectomy for medium vessel occlusion (MeVO) is still controversial. The aim of this study is to evaluate the recanalization therapies of MeVO in middle cerebral artery (MCA) and their outcomes.

Methods: Single-center retrospective analysis of patients with MeVO in MCA was done. Radiographic finding and reperfusion therapies were correlated with radiographic and clinical outcomes.

Results: A total of 44 patients (22 men [50 %]; mean [SD] age, 67.27 [12.9]; median [SD] baseline National Institutes of Health Stroke Scale [NIHSS] score, 11.35 [5.9]) were enrolled. Patients were treated with stent retrieval (6, 13.6 %), aspiration (7, 15.9 %), or combined therapy (26, 59.1%). The recanalization rate more than modified Treatment in Cerebral Infarction scale (mTICI) 2b/3 was achieved with 77.2 %. And good clinical outcome with modified Rankin Scale (mRS) $\leq$ 2 was achieved with 52.3 %. There was no significant difference between reperfusion therapies and the recanalization rate. Baseline NIHSS (OR, 1.154; p-value, 0.026) and angiographic defect in central a. (OR, 4.636; p-value 0.027) were associated with poor clinical outcome (mRS > 2)

Conclusions: Mechanical thrombectomy of MeVO in MCA is efficient and safe with either stent or aspiration therapies. Baseline NIHSS and involvement of central artery is associated with poor clinical outcome.

E-poster P-11

Watershed shift phenomenon in MCA occlusion patients after direct revascularization surgery

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Purpose: Superficial temporal artery (STA) – middle cerebral artery (MCA) anastomosis is most widely used treatment for patients with moyamoya disease or MCA occlusion. Neurologic deterioration after revascularization surgery is common and may be challenging to diagnose. Watershed phenomenon may be considered in case of increased cerebral blood flow of anastomosis site combined with cerebral edema. We introduce a case of watershed shift phenomenon presenting with global aphasia few days after surgery.

Methods: 66-year old male presented with dysarthria and right side weakness. Patient was diagnosed with acute infarction on Lt. basal ganglia and frontal cortex, and was admitted to local hospital to receive conservative treatment. After discharge, patient visited our hospital to receive trans-femoral carotid angiography and was diagnosed with left MCA occlusion. Patient went through STA-MCA anastomosis and encephalo-duro-myo-synangiosis.

Results: Although blood pressure and fluid management was strictly under control after surgery, patient presented sudden dysarthria on post-operative day 1. Immediate diffusion showed left temporal lobe infarction. Patient's dysarthria gradually improved with hydration. On post-operative day 2, patient showed mild aphasia. Computed tomography showed focal sulci effacement on vertex and temporal lobe, suggesting cerebral hyperperfusion (CHP), with no apparent cerebral hemorrhage or infarction. Patient's aphasia was improved after normotensive blood pressure control. MRI taken next day after surgery showed sulci effacement and edematous change on left cerebral cortex adjacent to anastomosis site. Patient symptom improved for next few days, but on 1 weeks after surgery patient showed sudden and severe degree global aphasia. CT perfusion showed hypoperfusion of temporal lobe cortex adjacent to anastomosis site with decreased cerebral blood flow and delayed mean transit time with little change of cerebral blood volume. Patient was applied with norepinephrine and blood pressure control was target to 150~160mmHg. Patient showed relief of global aphasia, and NEP was gradually removed after a week with normotensive blood pressure control. Patient was discharged from hospital on POD 18.

Conclusions: Based on the symptom presentation and series of image findings after surgery, it is reasonable to assume the patient experienced watershed shift phenomenon. Although most common complication after revascularization surgery is cerebral hemorrhage or acute infarction, rare complications such as watershed shift phenomenon must always be differentiated when neurologic deterioration occur.

E-poster P-12

Lens Dose Reduction by Table Height Adjustment During Three-dimensional Cerebral Angiography

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Purpose: With the development of cerebral digital subtraction angiography (DSA), 3D rotational angiography (3D-RA) is considered to be the indispensable neuro-interventional device in the investigation of aneurysm. However, additional 3D-RA could lead to expose patients to higher radiation doses, especially to the lens which is one of sensitive organs to radiation exposure. Our previous phantom study showed that the adjustment of table height can reduced the radiation dose to the lens. The purpose of this study is to confirm our hypothesis that the adjustment of table height will affect the radiation dose applied to the lens and to evaluate the effect and feasibility of this method to the patients.

Methods: We enrolled 20 patients scheduled to undergo cerebral DSA for the diagnostic evaluation of known unruptured intracranial aneurysms between June 2022 and July 2022. Patients who needed 3D-RAs in both internal carotid arteries (ICAs) due to suspicion of bilateral lesions or anterior communicating artery lesion were prospectively included. While obtaining the 3D-RA on bilateral ICAs, a different table height was applied where a conventional protocol was used for the one side and a reduction dose protocol for the other side. In the conventional protocol, the field-of-view is reduced as long as the target lesion is sufficiently included in the Z-axis and aligned with the center of the head in the X- and Y-axis. In the reduction dose protocol, we first drew an imaginary circle along the choroidal blush observed in the lateral view of the 2D ICA angiography performed just before the 3D-RA. Then, the table height was adjusted so that the anterior end of the FOV located outside the circle which was about 2.0 cm to 2.5 cm ascent. All angiograms were obtained using a biplane angiography machine (Artis Zee; Siemens, Forchheim, Germany). The 3D-RA was acquired with 5 seconds of C-arm rotation (70 kV peak voltage; 0.24 μGy/frame in dose; 200° in rotation angle; 133 projection images). The focal spot size was 0.4 mm (small) for 3D-RA. The kVp, milliampere (mA), pulse width, and copper filter were automatically determined by the angiographic system in the fixed routine protocol. Image protocols in these studies were the same as the optimized routine protocol used in our angiography suite. The Radiophotoluminescent glass dosimeter (PLD) reader system comprises PLD and the FGD-1000 automatic reader unit (AGC Techno Glass Co., LTD., Japan). Three PLDs per eye were used and the average value was used to measure the dose applied to the lens. The PLDs are placed side by side in a thin fabric pouch and are oriented perpendicular to the z-axis to prevent interference between each PLD. Two pouches were used for both eyes and attached to both sides of goggles made of thin and transparent film. The pouch was placed as close as possible to the lateral canthus of both eyes so that it was at the same level as the lens on lateral view. Moreover, the dose area product (DAP) which is usually measured with a radiation detector and the air kerma (AK) on the central x-ray beam axis were also compared between the two protocols.

Results: The mean age of the patients was 58.0 ± 9.4 years old, and 16 (80.0%) patients were female. Eleven patients performed dose reduction protocol on the right side. The table height was raised by 2.3 ± 0.1 cm on the dose reduction protocol side on average. There was significant difference in lens radiation dose between conventional protocol side and dose reduction protocol side (4653 [3993-4942] μGy vs. 789 [626-906] μGy, P<0.001). On the dose reduction protocol side, approximately 83% of radiation dose was reduced. In DAP, there was no difference in DAP between the two protocols (740 [640-769] μGy×m2 vs. 734 [635-789] μGy×m2, P=0.892). In AK, there was no difference in AK between the two protocols (75 ± 12 mGy vs. 76 ± 12, P=0.872).

Conclusions: The adjustment of table height could reduce the radiation dose to the lens by almost 80% without significant change of image quality. Especially, these lens dose reduction protocol can be performed in real-practice world.

E-poster P-13

Comparison of vacuum pressures and suction forces generated by different pump systems for aspiration thrombectomy

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Purpose: Aspiration thrombectomy is used to treat endovascular stroke treatment by clot removal through vacuum and suction forces. We aimed to investigate the pressures and suction forces generated by different pump systems for aspiration.

Methods: Vacuum pressure was measured using a vacuum gauge with a closed tip for the 60cc syringe and three different aspiration pumps. Using an artificial thrombus made from polyvinyl alcohol hydrogel and latex membrane, we assessed the catheter tip force generated on an artificial thrombus using 5Fr Sofia and 6Fr Sofia PLUS intermediate catheters combined with Penumbra Jet Engine or Stryker Medela AXS Universal Aspiration Set. Subsequently, we calculated the catheter tip forces based on the pressure and catheter tip size (force = area × pressure), and compared with the measured the catheter tip force.

Results: The 60cc syringe generated the highest vacuum pressure. Among the automatic pumps, the Penumbra jet engine generated the highest vacuum pressure. The catheter tip forces on the artificial thrombus and latex membrane were 18.5±1.70 and 8.0±1.23 gf, respectively and 13.9±1.37 and 5.6±0.83 gf, respectively using the 5 Fr Sofia with the Penumbra Jet Engine and Stryker Medela AXS Universal Aspiration Set, respectively. The corresponding values for the 6 Fr Sofia PLUS with the Penumbra Jet Engine and Stryker Medela pump were 39.7±3.88 and 20.7±0.92 gf and 25.4±4.96 and 18.0±0.84 gf.

Conclusions: The catheter diameter, vacuum pressure, and clot softness are positively correlated with the catheter tip force.

E-poster P-14

Delayed coil migration from anterior communicating aneurysm

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Introduction: Coil embolization is a common treatment for cerebral aneurysm. Cases of coil migrating during the procedure are reported from time to time. Yet, cases of delayed coil migration, which refers to coil migrating after the surgery, are rarely reported. We would like to report a case of delayed coild migration, which happened 12 days after the surgery.

Case report: A 51 year old man without any medical history came to the ER with sudden onset severe headache. SAH (Fissure grade 3) was found in Brain CT and Lt A1 dominant ruptured A-com aneurysm (Max:4.0mm, 3.0x2.1x4.0mm, Neck : 2.2mm) was seen on TFCA. Thus double catether coil embolization was proceeded. On POD5, the amount of SAH decreased and coil was stable in Brain CT. On POD 12, the patient complained about gait disturbance due to left leg weakness. Thus Brain CT was taken, and TCD was proceeded. On brain CT, the amount of SAH decreased, and coil was migrated. Mild spasm was seen in left A2 on TFCA compared to the one performed perviously. Stent insertion was performed for secure the coil. On POD 25, the patient was discharged without any symptom

Conclusion: In SAH patients, it is necessary to think about hemodynamic change after coil embolization. Even though delayed migration happens rarely, it would be good to consider its possibility.

E-poster P-15

Neurogenic pulmonary edema and Tako-tsubo cardiomyopathy in aneurysmal subarachnoid hemorrhage

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Objective: Neurogenic pulmonary edema (NPE) combined with Tako-Tsubo cardiomyopathy (TCM) is unique condition associated by aneurysmal subarachnoid hemorrhage (aSAH). Although several mechanisms have been proposed, the pathophysiology and management strategies are not yet fully established. The objective here was to determine the radiological and clinical outcome of patients with NPE with TCM after aSAH and to propose the management strategies.

Methods: In a retrospective clinical follow-up study, data were collected 564 consecutive patients who had been treated for aSAH at a single center between February 2015 and July 2022. We performed a literature review to assess the association of aSAH and NPE combined with TCM to aide in further understanding this clinical entity. 26 cases from 286 articles published between 1976 and 2022 were included from a PubMed search.

Results: In the 7 past years, eleven cases with aSAH were accompanied by NPE & TCM in our tertiary academic medical center. There were 1.9% occurrences of NPE and TCM after aSAH in the same period. Seven of the eleven cases were high grade aSAH(Hunt and Hess Grades Ⅳ and Ⅴ), while four were low grade aSAH(Grades Ⅱ and Ⅲ). The location of aneurysm was 27% at posterior circulation and 73% at anterior circulation. Ten cases were treated with coil embolization and one case was treated with clipping of aneurysm. The mortality rate combined with NPE & TCM was 9.1%, which is higher than total aneurysmal subarachnoid hemorrhage mortiality of 6.6%.

Conclusion: NPE combined with TCM is a unique finding in patients with aSAH, and severe clinical conditions may be an independent predictor of fatal outcome. Therefore, understanding of pathophysiology and appropriate diagnosis and management for this condition can provide improving outcome in patient with aSAH.

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충청남도 천안시 풍세면 남관리 200

케프라®엑스알서방정 500밀리그램, 750밀리그램(레비티라세탐)※

[제품명] 케프라®엑스알서방정 500밀리그램(레비티라세탐), 케프라®엑스알서방정 750밀리그램(레비티라세탐) **[전문의약품]** **[성상]** 500 mg 및 750 mg; 백색의 장방형 서방성 필름코팅정제 **[효능·효과]** 1.단독요법: 처음 뇌전증으로 진단된 2차성 전신발작을 동반하거나 동반하지 않는 부분발작의 치료(12세 이상), 2.부가요법: 기존 1차 뇌전증치료제 투여로 적절하게 조절이 되지 않는 2차성 전신발작을 동반하거나 동반하지 않는 부분발작의 치료(12세 이상) **[용법·용량]** 이 약은 서방성 정제이므로 분쇄하거나 분할 또는 씹지 않고 전체를 복용한다.이 약은 식사와 관계없이 투여할 수 있고, 충분한 양의 물과 함께 복용한다. 1일 용량은 1일 1회 복용한다. **1.부분발작의 단독요법 및 부가요법(12세 이상): 성인(18세 이상) 및 체중이 50kg이상인 청소년(12~17세):** 이 약은 1일 1회 1,000 mg으로 투여를 시작한다. 임상적 반응과 내약성에 따라, 2주마다 1일 1회 1,000 mg씩 증량 혹은 감량할 수 있으며, 최대권장용량은 1일 3,000 mg이다. **2.신장애 환자** 레비티라세탐 청소율이 신기능과 관련되어 있으므로 환자의 신장기능에 따라 개별적으로 투여한다. 신장애 환자에서의 용량조절은 의약품 첨부문서를 참조한다. **3.간장애 환자** 경증에서 중등증의 간장애 환자에는 용량조절이 필요치 않다. 중증의 간장애 환자의 경우, 크레아티닌 청소율은 신부전을 과소평가할 수 있다. 따라서 크레아티닌 청소율이 60 mL/min/1.73m² 미만일 경우 1일 유지량을 50% 감량하는 것이 좋다. **4.고령자(65세 이상)** 신기능이 약화된 노인 환자에서 용량조정이 권장된다. **[사용상의 주의사항] 1. 경고 1) 자살충동과 자살행동** 항뇌전증약을 복용한 환자에서 자살충동 또는 자살행동을 보이는 위험성이 증가되므로 항뇌전증약을 치료받은 환자는 자살충동 또는 자살행동, 우울증의 발현 또는 악화 및 기분과 행동의 비정상적 변화에 대하여 모니터링되어야 한다. 항뇌전증약을 처방받는 간질과 다른 많은 질병은 그 자체가 이환 및 사망, 치료기간 동안의 자살충동과 자살행동의 위험성 증가와 관련된다. 따라서 처방자는 항뇌전증약 처방 시 환자의 치료기간 동안 자살충동 또는 자살행동과 치료될 질병 간의 연관성 유무 및 이 약의 유효성을 함께 고려한다. **2) 신경정신과적 이상반응 부분발작;** · 성인 - 경구용 레비티라세탐은 1) 졸음, 피로, 2) 협조운동장애, 3) 행동이상 등의 중추신경계 이상반응을 발생시킨다. 졸음, 무력증, 협조운동장애는 레비티라세탐 일반정 투여 후 첫 4주 이내에 가장 빈번히 발생하였다. · 소아 - 레비티라세탐 일반정을 투여한 소아환자에 있어, 이 약은 졸음, 피로, 행동이상을 나타내었다. **3) 투약 중단** 이 약을 포함한 뇌전증치료제는 발작 빈도가 증가되는 잠재성을 최소화하기 위해 점진적으로 중단해야 한다. 이 약 투여를 중단하는 경우, 성인 및 체중이 50 kg이상인 청소년은 500 mg을 1일 2회 매 2-4주 마다 단계적으로 줄여나간다. 소아의 경우, 용량 감소는 매 2주마다 1일 2회 10 mg/kg를 초과해서는 안된다. **2. 다음 환자에는 투여하지 말 것** 1) 이 약의 주성분이나 다른 피롤리돈 유도체 또는 다른 구성성분에 과민 반응이 있는 환자 **3. 다음 환자에는 신중히 투여할 것** 1) 레비티라세탐을 투여받은 환자에서 자살, 자살 시도 및 자살 상상이 보고되었다. 우울 및/또는 자살 상상의 증상이 있는 경우 처방의에게 즉시 보고하도록 환자 (및 보호자) 에게 권고해야 한다. 2) 신장애 환자에 이 약을 투여하는 경우 용량 조정이 필요할 수 있다. 중증의 간장애 환자에서는 용량 선택 전에 신기능 검사가 권장된다(용법용량 참조). 3) 혈구수감소(호중구감소증, 무과립구증, 백혈구감소증, 혈소판감소증, 범혈구감소증)가 레비티라세탐 투여와 관련되어 있다고 알려져 있으며 일반적으로 투여개시시에 나타난다. 중대한 무력감, 발열, 재발성 감염 또는 응고장애를 경험한 환자의 경우 전혈구수 검사가 권고된다('4. 이상반응 5) 시판 후 수집된 이상반응'항 참조). 4) 이상행동 및 공격성 행동; 레비티라세탐은 자극과민성 및 공격성을 포함한 정신병적 증상과 행동이상을 유발할 수 있다. 레비티라세탐 투여 환자들은 기분 및/또는 인격 변화를 나타내는 정신과적 징후 발현에 대해 모니터되어야 한다. 그러한 행동들이 인지된다면 투여 조정 또는 점진적 투여 중단을 고려하여야 한다. 투여 중단 시, 용법용량 항을 참조한다. 5) 발작의 악화; 발작 악화라는 역설적인 반응이 특히 레비티라세탐 투여 초기 또는 용량 증가 시에 보고되었다. 발작의 악화가 발생한 경우, 환자는 의사와 즉시 상의하여야 한다. 6) 심전도 QT 간격 연장; 시판 후 경험에서 심전도 QT 간격 연장이 드물게 보고되었다. QTc 간격 연장 환자, QTc 간격에 영향을 미치는 약물을 병용하고 있는 환자, 또는 관련 심장질환 또는 전해질 장애가 있는 환자에게 투여 시 주의하여야 한다. **[제조원]** UCB Pharma S.A., Belgium **[수입자]** 한국유씨비제약㈜ 서울특별시 서초구 강남대로 369 A+ Asset Tower 4층

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