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9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

October 30 (Thu) – November 1 (Sat), 2025

SIGNIEL Busan, Korea

ABSTRACT BOOK

KoNES Korean NeuroEndovascular Society

Bi-Neurovascular Symposium

대한신경외과학연구재단 THE KOREAN NEUROSURGICAL RESEARCH FOUNDATION

Important dates

- Deadline for Abstract Submission: September 1 (Mon), 2025
- Deadline for Grant Application: September 1 (Mon), 2025
- Notification of Abstract Acceptance: September 19 (Fri), 2025
- Deadline for Pre-registration: September 30 (Tue), 2025

Program at a Glance

Oct 30 (Thu), 2025		
Session Time	Grand Ballroom	Ballroom 1+2
15:30-17:30		Pre-Congress Workshop BNS Skills Training with Video and Hands-on

Oct 31 (Fri), 2025			
Session Time	Grand Ballroom	Ballroom 1	Ballroom 2
07:00-08:00		Breakfast Seminar I - SIEMENS Healthineers Ltd. My Icono Experiences in Neurointerventions	Breakfast Seminar II Intracranial Arterial Stenosis
08:00-08:30	Opening Remarks		
08:30-09:30	Scientific Session I Ischemic Stroke	Interactive Booth Session I - SIEMENS Healthineers Ltd.	
09:30-10:00	Coffee Break		Interactive Booth Session II - Medtronic Korea
10:00-11:00	Scientific Session II AVM & AVF		
11:00-12:00	Scientific Session III Aneurysm Session I		
12:00-13:30	Luncheon Seminar I Stryker vs Medtronic vs Terumo Neuro - Flow Disruptor		
13:30-14:00	Coffee Break / Oral Poster Symposium I		Interactive Booth Session III - Stryker
14:00-15:00	Scientific Session IV Special Topics I - AI & Robotics		
15:00-15:30	Coffee Break / Oral Poster Symposium II		
15:30-16:30	Scientific Session V Special Topics II - Chronic Subdural Hematoma		
16:30-17:30	Scientific Session VI Aneurysm Session II - Mechanical Deformation of Flow Diverters		
17:30-18:00	Adjourn / Oral Poster Symposium III		
18:00-20:00		Gala Dinner	

Nov 01 (Sat), 2025			
Session Time	Grand Ballroom	Ballroom 1	Ballroom 2
07:00-08:00		Breakfast Seminar III Balt - Corpenic RC	Breakfast Seminar IV Terumo Neuro - WEB
08:20-08:30	Opening Remarks		
08:30-09:30	Scientific Session VII Free Paper I	Scientific Session VIII Free Paper II	Scientific Session IX Free Paper III
09:30-10:30	Scientific Session X New Device & Strategy	Interactive Booth Session IV - Balt	Interactive Booth Session V - Terumo Neuro
10:30-11:00	Coffee Break / Oral Poster Symposium IV		
11:00-12:00	Scientific Session XI Headache & CSF Disorders		
12:00-13:30	Luncheon Seminar II Medtronic vs Stryker vs Balt - Flow Diverter		
13:30-14:00	Coffee Break		
14:00-16:00		Meet The Expert I	Meet The Expert II
16:00-		Closing Remarks & Adjourn	

Program in details

Pre-congress, October 30

Ballroom 1+2		
15:30-17:30	**Pre-Congress Workshop - BNS Skills Training with Video and Hands-on** **Chair: Sukh Que Park (Soonchunhyang University, Korea)** **Joonho Chung (Pohang Stroke and Spine Hospital, Korea)**	
15:30-15:45	Aneurysm Coil Embolization **Dong Young Cho** *(Ewha Womans University, Korea)*	*21*
15:45-16:00	Flow Diverters and Flow Disruptors in the Treatment of Intracranial Aneurysms **Keun Young Park** *(Yonsei University, Korea)*	*22*
16:00-16:15	Mechanical Thrombectomy & Extra/Intracranial Stenting **Dong-Seong Shin** *(Soonchunhyang University, Korea)*	*23*
16:15-16:30	Endovascular Management of Intracranial Arterioveous Malformations & Dural Arteriovenous Fistulas **Jong Young Lee** *(Hallym University, Korea)*	*24*

Program in details

Day 1, October 31

Grand Ballroom

08:00-08:30	Opening Remarks **Dong Ik Kim (CHA University, Korea)** **Min Woo Baik (New Korea Hospital, Korea)** **Yong-Sam Shin (The Catholic University of Korea, Korea)**	
08:30-09:30	**Scientific Session I - Ischemic Stroke** **Chair: Yasushi Ito (Shinrakuen Hospital, Japan)** **Dong Ik Kim (CHA University, Korea)**	
08:30-08:45	Tenecteplase: What does it Change for the Interventionalist? **Minwoo Lee** *(Hallym University, Korea)*	*26*
08:45-09:00	Is There a Role of Advanced Imaging in Decision-Making for Mechanical Thrombectomy in Acute Stroke? **Hyun Jeong Kim** *(The Catholic University of Korea, Korea)*	*27*
09:00-09:15	Our Latest MT Strategy for M2 Occlusion Using AXS Vecta46 Aspiration Catheter **Kazutaka Uchida** *(Hyogo Medical University, Japan)*	*28*
09:15-09:30	Super Large Bore Catheter **Hal Rice** *(Gold Coast University Hospital, Australia)*	*29*
09:30-10:00	*Coffee Break*	
10:00-11:00	**Scientific Session II - AVM & AVF** **Chair: Akio Hyodo (Kamagaya General Hospital, Japan)** **Hae Woong Jeong (Inje University, Korea)**	
10:00-10:15	Latest Evolutions in the Use of 6D Imaging in Curative AVM Embolization **René Chapot** *(Alfried Krupp Krankenhaus Rüttenscheid, Germany)*	*31*
10:15-10:30	Advances in AVM Research and Treatment [Online] **Adnan H. Siddiqui** *(SUNY University at Buffalo Jacobs School of Medicine & Biomedical Sciences, USA)*	*32*
10:30-10:45	Curative Embolization for Anterior Cranial Fossa dAVFs Using Various Access Routes **Tomoaki Terada** *(Showa University, Japan)*	*33*
10:45-11:00	Angioarchitecture and Endovascular Treatment of Tentorial Dural AVFs **Yasunari Niimi** *(St. Luke's International Hospital, Japan)*	*34*
11:00-12:00	**Scientific Session III - Aneurysm Session I** **Chair: Ossama Yassin Mansour (Alexandria University, Egypt)** **Young Il Chun (Konkuk University, Korea)**	
11:00-11:12	Experience in the Treatment of 70 Fusiform Basilar Aneurysms **René Chapot** *(Alfried Krupp Krankenhaus Rüttenscheid, Germany)*	*36*
11:12-11:24	Flow Diverter in Bifurcation Aneurysms **Gaurav Goel** *(Medanta Hospital, Gurgaon, India)*	*37*
11:24-11:36	Troubles in Flow Diverter Treatment **Shinichi Yoshimura** *(Hyogo Medical University, Japan)*	*38*
11:36-11:48	Tips and Pitfalls about Intrasaccular Devices for Bifurcation Aneurysms **Tomoyuki Tsumoto** *(Showa University, Japan)*	*39*
11:48-12:00	WEB vs. Coiling: Propensity Score-Matched Study **Hyun-Seung Kang** *(Seoul National University, Korea)*	*40*

Program in details

Day 1, October 31

Grand Ballroom

12:00-13:30	**Luncheon Seminar I [Stryker vs Medtronic vs Terumo Neuro] - Flow Disruptor** **Chair: Affan Priyambodo (RSUP DR I.G.N.G Ngoerah, Indonesia)** **Seong-Rim Kim (The Catholic University of Korea, Korea)**	
12:00-12:25	Artisse in Focus: One-Year Evidence from INSPIRE-A and Key Device Features **Hal Rice** *(Gold Coast University Hospital, Australia)*	*42*
12:25-12:50	Evaluating the Safety and Effectiveness of Contour: Clinical Experience and Insights **Gaurav Goel** *(Medanta Hospital, Gurgaon, India)*	*43*
12:50-13:15	Predictors of Outcomes after WEB Treatment from the Korean WEB Registry **Hyun-Seung Kang** *(Seoul National University, Korea)*	*44*
13:15-13:30	Discussion	
13:30-14:00	*Coffee Break* / Oral Poster Symposium I	
14:00-15:00	**Scientific Session IV - Special Topics I - AI & Robotics** **Chair: Kenji Sugiu (Okayama University, Japan)** **Yong-Cheol Lim (Ajou University, Korea)**	
14:00-14:15	Usefulness of Intraoperative AI Assist during Transarterial Embolization for Dural Arteriovenous Fistula **Tomoyuki Tsumoto** *(Showa University, Japan)*	*46*
14:15-14:30	Robotic Mechanical Thrombectomy - Fiction or Near Future **Kamil Zeleňák** *(Comenius University's Jessenius Faculty of Medicine and University, Slovakia)*	*47*
14:30-14:45	Angiographic Robotics - Terminator's Touch? [Online] **Jens Fiehler** *(University Medical Center Hamburg-Eppendorf, Germany)*	*48*
14:45-15:00	Discussion	
15:00-15:30	*Coffee Break* / Oral Poster Symposium II	
15:30-16:30	**Scientific Session V - Special Topics II - Chronic Subdural Hematoma** **Chair: Shigeru Miyachi (Aichi Medical University, Japan)** **Yong-Sam Shin (The Catholic University of Korea, Korea)**	
15:30-15:45	Anatomical Considerations Pertinent to the MMA Embolization for Chronic SDH **Hal Rice** *(Gold Coast University Hospital, Australia)*	*50*
15:45-16:00	Materials for MMA Embo for SDH [Online] **Adnan H. Siddiqui** *(SUNY University at Buffalo Jacobs School of Medicine & Biomedical Sciences, USA)*	*51*
16:00-16:15	MMA Embolization in Chronic SDH Therapy - Discussing the Clinical Benefit [Online] **Jens Fiehler** *(University Medical Center Hamburg-Eppendorf, Germany)*	*52*
16:15-16:30	Discussion	

Program in details

Day 1, October 31

Grand Ballroom		
16:30-17:30	**Scientific Session VI - Aneurysm Session II - Mechanical Deformation of Flow Diverters** Chair: Adnan H. Siddiqui (SUNY University at Buffalo Jacobs School of Medicine & Biomedical Sciences, USA) Hyun-Seung Kang (Seoul National University, Korea)	
16:30-16:45	Clinical Implications of Mechanical Deformation [Online] **Jonathan Cortese** *(Bicêtre University, France)*	*54*
16:45-17:00	Braid Deformation of Flow Divertors: Material Matters? **Gaurav Goel** *(Medanta Hospital, Gurgaon, India)*	*55*
17:00-17:15	Management Strategies: Preventing and Fixing Deformation **Yilmaz Onal** *(Health Sciences University FSM Hospital, Turkey)*	*56*
17:15-17:30	Discussion	
17:30-18:00	Adjourn / Oral Poster Symposium III	

Program in details

Day 1, October 31

Ballroom 1		
07:00-08:00	**Breakfast Seminar I - SIEMENS Healthineers Ltd. My Icono Experiences in Neurointerventions** **Chair: Khairul Azmi Abd Kadir (University of Malaya, Malaysia)** **Seung Hun Sheen (CHA University, Korea)**	
07:00-07:20	Muiti-Phase Cone-Beam CT "Rapid Angio", Utilization and Validation **Yasushi Ito** *(Shinrakuen Hospital, Japan)*	*58*
07:20-07:40	Clinical Application of DCT Micro in Arteriovenous Shunts: From Imaging to Strategy **Jieun Roh** *(Pusan National University, Korea)*	*59*
07:40-08:00	Reflections on My Clinical Experience with Aneurysm Imaging Using Icono **Jong Hyun Park** *(Soonchunhyang University, Korea)*	*60*
08:30-11:00	**Interactive Booth Session I - SIEMENS Healthineers Ltd.**	
13:30-14:00	*Coffee Break* / Oral Poster Symposium I	
15:00-15:30	*Coffee Break* / Oral Poster Symposium II	
17:30-18:00	Adjourn / Oral Poster Symposium III	
18:00-20:00	Gala Dinner	

Program in details

Day 1, October 31

Ballroom 2		
07:00-08:00	**Breakfast Seminar II - Intracranial Arterial Stenosis** Chair: Anchalee Churojana (Mahidol University, Thailand) Sangwon Lee (Pusan National University, Korea)	
07:00-07:20	Best Medication and Best Indication for Stenting in ICAD **Cuong Tran Chi** *(Can Tho S.I.S General Hospital, Vietnam)*	*62*
07:20-07:40	Intracranial Stents: Personal Experience & Future Perspective **Yi-Bin Fang** *(Tongji University, China)*	*63*
07:40-08:00	Timing and Indication for Bypass Surgery in Ischemic Stroke: Current Perspectives **Dongkyu Jang** *(The Catholic University of Korea, Korea)*	*64*
09:30-12:00	**Interactive Booth Session II - Medtronic Korea**	
13:30-16:00	**Interactive Booth Session III - Stryker**	
17:30-18:00	Adjourn / Oral Poster Symposium III	
18:00-20:00	Gala Dinner	

Program in details

Day 2, November 1

Grand Ballroom

08:20-08:30	Opening Remarks **SoonChan Kwon (President of KoNES)**	
08:30-09:30	**Scientific Session VII - Free Paper I** **Chair: Masaru Hirohata (Kurume University, Japan)** **Seok-Mann Yoon (Soonchunhyang University, Korea)**	
08:30-08:40	Clinical Outcomes of Coil Embolization for Unruptured Intracranial Aneurysms Categorized by Region and Hospital Size: A Nationwide Cohort Study in Korea **BongGyu Ryu** *(Seoul National University, Korea)*	*66*
08:40-08:50	Interim Results of Endovascular Coiling Using Target Tetra® Detachable Coils for Small Intracranial Aneurysms (TETRA Registry) **Kyu Seon Chung** *(Yonsei University, Korea)*	*67*
08:50-09:00	Flow Diversion in Posterior Communicating Artery Branch-Incorporating Aneurysms: A Comparative Mini-Series of Saccular and Fusiform Lesions **Fauziah Chaira Ummah** *(Universitas Indonesia, Indonesia)*	*68*
09:00-09:10	Longitudinal Braid Stability of Surpass Evolve® Flow Diverter in the Aspect of Fish-Mouthing Deformation **Minu Nahm** *(Yonsei University, Korea)*	*69*
09:10-09:20	Comparison of Clinical and Radiological Outcomes Between Pipeline Shield and Pipeline Vantage Flow-Diverting Stents **Dong Young Cho** *(Ewha Womans University, Korea)*	*70*
09:20-09:30	Early Clinical Experience with Surpass ELITE Flow Diverters: Technical and Clinical Considerations **Jungjae Kim** *(Yonsei University, Korea)*	*71*
09:30-10:30	**Scientific Session X - New Device & Strategy** **Chair: Shigeru Miyachi (Aichi Medical University, Japan)** **Tae Gon Kim (CHA University, Korea)**	
09:30-09:45	Endovascular Simulations Using Tailor-Made Vascular Model **Kenji Sugiu** *(Okayama University, Japan)*	*73*
09:45-10:00	Development of Endovascular Electrode and Their Potential Clinical Application **Yuji Matsumaru** *(University of Tsukuba, Japan)*	*74*
10:00-10:15	Effectiveness of CTO Wire for Recanalization of Chronic Total Occlusion in Supraaortic Arteries **Tomoaki Terada** *(Showa University, Japan)*	*75*
10:15-10:30	Initial Experience with Obtura, A New Liquid Embolizing Agent which Radiopacity Disappears with Time **René Chapot** *(Alfried Krupp Krankenhaus Rüttenscheid, Germany)*	*76*

Program in details

Day 2, November 1

Grand Ballroom		
10:30-11:00	*Coffee Break* / Oral Poster Symposium IV	
11:00-12:00	**Scientific Session XI - Headache & CSF Disorders** **Chair: Ichiro Nakahara (Fujita Health University, Japan)** **Sung-Kon Ha (Korea University, Korea)**	
11:00-11:15	Pathophysiology of Headaches (Migrane) and Current Management / Anatomy **Woo-Seok Ha** *(Yonsei University, Korea)*	*78*
11:15-11:30	MMA Embo for Chronic Migraine **Adnan H. Siddiqui** *(SUNY University at Buffalo Jacobs School of Medicine & Biomedical Sciences, USA)*	*79*
11:30-11:45	10 Things You Need to Know about CSF Venous Fistulas [Online] **Waleed Brinjikji** *(Mayo Clinic, USA)*	*80*
11:45-12:00	Discussion	
12:00-13:30	**Luncheon Seminar II [Medtronic vs Stryker vs Balt] - Flow Diverter** **Chair: René Chapot (Alfried Krupp Krankenhaus Rüttenscheid, Germany)** **Adnan H. Siddiqui** **(SUNY University at Buffalo Jacobs School of Medicine & Biomedical Sciences, USA)**	
12:00-12:25	Managing Large and Giant Aneurysms: Surpass Elite Experience **Yong-Sam Shin** *(The Catholic University of Korea, Korea)*	*82*
12:25-12:50	Pipeline Shield Flow Diverter: Insights from Evidence and Practical Experience **Hal Rice** *(Gold Coast University Hospital, Australia)*	*83*
12:50-13:15	Silk Vista & Silk Vista Baby: Current Design Developments in Flow Diversion Technology **Yilmaz Onal** *(Health Sciences University FSM Hospital, Turkey)*	*84*
13:15-13:30	Discussion	
13:30-14:00	*Coffee Break*	

Program in details

Day 2, November 1

Ballroom 1

07:00-08:00	**Breakfast Seminar III - Balt - Corpenic RC** **Chair: Yilmaz Onal (Health Sciences University FSM Hospital, Turkey)** **Tae Gon Kim (CHA University, Korea)**	
07:00-07:30	Remodeling of Dural Fistulae **René Chapot** *(Alfried Krupp Krankenhaus Rüttenscheid, Germany)*	*86*
07:30-07:40	Initial Institutional Experience of Copernic RC in Treatment of Dural Fistulas **Jieun Roh** *(Pusan National University, Korea)*	*87*
07:40-07:50	The Copernic RC Balloon in the Treatment of Dural AVFs: Sinus Occlusion Versus Restoration **Woo Cheul Cho** *(The Catholic University of Korea, Korea)*	*88*
07:50-08:00	Same Disease, Different Point of View **Won Ki Yoon** *(Korea University, Korea)*	*89*
08:30-09:30	**Scientific Session VIII - Free Paper II** **Chair: Toshio Higashi (Yokohama Shintoshi Neurosurgical Hospital, Japan)** **Jin-Young Jung (Champodonamu Hospital, Korea)**	
08:30-08:38	Eight-Year Clinical Characteristics and Follow Up of Carotid Cavernous Fistula in West Java: A Single Centre Experience **Adi Nugroho Harlianto** *(Neurosurgery Resident, Indonesia)*	*91*
08:38-08:46	Comparison of the Transarterial and Transvenous Approaches and Different Embolization Modalities in the Treatment of Direct Carotid-Cavernous Fistulas- A Tertiary Care Centre Review in the Developing World **Vikrant Setia** *(Geetanjali Medical College and Hospital, Udaipur, India)*	*92*
08:46-08:54	Endovascular Treatment and Management of Spinal Arteriovenous Malformation and Fistula **Shinsuke Sato** *(St Lukes International Hospital, Japan)*	*93*
08:54-09:02	Salvage Intra-Arterial Thrombolysis by t-PA in Acute Ischemic Stroke not Amendable to Mechanical Thrombectomy **SungChul Jin** *(Inje University, Korea)*	*94*
09:02-09:10	Low-Dose Versus High-Dose Intra-Arterial Alteplase (IA-tPA) as Adjunct or Rescue After Mechanical Thrombectomy for Acute Ischemic Stroke: A Systematic Review **Zia Maula Fadhullah** *(Dr Soetomo General Teaching Hospital Surabaya Indonesia, Indonesia)*	*95*
09:10-09:18	Safety and Efficacy of Endovascular Techniques during Emergency Retrieval of Intracranial Onyx Reflux or Migration: A Systematic Review and Illustrative Case **Jared Paul Golidtum** *(Academy of Filipino Neurosurgeons, Philippines)*	*96*
09:18-09:26	Rescue Carotid Stenting in Tandem Occlusions: 5 years' Experience from A Comprehensive Stroke Center **Minh Thang Le** *(Can Tho SIS General Hospital, University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam)*	*97*

Program in details

Day 2, November 1

Ballroom 1		
09:30-12:00	**Interactive Booth Session IV - Balt**	
13:30-14:00	Coffee Break	
14:00-16:00	**Meet The Expert I** **Chair: Kyungsool Jang (Dongnam Institute of Radiological & Medical Sciences, Korea)** **Hyon-Jo Kwon (Chungnam National University, Korea)**	
14:00-14:40	Distal Thrombectomy in AIS: Do We Really Need to Stop? **Yilmaz Onal** *(Health Sciences University FSM Hospital, Turkey)*	***99***
14:40-15:20	Endovascular Management of Complex Aneurysms **Gaurav Goel** *(Medanta Hospital, Gurgaon, India)*	***100***
15:20-16:00	Neurointervention Using Robotics: From A-Z **Kamil Zeleňák** *(Comenius University's Jessenius Faculty of Medicine and University, Slovakia)*	***101***
16:00-	Closing Remarks & Adjourn	

Program in details

Day 2, November 1

Ballroom 2

07:00-08:00	**Breakfast Seminar IV - Terumo Neuro - WEB** **Chair: Shinichi Yoshimura (Hyogo Medical University, Japan)** **SoonChan Kwon (University of Ulsan, Korea)**	
07:00-07:15	WEB Embolization: Long-Term Clinical Results and Approaches to Reducing Technical Errors **Dae Won Kim** *(Wonkwang University, Korea)*	*103*
07:15-07:30	The Role of Balloon Assist Technique for WEB Treatment of Cerebral Aneurysm **Akio Hyodo** *(Kamagaya General Hospital, Japan)*	*104*
07:30-08:00	15 Years of WEB: A Paradigm Shift in WNBA Treatment **Laurent Spelle** *(Paris Saclay University, France)*	*105*
08:30-09:30	**Scientific Session IX - Free Paper III** **Chair: Ichiro Nakahara (Fujita Health University, Japan)** **Yong Bae Kim (Yonsei University, Korea)**	
08:30-08:38	Various Techniques of Intracranial-to-Intracranial Bypass (IIB) for Complex Cases with Illustrated Cases **Jae Seung Bang** *(Seoul National University, Korea)*	*107*
08:38-08:46	High-Flow Extracranial-to-Intracranial Bypass for Complex and Giant Cerebral Aneurysms: A Systematic Review and Meta-Analysis **Annisa Amalina** *(University of Indonesia, Indonesia)*	*108*
08:46-08:54	Perioperative Dexmedetomidine Improves Hemodynamic Stability, Recovery, and Neuroprotection in Patients with Intracranial Aneurysms: Systematic Review and Meta-Analysis **Hansel Bandaso** *(Universitas Sebelas Maret, Fatmawati National Hospital, Indonesia)*	*109*
08:54-09:02	Simultaneous Cerebral and Coronary Angiography to Detect Coexistent Coronary Artery Disease in Patients with Cerebral Artery Stenosis **Jaehyun Shim** *(PMC Park General Hospital, Korea)*	*110*
09:02-09:10	Predictors of Transradial Cerebral Angiography Failure and Comparative Outcomes with the Transfemoral Approach: A Single-Center, 5-Year Retrospective Study **Sanghyuk Im** *(The Catholic University of Korea, Korea)*	*111*
09:10-09:18	Implementation of Blunt Cerebrovascular Injury Screening in Cervical Fracture Patients: A Study from Trauma Referral Center in Indonesia **Vega Sola Gracia Pangaribuan** *(Faculty of Medicine, Universitas Airlangga Dr Soetomo General Academic Hospital Surabaya Indonesia, Indonesia)*	*112*
09:30-12:00	**Interactive Booth Session V - Terumo Neuro**	
13:30-14:00	Coffee Break	

Program in details

Day 2, November 1

Ballroom 2		
14:00-16:00	**Meet The Expert II** Chair: Hee Sup Shin (Kyung Hee University, Korea) Youngsoo Kim (Pohang Stroke and Spine Hospital, Korea)	
14:00-14:40	WEB Embolization : Predicting Factors for Optimal Aneurysm Occlusion / Long Term Follow Up **Laurent Spelle** *(Paris Saclay University, France)*	***114***
14:40-15:20	Venous Disorders **Adnan H. Siddiqui** *(SUNY University at Buffalo Jacobs School of Medicine & Biomedical Sciences, USA)*	***115***
15:20-16:00	How I Understand and Treat AVMs **René Chapot** *(Alfried Krupp Krankenhaus Rüttenscheid, Germany)*	***116***
16:00-	Closing Remarks & Adjourn	

Oral Poster Symposium

Oral Poster Symposium

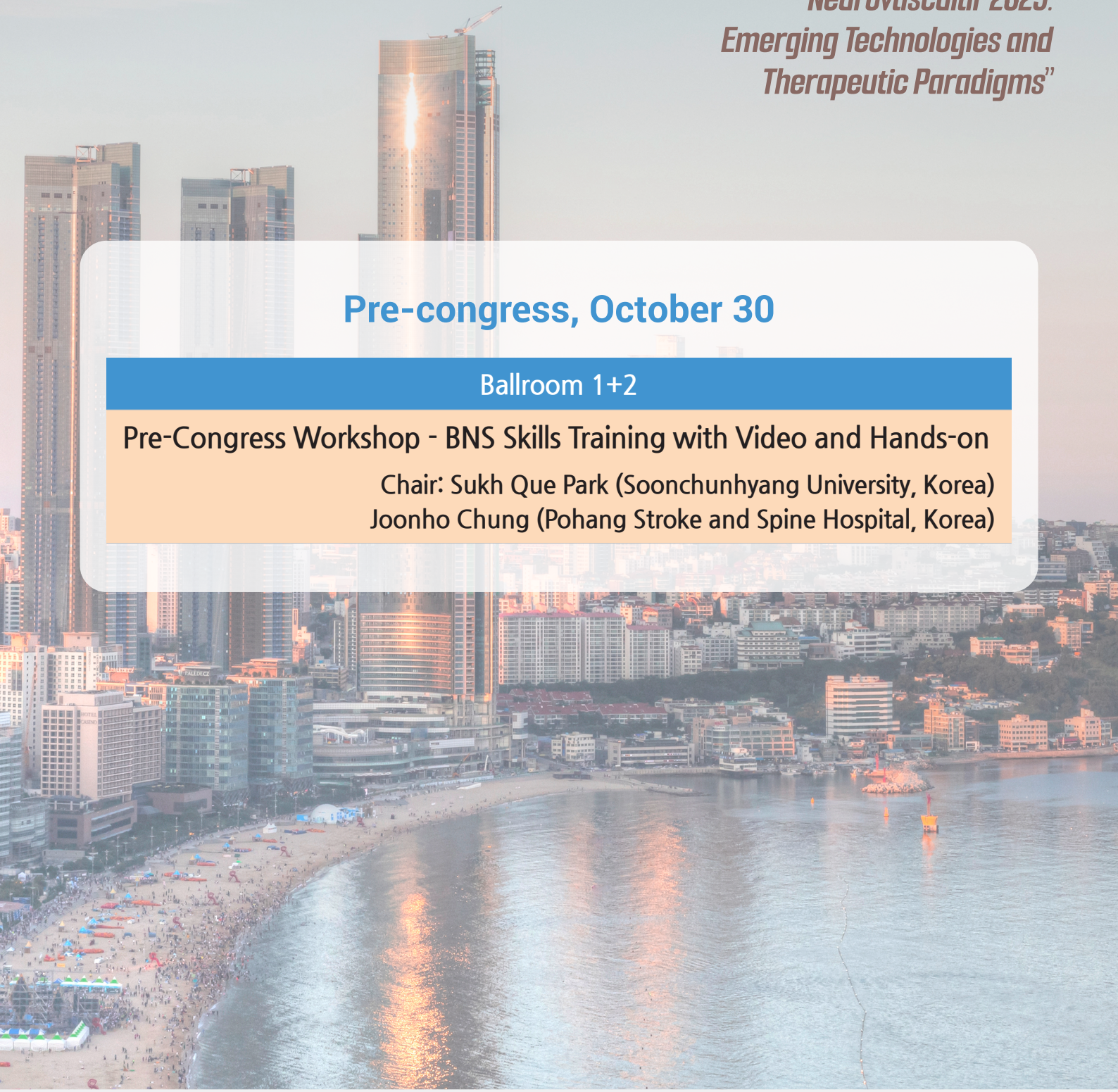
E-Poster

E-Poster

E-Poster

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"



Pre-congress, October 30

Ballroom 1+2

Pre-Congress Workshop - BNS Skills Training with Video and Hands-on

Chair: Sukh Que Park (Soonchunhyang University, Korea)
Joonho Chung (Pohang Stroke and Spine Hospital, Korea)

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Bi-Neurovascular Symposium

대한신경외과학연구재단 THE KOREAN NEUROSURGICAL RESEARCH FOUNDATION

Aneurysm Coil Embolization

Dong Young Cho
Ewha Womans University, Korea

Endovascular coil embolization remains the mainstay therapy for both ruptured and unruptured intracranial aneurysms, combining efficacy with minimally invasive safety. As aneurysm morphology varies widely, several adjunctive strategies have been developed to optimize neck coverage, microcatheter stability, and coil packing density. Mastery of these techniques and understanding device-specific properties are essential for successful and durable aneurysm occlusion.

Simple coiling is appropriate for small, narrow-neck aneurysms, relying on stable catheter positioning and careful coil size selection to create an ideal frame and dense packing. Balloon-assisted coil embolization (BACE) uses transient neck remodeling with balloon inflation to prevent coil prolapse and improve packing without the need for permanent implants.

The Double Microcatheter Technique (DMCT) offers another valuable alternative for wide-neck aneurysms without the use of adjunctive devices. Two microcatheters are placed within the sac to allow simultaneous or alternating coil deployment, facilitating a stable frame and reducing the risk of coil protrusion or migration.

Stent-assisted coiling (SAC) broadens the therapeutic window for wide-neck or complex bifurcation aneurysms. The jailing technique secures the coil microcatheter beneath a fully deployed stent, offering stability but preventing re-entry. The semi-jailing technique allows partial stent deployment, maintaining flexibility for microcatheter adjustment before final release. The cell-through technique, possible only with open-cell or braided stents such as Neuroform Atlas or LVIS Jr., permits microcatheter re-crossing through stent struts for Y- or T-stent configurations. Rescue stenting serves as an emergent option to stabilize prolapsed coils or restore compromised parent artery flow.

Tailoring these techniques to aneurysm geometry, vessel tortuosity, and stent architecture (open- vs. closed-cell) enables neurointerventionists to balance safety, stability, and hemodynamic preservation, ensuring optimal and durable treatment outcomes.

Flow Diverters and Flow Disruptors in the Treatment of Intracranial Aneurysms

Keun Young Park
Yonsei University, Korea

The management of intracranial aneurysms has evolved significantly over the past two decades, largely due to the advent of flow-modifying endovascular devices. Among these, flow diverters and flow disruptors represent new paradigms designed to achieve aneurysm occlusion through hemodynamic modification and vascular reconstruction.

Flow Diverters

Flow diverters are low-porosity, high-pore density braided stent-like implants that are deployed across the neck of target aneurysm within the parent artery. Their primary mechanism of action is to redirect blood flow away from the aneurysm sac, thereby promoting progressive intra-aneurysmal thrombosis while maintaining patency of the parent vessel. Over time, endothelialization or neoinitima formation occurs along the device surface, resulting in reconstruction of the diseased arterial segment.

Flow diverters are particularly effective for large/giant, fusiform, or wide-necked aneurysms that are difficult to treat with conventional coiling or clipping. Despite their efficacy, potential complications such as delayed aneurysm rupture, branch occlusion, and in-stent thrombosis necessitate careful patient selection, dual antiplatelet therapy, and meticulous technique.

Flow Disruptors

Flow disruptors are intrasaccular devices that are placed entirely within the aneurysm sac. Their design focuses on disrupting inflow jets and promoting intra-aneurysmal stasis and thrombosis without the need for parent vessel coverage. This unique property allows for treatment without long-term dual antiplatelet therapy, making flow disruptors an attractive option for ruptured aneurysms or patients at high hemorrhagic risk.

Prominent devices in this category include the Woven EndoBridge (WEB), Artisse, and the Contour Neurovascular System. These devices provide a single-step, intrasaccular approach, particularly suited for wide-neck bifurcation aneurysms where conventional coiling or stent-assisted techniques were needed.

Summary

Both flow diverters and flow disruptors represent milestones in the endovascular management of cerebral aneurysms. While flow diverters reconstruct the parent artery to achieve aneurysm exclusion, flow disruptors act within the sac to achieve hemodynamic isolation. Together, these technologies continue to expand the therapeutic landscape toward safer and more durable aneurysm management.

Mechanical Thrombectomy & Extra/Intracranial Stenting

Dong-Seong Shin

Soonchunhyang University, Korea

Mechanical thrombectomy is performed by positioning a balloon guiding catheter at the distal common carotid artery (CCA) or proximal internal carotid artery (ICA), with the technique determined by the chosen device. In suction thrombectomy, a suction catheter is advanced through the balloon catheter to the occlusion site, where negative pressure generated by a pump or syringe aspirates and removes the thrombus. Catheter size is selected according to vessel caliber. When using a retrieval stent, the thrombus is crossed with a microcatheter, the stent is deployed, and both are withdrawn together. A combined approach may also be used, advancing a suction catheter close to the lesion and retrieving the stent under continuous aspiration.

For extracranial stenting, a guiding catheter is placed in the proximal CCA, and a distal protection device is deployed in the ICA to prevent embolic infarction due to plaque rupture. A balloon is positioned at the stenotic segment and inflated to achieve 70-80% luminal expansion, with attention to potential bradycardia or cardiac arrest from carotid body compression. After sufficient dilation, an appropriately sized stent is placed to cover the entire stenotic area.

Intracranial stenting is technically demanding due to the small vessel caliber and the need to navigate through the curved ICA cavernous segment, where protection devices are generally not applicable. Device selection is limited, and balloon angioplasty is typically performed to achieve approximately 75% of normal vessel diameter before stent deployment. If residual stenosis remains, repeat balloon angioplasty may be considered. The most critical concern is to avoid vessel injury that can lead to thrombus formation, arterial occlusion, or rupture.

This lecture will demonstrate these key neuroendovascular techniques using operative videos, emphasizing technical nuances, procedural safety, and optimal device application.

Endovascular Management of Intracranial Arterioveous Malformations & Dural Arteriovenous Fistulas

Jong Young Lee

Hallym University, Korea

Intracranial dural AVFs are abnormal communications between arteries that supply the dura mater and draining cortical veins or venous sinuses. Classification and management are dependent on the presence of drainage/reflux into cortical veins because such drainage markedly elevates the risk of hemorrhage or venous congestion, resulting in neurologic deficits. Treatment options include microsurgical disconnection, endovascular transarterial embolization, transvenous embolization, or a combination. Intracranial arteriovenous malformations (AVMs) represent some of the most formidable and complex lesions encountered in neurovascular practice and can be the cause of morbidity and mortality. Ruptured or unruptured, brain AVMs are the focus of considerable debate regarding optimal management. In some instances, the decision for treatment can be controversial. We will review how these two diseases are managed, primarily focusing on endovascular treatment, based on representative clinical cases.

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 1, October 31

Grand Ballroom

Scientific Session I - Ischemic Stroke

Chair: Yasushi Ito (Shinrakuen Hospital, Japan)
Dong Ik Kim (CHA University, Korea)

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Tenecteplase: What does it Change for the Interventionalist?

Minwoo Lee

Hallym University, Korea

Tenecteplase (TNK) has recently emerged as a practical alternative to alteplase in acute ischemic stroke management, offering several pharmacologic and procedural advantages that may directly impact interventional strategies. This lecture will review the evolving evidence for TNK and discuss its implications from the perspective of the neurointerventionalist.

Key topics will include the pharmacodynamic characteristics of TNK—its longer half-life, higher fibrin specificity, and ease of single-bolus administration—and how these translate into workflow simplification and potentially improved reperfusion efficiency prior to or during thrombectomy. Comparative data from recent randomized controlled trials will be summarized, focusing on recanalization rates, early neurological improvement, and safety profiles relative to alteplase.

The lecture will further address the procedural considerations unique to interventional practice, such as optimal timing of TNK administration (pre-hospital, pre-procedure, or intra-arterial use), effects on clot composition and device performance, and management of hemorrhagic risk in the angiographic suite. Emerging research on combined systemic and local thrombolysis will also be discussed.

Finally, the session will highlight how the transition from alteplase to tenecteplase may alter clinical decision-making, procedural workflow, and the broader organization of stroke systems of care. The goal is to provide interventionalists with an evidence-based overview of how TNK is reshaping acute stroke treatment paradigms and what practical adjustments may be required in daily endovascular practice.

Is There a Role of Advanced Imaging in Decision-Making for Mechanical Thrombectomy in Acute Stroke?

Hyun Jeong Kim

The Catholic University of Korea, Korea

Mechanical thrombectomy has revolutionized the management of acute ischemic stroke. However, determining which patients will truly benefit from EVT—especially beyond the conventional time window—relies heavily on advanced imaging techniques that assess tissue viability, collateral circulation, and perfusion dynamics.

The DEFUSE 3 and DAWN trials established perfusion-based selection criteria for late-window thrombectomy (6-24 hours), demonstrating superior outcomes when a favorable mismatch profile exists—specifically, a small core with substantial penumbra. Target mismatch criteria typically require an ischemic core <70 mL, mismatch ratio ≥1.8, and absolute mismatch volume ≥15 mL. These physiologic parameters have proven more predictive of treatment benefit than time alone, embodying the paradigm shift from "time is brain" to "tissue is brain." Yet, variability in thresholds and scanner protocols remains a challenge, highlighting the need for harmonization.

Collateral circulation is a critical determinant of tissue fate and patient's outcome. Collateral imaging—via multiphase CT angiography, or the collateral map—assesses the extent and speed of retrograde filling in occluded territories. Good collaterals predict slower infarct progression and better outcomes, whereas poor collaterals indicate rapid core expansion. Recent studies have shown that the collateral map provides individualized estimation of the ischemic core, penumbra, and clinical outcome, suggesting its potential to enhance selection accuracy. However, further research is needed to clarify how this information should be specifically applied to mechanical thrombectomy decision-making.

Advanced neuroimaging has fundamentally transformed acute ischemic stroke management by enabling individualized treatment decisions based on tissue viability rather than arbitrary time constraints. Mastery of these techniques optimizes patient selection for endovascular therapy, maximizing treatment benefits while minimizing risks in appropriately selected candidates.

Our Latest MT Strategy for M2 Occlusion Using AXS Vecta46 Aspiration Catheter

Kazutaka Uchida

Hyogo Medical University, Japan

Our latest mechanical thrombectomy (MT) strategy for middle cerebral artery M2 segment occlusion was highlighting the application of the AXS Vecta46 aspiration catheter.

The study noted that patients with M2 occlusion undergoing EVT had a median NIHSS score of 15, with earlier onset-to-door times compared to controls. Propensity score-matched analysis indicated a favorable shift in 90-day outcomes (modified Rankin Scale 0-2 at 90 days: 57.1% MT vs 50.5% medical management; adjusted OR: 2.09, 95% CI: 1.26-3.47, p=0.004), and a trend toward reduced mortality. However, the benefit of MT was less pronounced in randomized trial populations, necessitating tailored patient selection. Further exploration of hemorrhagic outcomes demonstrated a higher rate of stent retriever use in symptomatic intracranial hemorrhage (ICH) cases, while combined technique and aspiration catheters may reduce such complications. Clinical data support that asymptomatic ICH still negatively impacts functional outcomes.

The technical feasibility and potential efficacy of a larger-bore aspiration catheter specifically designed for M2 (inner diameter 0.046 inches, outer 1.43 mm) was effective, without hemorrhage after MT. We show representative clinical cases illustrating successful recanalization and good recovery.

In conclusion, although some M2 occlusions present mildly, MT appears particularly useful for moderate to severe presentations, where techniques minimizing hemorrhagic risk such as using Vecta46 alone or in combination with Trevo 3 mm—may improve prognosis.

Super Large Bore Catheter

Hal Rice
Gold Coast University Hospital, Australia

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 1, October 31

Grand Ballroom

Scientific Session II - AVM & AVF

Chair: Akio Hyodo (Kamagaya General Hospital, Japan)
Hae Woong Jeong (Inje University, Korea)

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Latest Evolutions in the Use of 6D Imaging in Curative AVM Embolization

René Chapot

Alfried Krupp Krankenhaus Rüttenscheid, Germany

A curative embolization can be obtained in most AVMs including high grade 5 AVMs.

If embolization is intended to be achieved with a curative goal, specific rules must be respected:

- AVMs of more than 3 cm are preferentially to be treated in more than one session.
- 6D imaging allows to understand the AVM as a volume and not as a superimposition of vessels on a surface with the ability to visualize arterio-arterial anastomosis, to understand the venous segmentation and to define the limit of progression of embolic agent when achieving TAE.
- During the first embolization session, an antegrade access to retrograde feeders must be achieved in order to be able to embolize arteries feeding the AVM through cortical anastomosis from other vessel territories as the access to these vessels is lost after regular proximal embolization.
- Trans Arterial Embolization (TAE) requires to use an antireflux mechanism, preferentially the pressure cooker technique which allows the operator to focus on the diffusion of the embolic agent within the AVM and to inject higher volumes of embolic agent
- Trans Venous Embolization (TVE) allows to access to AV shunts that cannot be accessed by the arteries and carries a lower ischemic risk than TAE.
- TVE requires to occlude all AV shunts otherwise the AVM may bleed. Therefore, small AVMs are at lower risk for TVE.
- In large AVMs, a staged venous embolization can be achieved after analysis of the venous segmentation on 6D imaging

Advances in AVM Research and Treatment [Online]

Adnan H. Siddiqui

SUNY University at Buffalo Jacobs School of Medicine & Biomedical Sciences, USA

Curative Embolization for Anterior Cranial Fossa dAVFs Using Various Access Routes

Tomoaki Terada

Showa University, Japan

Objective: Anterior cranial fossa dural arteriovenous fistulas (ACF dAVFs) have traditionally been treated surgically. However, recent advances in endovascular therapy have enabled complete obliteration of ACF dAVFs using liquid embolic materials. Despite this progress, achieving a curative outcome remains challenging due to the primary feeders often being the ophthalmic artery. Excessive ONYX reflux may lead to central retinal artery occlusion or difficulty in microcatheter retrieval.

Cases: We treated 17 consecutive cases of ACF dAVFs using endovascular techniques. The male-to-female ratio was 16:1, with ages ranging from 43 to 74 years. Our treatment strategy was as follows:1. If an external carotid artery (ECA) feeder such as the middle meningeal artery was present, we approached via the ECA.

2. If no ECA feeders were identified, embolization was attempted via the ophthalmic artery. In these cases, we navigated a 3.2F distal access catheter into the ophthalmic artery to facilitate microcatheter (DeFrictor) retrieval. 3. If no accessible feeders were available, a transvenous approach was employed.

Results: ECA feeders were used in 4 cases, ophthalmic artery feeders in 11 cases, and a transvenous route in 5 cases. A combined transarterial and transvenous approach was used in 3 cases involving pial feeders. All cases were successfully treated and completely cured without neurological complications.

Conclusion: ACF dAVFs can be effectively and safely embolized using our strategic approach.

Angioarchitecture and Endovascular Treatment of Tentorial Dural AVFs

Yasunari Niimi, Sato S, Inoue T, Mochizuki T, Nonaka T, Kushi T, Ito K

Department of Neuroendovascular Therapy, St. Luke's International Hospital, Tokyo, Japan

Purpose: To analyze the angioarchitecture of tentorial dural arteriovenous fistulas (AVFs) and evaluate their endovascular treatment.

Methods: Fourteen cases experienced between 2013 and 2023 were retrospectively analyzed with respect to their angioarchitecture and endovascular management. The AVFs were classified into four categories based on their location: antero-medial (AM), postero-medial (PM), antero-lateral (AL), and postero-lateral (PL).

Results: The cohort included 11 males (78.6%) and 3 females, ranging in age from 1 to 79 years (mean age: 56 years). All cases were classified as Borden type III lesions. Five patients presented with aggressive symptoms such as cerebral hemorrhage or neurological deficits; four had minor symptoms including tinnitus or dizziness; and five were asymptomatic. The arterial feeders were primarily from adjacent dural arteries, while pure pial feeders were identified in 8 cases (57.1%). Venous drainage was site-specific: the vein of Galen in AM cases, deep cerebral or brainstem veins in PM cases, brainstem and cerebellar veins in AL cases, and superficial cerebral veins in PL cases.

All but one patient underwent transarterial embolization, with two receiving additional transarterial venous embolization. One patient remained untreated and asymptomatic for over seven years. Immediate complete occlusion was achieved in 8 cases, with 2 more achieving complete occlusion on follow-up, resulting in an overall complete occlusion rate of 76.9%. Neurological complications occurred in three patients, including two strokes and one transient facial nerve palsy.

Conclusion: While arterial feeders tended to be non-specific across groups, venous drainage patterns were location specific. An increasing number of asymptomatic lesions are being identified, some of which may remain stable for years. Endovascular treatment, guided by detailed angioarchitectural analysis, is an effective therapeutic approach.

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 1, October 31

Grand Ballroom

Scientific Session III - Aneurysm Session I

Chair: Ossama Yassin Mansour (Alexandria University, Egypt)
Young Il Chun (Konkuk University, Korea)

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Experience in the Treatment of 70 Fusiform Basilar Aneurysms

René Chapot

Alfried Krupp Krankenhaus Rüttenscheid, Germany

We retrospectively analyzed the results in the endovascular treatment of 70 fusiform aneurysms of the basilar artery using a combination of braided stents, flow diverters and parent artery occlusion.

These results demonstrate that the chances of success reduce with the growth of the aneurysm and that a staged procedure is to be preferred.

Flow Diverter in Bifurcation Aneurysms

Gaurav Goel

Medanta Hospital, Gurgaon, India

Flow diversion has emerged as a novel yet technically demanding approach for managing intracranial bifurcation aneurysms—a subset traditionally challenging for both microsurgical clipping and conventional coiling due to their complex hemodynamics and broad-neck morphology. This study reviews the current evidence on the safety and efficacy of flow diverter (FD) devices in bifurcation aneurysms across key anatomical sites including the anterior communicating artery (AComA), internal carotid artery terminus (ICAt), basilar apex (BA), and middle cerebral artery bifurcation (MCAb).

Meta-analytic data from 19 studies encompassing 522 patients revealed a complete occlusion rate of approximately 68% at an average of 16-months follow-up, with ischemic complications occurring in about 16% of cases—primarily due to jailed branch hypoperfusion or in-stent thrombosis. More recent single-center experiences report significantly improved results, with angiographic occlusion rates approaching 90-92% and low morbidity profiles when advanced antiplatelet management and careful case selection are applied. Emerging evidence suggests that endothelial remodeling and collateral adaptation following branch coverage play major roles in the eventual success or failure of occlusion, with covered branches remaining largely patent and asymptomatic in most cases.

While the technique remains off-label in many regions, flow diversion for bifurcation aneurysms is gaining clinical traction as devices become more flexible and less thrombogenic. The procedure should, however, be reserved for select patients with unsuitable anatomy for traditional strategies, and should be performed within specialized neurointervention centers with rigorous follow-up protocols. Ongoing innovations—including hydrophilic-coated and lower-metal-coverage designs—are likely to improve long-term safety while maintaining favorable hemodynamic remodeling, heralding a promising expansion of FD indications in complex bifurcation aneurysm treatment.

Troubles in Flow Diverter Treatment

Shinichi Yoshimura

Department of Neurosurgery, Hyogo Medical University, Nishinomiya, Japan

The use of flow diverters (FD) for unruptured intracranial aneurysms has expanded significantly, providing a reconstructive approach with high rates of occlusion. Nevertheless, FD treatment is associated with unique technical and clinical troubles that must be carefully managed.

During Deployment

1. Device twisting: Tortuous anatomy or poor navigation may result in device twisting, leading to incomplete wall apposition or maldeployment.
2. Foreshortening with aneurysm protrusion: FD shortening can cause partial migration into the aneurysm sac, resulting in unstable coverage or insufficient neck reconstruction.

After Deployment

1. FD occlusion: Acute or delayed thrombosis of the device can occur despite antiplatelet therapy, producing ischemic complications.
2. Aneurysm rupture: Although rare, delayed rupture after FD placement carries high morbidity and mortality.
3. Incomplete healing: Some aneurysms fail to occlude at long-term follow-up, requiring retreatment.
4. In-stent stenosis: Intimal hyperplasia or inadequate endothelialization may cause stenosis and further intervention.

This presentation will summarize these complications, focusing on our institutional experience. Representative cases will be used to illustrate both technical pitfalls and clinical outcomes. Strategies to reduce risks and improve the safety and efficacy of FD therapy in unruptured aneurysms will be discussed.

Tips and Pitfalls about Intrasaccular Devices for Bifurcation Aneurysms

Tomoyuki Tsumoto

Department of Neurosurgery, Showa Medical University Fujigaoka Hospital, Japan

Compared with coil embolization, embolization using an intrasaccular device (Woven EndoBridge; W-EB) is particularly useful for elderly patients because it shortens the procedure time and does not require long-term postoperative antiplatelet therapy. However, we have encountered cases in which selecting the appropriate W-EB size was difficult, or in which placement was abandoned due to acute angle between the parent vessel and the aneurysm's long axis. While W-EB holds great promise for treating recurrent cases after coil embolization, we have experienced some pitfalls that we would like to discuss. Angiography performed one year later demonstrated adequate occlusion in approximately 90% of cases, and the overall outcome was generally favorable. However, many of these cases were in a so-called neck remnant state, and further observation is necessary to determine long-term recurrence. Based on our own experience to date, we will introduce tips and pitfalls for W-EB placement.

WEB vs. Coiling: Propensity Score-Matched Study

Hyun-Seung Kang
Seoul National University, Korea

Woven EndoBrdge (WEB), an intra-saccular device, appears to have become one of important treatment option for patients with intracranial bifurcation aneurysms nowadays. There are voices on the high treatment cost for its usage in Asian countries, and this seems to be one of big hurdles against its widespread use. This short lecture reviews current literature comparing WEB and coiling (inclusion stent-assisted coiling) in terms of cost and effectiveness, and present results of a propensity score-matched study.

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 1, October 31

Grand Ballroom

Luncheon Seminar I [Stryker vs Medtronic vs Terumo Neuro] - Flow Disruptor

Chair: Affan Priyambodo (RSUP DR I.G.N.G Ngoerah, Indonesia)
Seong-Rim Kim (The Catholic University of Korea, Korea)

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Artisse in Focus: One-Year Evidence from INSPIRE-A and Key Device Features

Hal Rice

Gold Coast University Hospital, Australia

Evaluating the Safety and Effectiveness of Contour: Clinical Experience and Insights

Gaurav Goel

Medanta Hospital, Gurgaon, India

The study "Evaluating the Safety and Effectiveness of Contour: Clinical Experience and Insights" focuses on assessing the Contour Neurovascular System, a next-generation intrasaccular flow disruption device designed for the treatment of wide-necked intracranial bifurcation aneurysms. Conducted as a prospective multicenter clinical evaluation, the research analyzed procedural efficacy and patient safety through both single-arm trials and systematic meta-analysis of early clinical experiences.

A total of 34 patients were enrolled in the primary clinical study, achieving successful Contour implantation in 32 cases. Complete aneurysm occlusion was reported in 44% at six months and 69% at twelve months, with adequate occlusion (Raymond-Roy Grades I and II) in 84% at final follow-up. The safety endpoint included major stroke or nonaccidental death within thirty days, occurring in two patients. No procedure-related mortality was recorded, underscoring the device's favorable safety profile.

A subsequent pooled meta-analysis reinforced these findings across 131 treated aneurysms. The overall occlusion rate was 84.21% (95% CI=75.45-90.25), functional independence (mRS 0-2) reached 94.74%, and the adverse event rate was 4.7%. Thromboembolic events occurred in 8.5% of patients but were largely non-disabling. Procedure times ranged between 78 and 136 minutes, shorter with Contour-alone compared to Contour-assisted coiling. Both techniques yielded comparable efficacy, although Contour-only treatments demonstrated higher rates of functional independence.

In conclusion, clinical evidence indicates that the Contour Neurovascular System is safe, effective, and durable for managing wide-necked bifurcation aneurysms, with high rates of complete occlusion and functional recovery and a low incidence of serious complications. These outcomes support its growing clinical adoption as a minimally invasive alternative to traditional endovascular coiling.

Predictors of Outcomes after WEB Treatment from the Korean WEB Registry

Hyun-Seung Kang

Seoul National University, Korea

Woven EndoBrdge (WEB) is one of intra-saccular devices designed for the treatment of wide-neck intracranial bifurcation aneurysms. The purpose of this study was to evaluate various factors associated with clinical and angiographic outcomes following WEB treatment. This multicenter, retrospective study analyzed 405 patients with 412 aneurysms treated with the WEB device across 22 neurovascular centers. Clinical and radiologic data were reviewed to identify factors influencing patients' clinical outcome and target aneurysmal occlusion.

The rate of aneurysmal adequate occlusion, defined by Raymond-Roy occlusion class 1 and 2, increased from 70.2% at short-term (mean, 133 days) to 83.2% at long-term (mean, 499 days) follow-up (p=0.003). Aneurysm diameter was inversely correlated with complete occlusion, with a 6-mm cutoff identified. Wide-neck aneurysms exhibited lower occlusion rates at short-term period, but this effect was not observed at later periods. Aneurysms at the basilar apex and internal carotid artery terminus demonstrated higher rates of complete occlusion. Smoking acted as an inhibitor of long-term occlusion of target aneurysms. Centers with higher WEB treatment volumes (more than 30 cases) demonstrated lower thromboembolic events with sequelae.

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 1, October 31

Grand Ballroom

Scientific Session IV - Special Topics I - AI & Robotics

Chair: Kenji Sugiu (Okayama University, Japan)
Yong-Cheol Lim (Ajou University, Korea)

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Usefulness of Intraoperative AI Assist during Transarterial Embolization for Dural Arteriovenous Fistula

Tomoyuki Tsumoto

Department of Neurosurgery, Showa Medical University Fujigaoka Hospital, Japan

During transarterial embolization (TAE) of dural arteriovenous fistulas (AVF), the interventionist must simultaneously view both frontal and lateral views to determine whether to continue or stop the injection, which can be challenging when the venous sinus has a complex shape or is large. Here, we report our initial experience with TAE of dural arteriovenous fistulas using intraoperative AI assistance. The AI used in this case series was iMED Technologies' Neurovascular Assist. It extracts the image from the conventional vascular device and alerts the surgeon with real-time color changes and audio alarms. The region of interest can be freely selected, and an angiography overlap function is also available. Clinically, marking the region of interest makes it easy to detect when Onyx reaches the outside of the area or when excessive Onyx reflux occurs. Furthermore, when the isolated sinus space is large, utilizing intraoperative AI assistance to confirm Onyx penetration can prevent from insufficient embolization and improve cure rates. Based on our initial experience, we will introduce usefulness of intraoperative AI assist during TAE for dural AVF.

Robotic Mechanical Thrombectomy - Fiction or Near Future

Kamil Zeleňák

Comenius University's Jessenius Faculty of Medicine and University, Slovakia

Angiographic Robotics - Terminator's Touch? [Online]

Jens Fiehler

University Medical Center Hamburg-Eppendorf, Germany

The presentation by Prof. Jens Fiehler (University Medical Center Hamburg-Eppendorf) explores the evolving role of robotic and AI technologies in neuroendovascular procedures. It highlights the transformation from human-operated to increasingly autonomous robotic systems capable of precision, endurance, and remote operation.

Robotics represent a paradigm shift—robots can already outperform humans in precision, stability, and fatigue resistance, while eliminating radiation exposure risks. Drawing on analogies such as the "T-800" for multitasking and "Everybody Chapot" for dexterous micro-manoeuvres, he describes how AI-driven systems achieve superhuman accuracy and consistency, enabling complex neurointerventions that would challenge even expert hands.

The talk contextualizes this within healthcare disparities: many regions lack access to interventional neuroradiology (INR) expertise, making remote robotic stroke treatment a potential solution. As technology progresses through five levels of autonomy—from operator assistance to full automation—AI integration with imaging and navigation is expanding the boundaries of what's possible in endovascular care.

However, Fiehler also cautions that robotics raises questions of ethics and accountability, as responsibility for errors becomes diffuse among developers, clinicians, and institutions. He references the EU AI Act and calls for physician involvement in development and regulation to ensure safety, transparency, and clinical relevance.

Highlighting the EU-funded SHERPA project (Smart Human-centred Effortless support for Professional clinical Applications), he emphasizes human-centric, assistive robotics designed to support—not replace—interventionalists through AI-powered workflow integration.

Finally, Fiehler outlines the future trajectory: ongoing technological advances, falling sensor costs, modular and multi-specialty designs, and increasing machine learning capabilities will democratize access, standardize performance, and enhance patient safety. Robotics in neurointerventions, he concludes, is not a distant vision but a rapidly approaching reality—one that must balance superhuman capability with human oversight.

9th BNS
Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 1, October 31

Grand Ballroom

Scientific Session V - Special Topics II - Chronic Subdural Hematoma

Chair: Shigeru Miyachi (Aichi Medical University, Japan)
Yong-Sam Shin (The Catholic University of Korea, Korea)

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Anatomical Considerations Pertinent to the MMA Embolization for Chronic SDH

Hal Rice

Gold Coast University Hospital, Australia

Materials for MMA Embo for SDH [Online]

Adnan H. Siddiqui

SUNY University at Buffalo Jacobs School of Medicine & Biomedical Sciences, USA

MMA Embolization in Chronic SDH Therapy - Discussing the Clinical Benefit [Online]

Jens Fiehler

University Medical Center Hamburg-Eppendorf, Germany

The presentation by Prof. Jens Fiehler (University Medical Center Hamburg-Eppendorf) discusses the clinical and systemic value of middle meningeal artery embolization (MMAE) as an adjunct or alternative to surgery in managing chronic subdural hematoma (cSDH). Drawing on recent randomized controlled trials (RCTs)—particularly the EMBOLISE study—the talk highlights that MMAE with Onyx™ significantly reduces recurrence and reoperation rates following surgical evacuation of cSDH. The EMBOLISE data demonstrated a threefold reduction in recurrence (11.3% to 4.1%) and a number needed to treat (NNT) of approximately 14, confirming a strong preventive effect without added neurological risk.

Key takeaways include:

1. Clinical benefit and safety: MMAE prevents reoperation in frail, elderly patients where recurrence can lead to worsened outcomes and prolonged hospitalization. Its minimally invasive profile (≈0-2% procedure-related adverse events) makes it a favourable adjunct.
2. Patient-centered impact: Avoiding recurrence prevents unnecessary anaesthesia and surgical trauma, improves functional outcomes, and maintains quality of life. Meta-analyses confirm better modified Rankin Scale scores (0-1 in 100% of embolized vs. 53% of controls).
3. System-level advantages: Widespread adoption of MMAE can reduce emergency surgical burden, hospital length of stay, ICU use, and readmissions—yielding economic and operational efficiencies.

The presentation also outlines strategies for integrating MMAE into clinical pathways, including multidisciplinary collaboration between neurosurgery and neuroradiology, standardized referral and follow-up protocols, and use of digital triage tools. Finally, it addresses a common clinical question—"Why embolize everyone if only 7% benefit?"—by emphasizing that recurrence is unpredictable; broad application ensures protection of the vulnerable minority, analogous to preventive strategies in other medical disciplines. Together, the data position MMAE as an emerging standard of care for cSDH management.

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 1, October 31

Grand Ballroom

Scientific Session VI - Aneurysm Session II - Mechanical Deformation of Flow Diverters

Chair: Adnan H. Siddiqui (SUNY University at Buffalo Jacobs School of Medicine & Biomedical Sciences, USA)

Hyun-Seung Kang (Seoul National University, Korea)

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Clinical Implications of Mechanical Deformation [Online]

Jonathan Cortese

Bicêtre University, France

Flow diverter (FD) braid deformation is an increasingly recognized phenomenon following endovascular treatment of intracranial aneurysms, yet its clinical implications remain poorly characterized. We conducted a retrospective analysis of 245 consecutive flow diverter implantations from multiple manufacturers and device generations. We assessed the incidence, morphological patterns, clinical consequences, and predictive factors associated with FD braid deformation.

FD braid deformation occurred in approximately 15% of cases, encompassing all deformation types, including fish-mouthing, foreshortening, braid collapse, and braid bump. Thromboembolic events were the main cause of morbidity, particularly in cases of fish-mouthing and braid collapse, and complications were more frequent when retreatment was required. Device design, notably the use of drawn filled tubing technology with platinum wires, may influence the risk of deformation. These findings highlight the importance of recognizing FD braid deformation and guide device selection, procedural strategy, and future design improvements.

Braid Deformation of Flow Divertors: Material Matters?

Gaurav Goel

Medanta Hospital, Gurgaon, India

The Braid deformation of flow diverters represents a structural instability phenomenon with important clinical and material implications. The study "Flow diverter braid deformation following treatment of cerebral aneurysms: incidence, clinical relevance, and potential risk factors" provides a detailed evaluation of this phenomenon and its material determinants.

Flow diverters are braided, metallic, mesh-like implants designed to divert hemodynamic flow away from aneurysms and promote vessel reconstruction. However, post-deployment observations have identified up to 15% incidence of spontaneous braid deformation, manifested as fish-mouthing, braid collapse, or stent migration during angiographic follow-up. This deformation occurs without external manipulation and reflects intrinsic instability in the braided structure under physiological forces.

A retrospective analysis of 228 patients (245 procedures, 271 deployed devices) across multiple flow diverter platforms identified drawn filled tubing (DFT) designs incorporating platinum cores as a key independent predictor of deformation, with an adjusted odds ratio of 7.0. Larger device diameter also correlated with higher deformation risk (aOR=2.2). Contrarily, the base metal alloy (nitinol versus cobalt-chromium) and surface coatings did not show significant associations. Morphologically, braid collapse and fish-mouthing increased procedural morbidity, highlighting the clinical consequence of such structural changes.

These data emphasize that while hemodynamic performance has been optimized in modern flow diverters, mechanical resilience remains critically dependent on braid configuration and composite construction. The addition of platinum cores (in DFT wires) enhances radiopacity but may increase elastic mismatch and relaxation under cyclic loading. Future development efforts should therefore focus on material engineering and hybrid braiding geometry to enhance radial stability without compromising visibility or flexibility. Overall, this study establishes braid deformation as a non-negligible, material-sensitive complication that demands targeted design evolution for next-generation flow diverters.

Management Strategies: Preventing and Fixing Deformation

Yilmaz Onal

Health Sciences University FSM Hospital, Turkey

Flow diverters have been in current practice for almost two decades for the endovascular treatment of intracranial aneurysms. But recently, concerns have arisen regarding the stability of the FD braid over time. These deformations can manifest in various patterns, such as fish mouthing, braid collapsing, fore-shortening and braid-humping. The clinical significance of braid deformations depends on the type and severity of the deformation. Many mild fish-mouth or minimal braid changes are asymptomatic and may only be detected incidentally during routine radiologic follow-up.

Dramatic vessel caliber transitions (e.g., a proximal vessel segment significantly larger than the distal segment) can likewise cause problems; as the distal end adapts to a much smaller downstream artery, it may not maintain its intended form. Additionally, cases where the landing zone (stent end) is in a segment that is not sufficiently straight or ends in a short segment have an increased likelihood of deformation. If the stent's end is positioned right next to an aneurysm or at a sharp arterial curve, that end can, over time, be prone to deformation. Preventing flow-diverter deformation requires meticulous deployment technique, including optimal sizing, stable access, and real-time imaging while management of deformation demands a ready armamentarium of bailout techniques.

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 1, October 31

Ballroom 1

Breakfast Seminar I - SIEMENS Healthineers Ltd. My Icono Experiences in Neurointerventions

Chair: Khairul Azmi Abd Kadir (University of Malaya, Malaysia)
Seung Hun Sheen (CHA University, Korea)

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Muiti-Phase Cone-Beam CT "Rapid Angio", Utilization and Validation

Yasushi Ito

Department of Neurosurgery, Shinrakuen Hospital, Niigata, Japan

One of the latest angio machine, Artis icono D-spin (Siemens healthineer), enabled multiphase contrast cone-beam CT, "RAPID Angio" which provide perfusion image of patients in various ischemic disease.

In mechanical thrombectomy (MT), direct transfer to angio suite (DTAS) is one of the key to reduce treatment time. In DTAS, regular cone-beam CT is sufficient for neglecting hemorrhagic disease, however it is difficult to diagnose precise ASPECTS. RAPID angio (RA) for better case selection, ischemic core and penumbra. Our experience of DTAS with RA significantly reduced door to puncture time and door to reperfusion time compared with these of regular MRI based MT.

In cervical carotid stenosis and intracranial carotid stenosis cases, there were no quite discrepancy between SPECT and RA data. In case with large stage II area in SPECT before treatment, RA at the time of treatment also showed large area of Tmax>6sec. In this case, staged angioplasty was performed. Stage II area in SPECT and Tmax>6sec area were both markedly reduced after 1st angioplasty.

Default threshold of ischemic core is determined as 45% in RA, which is different from 30% in CT RAPID. MT cases of DTAS with RA, recanalization of mTICI 2b, 3 cases, DWI ischemic volume in MRI at next day was compared with ischemic core volume in RA of default 45% threshold and volume of recalculated 30% threshold. Default 45% threshold tends to under estimate ischemic core, 30% threshold was closer to DWI volume.

RAPID Angio provide useful perfusion status of the patient of various ischemic disease, which may contribute to better patient selection and better treatment strategies.

Clinical Application of DCT Micro in Arteriovenous Shunts: From Imaging to Strategy

Jieun Roh

Pusan National University, Korea

Precise evaluation of the fine angioarchitecture is indispensable in managing arteriovenous shunt diseases, including dural arteriovenous fistulas and arteriovenous malformations of the brain and spine. Understanding the complex relationships among feeders, shunt points, and draining routes is essential for planning a safe and effective endovascular approach. Conventional angiography, while dynamic, often fails to depict these intricate three-dimensional structures, underscoring the need for high-resolution volumetric imaging before treatment.

Recent advances in cone-beam computed tomography (CBCT) have significantly enhanced the visualization of microvascular anatomy. Long-acquisition protocols with prolonged contrast injection allow homogeneous filling of both arterial and venous compartments, revealing the shunt architecture in unprecedented detail. Non-binned image acquisition provides superb spatial resolution capable of delineating minute arterial feeders and venous pouches that cannot be recognized on routine angiography. Although this technique entails substantially higher radiation exposure, the diagnostic yield and the additional anatomic information it provides often justify the trade-off in selected complex cases.

Based on our institutional experience using the Artis Icono system, we have applied these advanced CBCT protocols in a variety of diagnostic and therapeutic settings for arteriovenous shunt diseases. While not a systematic scientific analysis, these accumulated cases demonstrate, from a practical standpoint, the remarkable utility of high-resolution CBCT in guiding treatment strategy, optimizing catheter navigation, and assessing treatment completeness. CBCT has thus evolved from a complementary tool into an indispensable modality in the neurointerventional workflow, and its role will continue to expand with further technological refinement.

Reflections on My Clinical Experience with Aneurysm Imaging Using Icono

Jong Hyun Park

Soonchunhyang University, Korea

The ARTIS icono system by Siemens Healthineers represents a significant advancement in angiography technology, offering high-resolution three-dimensional imaging, minimised radiation exposure, and integrated simulation software for precise pre-procedural planning. These innovations collectively enhance the diagnosis and treatment of neurovascular diseases. By improving workflow efficiency and device visualisation, the system supports a wide range of neurointerventional procedures, contributing to more personalised and effective patient care. Furthermore, the system's 3D simulation capabilities provide superior visualisation of complex anatomical structures, thereby improving device placement accuracy and procedural precision in challenging neurovascular cases.

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 1, October 31

Ballroom 2

Breakfast Seminar II - Intracranial Arterial Stenosis

Chair: Anchalee Churojana (Mahidol University, Thailand)
Sangwon Lee (Pusan National University, Korea)

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Best Medication and Best Indication for Stenting in ICAD

Cuong Tran Chi

Can Tho S.I.S General Hospital, Vietnam

Aggressive medical management remains the foundation for treating intracranial atherosclerotic stenosis (ICAS). The WASID trial (Warfarin-Aspirin Symptomatic Intracranial Disease, NEJM 2005) established aspirin 325 mg daily as safer and equally effective as warfarin for secondary prevention. But the risk of Ischemic stroke in territory of stenotic artery after 1 year is 15%.

Subsequently, the SAMMPRIS trial (Stenting and Aggressive Medical Management for Preventing Recurrent Stroke in Intracranial Stenosis, NEJM 2011) showed that intensive medical therapy—comprising dual antiplatelet therapy (aspirin + clopidogrel for 90 days), high-intensity statins, and strict vascular risk control—was superior to percutaneous transluminal angioplasty and stenting using the Wingspan system, primarily due to high peri-procedural complication rates.

However, selected patients with recurrent ischemic events despite optimized therapy or with hemodynamically significant (>70%) stenosis and poor collateral flow may benefit from endovascular revascularization in experienced centers.

A distinct emerging indication is rescue stenting after failed mechanical thrombectomy in acute large-vessel occlusion due to underlying ICAS. When standard thrombectomy fails to achieve durable reperfusion (TICI 0) because of fixed atherosclerotic stenosis or elastic recoil, bailout angioplasty with balloon dilation or stenting can restore flow and prevent re-occlusion. Recent multicenter registries and meta-analyses show that rescue stenting achieves successful reperfusion in >85% of such cases, with acceptable symptomatic hemorrhage rates (<6%) and improved 90-day functional outcomes compared with persistent occlusion.

Periprocedural management includes DAPT loading (aspirin+clopidogrel), intraprocedural heparinization, and post-stent DAPT for 3 months followed by single antiplatelet therapy.

In summary, Aggressive medical management remains the foundation for treating intracranial atherosclerotic stenosis (ICAS) with minor stroke symptoms; Best medication failure recurrence stroke related to large vessel severe stenosis: stenting can be indicated; Rescue stenting represents an evolving, evidence-supported intervention for selected patients with failed routinely thrombectomy or balloon angioplasty.

Intracranial Stents: Personal Experience & Future Perspective

Yi-Bin Fang

Tongji University, China

Objective: This study aimed to compare the safety and efficacy of the Neuroform Atlas stent when deployed via the Gateway balloon catheter versus a microcatheter for the treatment of symptomatic intracranial stenosis (IS).

Methods: In this single-center retrospective study, 33 patients with IS were treated with the Atlas stent after balloon angioplasty. The stent was deployed using either the Gateway balloon catheter (n=19) or a microcatheter (n=14). Primary outcomes included the rate of in-stent restenosis (ISR) and the incidence of post-procedural stroke or death within one month.

Results: The overall ISR rate was 15.4% (4/26), with a non-significantly higher rate in the microcatheter group compared to the Gateway group (30.0% vs. 6.25%, P=.39). The post-procedural stroke rate within one month was 3.3%, and was higher in the microcatheter group (7.7% vs. 0%, P=.43). Notably, the Gateway group had a significantly lower rate of stroke in the same territory (0% vs. 30.8%, P=.026). A higher incidence of residual stenosis <30% was significantly associated with the non-ISR group (72.2% vs. 0%, P=.014).

Conclusions: The Neuroform Atlas stent is a safe and effective treatment for IS. Deployment via the Gateway balloon catheter appears to be safer than using a microcatheter, potentially reducing the risk of territorial stroke. The degree of residual stenosis may be a key factor influencing the risk of ISR.

Timing and Indication for Bypass Surgery in Ischemic Stroke: Current Perspectives

Dongkyu Jang

Department of Neurosurgery, Incheon St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Korea

Extracranial-intracranial (EC-IC) bypass has been explored to augment cerebral perfusion in ischemic stroke, but its indications and optimal timing remain uncertain. We conducted a systematic review of adult stroke patients to evaluate current evidence on bypass surgery, focusing on timing (emergent vs. delayed) and appropriate indications. We systematically searched for studies (through 2025) on bypass in adult ischemic stroke. Randomized trials, cohort studies, and case series were included. Outcomes of interest were survival, stroke recurrence, and functional or neurologic measures (mRS, GOS, NIHSS). We compared emergent (acute) versus elective bypass timing and documented perioperative complication rates. RCTs in atherosclerotic carotid occlusion found no benefit of routine EC-IC bypass over medical therapy[1], while incurring high perioperative stroke risk (~12-15%)[2]. In contrast, in Moyamoya disease (particularly hemorrhagic presentation), revascularization significantly reduced recurrent hemorrhagic stroke and improved survival[3]. Emergent STA-MCA bypass has also been used as a salvage therapy after failed thrombectomy in acute stroke, with ~72% of patients achieving favorable 3-month outcomes (mRS ≤2)[4] and low major complication rates (~3%, no mortality)[4]. Elective delayed bypass is now reserved for select cases given mixed efficacy and procedural risks. For atherosclerotic stroke, bypass is not recommended due to lack of benefit and significant risk. It offers clear benefit in hemorrhagic-type Moyamoya and a limited salvage role in acute stroke when other therapies fail. Careful patient selection and timing are essential to maximize benefit and minimize perioperative risk.

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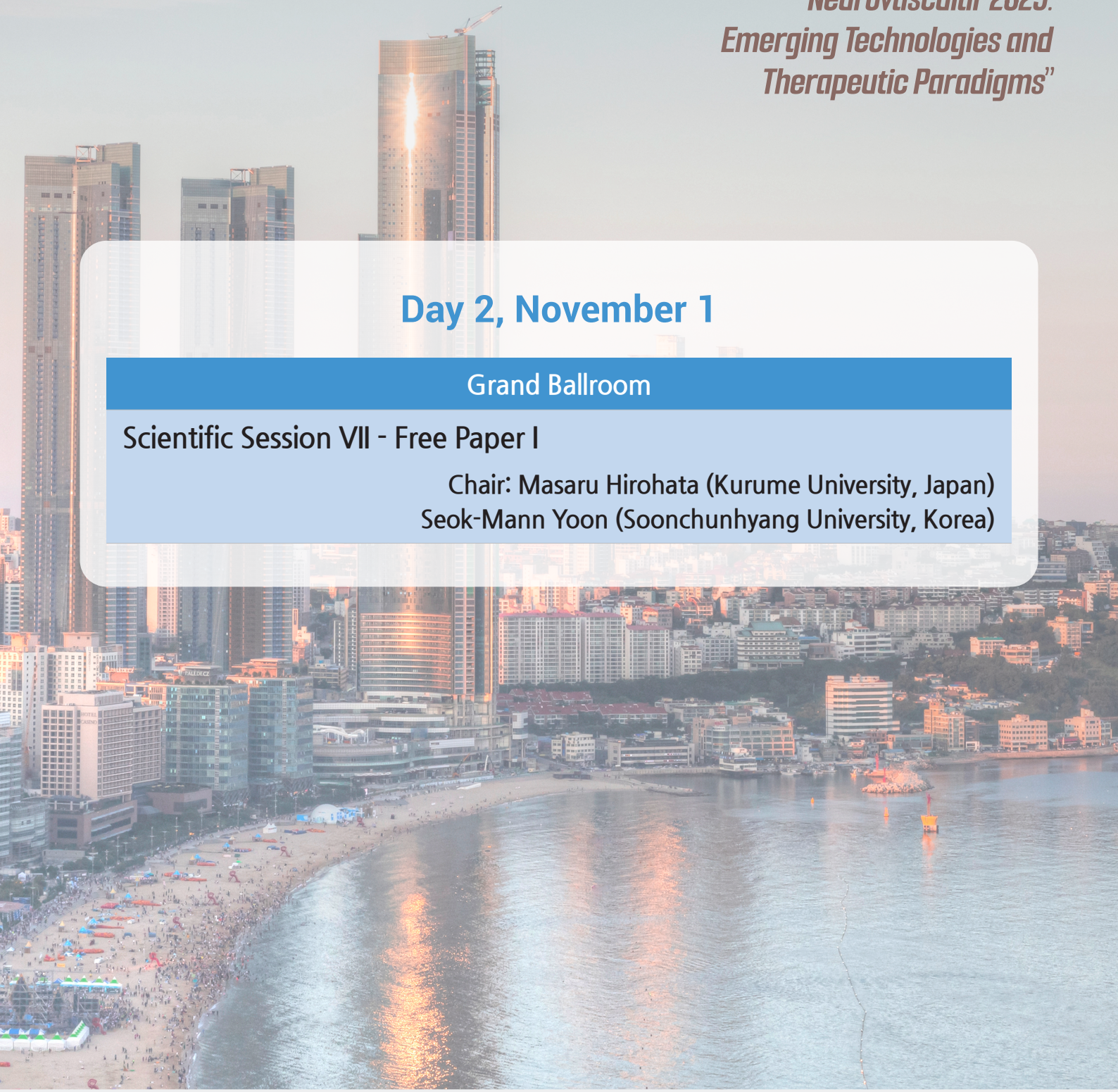

Day 2, November 1

Grand Ballroom

Scientific Session VII - Free Paper I

Chair: Masaru Hirohata (Kurume University, Japan)
Seok-Mann Yoon (Soonchunhyang University, Korea)

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Clinical Outcomes of Coil Embolization for Unruptured Intracranial Aneurysms Categorized by Region and Hospital Size: A Nationwide Cohort Study in Korea

BongGyu Ryu, Si Un Lee*

Neurosurgery, Seoul National University Bundang Hospital, Korea

Objectives: To analyze the outcomes of coil embolization (CE) for unruptured intracranial aneurysm (UIA) according to region and hospital size based on National Health Insurance Service data in South Korea.

Methods: The incidence of complications, including intracranial hemorrhage (ICRH) and cerebral infarction (CI), occurring within 3 months and the 1-year mortality rates in UIA patients who underwent CE in 2018 were analyzed. Hospitals were classified as tertiary referral general hospitals (TRGHs), general hospitals (GHs) or semigeneral hospitals (sGHs) according to their size, and the administrative districts of South Korea were divided into 15 regions.

Results: In 2018, 8425 (TRGHs, 4438; GHs, 3617; sGHs, 370) CEs were performed for UIAs. Complications occurred in 5.69% of patients seen at TRGHs, 13.48% at GHs, and 20.45% at sGHs. The complication rate in TRGHs was significantly lower than that in GHs (p=0.039) or sGHs (p=0.005), and that in GHs was significantly lower than that in sGHs (p=0.030). The mortality rates in TRGHs, GHs, and sGHs were 0.81%, 2.16%, and 3.92%, respectively, with no significant difference. Despite no significant difference in the mortality rates, the complication rate significantly increased as the number of CE procedures per hospital decreased (p=0.001; rho=-0.635). Among the hospitals where more than 30 CEs were performed for UIAs, the incidence of CIs (p=0.096, rho=-0.205) and the mortality rates (3 months, p=0.048, rho=-0.243; 1 year, p=0.009, rho=-0.315) significantly decreased as the number of CEs that were performed increased and no significant difference in the incidence of post-CE ICRH was observed.

Conclusion: The complication rate in patients who underwent CE for UIA increased as the hospital size and physicians' experience in conducting CEs decreased. We recommend nationwide quality control policies CEs for UIAs.

Interim Results of Endovascular Coiling Using Target Tetra® Detachable Coils for Small Intracranial Aneurysms (TETRA Registry)

Kyu Seon Chung[1], Hyun Jin Han[2], Keun Young Park[2], Yong Bae Kim[2], Jung Jae Kim*[2]

[1]Neurosurgery, Gangnam Severance Hospital Yonsei University College of Medicine, Korea,
[2]Neurosurgery, Severance Hospital Yonsei University College of Medicine, Korea

Objectives: The Target Tetra detachable coil features a unique tetrahedral structure. The TETRA registry is a single-center prospective study evaluating the safety and efficacy of Target Tetra coils for treating small intracranial aneurysms (≤5 mm).

Methods: Patients were enrolled between January 2024 and March 2025. Endovascular coiling was performed using Target Tetra coils for ≥70% of the total coil volume in all cases. The primary endpoints were immediate angiographic aneurysm occlusion rates and packing density. Secondary endpoints included periprocedural complications, device-related events, and both clinical and radiological outcomes during follow-up.

Results: A total of 95 patients with 99 intracranial aneurysms were enrolled (69 women; mean age 59.5±10.8 years), including one ruptured anterior communicating artery aneurysm. Aneurysm locations were anterior circulation in 92 (92.9%) and posterior circulation in 7 (7.1%). Mean dome diameter was 3.7±0.9 mm. All procedures were successfully conducted with mean packing density of 32.2±8.7%. Target Tetra coils comprised 89.5±11.5% of total coil volume. Immediate post-procedure angiography showed complete occlusion in 72 aneurysms (72.7%) and neck remnants in 20 (20.2%). Perioperative complications occurred in three cases (3.0%) within one month: one intraoperative aneurysm leakage (1.0%, 6-month modified Rankin Scale [mRS] 0) and two thromboembolic events (2.0%, 6-month mRS 3 and 0) during hospitalization. 271 Target Tetra coils were used. Device-related events included coil implantation failure to microcatheter in 5 coils (1.8%) and retrieval failure in 1 coil (0.4%). Six-month follow-up was available in 94 patients (all unruptured), and one delayed ischemic stroke (1.1%) occurred (mRS 0). Six-month MR angiography of 98 aneurysms showed complete occlusion in 91 (92.9%) and neck remnants in 7 (7.1%).

Conclusion: These interim 6-month results suggest that Target Tetra coils are safe and effective for treating small (≤5 mm) intracranial aneurysms, demonstrating favorable occlusion rates and acceptable complication profiles.

Flow Diversion in Posterior Communicating Artery Branch-Incorporating Aneurysms: A Comparative Mini-Series of Saccular and Fusiform Lesions

Fauziah Chaira Ummah

Neurosurgery, Universitas Indonesia, Indonesia

Objectives: Posterior communicating artery (PCom) aneurysms with branch incorporation pose unique treatment challenges. Achieving aneurysm occlusion while maintaining branch patency is critical. Flow diversion device (FDD) has emerged as a promising alternative, though evidence in branch-incorporating aneurysms remains limited.

Methods: We retrospectively analyzed four patients with PCom aneurysms incorporating the artery origin who underwent flow diversion at our center. Two cases were saccular and two fusiform. Demographic, morphological, procedural, and angiographic data were reviewed. Aneurysm occlusion was assessed using the O'Kelly-Marotta (OKM) scale, with branch patency and clinical outcomes measured by the modified Rankin Scale (mRS).

Results: All procedures were technically successful without perioperative complications. At early follow-up, occlusion ranged from OKM B2-C3. Saccular aneurysms (Cases 1 and 3) showed faster and more durable remodeling, achieving OKM C3 or requiring retreatment to progress, while fusiform lesions (Cases 2 and 4) demonstrated slower and incomplete occlusion. Branch analysis revealed fetal-type PCom (Case 2) remained patent, whereas non-fetal branches showed progressive stenosis or retreatment requirement but without ischemic sequelae. Clinically, three patients improved in mRS, and one patient deteriorated due to underlying disease progression rather than device-related ischemia.

Conclusion: Flow diversion is a feasible and safe strategy for PCom aneurysms with branch incorporation. Saccular aneurysms achieve earlier and more complete occlusion than fusiform variants. Branch fate is influenced by collateral demand: fetal-type PCom arteries remain patent, while non-fetal branches may stenose or occlude without functional deficit. These findings support selective use of FD in complex PCom aneurysms where clipping or coiling are limited.

Longitudinal Braid Stability of Surpass Evolve® Flow Diverter in the Aspect of Fish-Mouthing Deformation

Minu Nahm, Jungjae Kim*, Yong Bae Kim, Keun Young Park, Hyun Jin Han, Susy Youn

Department of Neurosurgery, Severance Hospital Yonsei University College of Medicine, Korea

Objectives: Fish-mouthing (FM), a convergence of focal FD end, without in-stent stenosis or intimal hyperplasia, has been observed during follow-up. While its clinical impact remains uncertain, FM may potentially contribute to thromboembolic events and therefore calls for attention. This study aimed to evaluate the incidence, longitudinal progress, and clinical relevance of FM.

Methods: We retrospectively reviewed 124 patients who underwent FD implantation using a single Surpass Evolve device (Stryker Neurovascular, Kalamazoo, MI, USA) for the treatment of cerebral aneurysms at a single institution. Postoperative, one-month and 1 year skull X-rays or computed tomography (CT) were systematically compared to assess the presence of FM, defined as a >25% reduction in both distal or proximal end diameter of the device based on the recommendations endorsed by the societies. Patient demographics, aneurysm characteristics and procedure-related factors were assessed to identify potential risk factors for FM.

Results: Of the 124 patients, 94 patients (with 113 aneurysms) completed one-month follow-up. Most aneurysms (105 cases, 92.9%) were located in the internal carotid artery (ICA), with a mean size of 11.95±4.64 (4.3 to 28.61) mm and saccular type (77.7%). FM was identified in 13 patients (13.8%), each proximal 2 (2.8%) and distal 12 (12.8%). The mean proximal and distal diameter reductions were 28.8% and 30.8%, respectively. Adequate occlusion (OKM grading) was achieved in 86.3% at 1 year angiographic follow-up. At one year, FM persisted in 6 patients (6.9%), with no newly developed cases. Univariate analysis showed associations with younger age (<60), absence of hypertension and absence of dyslipidemia; multivariate analysis confirmed lack of hypertension as an independent predictor. No thromboembolic complications were related to FM.

Conclusion: Surpass Evolve showed incidence of FM 13.8% in 1 month and 6.98% in 12 month, not associated with thromboembolic complication. In cases where FM is identified during follow-up, careful imaging follow-up may be considered.

Comparison of Clinical and Radiological Outcomes Between Pipeline Shield and Pipeline Vantage Flow-Diverting Stents

Dong Young Cho

Department of Neurosurgery, Ewha Womans University Seoul Hospital, Korea

Objectives: Flow diverters are a well-established modality for the treatment of intracranial aneurysms. The Pipeline Shield and Pipeline Vantage are two such devices with distinct design characteristics: the former featuring a phosphorylcholine coating for reduced thrombogenicity, and the latter incorporating a redesigned braid geometry and enhanced radiopacity. This study aimed to compare radiologic and clinical outcomes of the two devices, with a particular focus on flow diverter braid deformation (FDBD) and in-stent stenosis.

Methods: Patients treated with Pipeline Shield or Pipeline Vantage between September 2023 and November 2024 were retrospectively reviewed. Aneurysm occlusion was assessed via 6-month follow-up digital subtraction angiography (DSA), categorized as complete, near-complete, partial, or none. FDBD was classified into four patterns: foreshortening, braid hump, fishmouthing, and collapse. Incidence of in-stent stenosis and related clinical complications were also recorded.

Results: The Pipeline Vantage group exhibited a markedly higher incidence of FDBD (approximately 60%) and in-stent stenosis compared to the Pipeline Shield group. Common deformities included distal fishmouthing and braid hump. Despite these morphological issues, most cases achieved complete or near-complete aneurysm occlusion by 6 months. However, in-stent stenosis greater than 50% was observed in multiple Vantage cases, raising concerns about long-term luminal patency. No immediate clinical deterioration was observed, but longer-term data are warranted.

Conclusion: The Pipeline Vantage flow diverter demonstrated a significantly higher rate of braid deformation and in-stent stenosis compared to Pipeline Shield. While these structural changes did not correlate with poor short-term clinical outcomes, they may reflect intrinsic limitations of the stent's braid design and could potentially affect long-term durability. Further investigation into the mechanical stability of newer-generation flow diverters is essential.

Early Clinical Experience with Surpass ELITE Flow Diverters: Technical and Clinical Considerations

Jungjae Kim, Minu Nahm, Susy Yoon, Hyun Jin Han, Yong Bae Kim, Keun Young Park*

Neurosurgery, Yonsei University Severance Hospital, Korea

Objectives: The Surpass ELITE (SE) flow diverters are designed to promote better wall apposition based on the broader braid angle than previous Surpass EVOLVE flow diverters. Furthermore, a novel surface modification is applied to a 64-wire conduit of single-layered cobalt-chromium alloy. The objective of this study is to provide a comprehensive description of the technical feasibility and intra- and peri-operative safety of SE flow diverters.

Methods: A retrospective analysis was conducted on twenty-seven consecutive cases of intracranial aneurysm treatment with SE flow diverters. A comprehensive review and analysis was conducted on the properties of SE flow diverters, intraprocedural thromboembolic complications, early (<30 days) neurological complications, and imaging/clinical follow-up data.

Results: A total of 28 SE flow diverters were utilized in the treatment of 37 intracranial aneurysms (average maximal diameter 10.12±0.96 mm), affecting 27 patients (22 female, average age 57 years). All patients were treated with one SE flow diverter, with the exception of one patient in whom telescopic stenting with two SE flow diverters was utilized to bail out the dislodgement of the initial stent into the aneurysm. During the procedure, successful deployment of SE flow diverters was achieved without any suboptimal opening of the distal end. Coil was used as adjunct in 3 patients (11.1%) and balloon-angioplasty was performed in 14 patients (51.9%) to promote wall-apposition. One patient treated for vertebral artery dissecting aneurysm exhibited symptoms of motor weakness immediately following the procedure. However, the patient had recovered as a modified Rankin scale score 1 on discharge. Another patient with a symptomatic ICA aneurysm over 20 mm developed diplopia one week after the procedure. On short-term follow-up (<6 months), eight of nine aneurysms assessable on the imaging were completely obliterated.

Conclusion: Preliminary findings might indicate the credible performance of SE flow diverters for intracranial aneurysms enhancing wall apposition and

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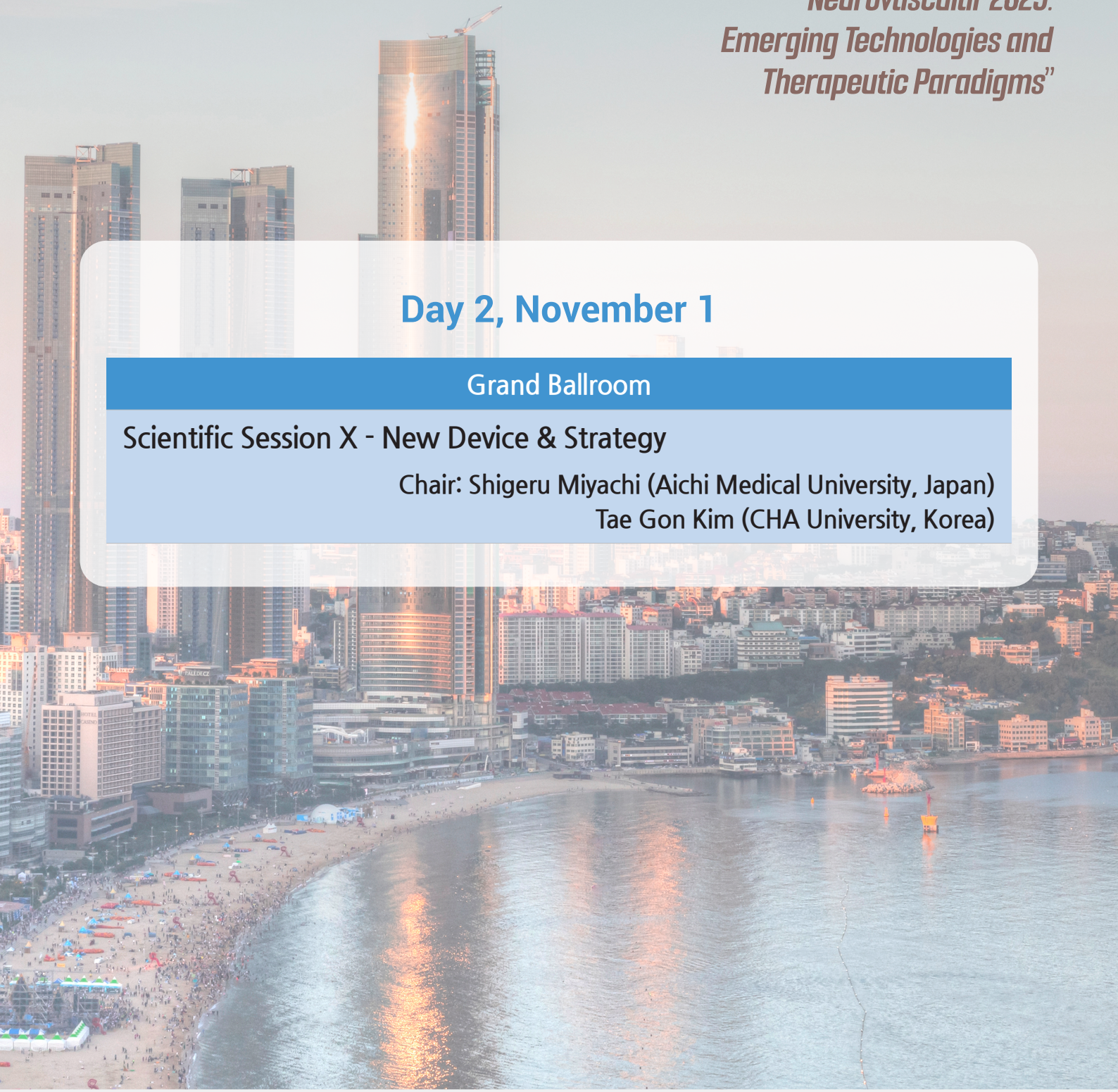

Day 2, November 1

Grand Ballroom

Scientific Session X - New Device & Strategy

Chair: Shigeru Miyachi (Aichi Medical University, Japan)
Tae Gon Kim (CHA University, Korea)

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Endovascular Simulations Using Tailor-Made Vascular Model

K. Sugiu, J. Haruma, M. Hiramatsu, R. Kimura, M. Kawakami, Y. Soutome, J. Fujita, F. Baba, S. Tanaka

Department of Neurological Surgery, Okayama University Hospital, Japan

Thanks to the latest technological innovations, it is now possible to create tailor-made hollow vascular models from preoperative patient such as three-dimensional digital subtraction angiograms.

The 3D-printed hollow models of intracranial aneurysm enable preoperative treatment simulation using various devices under conditions approximating clinical practice.

In this short lecture, I would like introduce usefulness and limitations of our simulation.

Development of Endovascular Electrode and Their Potential Clinical Application

Yuji Matsumaru

University of Tsukuba, Japan

Introduction: Focal resection for refractory epilepsy is an extremely effective treatment, but diagnosis of its focus often requires invasive intracranial electrode placement. We developed an intravascular EEG electrode (EP01) as a minimally invasive method, and reported that it is possible to diagnose focus lateralization in vivo, and that an FIH study showed that it was possible to obtain EEG recordings with higher sensitivity than scalp EEG, and that multiple electrodes up to 6 could be placed into venous sinuses.

Aim of Study: In order to verify whether EP01 is capable of diagnosing focus lateralization in the same way as conventional intracranial electrodes, we started a multicenter prospective single-arm study (EPSILON IE) in March 2024 in Japan.

Method: Patients with refractory focal epilepsy aged 15 to 70 years who undergo conventional intracranial electrode placement and have appropriate vascular anatomy. EP01 is placed in the bilateral cavernous sinuses, bilateral transverse sinuses, and superior sagittal sinus at the same time as conventional intracranial electrodes, and video-EEG recording is performed for up to 2 weeks. PE was defined as the concordance rate between EP01 with non-invasive testing for focal lateralization diagnosis and that of conventional intracranial electrodes. The planned number of cases is 37.

Results: 24 cases had enrolled by March 2025.

Conclusion: The EPSILON IE trial is progressing smoothly and is scheduled to complete enrollment

Effectiveness of CTO Wire for Recanalization of Chronic Total Occlusion in Supraaortic Arteries

Tomoaki Terada

Showa University, Japan

Objective: Endovascular recanalization is an effective treatment for ischemic conditions involving the supraaortic arteries—primarily the internal carotid, subclavian, and vertebral arteries. However, when a microcatheter enters the pseudolumen, accessing the distal true lumen becomes difficult. Conventional guidewires with a tip force of 1-3 g are often insufficient to penetrate the thick intima in cases of total occlusion. We began using a penetration wire with a tip force of 40 g to overcome this challenge.

Cases: Seven cases were treated using the penetration wire: five with internal carotid artery pseudo-total occlusion and two with subclavian artery occlusion. All patients presented with ischemic symptoms affecting the brain or upper limb.

Results: Recanalization was unsuccessful in all cases using conventional guidewires. With the penetration wire, six out of seven cases were successfully recanalized. One case failed due to an unstable microcatheter position. In ICA cases, penetration was achieved at the carotid canal, where the artery is anatomically fixed.

Conclusion: The use of a penetration wire significantly improves recanalization success in cases of pseudo-total occlusion where conventional guidewires fail.

Initial Experience with Obtura, A New Liquid Embolizing Agent which Radiopacity Disappears with Time

René Chapot

Alfried Krupp Krankenhaus Rüttenscheid, Germany

We expose our experience in the use of Obtura, which is a new embolic agent with specific properties:

- Obtura is based on EVOH as is Onyx or Squid, but its radioopacity is obtained by iodine and not tantalum powder. The EVOH remains in place after injection but the radioopacity progressively disappears due to liberation of the iodine.
- This allows a better homogeneity of the embolic agent with a higher ability to diffuse within the vascular networds.
- The risk of occlusion of a microcatheter is reduced in compare to standard liquid embolic agents.
- The resolution of the radioopacity is a major advantage in large lesions requiring embolization in several steps as the remaining shunting lesion is not hidden by the cast of the embolic agent
- This allows a reduction in the radiation exposure
- Artifacts in imaging by CT and MR in relation to Tantalum are cleared after resolution of the radioopacity

We expose our results in the treatment of the first 50 patients in our institution

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 2, November 1

Grand Ballroom

Scientific Session XI - Headache & CSF Disorders

Chair: Ichiro Nakahara (Fujita Health University, Japan)
Sung-Kon Ha (Korea University, Korea)

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Pathophysiology of Headaches (Migrane) and Current Management / Anatomy

Woo-Seok Ha

Yonsei University, Korea

Headache was once referred to as a "vascular headache," but advances in neuroscience have established "migraine" as the preferred term, reflecting the recognition of broader neurobiological mechanisms. Nevertheless, neurovascular coupling remains a central axis in the pathophysiology of headache, with meningeal vessels and trigeminovascular activation playing pivotal roles. Recent insights into the neurovascular anatomy have driven both pharmacological innovations, such as CGRP monoclonal antibodies and gepants, and interventional approaches targeting meningeal arteries and related structures. Beyond primary headache, the role of neurovascular mechanisms is increasingly highlighted in secondary headache disorders, including IIH (idiopathic intracranial hypertension) with venous sinus stenosis and type 3 SIH (spontaneous intracranial hypotension) with cerebrospinal fluid-venous fistula. Interventions such as middle meningeal artery embolization, intra-arterial anesthetic injection, and venous sinus stenting are expanding the therapeutic landscape. These evolving strategies emphasize the need for precise anatomical understanding and a multidisciplinary perspective on headache management. This lecture will review the pathophysiological underpinnings, current treatments, and neurovascular anatomy relevant to both established and emerging therapies.

MMA Embo for Chronic Migraine

Adnan H. Siddiqui

SUNY University at Buffalo Jacobs School of Medicine & Biomedical Sciences, USA

10 Things You Need to Know about CSF Venous Fistulas [Online]

Waleed Brinjikji
Mayo Clinic, USA

CSF venous fistulas are increasingly recognized as a leading cause of spontaneous intracranial hypotension (SIH). In this presentation, we will review ten things that everyone should know about CSFVFs and SIH. The ten things include: 1) SIH has a variety of clinical presentations, 2) the disease is likely as common as SIH, 3) brain MRI findings are diagnostic but not always present, 4) lateral decubitus myelography with dynamic imaging is the best way to diagnose a CSFVF, 5) endovascular therapy is safe and effective, 6) the epidural plexus is a great means of navigation, 7) rebound intracranial hypertension is common after treatment, 8) recurrences happen if you do not achieve penetration of the epidural venous plexus, 9) having multiple fistulas is common so is the development of new fistulas after treatment, and 10) CSF leaks are a common cause of subdural hematomas.

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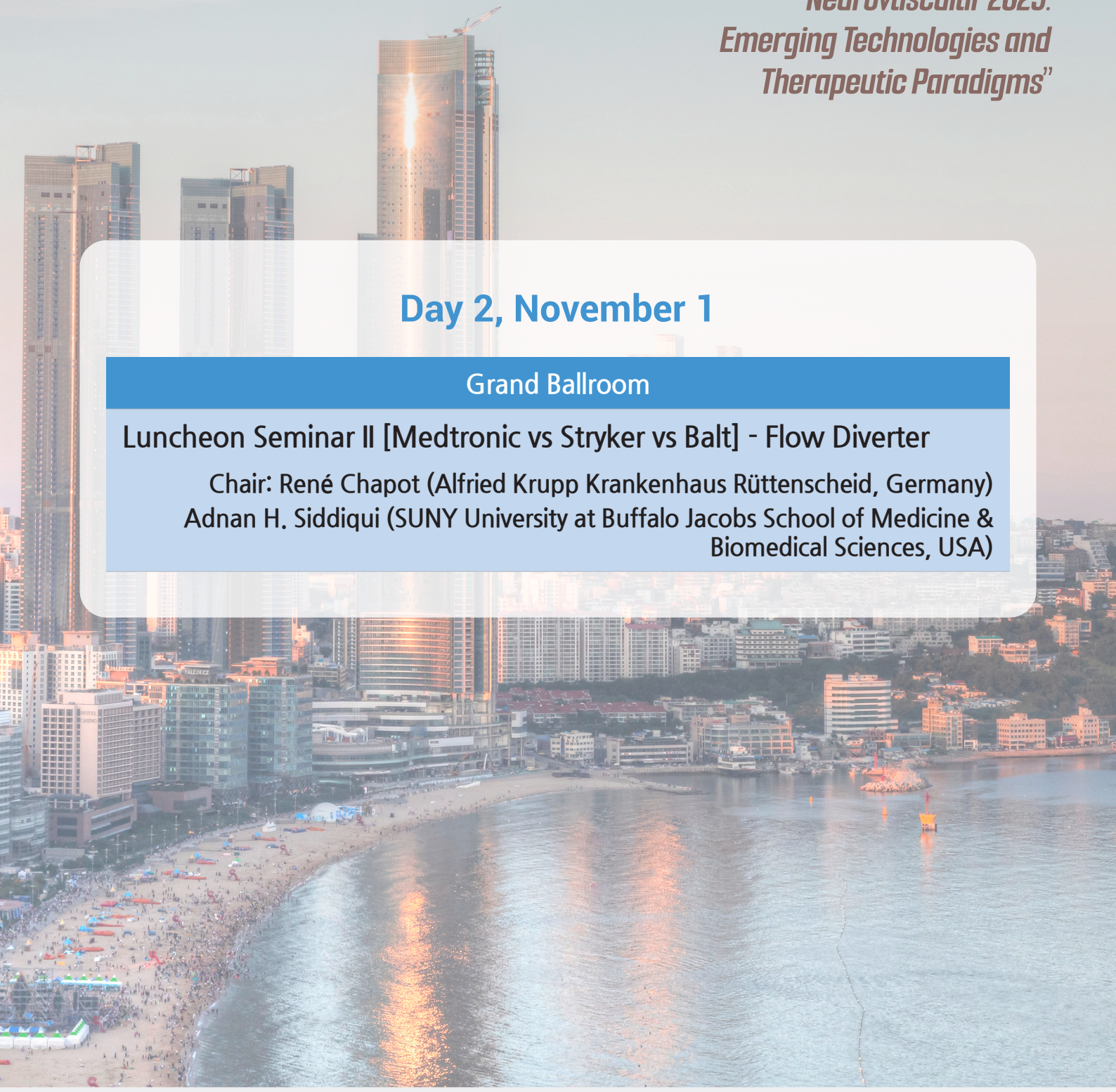

Day 2, November 1

Grand Ballroom

Luncheon Seminar II [Medtronic vs Stryker vs Balt] - Flow Diverter

Chair: René Chapot (Alfried Krupp Krankenhaus Rüttenscheid, Germany)
Adnan H. Siddiqui (SUNY University at Buffalo Jacobs School of Medicine & Biomedical Sciences, USA)

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Managing Large and Giant Aneurysms: Surpass Elite Experience

Yong-Sam Shin
The Catholic University of Korea, Korea

Pipeline Shield Flow Diverter: Insights from Evidence and Practical Experience

Hal Rice

Gold Coast University Hospital, Australia

Silk Vista & Silk Vista Baby: Current Design Developments in Flow Diversion Technology

Yilmaz Onal

Health Sciences University FSM Hospital, Turkey

Silk Vista is a self-expanding braided mesh flow-diverter constructed from 48 wires (drawn filled tube strands) forming the stent structure. This wire count and braid design yield a moderate mesh density due to the larger diameter range. The slightly larger-caliber wires in Silk Vista provide increased radial force for robust vessel wall apposition. Unlike earlier-generation Silk devices that featured flared ends (previously used as radiopaque markers and for wall apposition), the Silk Vista has no flared ends. Removing the flared ends, combined with the device's higher radial force, allows more uniform contact with the vessel wall and reduces the risk of incomplete opening or migration. Like the larger SV, the Silk Vista Baby is constructed from 48 drawn-filled tubing wires composed of nitinol with a platinum core. This material choice gives SVB the same benefits of superelasticity and shape memory (from nitinol) along with full radiopacity (from the platinum content). Each wire strand in SVB is essentially identical to those in SV, scaled to the smaller device. The bi-metallic wires allow the small stent to be seen entirely under X-ray while preserving the necessary flexibility to navigate tortuous distal anatomies. The use of DFT wires in a device deliverable through a 0.017" microcatheter was a novel achievement - previously, such small-caliber FDs often sacrificed visibility due to space limits for marker wires.

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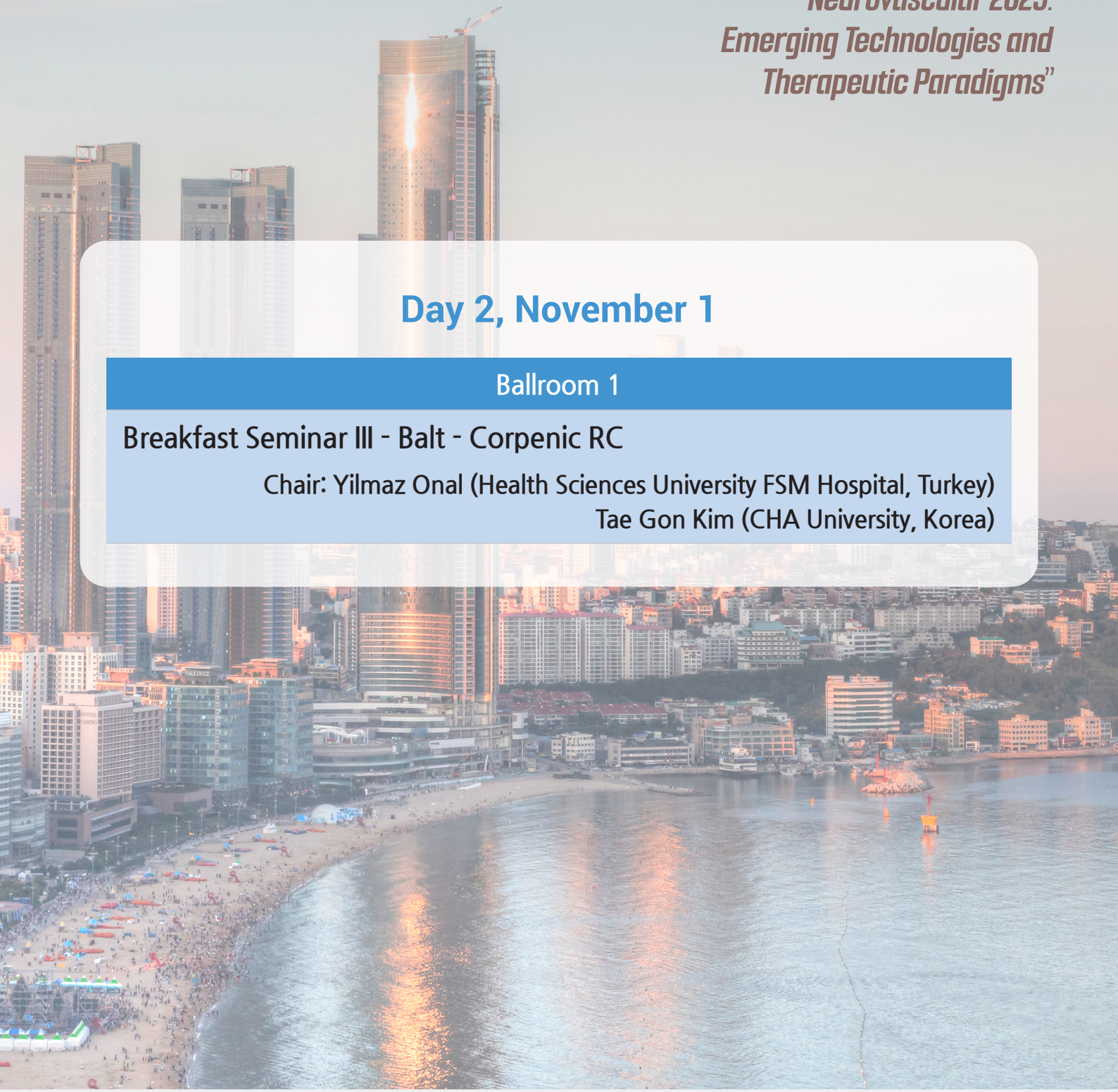

Day 2, November 1

Ballroom 1

Breakfast Seminar III - Balt - Corpenic RC

Chair: Yilmaz Onal (Health Sciences University FSM Hospital, Turkey)
Tae Gon Kim (CHA University, Korea)

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Remodeling of Dural Fistulae

René Chapot

Alfried Krupp Krankenhaus Rüttenscheid, Germany

We expose our experience in more than 300 procedures with the Copernic venous remodeling balloon. This balloon was specifically developed to be used in the treatment of dural fistulae. It enlarges the range of DAVF that can be cured be endovascular treatment due to rerouting of the embolic agent after inflation of the balloon but also due to the ability of achieving transvenous embolization.

The potential drawbacks are exposed with a risk of rerouting the embolic agent to veins draining in the sinus and the need to sometimes use several balloons simultaneously.

Initial Institutional Experience of Copernic RC in Treatment of Dural Fistulas

Jieun Roh

Pusan National University, Korea

The Copernic RC Balloon in the Treatment of Dural AVFs: Sinus Occlusion Versus Restoration

Woo Cheul Cho

The Catholic University of Korea, Korea

Dural arteriovenous fistulas (dAVFs) are pathological connections between dural arteries and venous sinuses or cortical veins, which can lead to serious neurological complications if left untreated. Management strategies must be tailored to the lesion's location, venous drainage pattern, and flow characteristics. Therapeutic approaches include endovascular embolization, stereotactic radiosurgery, microsurgical ligation, and, in some cases, combined treatment modalities. Endovascular treatment remains the primary modality.

At our institution, from January 2008 to September 2025, a total of 215 patients were diagnosed with cranial dAVFs and underwent 235 treatment sessions. In late 2024, the Copernic RC balloon was introduced in Korea. Since then, we have utilized this device in 9 embolization procedures—8 targeting transverse-sigmoid sinus dAVFs and 1 targeting a torcular dAVF. The balloon enabled temporary flow arrest during Onyx injection, improving embolic control and facilitating targeted penetration. It also allowed for preservation or restoration of venous sinus drainage.

Among the 9 balloon-assisted cases, there were no procedural-related complications. Complete or near-complete occlusion was achieved in 7 cases. Two cases showed incomplete obliteration; one patient experienced worsening tinnitus and underwent successful retreatment. Until now, all patients showed clinical improvement in their presenting symptoms.

Our experience suggests that the Copernic RC balloon might be good adjunctive device, offering better treatment outcomes in the endovascular management of dAVFs with feasible safety and efficacy. Furthermore, this device is valuable when preservation of venous drainage is critical.

Same Disease, Different Point of View

Won Ki Yoon
Korea University, Korea

Cerebral dural arteriovenous fistula (CDAVF) represents a challenging neurovascular disorder due to its complex anatomy and the scarcity of histopathological validation. My clinical experience with CDAVF has been limited, largely because of its rarity, which initially constrained both my knowledge and interest in this disease entity. However, through the treatment of two CDAVF cases using the *Copernic RC balloon catheter*, my understanding of this condition has substantially deepened. The device enabled precise anatomical delineation around the affected sinus, provided structural protection, and facilitated the restoration of sinus function. Alternating inflation and deflation of the balloon effectively controlled the penetration of the embolic agent, improving procedural safety and efficacy. Postprocedural image review and literature analysis further enhanced my comprehension of CDAVF pathophysiology and management. Here, I present two incomplete yet instructive cases and discuss the clinical utility of the *Copernic RC balloon catheter* in the endovascular treatment of CDAVF.

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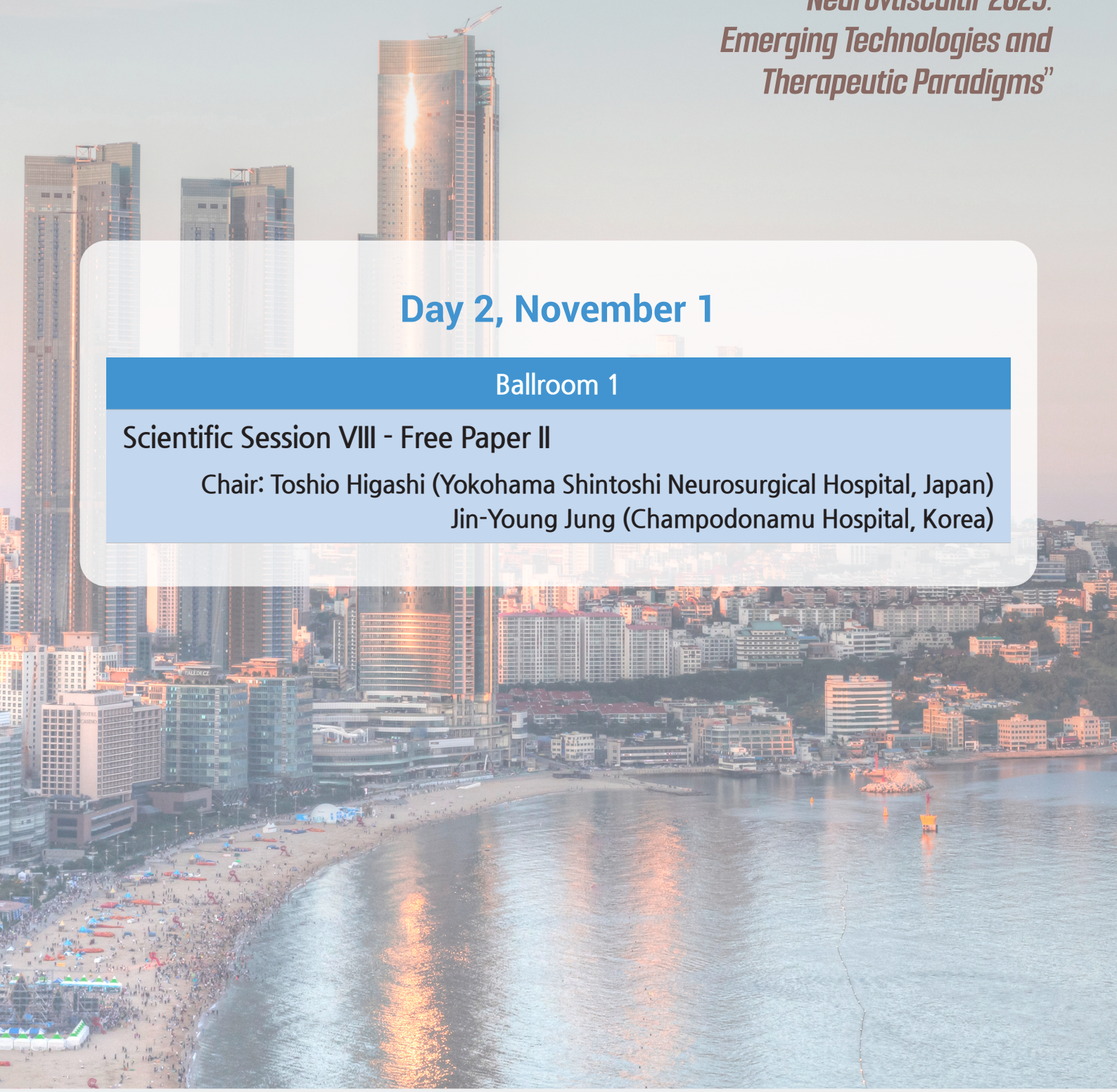

Day 2, November 1

Ballroom 1

Scientific Session VIII - Free Paper II

Chair: Toshio Higashi (Yokohama Shintoshi Neurosurgical Hospital, Japan)
Jin-Young Jung (Champodonamu Hospital, Korea)

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Eight-Year Clinical Characteristics and Follow Up of Carotid Cavernous Fistula in West Java: A Single Centre Experience

Adi Nugroho Harlianto[1], Bilzardy Ferry Zulkifli[2], Achmad Adam[2]

[1]Neurosurgery Department of Hasan Sadikin Hospital, Neurosurgery Resident, Indonesia,
[2]Neurosurgery Department of Hasan Sadikin Hospital, Neurosurgeon, Indonesia

Objectives: Carotid Cavernous Fistula (CCF) is a rare vascular abnormality characterized by anomalous fistula of carotid artery to the cavernous sinus. Historically, our center has been the only tertiary medical facility in West Java capable of endovascular treatment for CCF, resulting in the highest caseload in the region. This study aims to evaluate the clinical features, management and outcomes of the CCF cases managed at our facility to contribute to the current knowledge.

Methods: From 2018 to August 2025, all patients diagnosed with CCF who underwent multimodal endovascular procedures were retrospectively reviewed. Data collected included demographic and epidemiologic information, symptomatology, Barrow classification, treatment modalities, procedural outcomes and complications.

Results: During this period, 159 digital subtraction angiography (DSA) procedures were performed for 106 CCF cases, averaging approximately 19.75±2.30 procedures annually. The patient cohort was predominantly male (60.4%) with a mean age of 34.69±17.75 years. The most common presenting symptoms were proptosis (89.92%), chemosis (72.28%), and bruit (61.2%). The majority of CCFs were Barrow Type A (n=98, 92.5%), followed by Type B (n=6, 5.7%) and Type C (n=1, 0.9%), with no cases of Type D. Most fistulas were unilateral; however, 10 cases (9.4%) involved bilateral symptoms. The preferred treatment modality was coil embolization (n=55, 51.9%), followed by ballooning (n=5, 4.7%) and liquid embolization (n=3, 2.8%).

Conclusion: Multimodal endovascular therapy, has become the first-line treatment for CCF due to its safety and efficacy compared to open surgical approaches. The high incidence of motor vehicle accidents in Indonesia contributes to the relatively increased number of CCF cases annually in our facility. Our findings align with existing literature, confirming that Type A CCF is the most common, predominantly affecting males in their third decade of life. Coil embolization demonstrated reliable post-procedural outcomes, making it the preferred modality at our center.

Comparison of the Transarterial and Transvenous Approaches and Different Embolization Modalities in the Treatment of Direct Carotid-Cavernous Fistulas- A Tertiary Care Centre Review in the Developing World

Vikrant Setia[1], Anita Jagetia*[2]

[1]Neurosurgery, Assistant Professor, India, [2]Neurosurgery, Professor and Head of Department, India

Objectives: To analyze outcomes of transarterial vs transvenous approaches and compare treatment modalities (detachable balloons, coils, liquid embolics, stents, and coil-liquid combinations) in managing post-traumatic direct CCFs.

Methods: We retrospectively analyzed data from 24 patients with post-traumatic CCF treated via transarterial or transvenous endovascular approaches. Treatment modalities included detachable balloons, liquid embolic agents, or covered stents. The primary outcome was complete radiological occlusion of CCF; secondary outcomes included symptom relief (e.g., proptosis, chemosis, vision loss, tinnitus), recurrence at 6 months, and complications (e.g., cranial nerve palsy, stroke, TIA, blindness, death). Choice of approach was based on surgeon's discretion and angioarchitecture of CCF.

Results: Complete radiological occlusion was achieved in 76.5% (n=13) of transarterial and 71.4% (n=5) of transvenous cases. Symptom resolution occurred in 41.1% (n=7) and 42% (n=3) of the transarterial and transvenous groups, respectively, with partial resolution in 29.4% (n=5) and 28% (n=2). Over a median 6-month follow-up, recurrence rates were 11.7% (n=2) and 20% (n=1), respectively in TA and TV groups. Complications included 1 stroke, 1 death, and 3 cases of cranial nerve palsy.

Coils with or without liquid embolisate had the highest obliteration rate, symptom resolution, and least recurrence.

Conclusion: No significant differences were found between transarterial and transvenous embolization in terms of occlusion, recurrence, or complications.

Endovascular Treatment and Management of Spinal Arteriovenous Malformation and Fistula

Shinsuke Sato[1,2], Yasunari Niimi*[2]

[1]Neurosurgery, St Lukes International Hospital, Japan,
[2]Neuroendovascular Therapy, St Lukes International Hospital, Japan

Objectives: The target age range was 0-75 years. The study included 19 cases of AVM/AVF (intramedullary, perimedullary, filum terminale, and conus), including 2 SAMS cases and 1 CM-AVM case.

Methods: Intradural spinal arteriovenous malformations vary widely, including those associated with the genetic background and SAMS. The purpose of treatment depends on the presentation of the onset and location of the intradural spinal AVM/AVF. We retrospectively reviewed the outcomes of endovascular treatment of intradural spinal AVMs/AVFs at our institution.

Results: There were 10 cases of partial occlusion, 2 cases of occlusion, and 7 cases of complete occlusion. NBCA, Onyx (off-label use), and coils were used as embolization materials. The treatment method was changed to clipping the shuntpoint in one case because of difficulty in access based on angiographic findings. Complications were as follows: one case of extravasation from ASA (AVM) (catheter guided) (no worsening of symptoms). One case of PSA spasm (AVM) (no worsening of symptoms). One case of dissection of the origin of the medial sacral artery (conus) (treatment was temporarily abandoned, but became possible after a schedule change). One case of postoperative venous return failure with NBCA (conus).

Conclusion: While the management of intradural spinal AVM/AVF is challenging due to complex vascular anatomy and rarity, advancements in high-resolution imaging and multidisciplinary approaches are improving treatment outcomes. However, the risks associated with interventions, such as catheter-induced complications and postoperative spinal venous thrombosis, remain significant concerns that require careful consideration and ongoing research to address effectively.

Salvage Intra-Arterial Thrombolysis by t-PA in Acute Ischemic Stroke not Amendable to Mechanical Thrombectomy

SungChul Jin[1], Yunhyeok Choi[3], Hyungon Lee[4], Joonwon Lee[2], Seung Hwan Kim[5]

[1]Department of Neurosurgery, Inje University Haeundae Paik Hospital, Korea, [2]Department of Neurology, Inje University Haeundae Paik Hospital, Korea, [3]Department of Neurosurgery, Good Samsun Hospital, Korea, [4]Department of Neurosurgery, Haeundae Bumin Hospital, Korea, [5]Department of Neurosurgery, Samsung Changwon Hospital Sungkyunkwan University School of Medicine, Korea

Objectives: Mechanical thrombectomy (MT), with or without intravenous tissue plasminogen activator (IV tPA), is an established first-line therapy for acute large-vessel occlusion. However, several clinical scenarios remain challenging, including intractable lesions after repeated thrombectomy attempts, lesions deemed unsuitable for device navigation, and re-occlusion due to underlying intracranial atherosclerosis. In such cases, intra-arterial (IA) thrombolysis with t-PA may serve as a salvage strategy. We evaluated the clinical and radiologic outcomes of rescue IA t-PA in patients with acute ischemic stroke ineligible or refractory to MT.

Methods: Between July 2021 and December 2022, 90 patients with acute artery occlusion underwent MT at our institution. Among them, 16 patients received adjunctive IA t-PA due to: (1) underlying steno-occlusive disease (n=6), (2) intractable thrombus unresponsive to multiple MT attempts (n=6), or (3) lesions anatomically unsuitable for MT (n=4). IA t-PA was administered following standard angiographic confirmation of occlusion or re-occlusion of the lesions. Dose of t-PA was used 0.6 mg/kg to avoid hemorrhage complication and used up to 90mg if the patient will be treated with IV t-PA.

Results: Successful recanalization (TICI ≥ 2b) was achieved in 15 of 16 patients (93.8%). No cases of intraparenchymal hemorrhage requiring surgical decompression were observed. Minor hemorrhagic complications included subarachnoid hemorrhage (n=2, 12.5%) and hemorrhagic transformation in the infarcted core (n=1, 6.25%). Follow-up CT angiography on postoperative day 1 was available in 14 patients. Delayed re-occlusion occurred in 2 patients (14.3%)—one with intractable thrombus and one with intracranial stenosis. One patient died from unrelated hypovolemic shock (6.25%). At 90-day follow-up, favorable clinical outcome (modified Rankin Scale score 0-2) was observed in 2 patients (12.5%).

Conclusion: In our study, Rescue IA t-PA for acute ischemic stroke cases deemed intractable or unamenable to mechanical thrombectomy demonstrated high angiographic success and an acceptable

Low-Dose Versus High-Dose Intra-Arterial Alteplase (IA-tPA) as Adjunct or Rescue After Mechanical Thrombectomy for Acute Ischemic Stroke: A Systematic Review

Zia Maula Fadhullah, Nur Setiawan Suroto*

Department of Neurosurgery, Dr Soetomo General Teaching Hospital Surabaya Indonesia, Indonesia

Background: Intra-arterial alteplase (IA-tPA) has re-emerged as a potential adjunct or rescue strategy during endovascular thrombectomy (EVT) for acute ischemic stroke. However, dosing protocols vary widely across published studies, and the impact of low versus high IA-tPA doses on clinical and angiographic outcomes remains unclear.

Objective: To systematically review existing evidence on IA-tPA dosing during EVT, with a focus on symptomatic intracranial hemorrhage (sICH) and reperfusion quality as measured by final eTICI scores, stratified by adjunct versus rescue use.

Methods: A systematic literature search of PUBMED, Science Direct, Clinical Trial, And Scopus was conducted from 2015 through 2025. Eligible studies reported administration of IA-tPA during EVT with available information on dosing and outcomes of sICH and/or final reperfusion. Both randomized controlled trials and observational cohort studies were included. Data on dose regimens (mg/kg or absolute dose), timing of administration (adjunct after reperfusion vs rescue in incomplete reperfusion), and outcome definitions were extracted.

Results: Nine eligible studies were identified. Across studies, IA-tPA dosing ranged from 5 to 22.5 mg, with heterogeneous infusion strategies. Reported sICH rates did not significantly increase with higher dosing regimens, though definitions of sICH varied. Several studies suggested improved angiographic reperfusion (eTICI 2c/3) with moderate to higher IA-tPA dosing when used adjunctively, whereas outcomes in rescue settings were more variable and influenced by number of thrombectomy passes and baseline reperfusion status.

Conclusion: Current evidence suggests that IA-tPA, across a range of dosing regimens, does not markedly increase sICH risk, and may enhance reperfusion quality when used adjunctively. These findings underscore the need for standardized dosing protocols and prospective trials to clarify optimal IA-tPA strategies during EVT.

Safety and Efficacy of Endovascular Techniques during Emergency Retrieval of Intracranial Onyx Reflux or Migration: A Systematic Review and Illustrative Case

Jared Paul Golidtum

Neurosurgery, Academy of Filipino Neurosurgeons, Philippines

Objectives: Onyx embolization has reflux and migration rate of 15.8% to non-target intracranial arteries requiring emergency retrieval to prevent ischemic sequalae. Endovascular revascularization procedures for Onyx were scarcely published and risk of complications were poorly explained. The purpose of this systematic review is to assess the safety and efficacy of endovascular techniques during emergency retrieval of intracranial reflux or migrated Onyx. Specifically, we will identify causes of reflux or migration of Onyx; determine the success of retrieval, degree of recanalization, & modified first pass efficacy; describe complications and clinical outcome; and present illustrative cases from our institution.

Methods: To carry out this systematic review we used the PRISMA guidelines. We included scientific articles described for emergency endovascular retrieval techniques of intracranial reflux or migrated Onyx during embolization. Pubmed, Scopus, and Web of Science were used as a main source of information. Other methods of searching in websites, organizations, clinical trials, and citations were also done. Narrative synthesis was chosen to summarize and explain the findings since studies have variable endovascular approaches and reporting of outcome. Risk of bias was assessed by CARE guidelines.

Results: Eleven studies were selected with 12 non-target intracranial arteries occluded by Onyx cast underwent emergency endovascular retrieval were done. Each technique (stent-retriever, aspiration, and combined technique) achieved 83.3% of success rate of retrieval, mTICI 2b-3, and modified first pass efficacy. Stent-retriever alone technique had 50% new territory ischemia and 16.7% poor functional independence on follow up. Our illustrative cases utilized combined technique which achieved mTICI of 3 with mRS 0 on follow up.

Conclusion: Sequential immediate endovascular retrieval of Onyx cast is safe and effective to maintain the patency of non-target arteries. Stent-retriever combined with aspiration technique had excellent retrieval with minimal vascular complications even up to medium-sized arteries.

Rescue Carotid Stenting in Tandem Occlusions: 5 years' Experience from A Comprehensive Stroke Center

Minh Thang Le[1,2], Luan Tran*[2,5], Giang Nguyen[1], Nam Nguyen[2], Tran Nguyen[4], Hai Nguyen[6], Dang Tran[3]

[1]Digital Subtraction Angiography Unit, Can Tho SIS General Hospital, Vietnam, [2]Department of Cardiovascular and Thoracic Surgery, University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam, [3]Department of Environmental Health, University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam, [4]Department of Internal Medicine, Can Tho University of Medicine and Pharmacy, Vietnam, [5]Deparment of Thoracic and Vascular Surgery, University Medical Center, Vietnam, [6]Ho Chi Minh City Journal of Medicine, University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam

Objectives: Rescue carotid stenting has recently been provided as an additional treatment followed by mechanical thrombectomy in patients with tandem occlusions of the anterior circulation. Nevertheless, few available data support the benefits of this treatment in Asia. We hypothesized that this treatment would be associated with improved postprocedural clinical outcomes.

Methods: We retrospectively analyzed patients who underwent rescue carotid stenting for tandem occlusions of the anterior circulation between December 2020 and May 2024 at our hospital. Clinical, neuroimaging, procedural, and complication data were collected. Primary outcomes included the rate of good outcomes with the modified Rankin Scale (mRS) 2 at 3-month follow-up.

Results: Ninety patients with tandem occlusions of the anterior circulation who underwent rescue carotid stenting were included, all of whom achieved successful recanalization. Among the 80 cases with the distal-toproximal approach, diagnostic-Dotter was used in 85 %. Fifty-three patients (58.9%) had good outcomes, and six patients (6.7%) experienced parenchymal hemorrhage type II, which was associated with death (mRS 6) after the procedure.

Conclusion: Placement of rescue carotid stenting in tandem occlusions was associated with improved clinical outcomes, without increasing symptomatic intracranial hemorrhage.

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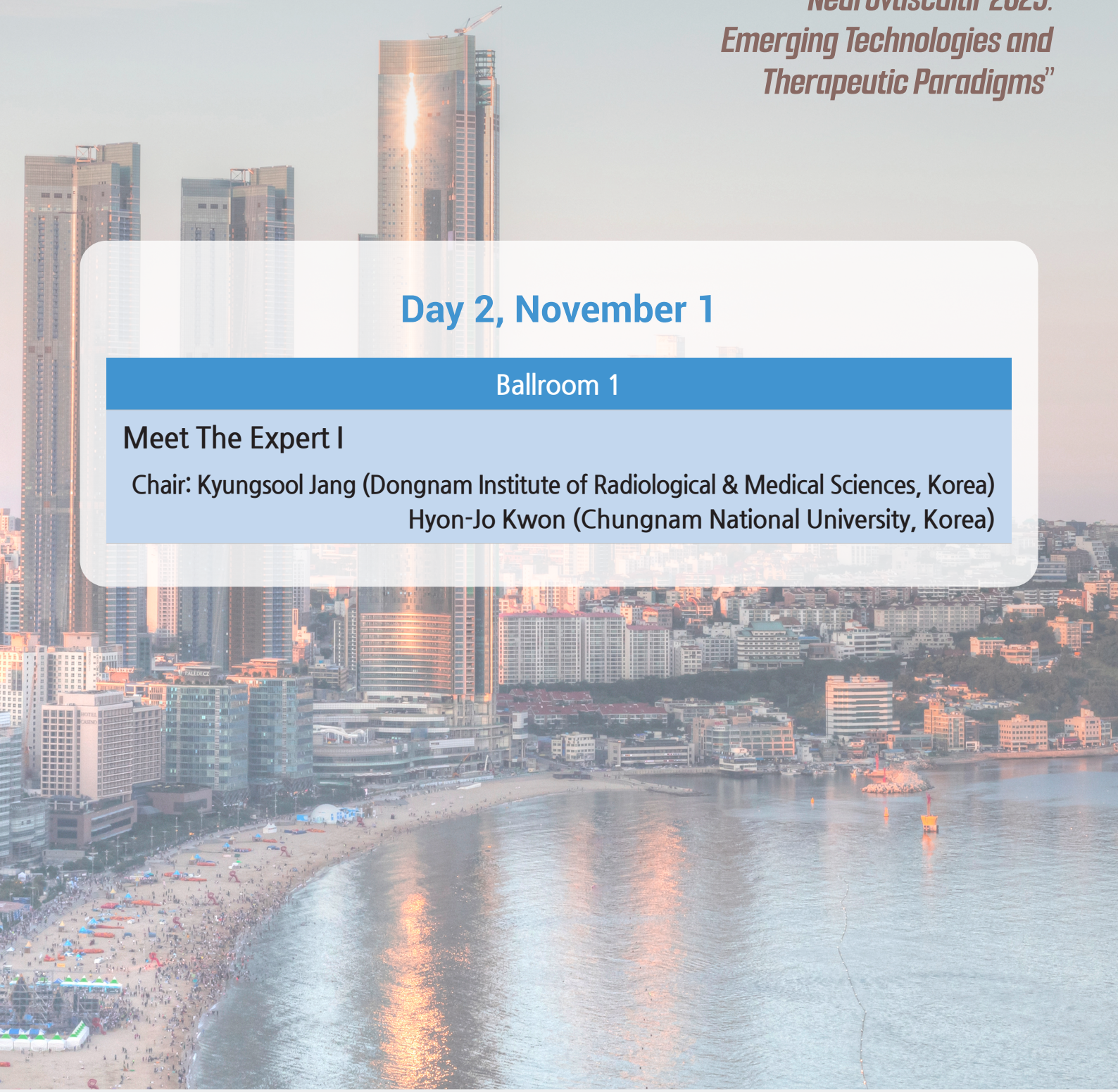

Day 2, November 1

Ballroom 1

Meet The Expert I

Chair: Kyungsool Jang (Dongnam Institute of Radiological & Medical Sciences, Korea)
Hyon-Jo Kwon (Chungnam National University, Korea)

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Distal Thrombectomy in AIS: Do We Really Need to Stop?

Yilmaz Onal
Health Sciences University FSM Hospital, Turkey

Endovascular Management of Complex Aneurysms

Gaurav Goel
Medanta Hospital, Gurgaon, India

Endovascular treatment of complex aneurysms has evolved into a transformative paradigm, moving from conventional microsurgical clipping to advanced reconstructive flow-based therapies. Complex aneurysms—giant, fusiform, dissecting, and distal lesions—once deemed inoperable, are now increasingly managed with sophisticated endovascular solutions that enable vessel preservation and long-term occlusion.

Flow diversion remains the cornerstone of this evolution, providing endoluminal vessel reconstruction through pressure redirection and neointimal healing. Newer coated flow diverters, incorporating surface modifications such as phosphorylcholine or heparin coatings, minimize thrombogenicity and allow safer use in small vessels or patients with dual antiplatelet resistance. This has expanded indications to previously high-risk settings, reducing ischemic complications.

Distal flow diversion represents another key extension of this paradigm. The development of low-profile microcatheters and smaller-diameter flow diverters has enabled treatment of aneurysms arising from distal anterior and posterior circulation branches, such as the pericallosal, PICA, and PCA segments. Recent multicenter studies have demonstrated over 80% complete occlusion rates with low permanent morbidity, confirming procedural safety and efficacy in distal locations.

Indirect flow diversion, leveraging hemodynamic effects from staged or adjacent parent vessel reconstruction, augments this progress. By modulating intra-aneurysmal flow without direct device placement across the aneurysm neck, it preserves critical perforators while achieving gradual occlusion.

Together, these advances mark a clear shift toward precision endovascular therapy—tailored to aneurysm morphology, hemodynamics, and vascular territory. The integration of distal access technology, hemo-modulatory strategies, and next-generation coated flow diverters underscores a future where minimally invasive, physiologic vessel reconstruction supersedes traditional exclusion-based aneurysm repair.

Neurointervention Using Robotics: From A-Z

Kamil Zeleňák

Comenius University's Jessenius Faculty of Medicine and University, Slovakia

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Day 2, November 1

Ballroom 2

Breakfast Seminar IV - Terumo Neuro - WEB

Chair: Shinichi Yoshimura (Hyogo Medical University, Japan)
SoonChan Kwon (University of Ulsan, Korea)

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WEB Embolization: Long-Term Clinical Results and Approaches to Reducing Technical Errors

Dae Won Kim, Eun Suk Park

Neurosurgery, Wonkwang University Hospital, Korea

Objectives: The Woven EndoBridge (WEB) device is a novel treatment option for wide-neck bifurcation intracranial aneurysms. While this device has had good results, there remains a subset of aneurysms that fail this treatment. The main objective of this study is to present the long-term results of WEB embolization and introduce the approaches to reducing technical errors.

Methods: This retrospective study included 79 patients with intracranial aneurysms treated with WEB from Dec. 2021 to Aug. 2025. Data from chart and image review covered demographics, aneurysm features, procedural details, occlusion status, and evaluation of technical errors with efforts to reduce them.

Results: The aneurysm locations were 41 at the A-com, 22 at the MCA bifurcation, and 16 at the basilar top. Fourteen aneurysms were ruptured. The mean dome and height were 5.4 and 5.1 mm, respectively, with a mean neck size of 4.5 mm and a dome-to-neck ratio of 1.2. The WEB devices used ranged from 3 to 11 mm.

The technical failure rate of WEB deployment was 1.3% (1 case). Device exchange due to sizing error occurred in 8 cases (10.1%). Periprocedural complications developed in 3 cases (3.8%), all of which were thromboembolic events without permanent deficits. Rescue stenting was required in 2 cases (5.1%), and retreatment in 1 case (1.3%). Stents were used in 5 cases (6.3%).

Follow-up DSA was available in 22 patients. Complete occlusion (WOS 0, 0') was achieved in 16 cases (72%), adequate occlusion (WOS 0, 0', 1) in 19 cases (86.4%), and neck remnant (WOS 2) in 3 cases (5.9%).

Conclusion: WEB embolization is a feasible and effective option for bifurcation aneurysms, though larger aneurysms remain prone to incomplete occlusion. Regardless of anatomical factors, ongoing efforts to reduce technical errors (e.g., sticky detachment, sizing issues) are essential to optimize outcomes.

The Role of Balloon Assist Technique for WEB Treatment of Cerebral Aneurysm

Akio Hyodo

Kamagaya General Hospital, Japan

Nowadays, endovascular treatment of cerebral aneurysms is the most popular treatment of them. And recently many new devices, such as flow diverter or intrasaccular flow disruptor, are invented and applied clinically, in order to improve the result for the large or giant aneurysms and wide neck aneurysms. As for intrasaccular flow disruptor, the WEB (Woven EndoBridge) is the only one intrasaccular flow disruptor in Japanese market. So far, we have used 92 WEBs for cerebral aneurysms (including 9 ruptured cases) from February 2021.

In this report, we will present our experiences and result of the treatment of the cerebral aneurysms using WEB. And especially for the role of balloon assist technique for WEB treatment of cerebral aneurysms. The role of balloon assist technique for WEB is a little bit different from the role for coil embolization. Balloon assist technique may change the axis of the inflow direction, and it makes the introduction of the VIA catheter into the aneurysm easier and more secure. And sometime detach of the WEB is difficult, then it makes easier and more secure. It also effective for detection of parent artery space good enough or not, when oversized WEB is used. We will show the representative cases of these effectiveness using the balloon assist technique for WEB.

In conclusion, the balloon assist technique is effective not only coil embolization but also WEB treatment of cerebral aneurysms. Endovascular treatment of cerebral aneurysms is greatly in progress and it is one of the first choice treatments for the cerebral aneurysms. Recently the time is changing and many new devices, such as flow diverter or intrasaccular flow disruptor, are invented and applied clinically.

15 Years of WEB: A Paradigm Shift in WNBA Treatment

Laurent Spelle

Paris Saclay University, France

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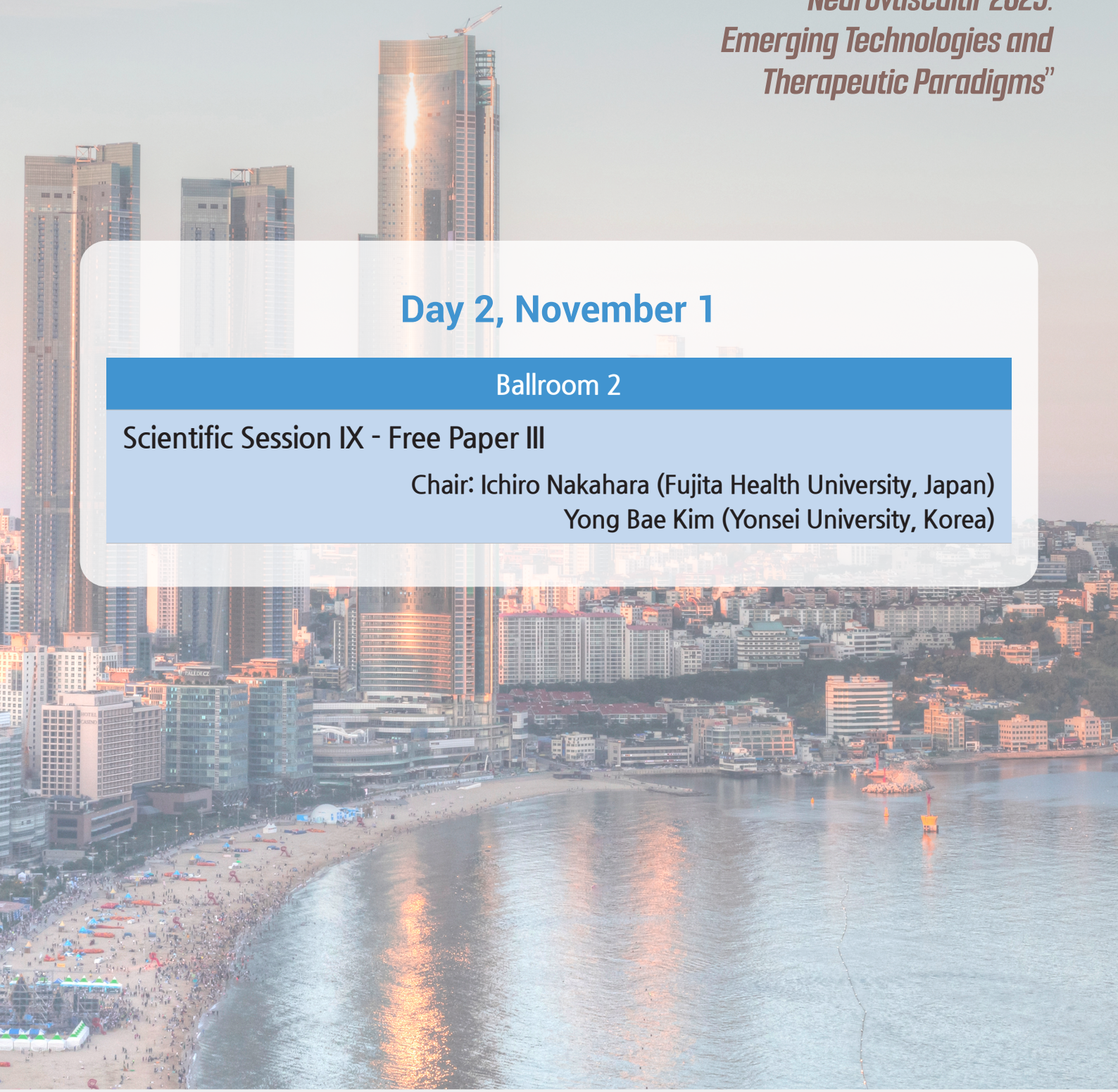

Day 2, November 1

Ballroom 2

Scientific Session IX - Free Paper III

Chair: Ichiro Nakahara (Fujita Health University, Japan)
Yong Bae Kim (Yonsei University, Korea)

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Various Techniques of Intracranial-to-Intracranial Bypass (IIB) for Complex Cases with Illustrated Cases

Jae Seung Bang[1], Si Un Lee[1], Sanghyo Lee[1], Taewon Choi[1], Bonggyu Ryu[1], Yonghun Song[1], Woong Beom Kim[2], Chang Wan Oh[3]

[1]Department of Neurosurgery, Seoul National University Budang Hospital, Korea,
[2]Department of Neurosurgery, Chonnam National University Hospital, Korea,
[3]Department of Neurosurgery, ChungAng University Gwangmyeong Hospital, Korea

Objectives: We sought to determine the utility of intracranial-to-intracranial bypass (IIB) surgery and the available bypass options for complex cases.

Methods: A total of 18 IIB cases were included. Each case was classified as IIB with or without an interposition graft. The clinical and angiographic status were evaluated pre- and postoperatively and at the last follow-up. Angiographic images were analyzed and reconstructed schematically. Postoperative angiography was used to measure the bypass patency and the presence of postoperative cerebral infarction. The recipient artery occlusion time for each bypass was measured.

Results: Of the 18 patients, 14 had presented with a complex intracranial aneurysm (IA), 1 with vertebrobasilar dolichoectasia, and 3 with intracranial arterial stenoocclusive disease. Ten patients had an incidentally discovered IA. Seven patients had presented with neurological deficits due to ischemia or aneurysmal mass effects. Of the 18 cases, 10 were IIBs with an interposition graft, including 4 cases of superficial temporal artery and 6 of radial artery graft bypass, and 8 were IIBs with a noninterposition graft, including 3 cases of in situ bypass, 1 case of reanastomosis, and 4 cases of reimplantation. The pre- and postoperative modified Rankin scale score did not change or improve, and all the bypasses were patent. No patient had died during the mean follow-up period of 50.0 months. The mean occlusion time of the recipient artery was 59.5 minutes. A total of 8 patients experienced postoperative cerebral infarction but all had almost recovered at discharge.

Conclusion: With proper selection of the IIB type, IIB can be a suitable treatment option for some patients with complex IAs and intracranial arterial steno-occlusive disease when extracranial-to-intracranial bypass is not feasible.

High-Flow Extracranial-to-Intracranial Bypass for Complex and Giant Cerebral Aneurysms: A Systematic Review and Meta-Analysis

Annisa Amalina

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Objectives: Managing of giant and complex aneurysms poses challenges, and extracranial to intracranial (EC-IC) bypass techniques are potential therapeutic options. The study's objective was to assess the safety and efficacy of EC-IC bypass in complex and giant aneurysms.

Methods: A systematic literature search of PubMed, Embase, the Cochrane Library, and ClinicalTrials.gov was conducted up to July 2025 to identify randomized controlled trials (RCTs) high-flow extracranial-to-intracranial bypass for complex and giant cerebral aneurysms. The review followed PRISMA guidelines, and risk of bias was assessed using the RoB-2 tool. Meta-analysis was performed using Review Manager (RevMan 5.4.1) calculated using a random-effects model.

Results: Across 13 studies, log-transformed odds ratios and standard errors were synthesized using a random-effects model. The overall pooled OR was 3.09 (95% CI: 1.91-5.00), indicating that patients receiving the evaluated intervention were approximately three times more likely to achieve a good functional outcome compared to controls. The effect was statistically significant ($Z=4.59$, $p<0.00001$). However, heterogeneity was high ($I^2=83\%$, $Chi^2=68.69$, $p<0.00001$), reflecting substantial variability among studies, likely due to differences in surgical techniques, patient characteristics, aneurysm complexity, and follow-up durations. Despite this heterogeneity, most studies reported ORs above 1.0, with several showing strong and significant associations, suggesting a consistent benefit of the intervention in improving functional outcomes in complex aneurysm cases. Across 11 included studies, the pooled odds ratio (OR) for graft patency was 10.56 (95% CI: 5.98-18.64), indicating that the intervention was associated with over tenfold higher odds of maintaining graft patency compared to controls. This finding was highly statistically significant ($Z=8.13$, $p<0.00001$).

Conclusion: EC-IC bypass procedures are a viable treatment option for complex and giant aneurysms, with high bypass patency rates and favorable clinical outcomes.

Perioperative Dexmedetomidine Improves Hemodynamic Stability, Recovery, and Neuroprotection in Patients with Intracranial Aneurysms: Systematic Review and Meta-Analysis

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Objectives: Uncontrolled hemodynamics during brain aneurysm therapies pose detrimental risks of aneurysm rupture, hematoma expansion, and neurological deterioration. Dexmedetomidine has been garnering interest in neurosurgical procedures, emerging as a preferred anesthetic agent for stabilizing hemodynamics and enhancing pain relief and recovery. This review aims to evaluate the efficacy of perioperative dexmedetomidine on hemodynamics, recovery, and neuroprotection in the treatment of intracranial aneurysms.

Methods: The literature search was performed across electronic databases, including PubMed, ScienceDirect, and Scopus. The study protocol was registered to PROSPERO under registration number CRD420250655524. Forest plots with 95% confidence intervals were generated to illustrate the pooled mean difference (MD) and odds ratio (OR) for each outcome of interest using Review Manager 5.4.

Results: Eight randomized controlled trials are deemed suitable for inclusion, comprising 639 patients, 530 of whom presented with unruptured aneurysms and 109 experienced aneurysmal subarachnoid hemorrhages. Of these patients, 493 had undergone endovascular embolization, while the remaining 146 were treated with surgical clipping. Patients receiving dexmedetomidine demonstrated more stable fluctuations of heart rate (HR) and mean arterial pressure (MAP) compared to controls. Dexmedetomidine significantly reduced HR after intubation (MD -12.01, [-22.21, -1.81], p=0.02) and immediately after procedure (-17.41, [-23.88, -10.94], p<0.00001) as well as MAP immediately after procedure (-16.02, [-22.38, -9.66], p<0.00001), but had no significant impact on MAP following intubation (-1.71, [-20.64, 17.22], p=0.86). Dexmedetomidine significantly decreased the concentrations of cerebral injury biomarkers: neuron-specific enolase (NSE) (-14.49 [-17.42, -11.56], p<0.00001) and S100B (-1.03 [-1.40, -0.66], p<0.00001), with the most pronounced drop observed at 24 hours post-procedure. During recovery, dexmedetomidine reduced the risk of coughing by 18% (OR [0.05, 0.65], p=0.009) but did not significantly alleviate nausea and vomiting or shorten awakening time.

Conclusion: Perioperative dexmedetomidine maintains hemodynamic stability, reduces coughing, and provides neuroprotection in patients with intracranial aneurysms, substantiated by the reduction of biomarkers for brain injury.

Simultaneous Cerebral and Coronary Angiography to Detect Coexistent Coronary Artery Disease in Patients with Cerebral Artery Stenosis

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Objectives: Cerebral arterial stenosis (CAS) and coronary artery disease (CAD) share common atherosclerotic mechanisms. We evaluated how often significant CAD coexists in patients with CAS and whether the anatomical pattern of CAS (extracranial, intracranial, tandem) differentially relates to CAD.

Methods: We retrospectively analyzed consecutive patients who, after MRA showing ≥50% stenosis in at least one cerebral artery, underwent same-day transfemoral cerebral angiography (TFCA) and coronary angiography (CAG). Patients were categorized as no significant CAS, extracranial stenosis, intracranial stenosis, or tandem stenosis (both intra- and extracranial). Significant CAD was defined as >50% luminal stenosis. Group differences in CAD prevalence were tested.

Results: A total of 428 patients were included (mean age 68.6±11.7 years; 42.8% female). Significant CAD was identified in 190 patients (44.4%). CAD prevalence differed significantly across CAS groups (χ^2=72.9, p<0.001, with the tandem stenosis group showing the highest rate. Post hoc analysis revealed a significantly higher rate of CAD in patients with tandem lesions, and a significantly lower rate in those without significant CAS. In multivariable analysis, CAS of any pattern (extracranial, intracranial, and tandem) was independently associated with coexistent CAD, along with prior stroke, male sex, and age >70 years. Among CAS subtypes, tandem stenosis showed the strongest association with CAD (odds ratio 14.051, p<0.001), exceeding the effects of isolated intracranial or extracranial stenosis (both significant; p<0.001).

Conclusion: CAS is significantly associated with coronary stenosis, and this association is particularly strong for tandem stenosis. These findings support concurrent cardiac evaluation in patients with CAS—especially older male patients and those with prior stroke—and highlight tandem lesions as a high-risk angiographic phenotype warranting proactive coronary assessment.

Predictors of Transradial Cerebral Angiography Failure and Comparative Outcomes with the Transfemoral Approach: A Single-Center, 5-Year Retrospective Study

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Objectives: Transradial cerebral angiography (TRCA) is increasingly favored over transfemoral cerebral angiography (TFCA) due to lower complication rates and improved patient comfort, despite anatomical and procedural challenges. This study aimed to assess factors influencing TRCA failure and compare clinical outcomes between TRCA and TFCA in patients undergoing diagnostic cerebral angiography at a single institution.

Methods: A retrospective review of 2314 patients (TRCA n=1843; TFCA n=471) undergoing cerebral angiography between April 2019 and February 2024 was conducted. TRCA and TRCA failure groups were compared based on demographic data, procedure duration, presence of aortic arch imaging, complications, and radial artery issues.

Results: TRCA was successful in 79.7% of cases, with 4.3% requiring conversion to TFCA. Main causes of failure were radial artery puncture failure (55%), severe tortuosity (17%), and stenosis (9%). Aortic arch imaging significantly increased TFCA selection (P<0.001). Overall complication rates were similar between TRCA (0.7%, 14 patients) and TFCA (0.6%, 3 patients) (P=1.000), though 11 TRCA complications were symptomatic cerebral infarctions. Proximal large vessel anatomical variations (identified in 1% of patients) led to TFCA in 96% of these cases. Multivariate analysis identified procedure time (odds ratio 1.112, P<0.0001) and radial artery issues as significant predictors of TRCA failure.

Conclusion: TRCA holds promise as a standard approach in neurointervention, but proficiency in both TRCA and TFCA remains essential. Radial artery issues and prolonged procedure time are significant predictors of TRCA failure. Optimizing TRCA outcomes requires meticulous preprocedural aortic arch evaluation, enhanced operator experience, and continuous technical refinements.

Implementation of Blunt Cerebrovascular Injury Screening in Cervical Fracture Patients: A Study from Trauma Referral Center in Indonesia

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Objectives: Cervical spine fractures had been one of the major risk factors for blunt cerebrovascular injury (BCVI). The incidence of BCVI in all cervical spine fractures, ranges from 30.4% to 74.4%. Recognizing this condition early by the application of BCVI screening may reduce the incidence of stroke due to vertebral artery injury (VAI) and carotid artery injury (CAI). Unfortunately, in developing countries, the application of BCVI screening had been under recognized. The use of head and neck CT angiography has led to higher cost, thus many patients had undiagnosed BCVI and several patients had stroke during their hospital stay.

Methods: This study was made to document our effort in implementing BCVI screening in patients with cervical fractures. We retrospectively analysed cervical spine cases which were managed in our hospital from July 2024 to July 2025. In this study, we described several cases in which cervical artery dissection is recognized and managed in our center.

Results: Among the 12 cervical fracture cases managed in our trauma referral center, there are 6 patients who died during admission and 1 patient died 1 day after referred back to the regional hospital. We are able to diagnose BCVI in one patient and initiated the antiplatelet, however the patient died due to the patient's pulmonary complications.

Conclusion: Early recognition for BCVI can help clinician to initiate antiplatelet or anticoagulant therapy. Close observation for neurologic deficits must be done by experienced clinician, since in cervical fracture patients, lateralization due to stroke can be difficult to recognize. However, as patients usually had multiple traumas, the choice of treatment should always be discussed in the multidisciplinary settings.

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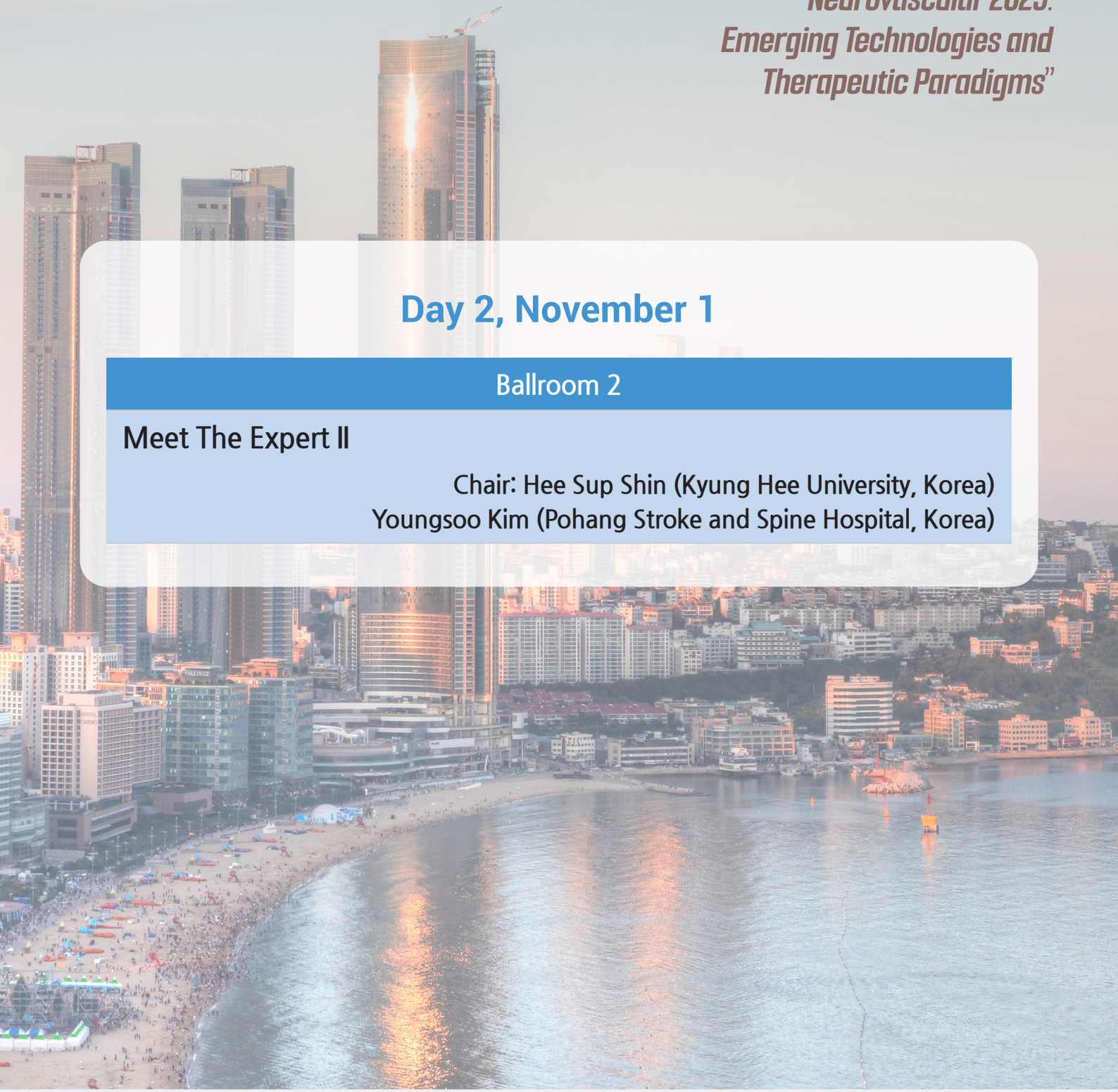

Day 2, November 1

Ballroom 2

Meet The Expert II

Chair: Hee Sup Shin (Kyung Hee University, Korea)
Youngsoo Kim (Pohang Stroke and Spine Hospital, Korea)

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WEB Embolization : Predicting Factors for Optimal Aneurysm Occlusion / Long Term Follow Up

Laurent Spelle

Paris Saclay University, France

Venous Disorders

Adnan H. Siddiqui

SUNY University at Buffalo Jacobs School of Medicine & Biomedical Sciences, USA

How I Understand and Treat AVMs

René Chapot

Alfried Krupp Krankenhaus Rüttenscheid, Germany

The nidus of an AVM is to be understood as a venous segmentation with a network of converging veins draining into a main outflow vein. Connections with the surrounding arteries can occur at any level of the venous network. These connections are therefore not termino-terminal between the end of an artery and the beginning of a vein but can be also termino-lateral arriving in the course of a vein. This venous segmentation is to be understood either during transvenous Embolization (TVE) or on 6D imaging obtained by fusion of 3D acquisition volumes.
The confirmation of this angioarchitecture is brought by the successful result of treatment of AVMs by staged venous embolization as achieved in our experience in 160 patients within the last 13 years.

Curative embolization of AVMs requires a combination of TAE and TVE. In TVE, all AV shunts of the compartment draining through the treated vein must be occluded to avoid post embolization hemorrhage. Therefore, the smaller the AVM, the lower the risk of TVE. Previous extensive Transarterial Embolization (TAE) is to be achieved prior to TVE

TVE with a single microcatheter does not allow to control the length of reflux and the penetration of the embolic agent within the AVM. Therefore, the retrograde pressure cooker technique is to be used.

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 1, October 31

Oral Poster Symposium I

Chair: Myeong Jin Kim (Gachon University, Korea)

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OP1-1

Using a Deep Learning-Based Decision Support System to Predict Emergent Large Vessel Occlusion Using Non-Contrast Computed Tomography

Myeong Jin Kim

Neurosurgery, Gachon University College of Medicine, Korea

Objectives: This retrospective, multi-reader, blinded, pivotal trial assessed the performance of artificial intelligence (AI)-based clinical decision support system used to improve the clinician detection of emergent large vessel occlusion (ELVO) using brain non-contrast computed tomography (NCCT) images.

Methods: We enrolled 477 patients, of which 112 had anterior circulation ELVO, and 365 served as controls. First, patients were evaluated by the consensus of four clinicians without AI assistance through the identification of ELVO using NCCT images. After a 2-week washout period, the same investigators performed an AI-assisted evaluation. The primary and secondary endpoints in ELVO prediction between unassisted and assisted readings were sensitivity and specificity and AUROC and individual-level sensitivity and specificity, respectively. The standalone predictive ability of the AI system was also analyzed.

Results: The assisted evaluations resulted in higher sensitivity and specificity than the unassisted evaluations at 75.9% vs. 92.0% ($p<0.01$) and 83.0% vs. 92.6% ($p<0.01$) while also resulting in higher accuracy and AUROC at 81.3% vs. 92.5%, ($p<0.01$) and 0.87 [95% CI: 0.84-0.90] vs. 0.95 [95% CI: 0.93-0.97] ($p<0.01$). Furthermore, the AI system improved sensitivity and specificity for three and four readers, respectively, and had a standalone sensitivity of 88.4% (95% CI: 81.0-93.7) and a specificity of 91.2% (95% CI: 87.9-93.9).

Conclusion: This study shows that an AI-based clinical decision support system can improve the clinical detection of ELVO using NCCT. Moreover, the AI system may facilitate acute stroke reperfusion therapy by assisting physicians in the initial triaging of patients, particularly in thrombectomy-incapable centers.

OP1-2

Use of Tirofiban in Acute Large and Small Vessel Occlusion: A Case Series

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Objectives: Tirofiban, a glycoprotein IIb/IIIa inhibitor, has potential utility in acute ischemic stroke when mechanical thrombectomy (MT) is contraindicated, incomplete, or refused. This case series explores real-world use of Tirofiban in various clinical contexts.

Methods: We retrospectively reviewed eight patients with large vessel occlusion (LVO) treated with Tirofiban between 2023 and 2024. Indications included MT refusal, residual thrombus post-MT, stent insertion, and severe presentation with preserved perfusion. Tirofiban was administered via IV, IA, or continuous infusion. Antithrombotic strategies post-infusion were tailored based on atrial fibrillation (A.fib) status and stroke mechanism. Follow-up CT was performed to assess hemorrhagic transformation.

Results: Three patients (aged 43-93) refused MT due to age, comorbidities, or mild symptoms. Tirofiban IV was followed by enoxaparin±clopidogrel, with stable outcomes. Two patients received IA/IV Tirofiban after MT with residual thrombus or stenting; both improved without hemorrhagic complications. In one patient with basilar occlusion and A.fib, Tirofiban 8 cc/h led to significant GCS improvement. Two patients over 88 years with ICA occlusion received continuous infusion after MT refusal; both remained stable.

Conclusion: Tirofiban appears to be a safe and flexible option in acute ischemic stroke when MT is not performed or incomplete. It was well tolerated across various scenarios, including elderly, cardioembolic, and posterior circulation strokes. Further research is warranted to define optimal dosing, indications, and outcomes.

Clinical Characteristics and Outcomes of Ischemic Stroke Patients Receiving Intravenous Thrombolysis

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Objectives: Ischemic stroke is one of the leading causes of disability and death worldwide. Intravenous thrombolysis (IVT) remains the standard treatment for acute ischemic stroke and has been shown to improve neurological outcomes and functional recovery. However, the effectiveness of IVT is influenced by several factors, including time from onset to hospital arrival, patient age, comorbidities, and in-hospital workflow efficiency. Monitoring clinical characteristics and treatment process indicators is therefore crucial for quality improvement in stroke care.

Methods: Data were obtained from the Chi Mei Medical Center Stroke Registry. Patients admitted with acute ischemic stroke in 2019-2025.07 who received IVT were included. Variables collected included demographics (age, sex), vascular risk factors (hypertension, diabetes, chronic kidney disease, atrial fibrillation), emergency workflow timestamps (arrival, imaging, IVT initiation), and whether endovascular thrombectomy (EVT) was performed. Outcomes analyzed were DTN, modified Rankin Scale (mRS) score at discharge, length of hospital stay, and in-hospital mortality.

Results: The mean patient age was approximately 70 years, with women comprising 40% of the cohort. Hypertension, diabetes, and atrial fibrillation were the most common risk factors. The median DTN was 45-50 minutes, indicating workflow efficiency close to international standards. The majority of patients had a hospital stay of 5-7 days. More than half of the patients achieved functional independence at discharge (mRS ≤2), while in-hospital mortality remained low.

Conclusion: IVT treatment for acute ischemic stroke at Chi Mei Medical Center demonstrated high process efficiency, with DTN times well controlled. Age and comorbidities remained the main factors influencing functional outcomes. To further reduce treatment delays and improve prognosis, a clinical decision support system (DSS) has been implemented, providing real-time alerts, process tracking, and multidisciplinary coordination to enhance decision-making and treatment quality.

Modifiable Lifestyle and Metabolic Risks for Ischemic Stroke in Indonesia: Comparative Contributions of Fruit, Vegetables, and LDL Cholesterol

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Objectives: Long-term disability globally, particularly among older adults. In Indonesia, the burden of ischemic stroke has escalated alongside demographic transitions and changing lifestyle patterns. This study aims to evaluate the role of three modifiable risk factors: low fruit intake, low vegetable intake, and elevated low-density lipoprotein (LDL) cholesterol, as contributors to ischemic stroke among Indonesian adults.

Methods: A descriptive comperative analysis was conducted using secondary data from the Global Burden of Disease (GBD) 2021 Study. The GBD comparative risk assessment framework was employed to estimate mortality and years lived with disability (YLD) attributable to each selected risk factor. The analysis focused on individuals aged 50 to 74 years residing in Indonesia. Data were disaggregated by exposure-specific attribution, enabling a side-by-side comparison of the health burden linked to dietary insufficiencies and metabolic dysfunction.

Results: Results from the 2021 dataset revealed that elevated LDL cholesterol was the most significant contributor to ischemic stroke burden in Indonesia, responsible for 17,567 deaths and 101,076 YLD. This figure dwarfed the burden attributable to dietary factors: low vegetable intake was associated with 2,826 deaths and 15,868 YLD, while low fruit intake accounted for 1,771 deaths and 10,415 YLD. The consistent dominance of LDL cholesterol in both mortality and disability indicators suggests that metabolic factors currently outweigh dietary ones in driving stroke burden among older Indonesians.

Conclusion: Among the three modifiable risk factors analyzed, elevated low-density lipoprotein (LDL) cholesterol emerged as the most influential contributor to the burden of ischemic stroke in Indonesian. These findings highlight the urgent need for integrated public health interventions focusing on early screening, lifestyle modification, and lipid control. Preventive strategies aimed at reducing LDL cholesterol levels through both pharmacological (e.g., statin therapy) and non-pharmacological approaches (e.g., dietary changes, physical activity).

OP1-5

Delays in Mechanical Thrombectomy for Acute Ischemic Stroke: Lessons from Indonesia for Low and Middle-Income Countries

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Objectives: Mechanical thrombectomy (MT) is the recommended treatment for large vessel occlusion in acute ischemic stroke, the leading cause of mortality in Indonesia, a lower-middle-income country (LMIC). Despite national efforts to reduce stroke mortality, patients often experience delays in receiving MT. This review quantifies these delays, highlights their consequences, and presents possible solutions relevant to Indonesia and other LMICs.

Methods: A systematic search was conducted in PubMed, Scopus, Web of Science, and Garuda until September 2025 for studies that reported MT intervals, delays, or outcomes in Indonesia. Data were extracted and compared with international benchmarks.

Results: Fifteen studies with more than 5,000 patients were analyzed. A multicenter study in Surabaya reported a mean onset-to-arrival 16.7 hours, with only 14% arriving ≤4.5 hours and just 2% receiving intravenous thrombolysis. In Yogyakarta, the onset-to-arrival time was 9.8 hours, with IVT administered in 1.7% of cases. In Jakarta, the onset-to-puncture time exceeded 6 hours, and the door-to-puncture time exceeded 120 minutes, with functional independence achieved in only 28% of patients. A Southeast Asian meta-analysis estimated Indonesian MT onset-to puncture at 5-7 hours and door-to-puncture at 100-150 minutes, compared with benchmarks of 3-4 hours and ≤90 minutes. Consequently, functional independence is achieved in <30% of Indonesian patients, versus 45-55% globally. Reviews consistently identify barriers, including low stroke awareness, emergency medical services (EMS) underuse, imaging bottlenecks, a shortage of specialists, unequal stroke center distribution, and insurance delays.

Conclusion: Indonesia currently faces a significant number of delays across the MT pathway, reducing recovery chances by half compared to the global standard. With priorities including public awareness, optimizing EMS, equal distribution of comprehensive stroke centers, faster imaging-to-angiography workflow, and streamlined insurance and referral processes. These lessons from Indonesia highlight broader LMIC challenges and guide on reducing stroke mortality and closing the gap with high-performing health systems.

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 1, October 31

Oral Poster Symposium II

Chair: Young Woo Kim (The Catholic University of Korea, Korea)

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OP2-1

Clinical Characteristics, Diagnostic and Multimodal Endovascular Management of Bilateral Carotid Cavernous Fistula: A Case Series with Long Term Follow Up and Literature Review

Adi Nugroho Harlianto[1], Bilzardy Ferry Zulkifli[2], Achmad Adam[2]

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[2]Neurosurgery Department Hasan Sadikin Hospital, Neurosurgeon, Indonesia

Objectives: Bilateral Carotid Cavernous Fistula (CCF) is very rare and thus poses diagnostic and therapeutic challenges for clinicians. Due to its rarity, a case series report on the clinical characteristics, diagnostic and multimodal endovascular management of Bilateral CCF is valuable in aiding clinicians apply the best medical practice for the patients. Here we report our centre experiences in diagnosing and treating Bilateral CCF, including long term follow ups of 3 months to 1.5 year.

Methods: Cases which were confirmed as Bilateral CCF by Angiography were collected from 2023 to August 2025. The cases were then reviewed for the clinical characteristics, diagnosis and the multimodal endovascular procedure performed for the patients. In addition, follow up of patient symptoms, subsequent angiography and complications were noted.

Results: Since 2023, four cases of Bilateral CCF were treated in our centre. Three out of four (75%) cases were associated with a previous history of head trauma. The most common presenting symptoms were bilateral chemosis (100%) and headache (100%), followed by unilateral proptosis (75%). All cases which were associated with head trauma presented direct CCF (Barrow Type A; 75%, $p<0.05$). In the spontaneous Bilateral CCF case, the right fistula was direct (Barrow Class A) and the left fistula was mixed (Barrow Class D). Patients with direct fistula were treated with coiling and subsequent follow up showed clinical improvements on chemosis and bruit, however unilateral proptosis, visual disturbance and ocular motoric palsy still persisted in these patients.

Conclusion: Bilateral CCF is challenging to diagnose and treat due to its rarity, extensive pathology (often comprised of direct fistulas from both carotid artery) and the technical skill and resources required to occlude the high flow shunt. Therefore, subsequent large scale studies on Bilateral CCF are required for better understanding of the pathologies and hence the most effective endovascular treatment of the patients.

OP2-2

Characteristics of Carotid Cavernous Fistula: Insights from a Single-Center Study

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[2]Neurovascular Division Department of Neurosurger, Hasan Sadikin Hospital Padjadjaran University, Indonesia

Objectives: This study aims to elucidate the distinct characteristics of CCF through a comprehensive analysis of cases from a single center, shedding light on its clinical manifestations, diagnostic imaging findings, and therapeutic interventions.

Methods: A retrospective review was conducted for 42 patients diagnosed with CCF at our institution over 5 year period. Data pertaining to demographic features, presenting symptoms, imaging findings, treatment approaches were analyzed.

Results: A total of 42 patients diagnosed with CCF were included in this study with 32 (76.2%) were Barrow Type A, 2 (4,8%) were Barrow type B and C, and 6 (14.3%) were Barrow Type D. Age (p=0.025), history of trauma (p=0.001), proptosis (p=0.043), bruit (p<0.001), imaging and angiography findings such as dilatation of superior ophthalmic vein (SOV) (p<0.001), cavernous sinus hyperdensity (p=0.007), proptosis (p=0.006), and anterior venous drainage (p=0.002) were significantly associated to the direct high flow type A Barrow Classification and consistent findings in this study. Treatments of choice in this study were conservative and endovascular approaches such as coil, recoil, detachable balloon, and ethylene vinyl-alcohol copolymer (EVOH) embolization in 12 (28.6%), 15 (35.7%), 6 (14.3%), detachable balloon 8 (19%), and 1 (2.4%) patients respectively.

Conclusion: Age, history of trauma, proptosis, bruit, dilatation of SOV, cavernous sinus hyperdensity, and anterior venous drainage were more associated to the direct high flow type A Barrow Classification of CCF. These findings contribute to a deeper understanding of CCF and inform clinical decision-making strategies aimed at improving outcomes. Further research efforts are warranted to validate these observations and refine therapeutic algorithms.

Complications of Particle Embolization in Preoperative Tumor Management: A Single-Center Experience

Fitra

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Objectives: Preoperative embolization is widely employed to reduce intraoperative blood loss and facilitate tumor resection. Particulate embolic agents remain among the most commonly used materials; however, their use carries a risk of neurological and systemic complications. This study reviews our single-center experience with particulate embolization for intracranial tumors, focusing on complication profiles.

Methods: We retrospectively reviewed patients who underwent preoperative tumor embolization with particulate agents at our institution. Patient demographics, tumor pathology, embolization technique, angiographic outcomes complications were analyzed.

Results: Among the patients who underwent particle embolization, near-complete devascularization was achieved in many of cases. Major complications included ischemic events.

Conclusion: Particle embolization remains an effective adjunct in the surgical management of hypervascular tumors, enabling safer resections. However, procedure-related complications must be anticipated. Careful patient selection, meticulous technique, and familiarity with vascular anatomy are critical to minimizing risk.

OP2-4

The Role of Iodine-No-Water Mapping in Spectral CT Angiography for the Evaluation of Carotid Stenosis: A Comparative Study with DSA

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[1]Department of Medical Imaging, Thong Nhat Hospital, Vietnam, [2]Department of Interventional Cardiology, Thong Nhat Hospital, Vietnam, [3]Department of Medical Imaging, Buon Ma Thuot Medical University Hospital, Vietnam, [4]Faculty of Medicine, Tan Tao University, Vietnam

Objectives: Conventional CT angiography (CTA) often overestimates the degree of carotid stenosis, especially in the presence of calcified plaques leading to incorrect patient management. Spectral detector CT angiography (SDCTA) allows for material decomposition, creating iodine-no-water (INW) maps that isolate the contrast-filled lumen. This study aimed to evaluate the diagnostic accuracy of the INW mapping of CTA for grading extracranial carotid stenosis compared to the gold standard, Digital Subtraction Angiography (DSA).

Methods: Patients with suspected extracranial ICA stenosis underwent both SDCTA and DSA. The degree of stenosis was quantified on three datasets: conventional CTA reconstructions, InW maps, and DSA images, using the North American Symptomatic Carotid Endarterectomy Trial (NASCET) criteria. Two blinded, independent radiologists performed all measurements and the agreement was assessed using Cohen's kappa statistic. Statistical analyses included paired t-tests, Pearson correlation coefficients, intraclass correlation coefficients (ICCs). Diagnostic accuracy for detecting ≥70% stenosis was assessed.

Results: A total of 112 patients with 138 extracranial stenotic internal carotid arteries were analyzed. Conventional CTA significantly overestimated the mean degree of stenosis compared to DSA (68.2%±15.2% vs. 58.9%±16.5%; $p<0.001$), particularly in heavily calcified lesions (overestimation of 22.5%). In contrast, measurements from INW maps showed no significant difference from DSA (59.3%±16.3%; $p=0.34$) and demonstrated superior correlation ($r=0.97$) and agreement (ICC=0.96) with DSA, compared to conventional CTA ($r=0.81$, ICC=0.79). For detecting ≥70% stenosis, INW mapping demonstrated a sensitivity of 95.7% and a specificity of 98.1%, compared to 90.8% sensitivity and 95.7% specificity for conventional CTA.

Conclusion: Iodine-no-water mapping in spectral CTA significantly improves the accuracy of extracranial carotid stenosis caused by calcification-induced blooming artifacts. It shows excellent agreement with DSA and can be a dependable non-invasive substitute for clinical decision-making and pre-procedural planning.

OP2-5

Risk Factors Associated with Cerebral Venous Sinus Thrombosis: A Retrospective Study

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Objectives: Risk factors for Cerebral Venous Sinus Thrombosis (CVST) in retrospective studies commonly include hormonal factors (such as oral contraceptive use, pregnancy, and puerperium), genetic thrombophilia (like Factor V Leiden and protein C/S deficiencies), acquired thrombophilia (including antiphospholipid syndrome), and inflammatory and infectious conditions (such as autoimmune diseases, infections like sinusitis, and malignancy). Other identified factors include dehydration, head trauma, hyperhomocysteinemia, and prolonged immobilization. Studies often find multiple risk factors are present in a single patient.

Methods: We retrospectively analyzed 62 patients with radiologically confirmed CVST admitted between 2020 and 2025. Demographic, clinical, and laboratory data were collected and subjected to statistical analysis. Univariate comparisons were performed using Chi-square or Fisher's exact test, and variables with significance were entered into multivariate logistic regression to identify independent predictors. All reported data are derived from precise statistical calculations. A p-value <0.05 was considered significant.

Results: The cohort included 38 females and 24 males, mean age 44.6±13.2 years. The most frequent risk factors were infection (29.0%), dehydration (24.2%), hormonal therapy (21.0%), chronic kidney disease (14.5%), and malignancy (11.3%). Univariate analysis identified female sex, hormonal therapy, infection, and CKD as significant. Multivariate logistic regression confirmed hormonal therapy (OR 3.4, 95% CI 1.3-8.7, p=0.011), systemic infection (OR 3.1, 95% CI 1.2-7.9, p=0.018), and CKD (OR 2.9, 95% CI 1.0-8.2, p=0.047) as independent predictors. Patients with ≥2 concurrent risk factors had significantly higher rates of extensive thrombosis and poor outcome (mRS ≥3, 41.9% vs. 17.2%, p=0.004).

Conclusion: This study demonstrates that hormonal therapy, infection, and CKD are key independent risk factors for CVST. Female sex further increases susceptibility, particularly in the setting of hormonal exposure. Recognition of these risks and aggressive management of overlapping comorbidities may aid in preventing severe complications.

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 1, October 31

Oral Poster Symposium III

Chair: Jaehung Choi (Dong-A University, Korea)

KoNES Korean NeuroEndovascular Society

Bi-Neurovascular Symposium

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OP3-1

Endovascular Thrombectomy and Bridging Therapy in Acute Ischemic Stroke: Outcomes and Prognostic Factors

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Objectives: Stroke remains a leading cause of disability and mortality worldwide. This study aims to evaluate the efficacy, safety, and prognostic factors of endovascular thrombectomy (EVT), with or without prior intravenous rtPA, in acute ischemic stroke (AIS) patients.

Methods: A prospective cohort of 42 AIS patients treated in a tertiary hospital in Vietnam with EVT was analyzed, including 32 undergoing EVT alone and 10 receiving bridging therapy (IV rtPA + EVT). Baseline clinical characteristics, imaging findings, and comorbidities were collected. Procedural success was assessed by recanalization rates (TICI 2b-3), and outcomes were measured using NIHSS and the modified Rankin Scale (mRS) at discharge and 3 months. Predictors of prognosis were identified through multivariable analysis.

Results: The mean age was 63.6 years; 61.9% were male. Hypertension (76.2%) and diabetes (40.5%) were the most common comorbidities. Mean door-to-recanalization time was 73.3±30.8 minutes. Successful recanalization was achieved in 95.2% of patients. Good functional recovery (mRS 0-2) was observed in 65.6% at discharge and 92.9% at 3 months (93.8% EVT-alone; 90.0% bridging). Mortality was 4.8%. Complications occurred in 9.5%, including hemorrhagic transformation (2.4%), infection (2.4%), and procedure-related death (4.8%). Predictors of poor outcome included higher baseline NIHSS, impaired consciousness, speech disturbance, lower GCS, atrial fibrillation, coagulation abnormalities, and lower ASPECTS/pc-ASPECTS scores (all $p<0.05$).

Conclusion: EVT, with or without bridging therapy, achieved high recanalization rates and excellent long-term functional outcomes in AIS patients. Bridging therapy showed comparable results to EVT-alone, supporting its role as an evolving paradigm in AIS management. These findings highlight EVT as a transformative therapy and underscore the importance of rapid workflow optimization and advanced neuroimaging to maximize treatment success.

OP3-2

Clinical Features and Outcomes of Reperfusion Injury Following IA Thrombectomy A Single-Center Cohort Study

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Objectives: Reperfusion injury after intra arterial (IA) mechanical thrombectomy for anterior circulation acute ischemic stroke (AIS) may present as malignant brain edema (MBE) and portend poor prognosis. This single center cohort study evaluated the incidence, clinical/imaging features, and outcomes of reperfusion injury, operationalized as MBE, following IA thrombectomy.

Methods: We analyzed clinical and imaging data from 265 AIS patients in the anterior circulation who underwent IA thrombectomy. Baseline non contrast CT at admission characterized the initial imaging features. Follow up CT or MRI within 72 hours classified patients into MBE and non MBE groups. MBE was defined as a midline shift ≥5 mm with localized swelling. Ninety day outcomes were assessed using the modified Rankin Scale (mRS). Regression analyses examined predictors of MBE and its association with clinical outcomes.

Results: Reperfusion injury manifesting as MBE occurred in 30 cases (9.8%) of patients. Compared with the non MBE group, patients with MBE showed distinct clinical/imaging and procedural profiles with a poor clinical outcome. On multivariable analysis, a lower baseline ASPECTS, the presence of a calcified hyperdense middle cerebral artery sign (HMCAS), poor angiographic collateral circulation, and inadequate revascularization independently increased the risk of MBE.

Conclusion: In this single center cohort, reperfusion injury, indicated as MBE within 72 hours after IA thrombectomy, was associated with worse outcomes. Readily available baseline imaging markers and procedural factors (low ASPECTS, calcified HMCAS, poor collaterals, and suboptimal revascularization) independently predicted MBE. This highlights opportunities for risk stratification and procedural optimization.

OP3-3

From Historical Trends to Future Planning: A Time-Series Analysis and Projection of Ischemic Stroke Prevalence and Mortality in Indonesia's Aging Population (1990-2050) to Inform Early Detection and Health System Strategies

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Objectives: Stroke is a leading cause of morbidity and mortality in Indonesia. The 2018 Basic Health Research Survey (Riskesdas) reported a 10.9% national stroke prevalence among adults, without distinction between ischemic and hemorrhagic types. Specific data on ischemic stroke remain limited but are essential for health policy and service planning. The objective of this study is to analyze historical trends and future projections of ischemic stroke burden in Indonesia's aging population, with the aim of informing early detection strategies and health system planning.

Methods: We analyzed data from the Global Burden of Disease (GBD) Study 2017-2021 to evaluate temporal changes and future burden of ischemic stroke in Indonesia, focusing on adults aged ≥55 years. Both prevalence and mortality were assessed, and temporal trends were summarized using the Annual Percentage Change (APC) for 1990-2021. Absolute differences between 2017 and 2021 were described to capture recent changes. For forward projections, time-series modeling in R was applied to historical estimates (2017-2021) to forecast prevalence and mortality for 2030, 2040, and 2050.

Results: Between 2017 and 2021, ischemic stroke mortality in adults aged ≥55 years increased from 124,462 to 140,239, while prevalence rose from 1.55 million to 1.83 million cases. The long-term trend from 1990-2021 showed a consistent increase, with an APC of +1.72%. Projections suggest that by 2030, mortality will reach 176,935 and prevalence 2.46 million cases. By 2040 and 2050, mortality is expected to increase further to 217,329 and 257,724, while prevalence is projected to grow to 3.16 million and 3.86 million, respectively.

Conclusion: Projections indicate that the burden of ischemic stroke in Indonesia will continue to increase through 2050.These findings inform the need for early detection strategies through screening, risk assessment, and public awareness, alongside health system strengthening with expanded stroke units, clear referral pathways, and accessible rehabilitation services.Integrated prevention and system preparedness are essential to mitigate the growing burden.

OP3-4

Rescue Intracranial Stenting in Acute Ischemic Stroke: A Preliminary Vietnamese Study

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Objectives: In cases of acute ischemic stroke (AIS) caused by intracranial large vessel occlusion, rescue intracranial stenting (RIS) has recently emerged as a treatment option for achieving recanalization when mechanical thrombectomy (MT) fails. However, few studies to date have reported on the benefcial outcomes of RIS. Our goal was to analyze whether RIS use can improve prognosis in patients 3 months post-treatment.

Methods: A retrospective analysis was performed on a prospective cohort of patients with AIS treated with RIS at Can Tho S.I.S General Hospital. The study inclusion criteria were evidence of intracranial large vessel occlusion, absence of intracranial hemorrhage (ICH), and severe stenosis or reocclusion after MT. Patients with tandem occlusions, failure to follow up after discharge, or severe or fatal illness concomitant with AIS were excluded from the study. The primary outcome was the "nonpoor" prognosis status rate at 3 months after RIS and post-procedural symptomatic ICH (sICH).

Results: The post-treatment outcomes of 85 eligible patients who received RIS between August 2019 and May 2021 were assessed. Of the 85 included patients, 82 (96.5%) achieved successful recanalization, and 4 (4.7%) experienced sICH. At 3-months post-treatment, 47 (55.3%) patients had "non-poor" outcomes, whereas 35 (41.2%) had good outcomes. The use of dual antiplatelet therapy was associated with new infarcts (relative risk [RR]: 0.1; 95% confdence interval [CI]: 0.01-0.7) and sICH occurrence (RR: 0.1; 95% CI: 0.01-0.9).

Conclusion: Our study suggests that despite the occurrence of post-procedural sICH in a small proportion of cases, RIS could serve as a useful alternative or additional treatment in the event of MT failure.

OP3-5

Safety of Cerebral Transarterial Autologous Adipose-Derived Mesenchymal Stem Cell Injection: A Case Series with Three Different Indications

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Objectives: Transarterial stem cell injection (TASI) is one of the safer administration routes of regenerative therapy to the brain. Stem cell offers a potential to replace damaged cells, reduce inflammation and promote the growth of new blood vessels and neural networks. Autologous adipose-derived mesenchymal stem cell (ADMSC)-based therapy has an advantage in safety as it virtually has no chance of transplant rejection. With the added benefit of bypassing ethical concerns that embryonic stem cell-based therapies might bring.

Methods: We report a series of three cases of uneventful autologous ADMSC TASI via the internal carotid arteries (ICA). One patient with traumatic brain injury (patient A) has two sessions of TASI done with the interval of three months between procedures. One patient with post stroke (patient B) has TASI to the ipsilateral ICA. And one patient with small vessel ischaemia (patient C) has TASI to both ICA. All of the procedures used microcatheters and slow injection rate to deliver the cells.

Results: Patient A has a motorcycle accident 4 months prior to the procedure and developed bradyphrenia as a sequela after 1 week of comatose which improved significantly after two sessions of TASI. Patient B has left hemiparesis after right internal capsule stroke 6 months prior to the procedure which seen only little improvement after TASI. Patient C has hypertension and chronic headache with small vessel ischaemic changes of the brain, reported reduced duration and pain scale of the symptoms after TASI. All three patient reported no post procedural additional neurological deficit.

Conclusion: TASI using autologous ADMSC is a safe option for brain regenerative therapy.

9th BNS Bi-Neurovascular Symposium

"Neurovascular 2025: Emerging Technologies and Therapeutic Paradigms"

Day 2, November 1

Oral Poster Symposium IV

Chair: Jun Kyeung Ko (Pusan National University, Korea)

KoNES Korean NeuroEndovascular Society

Bi-Neurovascular Symposium

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OP4-1

Analysis of Cryptogenic SAH for Proper Management

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Objectives: SAH due to aneurismal rupture is well known and the treatment is aneurismal occlusion either by clipping or coiling; coiling being preferred due to its excellent outcomes and minimal or no morbidity.

There are cases of SAH without any obvious aneurysm, some with massive SAH. Proper identification of the cause of bleed helps in institution of appropriate treatment which helps in patient recovery. Inability to identify the cause results in institution of inappropriate treatment which can have deleterious consequences and adversely affect patient survival.

This study discusses how to identify the cause of bleed, the site of bleed and to treat appropriately.

Methods: Retrospective analysis of SAH cases from 2018 to 2025.

Identifying the cases without any obvious aneurysm. Finding the various causes of SAH and their sites.

Results: 5- dissections- 3 treated with FD; 2 made complete recovery and no deficits; one with low GCS went DAMA. One patient had Massive SAH with IVH with low GCS 3/15 and hence was not intervened. One patient had focal SAH for which medical management was chosen and he recovered. One patient recovered from the acute phase and came for second opinion and was advised FD.

Dissection sites- right M1-M2, Left P1-P2, right V4, 3 patients with left supraclinoid ICA,
3- CVT: all recovered with IV anticoagulants
1- RCVS: recovered completely with IA Nimodipine and IV Milrinone
1-dAVF: treated by embolization

Conclusion: SAH is deadly and it is very important to detect not so obvious causes of SAH to institute appropriate treatment which can be life saving.

OP4-2

Advanced Stent-Assisted Coiling for Wide-Neck MCA Bifurcation Aneurysms: Experience with Half T-Stent and T-Stent Configurations

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Objectives: Wide-neck MCA bifurcation aneurysms remain among the most challenging lesions in endovascular practice. Coil instability and branch vessel compromise frequently necessitate advanced remodeling techniques. While Y-stenting and flow diversion are established, the T-stent and Half T-stent configurations are less frequently reported but represent valuable alternatives. We describe our institutional experience with two patients treated using these approaches, demonstrating both simplified and advanced technical adaptations.

Methods: Two patients with MCA bifurcation aneurysms were treated between 2022 and 2024. In one, a Half T-stent configuration was created using a single pEGASUS stent to partially cover the aneurysm neck, enabling stable coil packing and complete exclusion. In the second, a T-stent configuration was performed with dual stents (pEGASUS and Leo) deployed perpendicularly. To overcome challenging bifurcation anatomy, the twist-push maneuver was applied to achieve stable microcatheter positioning and precise deployment.

Results: Both procedures achieved Raymond-Roy class I occlusion with preserved bifurcation flow. No periprocedural complications occurred, and both patients remained neurologically stable with durable follow-up. The Half T-stent provided a hardware-sparing, simplified solution in one case, while the T-stent with twist-push ensured secure remodeling in a more complex aneurysm.

Conclusion: Our experience illustrates the adaptability of advanced stent-assisted coiling for wide-neck MCA bifurcation aneurysms. Both Half T-stent and T-stent configurations are feasible and safe, with technical choice depending on aneurysm anatomy and clinical context. These cases highlight the importance of tailoring stent-assisted strategies, reinforcing their role as valuable complements to Y-stenting and flow diversion in contemporary neuroendovascular therapy.

OP4-3

Depression or Anxiety According to Management Modalities in Patients with Unruptured Intracranial Aneurysms

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Objectives: In the treatment of unruptured intracranial aneurysms, the risk was usually estimated by objective neurological sequelae. However, their effects on depression and anxiety are rare and remain controversial. We aimed to evaluate the risk of depression and anxiety in patients with unruptured intracranial aneurysm stratified by management strategies in a population-based, longitudinal cohort study.

Methods: Using the Korean National Health Insurance Research Database, 71750 patients with unruptured intracranial aneurysms between 2008 and 2011 were identified and followed up until the end of 2020. The risk of depression and anxiety was compared among management strategies with respect to age, sex, and medical comorbidities.

Results: The Kaplan-Meier survival curves indicated that the treatment (clipping and endovascular treatment) group developed depression more frequently than the observation group (P<0.001). The adjusted hazard ratio was 1.11 (95% CI, 1.07-1.15) in the treatment group. According to the management modality, the Kaplan-Meier survival curves indicated that clipping and endovascular treatment groups developed depression more frequently than the observation group (P<0.0001). The adjusted hazard ratio was 1.15 (95% CI, 1.10-1.21) for clipping and 1.07 (95% CI, 1.02-1.12) for endovascular treatment. The depression risk was higher with advanced age (hazard ratio for 45-64 years, 1.37 [95% CI, 1.29-1.45] and hazard ratio for ≥65 years, 2.04 [95% CI, 1.92-2.17]). The risk for anxiety did not differ among the management modalities.

Conclusion: In this study, the risk of depression was slightly greater after clipping surgery than endovascular treatment. Data on treatment-related, long-term psychological outcomes, such as depression, may aid decision-making for preventive treatment of asymptomatic unruptured intracranial aneurysm patients.

OP4-4

Quandary in Giant Vertebro-Basilar Complex Aneurysm- Encountering Continuum of Complication

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Objectives: Institutional experience of short case series of 6 patients in the treatment of giant basilar and vertebrobasilar fusiform aneurysms using flow diversion, with a focus on the role of triple therapy (dual antiplatelet therapy plus oral anticoagulation) in optimizing outcomes. Given the high morbidity and mortality associated with these complex aneurysms, we evaluated the safety and efficacy of triple therapy in preventing ischemic complications while maintaining perforator patency.

Methods: Retrospectively reviewed Six cases of giant vertebrobasilar fusiform aneurysms treated with flow diverters at our center. Four patients received triple therapy (DAPT + anticoagulation), while two were managed with dual antiplatelet therapy (DAPT) alone. Clinical presentation, procedural details, antiplatelet/ anticoagulation regimens, complications, and angiographic and functional outcomes were analyzed.

Results: Among the six patients, four were treated with triple therapy. One patient in this group experienced an acute ischemic stroke after discontinuation of anticoagulation, and another died due to disease progression. Both patients in the DAPT group died. The remaining triple therapy patients demonstrated favorable functional outcomes. Angiographic follow-up showed stable aneurysm remodeling in two of four triple therapy cases, with no delayed ischemic events.

Conclusion: Triple therapy may reduce ischemic complications in giant vertebrobasilar aneurysms treated with flow diversion, though careful management of anticoagulation duration is critical. While mortality remains a concern in this high-risk population, triple therapy appears to offer a potential advantage over DAPT alone in preserving perforator patency and improving clinical outcomes.

OP4-5

Safety and Efficacy of Stent-Assisted Coil Embolization with Periprocedural Dual Antiplatelet Therapy for the Treatment of Acutely Ruptured Intracranial Aneurysms

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Objectives: Despite growing evidence for the effectiveness of stent-assisted coil embolization (SAC) in treating acutely ruptured aneurysms, the safety of stent placement in acute phase remains controversial because of concerns for stent-induced thromboembolism and hemorrhagic events attributable to the necessity of antiplatelet therapy. Therefore, we investigated the safety and efficacy of SAC with periprocedural dual antiplatelet therapy (DAPT) compared with the coiling-only technique to determine whether it is a promising treatment strategy for ruptured aneurysms.

Methods: We retrospectively evaluated 203 enrolled patients with acutely ruptured aneurysms, categorizing them into two groups: SAC and coiling-only groups. Comparative analyses between the two groups regarding angiographic results, clinical outcomes, and procedure-related complications were performed. A subgroup analysis of procedural complications was conducted on patients who did not receive chronic antithrombotic medications to alleviate their influence before hospitalization.

Results: 130 (64.0%) patients were treated using the coiling-only technique, whereas 73 (36.0%) underwent SAC. There was a trend to a higher complete obliteration rate (p=0.061) and significantly lower recanalization rate (p=0.030) at angiographic follow-up in the SAC group compared to the coiling-only group. Postprocedural cerebral infarction occurred less frequently in the SAC group (8.2%) than in the coiling-only group (17.7%), showing a significant difference (p=0.044). Although the ventriculostomy-related hemorrhage rate was significantly higher in the SAC group than in the coiling-only group (26.2% vs. 9.3%, p=0.031), the incidence of symptomatic ventriculostomy-related hemorrhage was comparable. Subgroup analysis excluding patients receiving chronic antithrombotic medications showed similar results.

Conclusion: SAC with periprocedural DAPT could be a safe and effective treatment strategy for acutely ruptured aneurysms. Moreover, it might have a protective effect on postprocedural cerebral infarction without increasing the risk of symptomatic hemorrhagic complications.

9th BNS
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PE-01

Mechanical Thrombectomy for a Giant Thrombus with Total Occlusion of CCA-ICA-MCA with Acute Infarction

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Objectives: To evaluate the feasibility and clinical outcome of mechanical thrombectomy (MT) in a patient with acute tandem occlusion extending from the common carotid artery (CCA) to the intracranial internal carotid artery (ICA) and middle cerebral artery (MCA).

Methods: A 62-year-old male presented with left-sided weakness and dysarthria (NIHSS 4, onset-to-door 1 hour). Under general anesthesia, stepwise MT was performed using large-bore suction catheters (Arrow 9F, Optimo 8F, Penumbra ACE 068) with adjunctive balloon angioplasty (Aviator, Coyote) and subsequent carotid stenting (Acculink, Epic) for residual stenosis. Multiple passes of aspiration were performed at the CCA, ICA, and MCA segments until complete recanalization was achieved.

Results: The total procedure time was 4 hours 11 minutes. A large thrombus burden was successfully removed with sequential aspiration, and complete recanalization was achieved following adjunctive balloon angioplasty and stenting. No peri-procedural complications were observed. Postoperative diffusion-perfusion mismatch imaging confirmed favorable reperfusion. The patient showed clinical improvement on follow-up.

Conclusion: Mechanical thrombectomy for whole CC-IC tandem occlusion can be feasible and effective when performed under general anesthesia. Large-bore aspiration catheters (>8F) are useful for extensive thrombus removal. In acute tandem lesions, carotid artery stenting may provide better outcomes than angioplasty alone. This case supports the expanding role of MT in complex tandem occlusions.

PE-02

Transvenous Embolization of Transverse-Sigmoid Sinus Dural Arteriovenous Fistula via Contralateral Transverse Sinus Route

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Objectives: Dural arteriovenous fistulae (dAVFs) often accompany venous drainage abnormality such as proximal and/or distal sinus stenosis or occlusion. The drainage abnormality of dAVFs makes approach to transvenous embolization difficult and sometimes impossible. We introduce a case of dAVF with proximal sinus occlusion treated by transvenous embolization via contralateral transverse sinus route passing through the confluence sinus.

Methods: The patient was a 68-year-old man. He presented with sudden loss of consciousness and tonic seizure like movement with eye ball deviation to right side for about 3 minutes followed confused state, headache and sensory aphasia. Computed tomography of brain showed about 2 cm sized left posterior temporal intracerebral hemorrhage. CT angiography demonstratednear occluded left transverse sinus with numerous cortical venous dilatation in the left temporal lobe. Magnetic resonance images showed early stage of intracerebral hemorrhage with perilesional brain edema in left posterior temporal lobe and flow void on the cortical surface near the lesion. Transfemoral cerebral angiography revealed a dural arteriovenous fistula involving the left transverse sinus with numerous feeders from the occipital and posterior auricular artery. It was directly communicated with the left dural sinus, probably sigmoid sinus. Outflow to the internal jugular vein was obstructed. Instead, it drains to the contralateral transverse sinus and adjacent cortical veins mainly through the vein of Labbe.

Results: Under general anesthesia, right femoral vein was also punctured and 7 Fr sheath was proceeded for embolization. After superselection of the left sigmoid-jugular junction via contralateral internal jugular vein, sigmoid, transverse, ipsilateral transverse and sigmoid sinus with microcatheter, coil embolization was performed. Complete occlusion was seen from the sigmoid-jugular junction to the vein of Labbe draining site on final angiogram.

Conclusion: Dural arteriovenous fistula involving the isolated transverse sigmoid sinus with patent contralateral venous route, transfemoral transvenous embolization can be considerable route of treatment.

Stent-Assisted Coiling of A1 Aneurysm: Intraoperative Rupture and Bailout Treatment

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Objectives: A 59-yeay-old woman was planned to get a stent-assisted coil embolization for Rt A1 unruptured aneurysm (2.14×2.19×2.58 mm, DNH) with posterior direction who had undergone mechanical thrombectomy due to AF-related cardioembolic Lt ICA T occlusion at 14 months ago.

Methods: At the Rt C4 segment, a guiding catheter was positioned and Excelsior SL-10 J catheter was inserted up to Rt A2 and Neuroform atlas 3×15 mm was deployed for the proximal end of the stent to be positioned at the origin of Rt A1. Excelsior SL-10 J was tried to be inserted into aneurysm sac and coiling using either PICO 2 mm and Axium 2D 2 mm was failed. Excelsior SL-10 45 with steam shaping was inserted into aneurysm sac during SL-10 J catheter protection. Both Axium 3D 2 mm and PICO 2 mm coils were failed to be inserted. Optima CSS 1.5mm was inserted but contrast leakage was noted, and active bleeding was identified on the DSA.

Results: Therefore, Rt carotid compression was performed and Sceptor C 4×10 mm was deployed into ICA T portion and ballooning was done. Active bleeding was halted, and distal ICA occlusion was noted. She was transferred to OR swiftly. Radiolucent Mizuho head frame was set up. Rt pterional approach and FTP large craniectomy were performed. After ICA exposure, temporary clamping of C6 segment was done. Deflation of Scepter C was done, and MEP was recovered. Bayonet mini 7mm clip was applied to the aneurysm neck of Rt A1 and balloon was completely removed. ICG videoangiography showed no contrast leakage from the sac. After frontal ICH removal, Rt MCAB AN was clipped additionally. Intraoperative angiogram showed no remnant sac. Postoperative course showed mRS 4 at the discharge.

Conclusion: In conclusion, an endovascular treatment of a small A1 proximal aneurysm with posterior direction is very technically challenging and surgical clipping may be the better

Prevalence of Risk Factors in Stroke Patients: A Retrospective Analysis

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Objectives: Stroke is a leading cause of mortality and disability worldwide, posing a substantial public health burden. Controlling vascular risk factors remains the cornerstone of stroke prevention and recurrence reduction. Understanding the prevalence and distribution of risk factors among stroke patients provides essential evidence for clinical care and health policy.

Methods: We retrospectively analyzed 3,342 patients with confirmed stroke. Demographic characteristics and clinical risk factors were collected, including hypertension, diabetes mellitus, dyslipidemia, smoking, alcohol use, heart disease, chronic kidney disease, cancer, prior stroke or transient ischemic attack (TIA), as well as lifestyle and family history. Descriptive statistics were used to report prevalence rates.

Results: Hypertension (80.3%) and dyslipidemia (79.7%) were the most prevalent risk factors, followed by diabetes mellitus (41.7%) and smoking (30.0%). Other common risk factors included heart disease (22.2%), previous stroke (20.3%), alcohol use (17.2%), chronic kidney disease (9.8%), and cancer (8.0%). Less frequent risk factors comprised TIA (1.6%), peripheral arterial disease (0.8%), polycythemia (0.2%), recent infection (5.7%), physical inactivity (4.5%), and family history of stroke (10.9%). The majority of patients presented with two or more coexisting risk factors, underscoring the importance of multimorbidity in stroke pathogenesis.

Conclusion: Stroke patients commonly present with multiple vascular risk factors, with hypertension, diabetes mellitus, dyslipidemia, and smoking being the leading modifiable risks. Comprehensive risk factor management, lifestyle interventions, and targeted prevention strategies for patients with cancer or chronic kidney disease are crucial to reduce recurrent stroke and improve long-term outcomes.

LVIS EVO Stent for Complex Intracranial Aneurysms: Long-Term Safety and Efficacy in a Single-Center Retrospective Cohort

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Objectives: This study aims to assess the procedural feasibility, safety profile, and both angiographic and clinical outcomes of the LVIS EVO braided stent in the treatment of complex intracranial aneurysms. Follow-up data were analyzed at short-term (6 months), mid-term (12 months), and long-term (24 months) intervals in a single-center retrospective cohort.

Methods: A total 63 patients with 68 aneurysms were included. These comprised incidental aneurysms (n=52), acute subarachnoid hemorrhage (n=11), and recanalized aneurysms following prior intervention (n=5). Aneurysm locations were predominantly distal internal carotid artery (n=40), anterior communicating artery origin (n=8), middle cerebral artery bifurcation (n=8), and posterior circulation sites (basilar, superior cerebellar, vertebral arteries; n=12). Morphological analysis revealed mean dome diameter of 4.78 mm, neck diameter of 3.45 mm, and height of 3.41 mm. Angiographic results, clinical outcomes and procedural complications were assessed at each follow-up interval.

Results: Immediate complete occlusion, defined as Raymond-Roy Occlusion Classification (RROC) I, was achieved in 59% of aneurysms. At 6-month follow-up, complete occlusion improved to 80.6%. Sustained occlusion was observed in 81.4% at 12 months and increased to 85% at 24 months. Technical issues during stent deployment occurred in 10 cases (14.7%), including multiple deployment-attempts, incomplete stent-expansion, and stent-migration. Postprocedural imaging revealed one case of ICH and SAH, both related to microwire manipulation. Ischemic stroke occurred in two patients (2.9%), with one remaining neurologically asymptomatic. Aneurysm recanalization was observed in four cases (5.9%), and one patient (1.5%) required retreatment. No cases of in-stent thrombosis, vessel-narrowing, or branch-occlusion were reported during follow-up.

Conclusion: LVIS EVO stent demonstrated high procedural safety and efficacy for both ruptured and un-ruptured intracranial aneurysms. It provides durable aneurysm occlusion with acceptable complication and retreatment rates, supported by favorable long-term clinical and angiographic outcomes. These findings support the LVIS EVO stent as a reliable option in the neuroendovascular management of complex intracranial aneurysms.

PE-06

Intracranial Epidural Mass Mimicking Subacute Hematoma: A Rare Case of Non-Hodgkin Lymphoma in a Young Adult

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Objectives: Intracranial epidural lesions may mimic hematomas, infections, or neoplasms. Primary central nervous system (CNS) lymphoma, especially Non-Hodgkin's lymphoma (NHL), is an uncommon presentation in young adults but it should be included in the differential when radiologic findings are atypical. Lymphoma of the central nervous system, particularly Non-Hodgkin's lymphoma, is a rare but important differential diagnosis when imaging features are atypical. Intracranial epidural and subdural masses can mimic the hematomas, infectious lesions, or neoplastic processes.

Methods: A 26-year-old male presented to the neurosurgery outpatient clinic with a progressive swelling on the vertex of his scalp for one month. The mass was firm, non-tender, and fixed to the underlying structures. Vital signs were within normal limits, and neurological examination revealed mild hemiparesis in the right side. Contrast-enhanced brain MRI interpreted as a subacute subdural hematoma. The patient subsequently underwent surgical exploration, where the intraoperative findings revealed an atypical solid mass rather than a hematoma. Histopathological examination confirmed the diagnosis of Non-Hodgkin's lymphoma

Results: Intracranial lymphoma presenting as subdural or epidural lesions is rare, often leading to misdiagnosis as subacute or chronic subdural hematoma due to overlapping radiological features. Recent studies emphasize that MRI features such as disproportionate enhancement, dural thickening, and restricted diffusion should raise suspicion for neoplasm. Histopathology with immunohistochemistry remains the gold standard for diagnosis. Management differs significantly from hematomas; instead of surgical evacuation, standard therapy involves high-dose methotrexate-based chemotherapy, often combined with rituximab and/or radiotherapy. Literature from recent years demonstrates improved survival outcomes with chemoimmunotherapy protocols. Early identification is crucial to prevent inappropriate management and delay in oncologic treatment

Conclusion: This case highlights the diagnostic challenge of differentiating lymphoma from subacute hematoma. Neurosurgeons should remain vigilant of atypical features on imaging, and histopathological confirmation is essential to establish the correct diagnosis and guide effective treatment.

PE-07

Coil Embolization Facilitating Onyx Penetration in a Diffuse Cerebral AVM: A Case Report

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Objectives: Arteriovenous malformations (AVMs) are fragile vascular malformations often associated with hemorrhage, flow-related aneurysms, and significant treatment challenges. Diffuse-type AVMs, in particular, are difficult to achieve complete occlusion due to their multiple feeding arteries.

Methods: -

Results: A 43-year-old female presented to the emergency department with headache and dizziness. Brain imaging revealed a left corpus callosum intracerebral hemorrhage (ICH) with intraventricular hemorrhage (IVH), and a diffuse-type AVM approximately 6 cm in size, supplied by both anterior cerebral arteries (ACAs). The right side drained into the sagittal sinus with a 2.5 mm small aneurysm in the right pericallosal artery, while the left side drained into the internal cerebral vein with a 8 mm aneurysm in the left pericallosal artery.

Initially, coil embolization was performed for the large left ACA aneurysm with simultaneous occlusion of the feeding artery. On the right side, coil embolization of the small aneurysm and Onyx embolization were performed, followed by embolization of a small branch feeding artery from the right A3 segment. A total of 6 vials of Onyx were used, which is greater than the average reported in other studies. By occluding the main feeding arteries with coils and selectively targeting the smaller branches, a more effective embolization was achieved. Furthermore, converting a high-flow AVM into a low-flow AVM using coil embolization facilitated safer and more efficient Onyx embolization, resulting in a favorable angiographic outcome.

Residual feeders from the distal artery of right M1 and right MCA cortical branches remained, for which radiosurgery is planned. The patient was discharged without neurological deficits after conservative management.

Conclusion: This case demonstrates that a combined approach with coil embolization for flow reduction and selective Onyx embolization of small feeding branches can be an effective strategy in the treatment of diffuse high-flow AVMs, leading to improved safety and outcomes.

Recurrent Right Fetal-Type PCA Aneurysm Post Stent-Assisted Coiling: Successful Retreatment with Coil Embolization

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Objectives: Wide-neck aneurysms involving the fetal-type posterior cerebral artery (PCA) present significant challenges in endovascular treatment. Recurrence after initial stent-assisted coiling is a rare but concerning complication. The use of multiple coils may enhance packing density and reduce recurrence risk.

Methods: A 56-year-old female with a medical history of hypertension, hypothyroidism, polycystic kidney disease, chronic kidney disease stage 5, pulmonary embolism, and seizures underwent stent-assisted coiling for a ruptured right fetal-type PCA wide-neck aneurysm with subarachnoid hemorrhage on August 7, 2024. Post-procedure surveillance MRI with TOF-MRA revealed coil mass compaction and a recurrent aneurysmal sac measuring 12.8×3.8 mm at the aneurysm orifice. The right ICA-M1 segment and right fetal-type PCA remained patent. The patient was asymptomatic, with no headache, nausea, or vomiting.

Results: Management and Outcome: Diagnostic angiography confirmed aneurysm recurrence. The patient underwent retreatment using 16-coil embolization, achieving effective aneurysm occlusion while preserving flow in the parent vessels. She tolerated the procedure well without immediate complications and was closely monitored with regular imaging follow-ups.

Conclusion: This case underscores the importance of vigilant long-term surveillance in patients with complex aneurysm morphology, even in the absence of symptoms. Use of 16-coil embolization is an effective strategy for recurrent wide-neck fetal-type PCA aneurysms, enabling safe aneurysm occlusion and prevention of potential rebleeding.

PE-09

Persistent Trigeminal Artery Aneurysm: Treatment with Coil Embolization

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Objectives: Case presentation and review articles of persistent trigeminal artery (PTA) aneurysm treatment.

Methods: 76-year-old woman with acute large infarct over right MCA, ASPECT score 7, NIHSS=9. Incidental finding of large aneurysm within left cavernous sinus was noted in MRI. Diagnostic angiography showed narrow-neck aneurysm originated from PTA. TAE with coiling was arranged post-infarction 3 week.

Results: The aneurysm was completely obliterated, and the PTA was patent.

Conclusion: Endovascular treatment highlighted the importance of accurate vascular anatomy evaluation and strategies for PTA aneurysm.

Single-Session Endovascular Coiling for Traumatic Carotid-Cavernous Fistula with Cortical Venous Reflux

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Objectives: To present a rare case of traumatic carotid-cavernous fistula (tCCF) with cortical venous reflux (CVR) and to highlight the importance of early recognition, angiographic evaluation, and endovascular treatment.

Methods: A 39-year-old woman with a history of motor vehicle accident and prior craniotomy for intracerebral hemorrhage presented with progressive left eye proptosis, visual decline, orbital bruit, cranial nerve III, IV, and VI palsies, and longstanding pulsatile tinnitus. Diagnostic digital subtraction angiography (DSA) was performed, followed by transarterial coil embolization under general anesthesia.

Results: DSA confirmed a direct left-sided tCCF with cortical venous reflux. Complete occlusion was achieved after single-session coil embolization without adjunctive devices. Postoperatively, ocular symptoms subsided and no new neurological deficits were observed.

Conclusion: Traumatic carotid-cavernous fistulas with cortical venous reflux are neurosurgical emergencies. Early diagnosis with DSA and prompt endovascular coil embolization can provide safe and effective treatment, preventing potentially fatal complications and restoring normal venous drainage.

Hybrid Treatment of Large SCA Aneurysm in a Takayasu Arteritis Patient

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Objectives: Takayasu arteritis (TAK) is a rare, chronic inflammatory disease that affects the aorta and its major branches, leading to significant complications. Occlusion of large arteries, such as the carotid and subclavian arteries, alters blood flow dynamics, which may influence the formation of cerebral aneurysms. Additionally, these arterial obstructions can present challenges in the treatment of aneurysms. Here, we introduce a hybrid treatment approach for a large superior cerebellar artery (SCA) aneurysm in a patient with Takayasu arteritis and discuss key considerations.

Methods: A 56-year-old female presented with a growing superior basilar trunk aneurysm at the origin of the SCA. The aneurysm was approximately 15 mm in size, saccular in morphology, with the SCA arising directly from the sac. The patient also exhibited occlusions of the left carotid artery, distal subclavian artery, and abdominal aorta. The patient was on hypertension medication and immunotherapy, and was in normal neurological state.

Results: Cerebral angiography was performed via the right brachial route. A two-step hybrid operation was planned. The first step involved a superficial temporal artery-superior temporal artery bypass performed through a subtemporal craniotomy. The second step entailed coil embolization using a double microcatheter technique. Although the procedure encountered some trials and errors, the treatment was ultimately successful, and the patient remained in good condition postoperatively.

Conclusion: Large artery occlusions induced by Takayasu arteritis can pose significant obstacles in the treatment of cerebral aneurysms. A hybrid treatment approach, combining surgical bypass and endovascular techniques, may be an effective and safe option in such complex cases.

PE-12

Combined Treatment for Unruptured Giant Aneurysm Involving Vertebrobasilar Junction

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Objectives: We aimed to report the treatment of a complex giant aneurysm involving vertebrobasilar junction.

Methods: A 66-year-old man presented with cognitive impairment. The patient underwent flow-diverting stent-assisted coil embolization, followed by parent artery occlusion of the right vertebral artery. At the 3-month follow-up, persistent aneurysm filling was noted on angiography. Therefore, we deployed one more overlapping flow-diverting stent. However, one year later, the patient returned with new-onset dysphagia. MRI revealed brainstem compression, and angiography demonstrated coil compaction with aneurysm filling. To redirect flow from the basilar artery and preserve perfusion to the right AICA-PICA common trunk, a right occipital artery (OA) to posterior inferior cerebellar artery (PICA) bypass was performed.

Results: Dysphagia resolved within one week postoperatively. At the 3-month clinical follow-up, the patient exhibited no further brainstem-related symptoms.

Conclusion: Flow diversion alone was insufficient for treating this vertebrobasilar giant aneurysm due to involvement of the right AICA-PICA common trunk at the aneurysm neck. A right OA-PICA bypass effectively redirected flow and may have contributed to aneurysm thrombosis by reducing hemodynamic stress from the basilar artery.

Mechanical Thrombectomy and Rescue Intra-Arterial Thrombolysis in Posterior Communicating Artery Occlusion: A Rare Case Report

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Objectives: To report a rare case of isolated posterior communicating artery (PComA) occlusion and describe the role of rescue intra-arterial thrombolysis when mechanical thrombectomy fails.

Methods: A 31-year-old man presented with sudden visual loss and left-sided weakness one hour prior to admission. CT scan showed insular ribbon sign with ASPECTS 9 and NIHSS 11. Angiography revealed isolated occlusion of the right PComA. Mechanical thrombectomy was attempted but failed due to the small vessel caliber. Rescue intra-arterial alteplase (21 mg) was then administered.

Results: Successful reperfusion was achieved (mTICI 2B) without hemorrhagic complications. Clinical manifestations included homonymous hemianopia with macular sparing and left hemiparesis, consistent with thalamic and posterior cerebral artery involvement.

Conclusion: Isolated PComA occlusion is exceedingly rare but may present with acute visual and motor deficits. While mechanical thrombectomy is the standard treatment, intra-arterial thrombolysis can be an effective rescue option in small-caliber vessels. Further studies are needed to guide optimal management.

Longitudinal Endovascular Management of Multiple Intracranial Aneurysms: Sequential Stent-Assisted Coiling and Flow Diversion in a Single Patient

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Objectives: Multiple intracranial aneurysms (MIAs) occur in up to 30% of patients and pose challenges regarding prioritization, treatment sequencing, and long-term durability. Endovascular therapy provides multimodal strategies, including stent-assisted coiling (SAC) for acute rupture and flow diversion (FD) for durable parent vessel reconstruction. We describe the longitudinal management of a single patient requiring three staged interventions with three-year angiographic follow-up.

Methods: A middle-aged woman presented in March 2022 with subarachnoid hemorrhage, severe headache, and neck stiffness. Digital subtraction angiography demonstrated a ruptured right MCA-M2 bifurcation aneurysm (7.7×4.1 mm; neck 4.7 mm) and an incidental unruptured left ICA-C6 aneurysm (2.1×5.0 mm; neck 5.4 mm). The patient had a history of hypertension managed with Exforge and was neurologically intact on admission (GCS 15).

The patient underwent three staged endovascular procedures. In March 2022, the ruptured MCA-M2 aneurysm was treated with emergency SAC using a Leo 2.5×18 mm stent and detachable Wallaby coils, achieving immediate aneurysm exclusion. In April 2022, the unruptured ICA-C6 aneurysm was electively reconstructed with a Leo Baby 2.0×12 mm flow diverter to remodel the parent artery and secure long-term durability. In August 2023, following a recurrent SAH, a repeat SAC was performed on the culprit aneurysm, again resulting in stable exclusion. All procedures were performed under general anesthesia via transfemoral access with contemporary guiding and microcatheter systems.

Results: Each intervention achieved complete aneurysm occlusion (Raymond-Roy class I) with preserved parent and bifurcation flow. There were no peri-procedural complications. The patient remained neurologically intact. Surveillance angiography in March 2025 confirmed durable occlusion of both aneurysms with no evidence of recurrence.

Conclusion: This case illustrates the feasibility and safety of staged multimodal endovascular therapy for MIAs. SAC provided immediate protection in rupture, FD ensured durable reconstruction in an unruptured lesion, and repeat SAC

Endovascular Recanalization with Stenting for Non-Acute Internal Carotid Artery Occlusion: A Case Report

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Objectives: Non-acute internal carotid artery (ICA) occlusion is associated with recurrent ischemic symptoms despite best medical therapy. Endovascular recanalization with angioplasty and stenting may provide symptomatic relief and improve cerebral perfusion in carefully selected patients, although evidence remains limited.

Methods: A 66-year-old male with a history of ischemic stroke presented with residual left-sided weakness, numbness, and dysarthria. Arterial spin labeling MRI revealed hypoperfusion in the right cerebral hemisphere, consistent with non-acute right ICA occlusion. The patient was initiated on dual antiplatelet therapy with aspirin (100 mg/day) and clopidogrel (Plavix® 75 mg/day), in addition to lipid-lowering therapy, before undergoing endovascular intervention.

Results: Sequential balloon angioplasty of the occluded ICA and carotid bifurcation was performed, followed by deployment of a 9×50 mm self-expanding Carotid Wallstent (Boston Scientific). Post-dilation achieved <20% residual stenosis, and final angiography confirmed restoration of antegrade flow in the middle and anterior cerebral arteries without peri-procedural complications. After stent placement, the patient was transitioned to long-term dual antiplatelet therapy with aspirin and ticagrelor (Brilinta®) to minimize the risk of in-stent thrombosis.

Follow-up and Outcome: The patient remained on lifelong aspirin with ticagrelor maintained for 24 months. At four months, motor function had partially improved (mRS score 3), and follow-up angiography confirmed improved ICA patency. During two years of structured follow-up, dual antiplatelet therapy with aspirin and ticagrelor was well tolerated, with no recurrent ischemic events and durable stent patency.

Conclusion: Endovascular angioplasty with stent placement is a feasible and safe therapeutic option for selected patients with chronic ICA occlusion. This case demonstrates that sustained dual antiplatelet therapy with aspirin and ticagrelor is essential to optimize long-term clinical and angiographic outcomes after carotid stenting.

The Efficacy of Stem Cell-Derived Exosomes as Vehicles of Therapeutic microRNA for Glioma Therapy: A Systematic Review and Meta-Analysis of Preclinical Studies

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Objectives: Glioma is one of the most prevalent brain tumors and is challenging to treat. The mortality of glioma remains high and there is no effective treatment for this cancer. Recent studies investigating stem cells have shown interest in their ability to inhibit tumor growth. Stem cell-derived exosomes containing microRNA have made significant progress in glioma treatment and several studies have revealed an increase in the antitumor effect. This study aimed to evaluate the efficacy of stem cell-derived exosomes loaded with microRNA therapy for glioma in preclinical studies.

Methods: PubMed, ScienceDirect, ProQuest, and Google Scholars were used to retrieve studies investigating stem cell-derived exosomes loaded with microRNA for glioma treatment. All published articles were searched from inception to November 2023. The effect sizes of mean differences (MDs), a random-effects model, and 95% confidence interval (CI) were calculated using RevMan 5.4 software. The quality of studies was evaluated using Systematic Review Center for Laboratory Animal Experimentation (SYRCLE) tool.

Results: A total of 10 studies were retrieved, of which six were eligible for meta-analysis. The treatment group significantly reduced tumor volume (MD=-283.31, 95% CI [-440.12, -126.51], p=0.0004) and tumor weight (MD=-0.36, 95% CI [-0.50, -0.22], p<0.0001) compared with the control group. Subgroup analyses respecting the effect of stem cell sources (MSC, MD=-319.10, 95% CI [-600.32, -37.88], p=0.03; Others, MD=-262.80, 95% CI [-483.31, -42.28], p=0.02), and administration routes (subcutaneous, MD=-451.99, 95% CI [-526.24, -377.74], p<0.00001; intravenous, MD=-76.40, 95% CI [-105.01, -47.79], p<0.00001) revealed that the treatment group significantly reduced the tumor volume. The quality assessment yielded that all included studies have a low risk of bias.

Conclusion: Stem cell-derived exosomes loaded with microRNA were found to have significantly better outcomes and have potential as a promising treatment for glioma. Future studies must address the strategy to translate this treatment into clinical application.

Antitumor Activity of Oncolytic Virus Therapy Against Glioma: A Systematic Review and Meta-Analysis of Preclinical Studies

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Objectives: Glioma is the most prevalent primary brain tumor in adults, with a poor prognosis despite multiple modalities of therapy have been used. Currently, oncolytic virotherapy is emerging as an alternative glioma treatment because previous studies have shown the outcomes of this therapy are promising but scarce. This study aimed to evaluate the effects of oncolytic virus therapy for glioma.

Methods: Preclinical studies involved in this research were searched from PubMed, Science direct, ProQuest, and Google Scholar databases from inception to May 2024. Studies comparing the effects of virotherapy against the control group and written in English were included. The primary outcome was tumor volume. The secondary outcomes were adverse events and survival rates. A pooled analysis was calculated using a standardized mean difference and a random effect model. The analysis was performed using RevMan 5.4 software.

Results: A total of nine studies were included in this research. The results yielded that oncolytic virus therapy improved tumor volume compared with the control group, significantly (SMD -2.42, 95% CI -3.89 to -0.94, p=0.001). Subgroup analyses also revealed that studies using adenovirus as an oncolytic virus reduced tumor volume significantly than control group (SMD -1.82, 95% CI -3.49 to -0.23, p<0.0001). Moreover, a combination therapy between oncolytic virus and temozolomide was found to have a significant reduction in tumor volume (SMD -5.94, 95% CI -7.77 to -4.11, p<0.02). Four studies reported survival outcomes and showed similar results that oncolytic virus therapy prolonged survival in mice with glioma. No adverse events were reported in the treatment group.

Conclusion: Oncolytic virus therapy has beneficial effects for glioma therapy by reducing tumor volume. It also improved survival outcomes, with no adverse events were found. Furthermore, this finding suggests that oncolytic virus might be a promising approach for glioma therapy and needs further studies with a large sample size to validate this finding.

Chronic Subdural Hematoma in an HIV Patient: Successful Treatment with Burr Hole Drainage and Middle Meningeal Artery Embolization

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Objectives: To present a rare case of chronic subdural hematoma (CSDH) in a patient with long-standing human immunodeficiency virus (HIV) infection, successfully managed with combined surgical and endovascular treatment

Methods: A patient with an 8-year history of HIV and prior cerebral toxoplasmosis presented with progressive left-sided weakness for one month, accompanied by weight loss and chronic headache. Neurological examination showed persistent hemiparesis without seizures or altered consciousness. Brain imaging revealed chronic subdural hematoma. The patient underwent burr hole drainage with subdural drain placement, followed by middle meningeal artery embolization to reduce the risk of recurrence.

Results: Neurological symptoms improved significantly after intervention, with gradual resolution of hemiparesis. The postoperative course was uneventful, and no new neurological deficits occurred.

Conclusion: CSDH may develop in HIV patients due to multifactorial risks, including prior opportunistic infections and treatment history. A combined approach of burr hole drainage and middle meningeal artery embolization provided favorable outcomes in this case. This highlights the need for comprehensive management of intracranial complications in immunocompromised patients.

A Prospective Pilot Study Assessing the Safety and Efficacy of a Novel Trocar for Laparoscopic Ventriculoperitoneal Shunt Surgery for Post-Hemorrhagic Hydrocephalus

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Objectives: Laparoscopic assistance for distal peritoneal catheter placement in ventriculoperitoneal (VPS) shunting can shorten operative time and reduce invasiveness. This prospective pilot study assessed the safety and practical feasibility of a novel Trocar specifically designed for VPS.

Methods: Seven patients with post-hemorrhagic hydrocephalus underwent laparoscopic-assisted VPS using the novel Trocar. Intraoperative safety, device performance, and workflow feasibility in the operative setting were evaluated.

Results: All procedures were completed through a single 1 cm skin incision in less than 30 minutes. No distal catheter malfunctions occurred, and no complications were observed during short-term follow-up (≤3 months).

Conclusion: In this pilot series, the novel Trocar enabled minimally invasive distal catheter placement with favorable short-term safety. These findings support the device's feasibility and suggest potential procedural efficiency benefits. Larger studies with longer follow-up are warranted to confirm clinical effectiveness.

Venous Balloon Angioplasty for Cerebral Venous Sinus Occlusion Followed by Sequential Endovascular Treatment of Dural AVF: A Case Report

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Objectives: Dural arteriovenous fistula (AVF) and cerebral venous sinus occlusion are rare but potentially severe intracranial vascular pathologies that can cause venous hypertension, intracerebral hemorrhage, and neurological deterioration. In some patients, determining which disease process occurred first is challenging, as AVF and sinus occlusion often coexist and interact hemodynamically.

Prompt and stepwise endovascular intervention is critical for improving outcomes and reducing morbidity in complex cases.

Methods: A 66-year-old woman with a history of left hemifacial spasm treated by MVD presented with new-onset right-sided weakness and aphasia. CT showed left basal ganglia ICH. MR revealed cortical venous ectasia, and TFCA demonstrated occlusion of the torcula, and a dural AVF with retrograde flow into deep vein.

Results: After multidisciplinary discussion, balloon angioplasty of the occluded venous sinus was performed as the initial intervention. This resulted in resolution of the retrograde venous flow and partial clinical stabilization. However, three months later, follow-up angiography revealed persistent AVF with venous hypertension. Subsequently, transarterial Onyx embolization under Copernic balloon guide was performed, achieving durable control of the fistula.

Conclusion: This case demonstrates the role of primary balloon angioplasty in treating venous sinus occlusion with dural AVF and venous hypertension where the order of lesion development was uncertain. Venous balloon angioplasty successfully alleviated venous congestion, and onyx embolization led to resolution of the AVF. Balloon angioplasty can be a treatment option in complex venous sinus pathologies for improving hemodynamics. Sequential and multidisciplinary management is crucial for optimal outcomes when addressing sinus occlusion with associated dural AVF.

The Sofia Introducer in Reversed Manner (SIREM) Technique for Preserving the Sofia Tip

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Objectives: In thrombectomy, the Sofia aspiration catheter and NeuroMAX 088 guiding catheter are frequently used. However, for a second pass, the Sofia tip is highly susceptible to damage when it is retrieved through the NeuroMAX 088's narrow green hub. We have discovered an innovative technique, using the Sofia introducer in a reversed manner (SIREM), that can significantly reduce this risk, ensuring the catheter tip can be safely retrieved and reused for a second pass.

Methods: During thrombectomy, we prioritize using the Sofia aspiration catheter. For a second pass, whether or not a stent retriever is needed, we will use a second pass with previous Sofia aspiration catheter. Our guiding catheters are always the NeuroMAX 088 with the green hub.

Our objective is to compare the differences between the SIREM technique and the conventional method of manually and slowly withdrawing the Sofia tip

Results: We compared two groups of eight practical thrombectomy cases each. The group that used the SIREM technique was able to perform a second pass without any damage to the Sofia tip, regardless of whether a stent retriever was used. In contrast, the group that simply withdrew the Sofia tip by hand suffered tip damage in six cases. In five of them, the catheter could not be re-advanced into the guiding sheath using the Sofia introducer, thus preventing the effective use of the Sofia aspiration catheter for a second pass.

Conclusion: SIREM is a viable and effective technique to reduce the risk of damaging the Sofia tip. This technique also preserves the advantage of the NeuroMAX 088's green hub, its "saving distance" feature and allows the Sofia aspiration catheter to be successfully and effectively used for at least two passes of thrombectomy.

Role of Transcirculation Approach during Emergency Embolization of Symptomatic Recurrent PCoA Aneurysm Presented with Cavernous Sinus Syndrome after a Failed Flow-Diversion Stent Treatment: A Case Report and Review of Literature

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Objectives: Intracranial aneurysms presented with subarachnoid hemorrhage or mass effect with imminent threat due to recurrent aneurysm from an acute failed embolization constitute a critical step in selecting appropriate treatment and is not well defined in the literature. Furthermore, occlusion of parent artery from previous operations the treatment options became limited and difficult where alternative approaches like transcirculation or neurosurgery are highly considered.

Methods: Here, we present a case of symptomatic recurrent aneurysm successfully treated through transcirculation embolization. We also searched the literature for similar studies.

Results: 50-year-old gentleman presented with headache, left ptosis, ophthalmalgia, and diplopia two months after successful flow diversion embolization of unruptured tandem aneurysms at left AChA and PCoA ICA segments without neurologic deficit. Within 1 month follow up, he has progressive left cavernous sinus syndrome prompting us to do immediate angiogram and offer urgent treatment. Neuro-imagings showed enlarged left PCoA aneurysm with mass effect on cavernous region, complete obliteration of AChA aneurysm, aneurysm necks completely covered without endoleak, PCoA has lamilar flow, and has a robust patent P1. Primary coiling utilizing the ipsilateral P1 towards PCoA aneurysm was planned instead of microneurosurgery because he is on dual anti-platelet and risk of rupture is high. Access to aneurysm is straightforward and RROC 1 was achieved. He discharged after two days of treatment without new deficits. His symptoms improved within 1 month and complete occlusion of PCoA aneurysm on 3 months follow up with an mRS of 0.

Conclusion: Transarterial embolization from contralateral, posterior-to-anterior, or anterior-to-posterior to access the symptomatic aneurysm is safe and effective. With strong rationale and favorable angiography, emergency transcirculation approach is highly reasonable.

PE-23

Establishing Microsurgical Clipping in Secondary Referral Hospital: Our Journey at Airlangga University Hospital

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Objectives: Ruptured intracranial aneurysms present a significant barrier to optimal patient outcomes, particularly in resource-limited institutional settings. The acute nature of aneurysmal subarachnoid hemorrhage, with documented prehospital mortality approaching 26%, requires immediate therapeutic intervention according to established AHA/ASA protocols recommending definitive treatment within 24 hours.

Methods: Currently available resources at our institution present limitations including basic microscopic visualization without advanced fluorescence guidance, inadequate specialized instrumentation for microsurgical clipping, and constrained budgetary allocations through governmental insurance mechanisms. The authors aimed to develop and describe a reproducible approach to establishing aneurysm clipping services despite these institutional resource constraints.

Results: We present two consecutive patients with complex intracranial aneurysms managed through microsurgical clipping at our secondary referral center. Case 1 involved a 12-year-old female presenting with thunderclap headache and mild hemiparesis (GCS 15). Neuroimaging revealed subarachnoid hemorrhage with a left M1 bifurcation saccular aneurysm (dome-to-neck ratio 1.7). Intraoperative findings demonstrated unexpected large thrombotic components, successfully clipped with excellent outcome (mRS 1). Case 2 presented a 55-year-old female with decreased consciousness and hemiparesis following complex hemorrhage requiring initial surgical decompression. CTA identified dual pathology: left M1 blister aneurysm and wide-neck anterior communicating artery aneurysm (dome-to-neck ratio 1.1). Despite technical challenges, microsurgical management achieved functional independence (mRS 4), demonstrating feasibility of complex neurovascular procedures in secondary care settings.

Conclusion: This case series demonstrates feasible microsurgical clipping implementation in resource-limited settings through strategic equipment partnerships and procedural adaptations. Successful management of complex aneurysmal pathologies validates this reproducible model. Although endovascular coiling predominates in well-resourced centers, microsurgical clipping remains essential for morphologically complex lesions and resource-constrained environments, potentially expanding access to definitive neurovascular care while maintaining acceptable clinical outcomes.

PE-24

Spontaneous Thrombosis in Unruptured Intracranial Aneurysm in Pediatrics: A Case Report and Literature Review

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Objectives: Intracranial aneurysms are widely documented in the adult population; however, they are uncommon in children. Spontaneous thrombosis is prevalent in the paediatric population, however the specific processes are unpredictable. Analysing each case comprehensively will assist in determining the most suitable treatment.

Methods: We report the case of a 6-year-old boy presenting with left eyelid closure for two days and complete ophthalmoplegia of the left eye, along with a three-week history of persistent headache. His only notable past history was a resolved facial abscess on the left forehead three weeks earlier. Transfemoral angiography revealed a large, wide-necked saccular aneurysm at the cavernous segment of the left internal carotid artery (ICA). Endovascular occlusion with intracranial bypass was planned, but the parents opted for conservative management. Follow-up MR angiography at five months showed complete occlusion of the left ICA with preserved cerebral perfusion through collateral circulation.

We also reviewed the literature from the past two decades on spontaneous thrombosis of unruptured intracranial aneurysms in children, analyzing demographics, aneurysm location, possible etiologies, features associated with thrombosis, and treatment approaches.

Results: There are a total of 25 pediatric patients that had spontaneous thrombosis following the diagnosis of intracranial aneurysm. Eighteen patients had a history of rupture, with the most common location is ICA (8 patients) and basilar artery (8 patients). The most common etiology is dissecting aneurysm (16 patients). The time to thrombosis varied, with 6 patients had complete thrombosis in less than 1 week and the longest time to thrombosis is 11 months.

Conclusion: Spontaneous thrombosis of intracranial aneurysm in pediatric population has been described in literatures. The specific mechanism is unknown; however, understanding the aetiology, progression of clinical impairments, and radiographic characteristics of the aneurysm may aid in determining whether or not the aneurysm spontaneously thrombosed.

Subarachnoid Hemorrhage from Traumatic Arteriovenous Fistula Successfully Treated with Endovascular Treatment: A Case Report

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Objectives: Middle meningeal artery-dural arteriovenous fistula (MMA-dAVF) is a rare vascular lesion, occasionally associated with intracranial hemorrhage. We present a fatal case of traumatic subarachnoid hemorrhage (SAH) due to an MMA-cortical venous fistula treated by endovascular coil trapping, and we contextualize this case through a review of the literature.

Methods: A 75-year-old woman with a medical history of hypertension, diabetes mellitus, hyperlipidemia, and dementia presented after following a backward fall. The patient presented with a GCS score of E1V1M2, indicative of a semi-comatose state, and Both pupils were fixed at 3 mm in diameter. Brain CT revealed extensive basal cisternal SAH and intraventricular hemorrhage. CTA and transfemoral cerebral angiography (TFCA) identified an MMA-cortical venous fistula: the fistula originated from the frontal branch of the left MMA and drained into the left anterior cerebral vein, superficial middle cerebral vein, cavernous sinus, and pterygoid plexus. Bilateral external ventricular drains (EVDs) were placed for intracranial pressure control. Endovascular coil trapping was performed using both detachable and pushable coils, attaining complete shunt occlusion.

Results: Post-embolization angiography demonstrated complete obliteration of the arteriovenous shunt without residual flow. Nevertheless, the patient remained comatose after the procedure and expired on postoperative day 2 from hypoxic brain injury secondary to severe cerebral edema.

Conclusion: Although middle meningeal artery-dural arteriovenous fistula (MMA-dAVF) is an uncommon vascular pathology, it should be recognized as a potential cause of traumatic subarachnoid hemorrhage. Early diagnosis with angiographic evaluation and prompt endovascular intervention can achieve complete fistula occlusion. However, overall clinical outcome is primarily determined by the severity of the initial hemorrhage and subsequent secondary brain injury. Continued reporting of similar cases is necessary to further delineate the pathophysiology and establish optimal treatment strategies.

Transvenous Embolization (TVE) In Cerebral Dural Arteriovenous Fistulae (dAVF): A Case Report

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Objectives: Cerebral dural arteriovenous fistulae (dAVFs) account for approximately 10% of intracranial vascular malformations and are considered rare lesions. Patients with intracranial dAVFs have an estimated annual risk of hemorrhage of 1.8%, with a case fatality rate of about 20%. Endovascular treatment has become the mainstay therapy, with TVE achieving high rates of success in obliterating venous sinus malformations.

Methods: We report the case of a 66-year-old male who presented with dysphagia, visual hallucinations, blank stare, aphasia, and cognitive decline over several days prior to admission. He had a history of cerebral hemorrhage in the right basal ganglia in 2021, managed with craniotomy and ventriculoperitoneal shunt placement. Non-contrast head CT revealed temporal infarction with multifocal hemorrhage in the left temporal lobe. MRI demonstrated a dAVF involving the left transverse and sigmoid sinuses with multiple feeders from the left external carotid artery (LECA). The patient underwent successful transvenous embolization using coils, which achieved complete occlusion of the fistula. The follow-up CT post-embolization demonstrated resolution of brain edema and revealed no hemorrhage.

Results: This case highlights a dAVF involving the left transverse and sigmoid sinuses with multiple feeders from the LECA, presenting clinically with progressive neurological decline. TVE was particularly advantageous in this case due to the involvement of external carotid artery branches supplying cranial nerves traversing the ventral skull base foramina.

Conclusion: Transvenous coil embolization can achieve complete occlusion of cerebral dAVFs with favorable clinical and radiological outcomes.

PE-27

Intracranial Stenting with Chemical Thrombolysis for Acute Ischemic Stroke with Intracranial Artery Stenosis Based on Chronic Kidney Disease

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Objectives: When acute ischemic stroke (AIS) with large intracranial artery occlusion occurs, endovascular treatment (EVT) should be considered for thrombectomy. If there is intracranial artery stenosis (ICAS) exist, suction & stent retrieval thrombectomy may be insufficient for revascularization. So we consider intracranial stenting with chemical thrombolysis using intra-arterial Glycoprotein IIb-IIIa inhibiter (Tirofiban). But when patient have chronic kidney disease and need renal replacement therapy (RRT), we have to take high risk of bleeding tendency.

Methods: 82 year-old woman was admitted at ER with aphasia with motor weakness. On brain CT angiogram, left middle M1 occlusion was checked and there was left internal borderzone multiple infarction and perfusion time delay of Lt. MCA territory was checked on brain MRI. In angiogram, there was Lt. M1 occlusion and good collateral flow at Lt. MCA territory. So we thought there would be ICAS lesion.

Results: We deployed Solitaire stent and after checking recanalization of Lt. M1 flow, IA Tirofiban injection was done. After that. Lt. M1 flow was recovered but severe stenosis of Lt. M1 was checked. Postoperative IV Tirofiban was used, and concurrent dual antiplatelet treatment was done. But postoperative renal failure occurred so we did conventional hemodialysis for RRT. On the day of RRT, very huge intracerebral hemorrhage (ICH) was checked on left frontal area, and she died at next day.

Conclusion: When patients have renal failure and need RRT, original stent deployment & IA thrombolysis treatment is maybe not safe for AIS with ICAS. IV Tirofiban treatment, dual antiplatelet medication and heparinization for RRT can be risk of ICH after RRT. I think we have to manipulate drug dose, infusion time and for preventing postoperative hemorrhage complication. And regular follow-up Brain CT scan is necessary for checking intracerebral hemorrhage.

Successful Single-Coil Embolization and Emergency Snare Retrieval in Carotid-Cavernous Fistula: Two Case Reports

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Objectives: Carotid-cavernous fistula (CCF) is a rare vascular disorder resulting from abnormal communication between the carotid artery and the cavernous sinus. It occurs in approximately 1-2.5% of head trauma cases. The most common presenting symptoms include proptosis, conjunctival edema, and diplopia.

This case series presents two rare cases of direct-type CCF managed with single-coil embolization, including one complicated by premature coil detachment that was successfully managed with snare retrieval.

Methods: This case series aims to report two uncommon presentations of direct-type CCF managed with single coil embolization, including a case with premature coil detachment successfully resolved with snare retrieval.

Case 1: A 13-year-old underwent embolization via right femoral access using a Vargo guiding catheter and Headway 17 microcatheter. A single Optima Complex 18 coil (14 mm × 47 cm) was deployed.

Case 2: A 21-year-old underwent coiling with a Chaperon 6F guiding catheter and Headway 17 microcatheter using a 16 mm × 55 cm Optima coil. During deployment, premature coil detachment occurred with distal migration to the aortic arch. The coil was successfully retrieved using a 15 mm Memopart snare.

Results: In Case 1, follow-up at two weeks revealed significant improvement in proptosis and visual acuity, with further clinical improvement observed at the one-month evaluation. While multiple coils are typically used in the treatment of CCF—often more than five in certain cases—this case was successfully treated using a single coil only.

In Case 2, the migrated coil was completely retrieved without complications. Repeat DSA showed no evidence of thrombus or vascular stenosis, and the patient remained clinically stable without any neurological deficits

Conclusion: Single-coil embolization is a feasible technique for the treatment of direct CCF when appropriate coil sizing is applied. Preferably, a sufficiently large coil should be selected to achieve complete occlusion of the fistula, although longer coils may pose technical challenges during deployment. Nevertheless, excessive coil length increases the risk of premature detachment. Snare-assisted retrieval provides a safe and effective solution in such emergency situations.

PE-29

Traumatic Carotid Cavernous Fistula

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Objectives: This case presentation provided an information that one of the complication in head injury in the eye is Carotid Cavernous Fistula than can be decreas the function of the eye and how to treat this problem

Methods: In this presentation we collect 2 patients with CCF and already treated with endovascular procedure and we place a coil to obstruct di fistula

Results: After we do the procedure, we can confirm that the results is better, symptom of the patient was improved

Conclusion: As one of the complication of head trauma, CCF can be worse if not treated proper, and endovascular procedure is best treatment for it

PE-30

Intraoperative Middle Cerebral Artery Occlusion During Endovascular Coiling of an Anterior Communicating Artery Aneurysm: A Case Report

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Objectives: Endovascular coiling is a standard treatment for intracranial aneurysms, particularly anterior communicating artery (AComA) aneurysms. Despite its effectiveness, the procedure carries a risk of intraoperative complications, including thromboembolic occlusion. We present a case of intraoperative middle cerebral artery (MCA) occlusion during endovascular embolization of an AComA aneurysm, which was successfully managed with mechanical thrombectomy.

Methods: A 53-year-old female with a history of hypertension and coronary artery disease presented with severe headache and transient loss of consciousness. Non-contrast CT revealed subarachnoid hemorrhage, and digital subtraction angiography (DSA) demonstrated a saccular AComA aneurysm arising from the left A1 segment. The patient underwent endovascular embolization using a microcatheter-assisted coiling technique.

Results: The aneurysm was completely embolized with two detachable coils. Intraoperative angiography revealed thrombus formation causing significant occlusion of the M2-M3 branch of the MCA, accompanied by severe vasospasm-related flow reduction. Mechanical thrombectomy with a Solitaire X stent retriever (4×40 mm) restored vessel patency. Postoperative CT showed no hemorrhagic complications, and the patient was discharged without neurological deficits.

Conclusion: MCA occlusion represents a serious intraoperative complication during endovascular coiling of intracranial aneurysms. Prompt recognition and immediate intervention with mechanical thrombectomy are crucial to restoring cerebral circulation and preventing irreversible neurological damage.

PE-31

Emergency Intracranial Stenting Versus Medical Therapy in Acute Middle Cerebral Artery Occlusion Caused By Severe Stenosis: A Case Series

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Objectives: We present three cases of acute middle cerebral artery (MCA) occlusion due to severe intracranial stenosis. Among them, two patients underwent emergency intracranial stent placement, while one patient received medical treatment alone.

Methods: Emergent IA thrombectomy was done in two patients. Medical treatment (IA/IV IIbIIIa infusion) was done in one patient.

Results: The patients treated with stent placement demonstrated favorable outcomes, with successful vessel recanalization and improved neurological recovery. In contrast, the medically treated patient experienced re-occlusion, leading to a poorer prognosis.

Conclusion: These cases highlight the potential role of emergency intracranial stenting as an effective rescue therapy in selected patients with acute MCA occlusion caused by underlying severe stenosis.

Integrating STA-MCA Bypass with Modern Neurovascular Strategies: A Case Series in Aneurysm and Moyamoya Disease

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Objectives: To present the first institutional experience at Dr. Hasan Sadikin General Hospital integrating superficial temporal artery to middle cerebral artery (STA-MCA) bypass with multimodal neurovascular strategies, in the management of aneurysm and moyamoya disease, with emphasis on graft patency and surgical safety

Methods: This case series describes three patients treated in 2025. One patient presented with a saccular aneurysm at the C6 segment of the left internal carotid artery (ICA), and two others were diagnosed with unilateral moyamoya disease. All underwent STA-MCA bypass—single-barrel (SB) bypass with clipping in the aneurysm case and double-barrel (DB) bypass in the moyamoya cases. Advanced neurovascular strategies were applied for diagnostic and operative planning, and outcomes were assessed with the modified Rankin Scale (mRS) and clinical follow up

Results: The patients had a mean age of 50 years (range 35-74), with males representing 67% of the series. Right hemiparesis was the most common initial presentation. Advanced neurovascular modalities, including CTA, MRA, DSA, and CT perfusion, were employed to guide diagnostic evaluation and therapeutic planning. The patient with the aneurysm underwent clipping and SB bypass, but experienced postoperative neurological deterioration, with mRS worsening from 4 to 6, resulting in death. Intraoperative Doppler and electrophysiologic monitoring in two moyamoya patients undergoing DB bypass confirmed excellent patency and absence of new deficits during follow-up

Conclusion: This initial institutional series demonstrates the feasibility of combining STA-MCA bypass with advanced neurovascular strategies in a resource-limited setting. The favorable outcomes of DB bypass in moyamoya disease underscore its role in broader cerebral revascularization. Beyond local significance, this experience establishes a foundation for developing structured bypass programs in Indonesia and highlights the adaptability of modern neurovascular techniques to diverse clinical environments, providing valuable insight for other emerging centers worldwide

PE-33

Stellate Ganglion Block: A Promising Novel Therapeutic Approach for Refractory Central Post Stroke Pain

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Objectives: Central post-stroke pain (CPSP) is a debilitating neurological condition that often resists conventional treatments. Despite its profound impact on a patient's quality of life, effective and long-lasting therapeutic options remain limited. This report explores the potential of stellate ganglion block (SGB) as a novel treatment for patients with severe, refractory CPSP. While SGB is traditionally used for sympathetically-mediated pain syndromes, this case series highlights its potential to modulate central pain pathways.

Methods: A retrospective analysis was conducted on the outcomes of 5 patients (3 male, 2 female) with a history of stroke. All patients presented with chronic, severe, and medication-refractory CPSP in their upper extremities and had previously failed multiple standard pharmacological treatments. The pain was consistently described as a burning or shooting sensation. Each patient received a series of SGB procedures under ultrasound guidance. Pain intensity was measured using the Numeric Rating Scale (NRS) before and after each procedure.

Results: All 5 patients experienced a significant reduction in their pain scores immediately following the SGB procedures. The average NRS score decreased from a baseline of 8.2 to 2.4. The duration of pain relief varied among patients, with some requiring additional SGB sessions to maintain their pain control. Importantly, no significant adverse events were observed during or after the procedures.

Conclusion: This case series suggests that SGB may be a valuable therapeutic option for managing refractory CPSP. The observed long-term pain relief in some patients challenges the conventional understanding of SGB's mechanism and suggests that it may have a beneficial effect on central pain processing. While these findings are based on a limited number of cases, they warrant further investigation through larger, controlled studies to confirm the efficacy of SGB in this patient population and to elucidate its precise mechanism of action.

PE-34

Ruptured Posterior Communicating Artery Aneurysm: Primary Coiling and Placement of a Lumbar Drain in a Resource-Limited Setting

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Objectives: To present a case of ruptured posterior communicating artery (PComm) aneurysm treated with primary endovascular coiling and lumbar drain placement, as an alternative to external ventricular drainage (EVD) at a tertiary referral hospital in Malang, Indonesia. This case demonstrates that a minimally invasive approach can be performed feasibly and effectively in a non-provincial capital city with limited resources

Methods: A 48-year-old female came to emergency room, referred from a private hospital, complaining of sudden severe headache and vomiting. Patient with NRS 8-9, positive meningeal sign and classified as Hunt and Hess grade II. CT scan showed diffuse subarachnoid hemorrhage and intraventricular hemorrhage (Fisher Grade 4). CT angiography revealed a ruptured saccular aneurysm on the left internal carotid artery-posterior communicating artery junction and an incidental wide-neck basilar aneurysm.

A multidisciplinary team decided on endovascular coiling of the ruptured aneurysm and conservative management for the basilar aneurysm. A lumbar drain (LD) was placed under general anesthesia immediately prior to coiling to aid in intracranial pressure (ICP) management.

Results: Coiling was performed using a simple coil technique with Hydrosoft and Hypersoft coils from Microvention. The final angiography showed no signs of vascular abnormalities or vasospasm. Within 24 hours post procedure, the patient's fully conscious, there was no neurological deficit and no headache (NRS 0). No complications related to the lumbar drain were observed. The TCD evaluation revealed no vasospasm during observation in the stroke unit.

Conclusion: This case demonstrates that lumbar drain placement may be viable and effective alternative to EVD for ICP management in ruptured aneurysmal SAH in limited resource settings. It also showcases that a minimally invasive, multidisciplinary neurointervention approach is achievable with favorable outcomes even in outside Indonesia's provincial capitals.

Improvement of Hemifacial Spasm Following Palliative Embolization of an Unruptured Cerebellar Arteriovenous Malformation

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Objectives: Posterior fossa arteriovenous malformations (AVMs) are uncommon, accounting for 7-15% of all intracranial AVMs. These malformations typically present with symptoms such as headaches, seizure, and intracerebral hemorrhage. Reports of hemifacial spasm-characterized by involuntary contractions of the facial muscles-as a presenting symptom of AVMs are extremely rare and usually occur only when the facial nerve is compressed.

Methods: This was a case report of patient A 35-year-old male presented with worsening left-sided hemifacial spasm, unresponsive to medication for around one year, followed by progressive headache and dizziness. T2-weighted MRI revealed contact between the facial nerve root and a tortuous posterior inferior cerebellar artery (PICA), along with an AVM in the left cerebellar hemisphere.

Results: Cerebral angiography demonstrated a left cerebellar AVM with feeding arteries from superior cerebellar artery (SCA) and PICA. The patient underwent successful embolization of the SCA using glue (n-BCA:lipiodol). An intraprocedural thrombus developed but was managed appropriately. Post-procedural cerebral angiography revealed recanalization of the basilar artery and left PICA, with a 30% reduction in nidus size. The hemifacial spasm improved significantly after embolization with an HFS-7 score reduction of six points in the first week post-procedure.

Conclusion: Palliative embolization has shown potential in alleviating symptoms associated with hemifacial spasm and improving quality of life. Careful patient selection is essential to rule out secondary causes of hemifacial spasm and to identify underlying neurovascular contacts.

PE-36

Successful Coil Embolization For Ruptured Anterior Communicating Artery Aneurysm: A Case Report

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Objectives: Early diagnosis and timely endovascular intervention can lead to favorable outcomes in patients with ruptured ACom aneurysms, with good neurological recovery and functional independence.

Methods: A 68-year-old hypertensive woman presented with sudden headache, dizziness, and vomiting. Imaging confirmed diffuse subarachnoid hemorrhage due to a ruptured right ACom aneurysm, along with an unruptured aneurysm at the left intracranial ICA. Endovascular coiling was performed after discussion with the patient and family.

Results: Post-procedure, the patient remained alert with stable neurological status and full muscle strength. Blood pressure was well controlled, and no vasospasm or rebleeding was noted. She was transferred to the general ward and was ambulatory without assistance. Dual antiplatelet therapy with aspirin and clopidogrel was continued for 6-12 months.

Conclusion: Early diagnosis and timely endovascular intervention can lead to favorable outcomes in patients with ruptured ACom aneurysms, with good neurological recovery and functional independence.

PE-37

Risk Factors and Incidence of Cancer-Related Fatigue in Outpatient Breast Cancer Patients Undergoing Chemotherapy

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Objectives: This study aimed to investigate the incidence of cancer-related fatigue (CRF) in outpatient breast cancer patients undergoing chemotherapy and to identify major risk factors associated with moderate-to-severe CRF, with the goal of informing individualized intervention strategies.

Methods: From May 20 to July 20, 2024, 50 outpatient breast cancer patients receiving chemotherapy were assessed for fatigue using a 0-10 scale, with scores ≥4 indicating moderate-to-severe CRF. Data collected included demographics, cancer stage, comorbidities, employment and education status, chemotherapy regimen, and treatment frequency. Multivariate logistic regression was used to analyze associations with CRF severity.

Results: CRF was present in 29 patients (58%), with 16 of them (55.2%) experiencing moderate-to-severe fatigue. Significant risk factors for CRF included unemployment (OR: 5.75; 95% CI: 2.10-15.72; p<0.001), Stage IV disease (OR: 5.36; 95% CI: 1.88-15.26; p=0.002), comorbid chronic diseases (OR: 3.52; 95% CI: 1.26-9.81; p=0.017), paclitaxel-based chemotherapy (OR: 6.82; 95% CI: 2.21-21.07; p<0.001), and weekly chemotherapy frequency (OR: 8.17; 95% CI: 2.98-22.39; p<0.001). Age and education level were not statistically significant.

Conclusion: CRF affected over half of outpatient breast cancer patients, with more than half experiencing moderate-to-severe fatigue. Identified risk factors highlight the need for routine fatigue assessments and personalized interventions—such as exercise, nutrition, psychological support, and pharmacologic strategies—to improve patient quality of life and adherence to treatment.

De Novo Anastomotic Site Aneurysms After Anterior Cerebral Artery Bypass: Etiology, Hemodynamics, and Surgical Strategies

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Objectives: De novo aneurysms at anastomotic sites following cerebral bypass are rare but carry high rupture risks. We present two cases of de novo aneurysms after side-to-side (STS) anterior cerebral artery (ACA) bypass, exploring their etiology, hemodynamic mechanisms, and surgical management

Methods: We described two unique cases of de novo aneurysm after ACA-ACA STS bypass for aneurysm. The surgical strategy involved modified trapping and STA-ACA bypass to preserve distal flow, we successfully managed the cases without recurrence up to 26 months of follow up.

We performed computational fluid dynamics to identify wall shear stress at the anastomosis site. Additionally, the aneurysm wall was resected and examined pathologically.

Results: We found that pre-existing arterial wall pathology (chronic dissection, inflammation) and hemodynamic stress from STS bypass contribute to aneurysm formation.

CFD demonstrated elevated shear stress at anastomotic sites, exacerbated by pulsatile flow in STS configurations.

Conclusion: De novo aneurysms after ACA bypass necessitate long-term surveillance. STS techniques may increase aneurysm risk in fragile vessels; end-to-side bypass and interposition grafts offer safer alternatives. Histopathological and CFD analyses underscore the importance of individualized revascularization strategies.