Korean Society of Interventional Neuroradiology
1994
KSIN

EACoN

East Asian Conference of Neurointervention

in conjunction with

KCNI 2025

Korean Congress of Neurointervention

December 12(Fri) – 13(Sat), 2025

Coex Magok, Seoul, Korea

SK 케미칼 Life Science Biz.

Teglutik

Riluzole oral suspension

More Convenient RILUZOLE[2]

Teglutik : An innovative liquid formulation of riluzole for ALS patients[1-3]

- **Proven efficacy** of riluzole[1, 4*-5]
  *Significantly prolonged survival in clinical trials in patients with ALS vs. placebo
- **Ready to use** and enables certainty of dosing[1-3]
- **Nectar-like viscosity** to facilitate swallowing[3,6]
- **Can be administered orally or through PEG tube**[1,7]

Suitable from diagnosis and at all stages of ALS[2, 8]

Every ALS patient can benefit from **Teglutik**[1-2, 4]

테글루틱현탁액 제품요약정보[1]

「**전문의약품**」**|제품명** • 테글루틱현탁액(리루졸) **[원료약품 및 그 분량]** 100mL 중 • 테글루틱현탁액 유효성분: 리루졸(별규)…500mg [효능·효과] 근위축성측삭경화증(amyotrophic lateral sclerosis) 환자의 생존기간을 연장시키거나 기관절개시점을 늦추어 준다. **[용법·용량]** 성인 및 노인에 대한 이 약의 권장용량은 1일 100mg/20mL이며, 매 12시간 간격으로 50mg/10mL씩 경구투여, 또는 PEG관(Percutaneous endoscopic tubes)을 이용하여 투여한다. 용량을 증가시킴으로서 특별하게 유익성이 증강되는 것을 기대할 수 없으나 이상반응은 증가한다. 음식물로 인한 생체이용률(bioavailability)의 감소를 방지하기 위하여 최소한 식사 1시간 전 또는 2시간 이후에 이 약을 복용한다. **[사용상의 주의사항]** 1. 경고 1) 간 손상/간의 화학적 모니터링 - 간기능 부전이 있거나 기왕력이 있어 혈청 transaminase(ALT/SGPT AST/SGOT), 빌리루빈, gamma-glutamate transferase(GGT)가 이상 수치를 나타내는 환자에게 이 약을 투여 시에는 주의를 요한다. 몇몇 LFT의 기준 수치가 상승(특히 빌리루빈의 상승)시에는 이 약을 사용해서는 안된다. (중략) 2) 호중구감소증 - (중략) 환자가 발열 증상을 나타낼 경우에는 즉시 의사에게 알리고, 백혈구 수치를 확인해야 한다. 호중구 감소의 경우 이 약의 투여를 중단하여야 한다. 3) 간질성 폐질환 - 이 약을 투여 받는 환자에서 간질성 폐질환이 보고되었고, 그 중 일부는 중증이었다. (중략) 대부분의 사례는 투여를 중단하고 대증 치료를 받은 후 증상이 사라졌다. 2. 다음 환자에는 투여하지 말 것. 1) 이 약 또는 이 약에 함유된 성분에 대해 과민증이 있는 환자 2) 간질환이 있거나 transaminase 수치가 정상상한치의 3배 이상인 환자 3) 임부 또는 수유부 4) 희소 유전성 과당 불내증 환자(이 약은 액상의 소르비톨을 포함하고 있음.) 3. 다음 환자에는 신중하게 투여할 것: 간기능 및 신기능 부전 환자에 이 약을 투여 시에는 주의를 요한다. 특히 이 약에 의한 간효소 증가로 간이 손상된 경우, 간손상이 이 약 대사에 미치는 영향은 알려지지 않았다. 신부전 환자에게 반복투여한 시험은 수행된 바 없다. (후략) **[포장단위]** • 1병/상자(300mL/병) **[저장방법]** • 기밀용기, 실온(1~30℃) 보관 **[사용기한]** • 제조일로부터 36개월(직접용기에 별도표기) [제조자] • Italfarmaco, S.A., C/San Rafael, 3, Pol. Ind, Alcobendas, 28108 Madrid, Spain **[원료공급처]** • ScinoPharm Taiwan, Ltd., No.1, Nan-Ke 8th road, Shan-Hua, Tainan 74144, Taiwan **[수입자]** • 에스케이케미칼㈜ 충청북도 청주시 흥덕구 산단로 149 **[판매자]** • 에스케이케미칼(주) 경기도 성남시 분당구 판교로 310 2022.10.26 개정
※처방하시기 전 제품설명서 전문을 참고하십시오. 최신 허가사항에 대한 정보는 '식품의약품 안전처 의약품안전나라(https://nedrug.mfds.go.kr/index)'에서 확인할 수 있습니다.

References 1. 테글루틱현탁액(리루졸) 허가정보, 의약품안전나라 [Cited 2022.10.26] Available from: http://nedrug.mfds.go.kr/ 2. Keating GM. Riluzole oral suspension in amyotrophic lateral sclerosis: a guide to its use, Drugs Ther Perspect. 2016 32: 7: 282–286. 3. Dyer AM et al., A. Riluzole 5 mg/mL oral suspension: for optimized drug delivery in amyotrophic lateral sclerosis, Drug Des Devel Ther. 2016 Dec 22;11:59–64. 4. Miller RG et al., Riluzole for amyotrophic lateral sclerosis (ALS)/motor neuron disease (MND), Cochrane Database Syst Rev. 2012 Mar 14;2012(3):CD001447. 5. Bensimon G et al., A controlled trial of riluzole in amyotrophic lateral sclerosis, ALS/Riluzole Study Group, N Engl J Med. 1994 Mar 3;330(9):585–91. 6. Onesti E et al., Dysphagia in Amyotrophic Lateral Sclerosis: Impact on Patient Behavior, Diet Adaptation, and Riluzole Management, Front Neurol. 2017 Mar 21;8:94. 7. Brooks BR et al., Riluzole Oral Suspension: Bioavailability Following Percutaneous Gastrostomy Tube–modeled Administration Versus Direct Oral Administration, Clin Ther. 2019 Dec;41(12):2490–2499. 8. The EFNS Task Force on Diagnosis and Management of Amyotrophic Lateral Sclerosis, EFNS guidelines on the clinical management of amyotrophic lateral sclerosis(MALS)—revised report of an EFNS task force, Eur J Neurol. 2012 Mar; 19(3):360–75.

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Coex Magok, Seoul, Korea

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WELCOME MESSAGE

Dear Colleagues & Friends,

We are pleased to invite you to EACoN in conjunction with KCNI 2025, taking place on December 12–13, 2025, at Coex Magok, Seoul, Korea.

The East Asian Conference on Neurointervention (EACoN) 2025, held in conjunction with the Korean Congress of NeuroIntervention (KCNI) 2025, is set to bring together a vibrant community of experts and rising leaders in the field of neurointervention. Hosted by the Korean Society of Interventional Neuroradiology (KSIN), KCNI 2025 will build on KSIN's 30-year legacy and the success of its inaugural congress to further advance excellence in cerebrovascular care.

Since its inception in 2010, EACoN has played a pivotal role in fostering regional collaboration among neurointerventional professionals from Korea, China, and Japan. With its emphasis on minimally invasive techniques and collaborative research, EACoN continues to serve as a key platform for sharing insights and shaping the future of neurointerventional treatment.

This year, we are especially excited to introduce a dedicated educational program featuring hands-on programs tailored for young neurointerventionists across East Asia. This initiative marks a meaningful opportunity to support and inspire the next generation of specialists, and we believe it will lay a strong foundation for emerging leaders who will pioneer the future of neurointervention.

Moreover, EACoN 2025 represents an important milestone—the beginning of its transformation into an annual international congress, setting the stage for sustained global exchange and long-term collaboration in the years to come.

Together, EACoN in conjunction with KCNI 2025 will provide an exceptional opportunity to engage in interdisciplinary dialogue, showcase cutting-edge research, and build lasting professional connections. We warmly welcome neurointerventionists, healthcare professionals, and researchers from around the world to join us in Seoul and be part of this meaningful journey.

Once again, welcome to the EACoN in conjunction with KCNI 2025. We look forward to seeing you in Seoul and wish you a productive and enjoyable experience.

We look forward to your active participation.

Sangil Suh

Sangil Suh
President, EACoN
in conjunction with KCNI 2025

Hae Woong Jeong

Hae Woong Jeong
Organizing Chair, EACoN
in conjunction with KCNI 2025

ORGANIZATION COMMITTEE

President	**Sangil Suh**	Korea University Guro Hospital
Organizing Chair	**Hae Woong Jeong**	Inje University Busan Paik Hospital
Organizing Vice Chair	**Hong Jun Jeon**	Kangdong Sacred Heart Hospital
	Yunsun Song	Asan Medical Center
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Deputy Director	**Bo Kyu Kim**	Korea University Anam Hospital
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	Jang-Hyun Baek	Kangbuk Samsung Hospital
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	Keunyoung Park	Severance Hospital
	Joong-Goo Kim	Jeju National University Hospital
	Junhwee Kim	Yongin Severance Hospital
	Lee Hwangbo	Pusan National University Hospital
	Jun Yup Kim	Seoul National University Bundang Hospital

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	Na-Rae Yang	Ewha Womans University Mokdong Hospital
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	Jin Wook Choi	Ajou University Hospital
	Woo-Keun Seo	Samsung Medical Center
	Hyo Sung Kwak	Jeonbuk National University Hospital
	Dong Joon Kim	Severance Hospital
	Sang Hyun Suh	Gangnam Severance Hospital
Exhibition	**Chi-Hoon Choi**	Chungbuk National University Hospital
	Lee Hwangbo	Pusan National University Hospital
Publication	**Sung Hyun Baik**	Seoul National University Bundang Hospital
Social Program	**Byung Hyun Baek**	Chonnam National University Hospital

PROGRAM AT A GLANCE

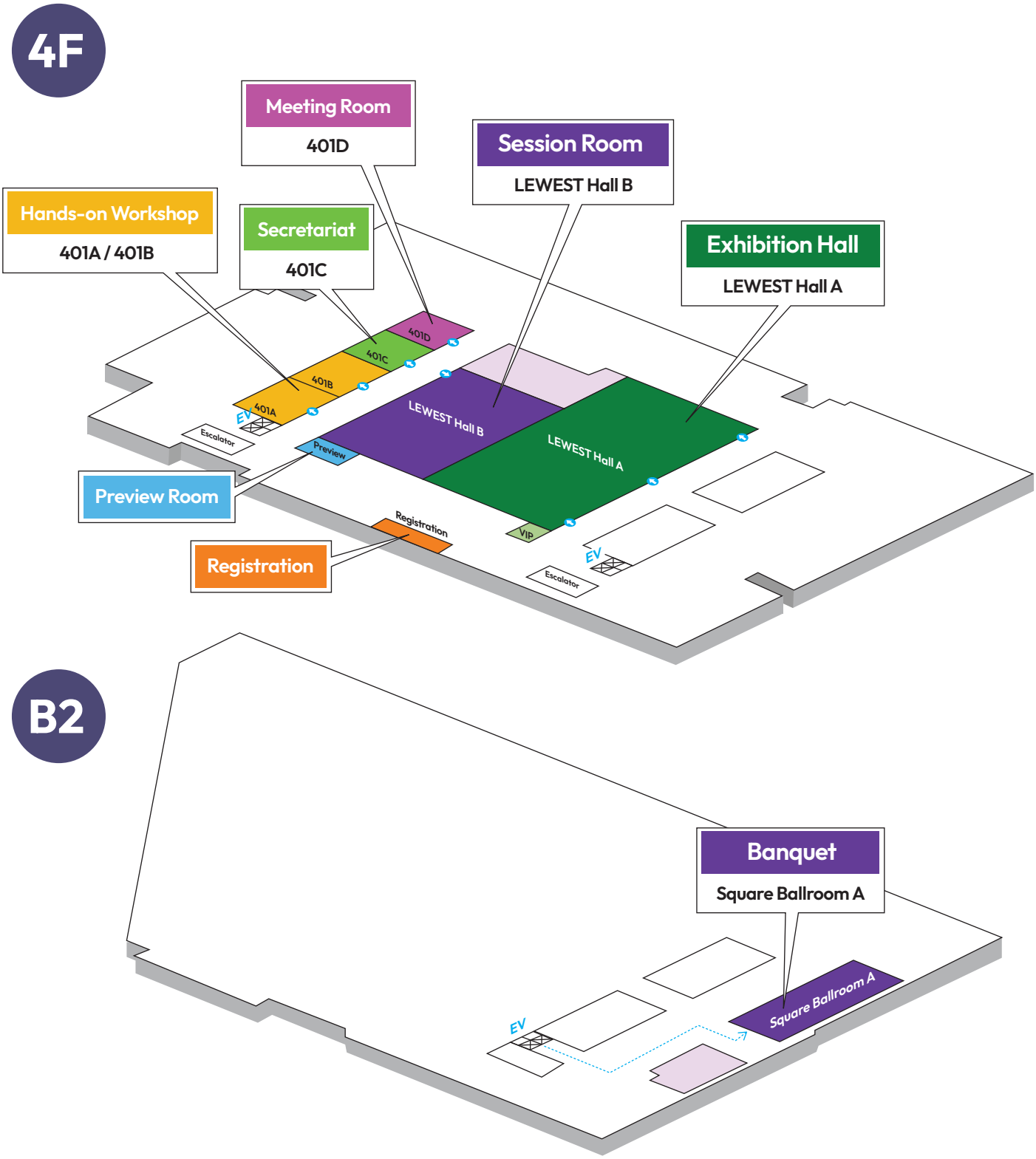
Day 1 December 12 (Fri), 2025

VENUE	LEWEST Hall B	
08:30-09:00	Registration	
09:00-10:30	**International Education Program**	
10:30-10:50	Coffee Break	
10:50–11:50	**Special Focus Session:** Advances in Neurointervention	| 401 A, B | **Hands-on Workshop & Industry Booth Visit**
11:50–12:00	**Opening Ceremony**	
12:00–12:15	**Luncheon Industrial Symposium 1-1** Stryker Korea	
12:15–12:30	**Luncheon Industrial Symposium 1-2** Medtronic Korea	
12:30–12:45	**Luncheon Industrial Symposium 1-3** Terumo Neuro(MicroVention)	
12:45–13:00	**Luncheon Industrial Symposium 1-4** Balt International SAS	
13:00–13:20	Coffee Break	
13:20–15:00	**Invited Lectures Session 1** Aneurysm	
15:00–15:20	Coffee Break	
15:20–17:20	**Scientific (Free Paper) Session 1** Aneurysm	| 401 D | **Japan – Korea Friendship Case Conference**
18:00-20:00	| Square Ballroom A | **Banquet**	

Day 2 December 13 (Sat), 2025

VENUE	LEWEST Hall B
08:00-09:00	Registration
09:00–10:40	**Invited Lectures Session 2** Shunt Lesions & Miscellaneous Topics
10:40–11:00	Coffee Break
11:00–12:00	**Scientific (Free Paper) Session 2** Shunt Lesions & Miscellaneous Topics
12:00–12:15	**Luncheon Industrial Symposium 2-1** GE HealthCare
12:15–12:30	**Luncheon Industrial Symposium 2-2** Johnson & Johnson MedTech
12:30–12:45	**Luncheon Industrial Symposium 2-3** Wallabyphenox
12:45–13:00	**Luncheon Industrial Symposium 2-4** Penumbra
13:00–13:20	Coffee Break
13:20–14:50	**Invited Lectures Session 3** Acute Ischemic Stroke
14:50–15:10	Coffee Break
15:10–17:10	**Scientific (Free Paper) Session 3** Acute Ischemic Stroke & CAS
17:10–17:30	**EACoN in conjunction with KCNI 2025 Awards & Closing Ceremony**
17:30-18:00	**KSIN General Assembly and Awards Ceremony**

FLOOR PLAN


4F
Meeting Room
401D
Session Room
LEWEST Hall B
Hands-on Workshop
401A / 401B
Secretariat
401C
Exhibition Hall
LEWEST Hall A
401D
401C
401B
401A
EV
Escalator
LEWEST Hall B
LEWEST Hall A
Preview
Preview Room
Registration
Registration
VIP
EV
Escalator
B2
Banquet
Square Ballroom A
EV
Square Ballroom A

CONFERENCE INFORMATION

Title	EACoN in conjunction with KCNI 2025
Dates	December 12 (Fri) - 13 (Sat), 2025
Venue	Coex Magok, Seoul, Korea
Website	www.eacon2025.kr
Official Language	English
Organized by	Korean Society of Interventional Neuroradiology (KSIN)
Secretariat	Convention PM Scientific Program & Sponsor: Tel: +82-31-908-4383 Registration: Tel: +82-31-906-4388 E-mail: eaconkcni@conventionpm.com [During the conference: Room 401C, 4F, Coex Magok]

Registration

Registration Desk

Date	Time	Location
December 12 (Fri)	08:30-17:20	Lobby (4F)
December 13 (Sat)	08:00-17:00	

On-site Registration Fee

Categories		Registration Fee (Dec 12-13, 2025)
Overseas	Invited Faculty	Free
	Participants	USD 150
	International Education Program Trainee	USD 50
회원	초청 연자 및 좌장	무료
	정회원, 준회원	150,000원
	명예회원, 원로회원	무료
비회원	초청 연자 및 좌장	무료
	전문의	150,000원
	전임의, 전공의	100,000원
	간호사, 방사선사, 연구원	100,000원
	기업회원 (유료등록)	150,000원

On-site Name Badge

A name badge will be used as a pass. You are kindly requested to wear your name badge throughout the conference. Please note that access to the session rooms and exhibition area may be restricted if you are not wearing your name badge.

Certificate of Attendance & Registration Fee Receipt

All registered participants can download and print a certificate of attendance & registration fee receipt from 'My Page' on the conference website (https://www.eacon2025.kr/). The service will be available after the conference.

평점안내 (Only for Korean Participants)

- 평점은 대회 기간 중 세션룸 입실/퇴실 시마다 태깅을 통해 체류 시간이 확인되어야 평점이 부여됩니다.
- 출결 체크 누락으로 인한 평점은 대회 종료 후 반영되지 않습니다.

*** 출결 체크 위치: 등록데스크, 각 세션장 출입구**

구분	12월 12일 (금)	12월 13일 (토)	비고
대한의사협회	최대 5평점	최대 6평점	시간 당 1점 (1시간 초과 시 인정)

*** 12월 12일(금), 10:50-11:50 Special Focus Session은 평점 인정 세션에서 제외됩니다.**

Opening Ceremony

Date	Time	Location
December 12 (Fri)	11:50-12:00	LEWEST Hall B (4F)

Luncheon Symposiums

Date	Time	Place	Company
December 12 (Fri)	12:00-12:15	LEWEST Hall B (4F)	stryker
	12:15-12:30		Medtronic Engineering the extraordinary
	12:30-12:45		TERUMO NEURO
	12:45-13:00		balt inspiring innovation
December 13 (Sat)	12:00-12:15	LEWEST Hall B (4F)	GE HealthCare
	12:15-12:30		Johnson&Johnson MedTech
	12:30-12:45		wallaby phenox
	12:45-13:00		Penumbra

** Lunch will be provided to all participants at **LEWEST Hall B** (4F) during the Luncheon Symposiums.

CONFERENCE INFORMATION

Banquet

Date	Time	Location
December 12 (Fri)	18:00-20:00	Square Ballroom A (B2)

Closing Ceremony

Date	Time	Location
December 13 (Sat)	17:10-17:30	LEWEST Hall B (4F)

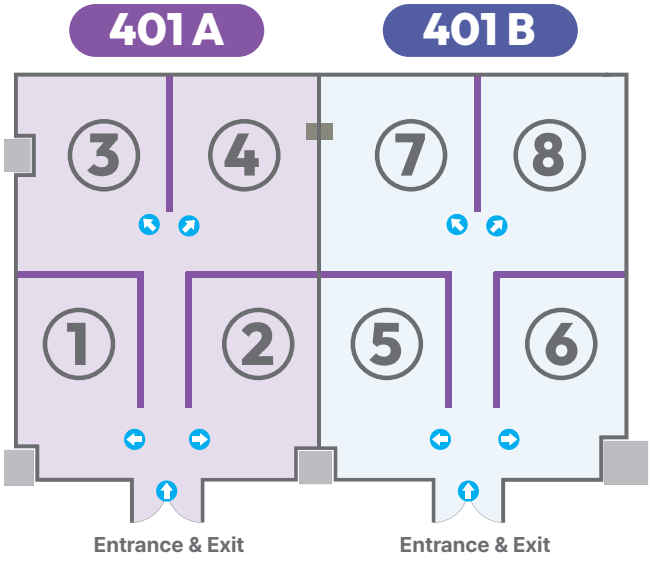
Coffee Break

Date	Time	Location
December 12 (Fri)	10:30-10:50, 13:00-13:20 15:00-15:20	LEWEST Hall A (4F) (Exhibition Hall)
December 13 (Sat)	10:40-11:00, 13:00-13:20 14:50-15:10	

Hands-on Workshop

Schedule

Date	Time	Place	Participation
December 12 (Fri)	10:50-12:00	401A, 401B	International Educational Trainee
	12:00-17:00		All Participants



Room	Location No.	Company Name
401A	①	Johnson&Johnson MedTech
	②	Penumbra
	③	stryker
	④	wallaby phenox
401B	⑤	balt inspiring innovation
	⑥	Abbott
	⑦	Medtronic Engineering the extraordinary
	⑧	TERUMO NEURO

PRESENTATION GUIDELINES

Presentation Method & Type

Category	Presentation	Q&A
Invited Lectures & Oral Presentations	In-person	In-person

All presenters are required to arrive in the session room 30 minutes before the session begins and to take a seat in the first row reserved for speakers.

How to Upload Your Presentation File(s)

After logging into the system in the Preview Room, please confirm presentation time and upload the presentation file(s) to the appropriate folder.

- Please visit the Preview Room at least 1 hour before your session starts to ensure your presentation file displays properly. A technician will be available to assist you with checking your presentation file.
- If your file contains video, please ensure that it works properly on the PC prepared in the Preview Room at least 2 hours prior to your presentation.
- All presentation files will be stored on a network server and accessible on the PCs in each session room 30 minutes prior to the session start.

Podium Equipment

You may start your presentation by clicking the left mouse button. Your speaker notes (PowerPoint slide notes) will be visible on the PC monitor during your presentation.

Preview Room

Date	Operating Hours	Location
December 12 (Fri) - 13 (Sat)	08:30-17:00	Adjacent to the LEWEST Hall B (4F)

e-Poster Display

Date	Operating Hours	Location
December 12 (Fri)	10:00-17:20	LEWEST Hall A (4F) (Exhibition Hall)
December 13 (Sat)	09:00-16:00	

Awards Ceremony

Date	Time	Location
December 13 (Sat)	17:10-17:30	LEWEST Hall B (4F)

INVITED FACULTY

Nathan W Manning	Sydney Neurointerventional Specialists	Australia
Vinicius Carraro do Nascimento	Gold Coast University Hospital	Australia
Bo Hong	Shanghai General Hospital	China
Pengfei Xing	Changhai Hospital	China
Shu Wan	Zhejiang Hospital	China
Wei Ni	Huashan Hospital	China
Yu Zhou	Changhai Hospital, Naval Medical University	China
Zhenyu Jia	The First Affiliated Hospital with Nanjing Medical University	China
Tariq Matin	Artemis Hospitals Gurugram	India
Vikas Bhatia	Post Graduate Institute of Medical Education and Research	India
Akira Ishii	Juntendo University Hospital	Japan
Hiro Kiyosue	Kumamoto University Hospital	Japan
Hiroshi Yamagami	Osaka National Hospital	Japan
Masaki Komiyama	Osaka City General Hospital	Japan
Nobuyuki Sakai	Seijinkai Shimizu Hospital	Japan
Shinichi Yoshimura	Hyogo Medical University	Japan
Yasushi Ito	Shinrakuen Hospital	Japan
Yasushi Matsumoto	Tohoku University Hospital	Japan
Yuji Matsumaru	University of Tsukuba Hospital	Japan
Chung-Wei Lee	National Taiwan University Hospital	Taiwan
Yilmaz Onal	Fatih Sultan Mehmet Teaching and Research Hospital	Turkiye
Vu Dang Luu	Bach Mai University Hospital	Vietnam
Byungjun Kim	Korea University Anam Hospital	Korea
Chang Woo Ryu	Kyung Hee University Hospital at Gangdong	Korea
Dae Chul Suh	Gangnam St. Peter's Hospital	Korea
Dong Joon Kim	Severance Hospital	Korea
Hae Woong Jeong	Inje University Busan Paik Hospital	Korea
Hong Gee Roh	Konkuk University Medical Center	Korea
Hyun Jeong Kim	Daejeon St. Mary's Hospital	Korea
In Sup Choi	Tufts University	Korea
Jae Wook Jung	Severance Hospital	Korea
Jaeil Lee	Pusan National University Hospital	Korea
Jieun Roh	Pusan National University Yangsan Hospital	Korea
Jin Wook Baek	Inje University Busan Paik Hospital	Korea
Joon Hong Bae	GE HealthCare	Korea
Seung Kug Baik	Pusan National University Yangsan Hospital	Korea
Woong Yoon	Chonnam National University Hospital	Korea
Yunsun Song	Asan Medical Center	Korea

DAILY PROGRAMS

Day 1 December 12 (Friday)

Time	LEWEST Hall B
08:30-09:00	Registration
09:00-10:30	**International Education Program** *Hae Woong Jeong (Inje University Busan Paik Hospital, Korea),* *Yasushi Matsumoto (Tohoku University Hospital, Japan)*
09:00-09:30	Developmental and phylogenetic insights into neurovascular anatomy *Masaki Komiyama (Osaka City General Hospital, Japan)*
09:30-10:00	Key concepts in neurovascular anatomy *In Sup Choi (Tufts University, USA)*
10:00-10:30	Application of C-arm CT for intracranial stenting *Bo Hong (Shanghai General Hospital, China)*
10:30-10:50	Coffee Break
10:50-11:50	**Special Focus Session: Advances in Neurointervention** *Jaeil Lee (Pusan National University Hospital, Korea), Yasushi Ito (Shinrakuen Hospital, Japan)*
10:50-11:10	Transarterial embolization of AVM *Yilmaz Onal (Fatih Sultan Mehmet Teaching and Research Hospital, Turkiye)*
11:10-11:30	Development of novel endovascular electrodes for the diagnosis of epileptic focus *Yuji Matsumaru (University of Tsukuba Hospital, Japan)*
11:30-11:50	Recent clinical study (MeVO with RED43) update including DIVA study *Vinicius Carraro do Nascimento (Gold Coast University Hospital, Australia)*
10:50-11:50	**Hands-on Workshop and Industry Booth Visit** *Room 401A, 401B and LEWEST Hall A*
11:50-12:00	**Opening Ceremony**
12:00-13:00	**Luncheon Industrial Symposiums 1** *Jin Wook Baek (Inje University Busan Paik Hospital, Korea), Akira Ishii (Juntendo University Hospital, Japan)*
12:00-12:15	[1-1. Stryker Korea] Surpass streamline to evolve to elite *Hae Woong Jeong (Inje University Busan Paik Hospital, Korea)*
12:15-12:30	[1-2. Medtronic Korea] Flow diverters (focus on pipeline) for distal aneurysms and uncommon conditions *Chung-Wei Lee (National Taiwan University Hospital, Taiwan)*
12:30-12:45	[1-3. Terumo Neuro(MicroVention)] WEB device: Our journey *Tariq Matin (Artemis Hospitals Gurugram, India)*
12:45-13:00	[1-4. Balt International SAS] Silk Vista & Silk Vista Baby: Current design developments *Yilmaz Onal (Fatih Sultan Mehmet Teaching and Research Hospital, Turkiye)*

DAILY PROGRAMS

Day 1 December 12 (Friday)

13:00-13:20	Coffee Break
13:20-15:00	**Invited Lectures Session 1: Aneurysm** *Hong Gee Roh(Konkuk University Medical Center, Korea), Nobuyuki Sakai (Seijinkai Shimizu Hospital, Japan), Bo Hong (Shanghai General Hospital, China)*
13:20-13:45	Treatment strategy of fetal-type IC-Pcom aneurysms *Akira Ishii (Juntendo University Hospital, Japan)*
13:45-14:10	Technical advice for stent-assisted coil embolization *Shu Wan (Zhejiang Hospital, China)*
14:10-14:35	Microballoon catheter techniques during endovascular aneurysm treatment *Jieun Roh (Pusan National University Yangsan Hospital, Korea)*
14:35-15:00	Braid deformation in flow-diverting stents: Mechanisms, clinical consequences, and determinants of risk *Nathan W Manning (Sydney Neurointerventional Specialists, Australia)*
15:00-15:20	Coffee Break
15:20-17:20	**Scientific (Free Paper) Session 1: Aneurysm** *Chang Woo Ryu (Kyung Hee University Hospital at Gangdong, Korea),* *Shu Wan (Zhejiang Hospital, China)*
15:20-15:30	Interim results of endovascular coiling using Target Tetra® detachable coils for small intracranial aneurysms (TETRA Registry) *Kyu Seon Chung (Gangnam Severance Hospital, Korea)*
15:30-15:40	Evaluation of coil embolization status changes six months after cerebral aneurysm coil embolization: What factors are essential for status maintenance? *Keisuke Sato (Nagaoka Red Cross Hospital, Japan)*
15:40-15:50	Isolated peripheral unruptured posterior inferior cerebellar artery (PICA) aneurysm treatment outcomes from single tertiary center experience *Abdullah Alhindi (Ministry of Health, Saudi Arabia)*
15:50-16:00	Embolization of intracranial aneurysm with Target Tetra coils: Initial clinical experience and short-term follow up results *Dong Hyun Yoo (Seoul National University Hospital, Korea)*
16:00-16:10	Efficacy and outcomes of accero intracranial braided stent in wide-neck bifurcation aneurysms: A single-center experience *Ahmed Albaqshi (King Fahad Hospital Al Hofuf, Saudi Arabia)*
16:10-16:20	Longitudinal braid stability of Surpass EvolveTM: In the aspect of Fish-mouthing deformation *Minu Nahm (Severance Hospital, Korea)*
16:20-16:30	Woven EndoBridge embolization for intracranial aneurysms: Single center experiences in South Korea *Jung-Jae Kim (Severance Hospital, Korea)*
16:30-16:40	Technical strategy in Woven EndoBridge (WEB) embolization of boot-shaped cerebral aneurysms *Dae Chul Suh (St. Peter's Hospital, Korea)*

DAILY PROGRAMS

Day 1 December 12 (Friday)

16:40-16:50	Combined microsurgical and endovascular approach in the hybrid operating angiosuite: A case series on blood-blister intracranial aneurysms *Hong Jun Jeon (Kangdong Sacred Heart Hospital, Korea)*	
16:50-17:00	Preclinical animal models for cerebral aneurysms *Mohamed Deniwar (Mansoura University Hospital, Egypt)*	
17:00-17:10	Longitudinal 7T MRI biomarkers in a rat cerebral aneurysm model: A preliminary platform for future unruptured cerebral aneurysm stabilization trials *Yeon Soo Kim (Asan Medical Center, Korea)*	
17:10-17:20	2025 KSIN Achievement Award Paper Presentation Optimizing image quality in cerebral 3D rotational angiography: A study on the impact of voxel size *Yunsun Song (Asan Medical Center, Korea)*	
15:20-17:20	**Japan-Korea Friendship Case Conference** *Jieun Roh (Pusan National University Yangsan Hospital, Korea)*	Room 401D
15:20-15:32	A case of giant fusiform vertebral artery aneurysm *Koichi Arimura (Kyushu University, Japan)*	
15:32-15:44	Comparing diagnostic modalities for rotational vertebral artery syndrome *JoonNyung Heo (Severance Hospital, Korea)*	
15:44-15:56	Endovascular treatment of a Non-sinus type parasagittal dural arteriovenous fistula using an external compression technique *Yoshinobu Horio (Fukuoka University Chikushi Hospital, Japan)*	
15:56-16:08	Ischemic stroke following cervical artery dissection caused by a bicycle handlebar injury: A case report *Dong-Hyun Shim (Ulsan Medical Center, Korea)*	
16:08-16:20	Superselective transvenous embolization and sinus angioplasty for TSS-dAVF (Borden Type III) *Yasuyuki Kaku (Kumamoto University Hospital, Japan)*	
16:20-16:32	Transarterial and transvenous embolization of CCF *Bo Kyu Kim (Korea University Anam Hospital, Korea)*	
16:32-16:44	Isolated sinus DAVF treated with Onyx TAE under ECA flow control by mechanical compression *Ryota Kurogi (Kyushu University Hospital, Japan)*	
16:44-16:56	Case review of acute stroke with tandem occlusion: Managements and considerations *Jae Woong Kim (Chonnam National University Hospital, Korea)*	
16:56-17:08	A case of transverse sinus DAVF with pial arterial supply *Hironori Haruyama (Kyushu University Hospital, Japan)*	
17:08-17:20	During MMA embolization for chronic subdural hematoma: What we can see, what we can't see *Youngsoo Kim (Pohang Stroke and Spine Hospital, Korea)*	
18:00-20:00	**Banquet**	Square Ballroom A

DAILY PROGRAMS

Day 2 December 13 (Saturday)

Time	LEWEST Hall B
09:00-10:40	**Invited Lectures Session 2: Shunt Lesions & Miscellaneous Topics** *Dae Chul Suh (Gangnam St. Peter's Hospital, Korea), Masaki Komiyama (Osaka City General Hospital, Japan)*
09:00-09:20	Endovascular treatment strategy for intracranial dural AVF *Seung Kug Baik (Pusan National University Yangsan Hospital, Korea)*
09:20-09:40	Spinal sacral arteriovenous fistulas associated with spinal lipoma *Hiro Kiyosue (Kumamoto University Hospital, Japan)*
09:40-10:00	Endovascular strategies for carotid cavernous fistulas *Vu Dang Luu (Bach Mai University Hospital, Vietnam)*
10:00-10:20	Managing Non-Acute SDH using liquid material (MAGIC-MT) *Wei Ni (Huashan Hospital, China)*
10:20-10:40	Therapeutic neurointervention with radial access *Vikas Bhatia (Post Graduate Institute of Medical Education and Research, India)*
10:40-11:00	Coffee Break
11:00-12:00	**Scientific (Free Paper) Session 2: Shunt Lesions & Miscellaneous Topics** *Dong Joon Kim (Severance Hospital, Korea), Yuji Matsumaru (University of Tsukuba Hospital, Japan)*
11:00-11:09	Characteristics and angioarchitecture of brain arteriovenous malformation with transdural Blood Supply: A multicenter retrospective study in Japan *Yasuyuki Kaku (Kumamoto University Hospital, Japan)*
11:09-11:18	Unveiling the osseous and extracranial venous anatomy of the cranio-cervical junction using CT-DSV *Katsuhiro Mizutani (Keio University, Japan)*
11:18-11:27	AI-enhanced segmentation of cerebral vasculature on non-contrast CT in acute ischemic stroke with large vessel occlusions *ZhenYu Jia (The First Affiliated Hospital with Nanjing Medical University, China)*
11:27-11:36	Collateral perfusion score as a surrogate of infarct growth rate and predictor of futile endovascular thrombectomy in acute anterior circulation ischemic stroke *Hee Jong Ki (Daejeon St. Mary's Hospital, Korea)*
11:36-11:45	Utilization of flat panel perfusion image, RAPID Angio, for various neuroendovascular therapy *Yasushi Ito (Shinrakuen Hospital, Japan)*
11:45-11:54	Diagnostic performance of CT perfusion in detecting contralateral aplasia of the A1 segment in acute internal carotid artery occlusion *Hao Wang (Linyi People's Hosptial, China)*
11:54-12:00	Impact of magnified 3D rotational angiography on eye lens radiation dose: A phantom and clinical study *Yunsun Song (Asan Medical Center, Korea)*

DAILY PROGRAMS

Day 2 December 13 (Saturday)

12:00-13:00	**Luncheon Industrial Symposiums 2** *Byungjun Kim (Korea University Anam Hospital, Korea), Wei Ni (Huashan Hospital, China)*
12:00-12:15	[2-1. GE HealthCare] Considering the care of vulnerable patients - The role of isosmolar contrast media *Joon Hong Bae (GE HealthCare, Korea)*
12:15-12:30	[2-2. Johnson & Johnson MedTech] New concept of end-to-end thrombus control: EPIC-PRO *Zhenyu Jia (The First Affiliated Hospital with Nanjing Medical University, China)*
12:30-12:45	[2-3. Wallabyphenox] Clinical application of the new Paragon BGC: Korean experience and insights *Yunsun Song (Asan Medical Center, Korea)*
12:45-13:00	[2-4. Penumbra] DIVA Study - Distal vessel aspiration in acute ischemic stroke using the RED 43 in Australia *Vinicius Carraro do Nascimento (Gold Coast University Hospital, Australia)*
13:00-13:20	Coffee Break
13:20-14:50	**Invited Lectures Session 3: Acute Ischemic Stroke** *Woong Yoon (Chonnam National University Hospital, Korea),* *Hiroshi Yamagami (Osaka National Hospital, Japan)*
13:20-13:50	Blood pressure management after endovascular treatment for acute stroke: Insights from the OPTIMAL-BP study *Jae Wook Jung (Severance Hospital, Korea)*
13:50-14:20	Endovascular treatment for acute intracranial large vessel occlusion due to atherothrombosis: Insights from the RESCUE AT-LVO study *Shinichi Yoshimura (Hyogo Medical University, Japan)*
14:20-14:50	Revisiting the role of balloon guided catheters in mechanical thrombectomy: Insights from the PROTECT-MT study *Pengfei Xing (Changhai Hospital, China)*
14:50-15:10	Coffee Break
15:10-17:10	**Scientific (Free Paper) Session 3: Acute Ischemic Stroke & CAS** *Hyun Jeong Kim (Daejeon St. Mary's Hospital, Korea),* *Yu Zhou (Changhai Hospital, Naval Medical University, China)*
15:10-15:19	Dual-layered stent retriever for cancer-related stroke endovascular thrombectomy *Jaeseob Yun (Keimyung University Dongsan Medical Center, Korea)*
15:19-15:28	Modified two-stage aspiration technique (TSAT) for primary MeVO *Ryushi Kondo (Saitama Sekishinkai Hospital, Japan)*
15:28-15:37	Analysis of the influence of vascular patterns on mechanical thrombectomy for distal middle cerebral artery embolism *Hiroki Kobayashi (National Cerebral and Cardiovascular Center, Japan)*

DAILY PROGRAMS

Day 2 December 13 (Saturday)

15:37-15:46	Facilitating angioplasty and stenting with dual- lumen balloon microcatheter for intracranial atherosclerotic stenosis-related large vessel occlusion: A comparative study *Yu Zhou (Changhai Hospital, Naval Medical University, China)*
15:46-15:55	Transradial versus transfemoral endovascular thrombectomy for posterior circulation large vessel occlusion: A prospective multicenter study *Hao Wang (Linyi People's Hospital, China)*
15:55-16:04	Why is a large-bore catheter necessary in large vessel occlusion from a biomechanical perspective? *Hyeon Ji Lee (Jeonbuk National University, Korea)*
16:04-16:13	Syringe vs pump aspiration in acute large vessel occlusion: Single-center retrospective comparative study *Boseong Kwon (Asan Medical Center, Korea)*
16:13-16:22	Angioplasty versus angioplasty plus stenting for underlying intracranial atherosclerotic stenosis in acute large vessel occlusion *Byung Hyun Baek (Chonnam National University Hospital, Korea)*
16:22-16:31	Determining the optimal timing of dual-energy CT for prediction of hemorrhagic complications after endovascular thrombectomy *Kyubong Lee (Korea University Guro Hospital, Korea)*
16:31-16:40	Delayed white matter injury after endovascular thrombectomy in acute anterior circulation large vessel occlusion: A two-center retrospective study *ZhenYu Jia (The First Affiliated Hospital with Nanjing Medical University, China)*
16:40-16:49	Rescue carotid stenting in tandem occlusions: 5 years' experience from a comprehensive stroke center *Thang Minh Le (Can Tho S.I.S General Hospital, Vietnam)*
16:49-16:58	Factors associated with post-procedural hypotension following carotid artery stenting: Preliminary study of deployed stent configuration *Bora Chung (Pusan National University Yangsan Hospital, Korea)*
16:58-17:10	2025 KSIN Achievement Award Paper Presentation Optimal duration of dual antiplatelet therapy after carotid artery stenting: A nationwide cohort study *Kwon-Duk Seo (Gangnam Severance Hospital, Korea)*
17:10-17:30	**EACoN in conjunction with KCNI 2025 Awards & Closing Ceremony**
17:30-18:00	**KSIN General Assembly and Awards Ceremony**

Aneurysm

EP 1-01 Aneurysmal rupture of posterior cerebral artery dissection due to Stent graft-induced new entry
Jaejin Park, Seung Young Chung, Hyun Dong Yoo (Korea)*

EP 1-02 A case of successful two-stage treatment with coil embolization and flow diverter stenting for a ruptured anterior wall aneurysm of the internal carotid artery
Shintaro Nakajima (Japan)

EP 1-03 Long-term follow-up of clipped intracranial aneurysms using PETRA-MRA
Hee Sang Oh, Sang Hyung Suh (Korea)*

EP 1-04 Mid-term results of the Surpass flow diverter stent: A comparison between evolve and streamline
Shunsuke Omodaka, Hiroyuki Sakata, Yasushi Matsumoto, Hidenori Endo (Japan)*

EP 1-05 A case of compressive optic neuropathy due to an internal carotid artery aneurysm treated with flow diverter placement and coil embolization
Terushige Toyooka, Masaya Nakagawa, Syunsuke Tanoue, Satoka Matsuno, Kazutaka Suzuki, Wataru Ueki, Syo Sato, Tetsuya Yamamoto, Kazuya Fujii, Satoru Takeuchi, Yumiko Mishima, Arata Tomiyama, Satoshi Tomura, Kojiro Wada (Japan)*

EP 1-06 Spinal arterial aneurysms and vascular malformations: Review and own experience
Mohamed Deniwar (Egypt)

EP 1-07 Endovascular treatment of extra cranial large aneurysms with multiple overlapped stenting using LVIS stents
Mohamed Deniwar (Egypt), Deok Hee Lee (Korea)

EP 1-08 From looped to linear: A stent-based technique to unloop microcatheters in wide-neck basilar tip aneurysm flow-diversion
Mohamed Awad Alkareem (UK)

EP 1-09 The affection of smoking on pharmacological treatment outcomes in patients with intracranial aneurysms in Indonesia
Haryanto Ah, Andi Nursanti (Indonesia)*

EP 1-10 A mouse model of intracranial aneurysm: Cisterna magna elastase injection combined with hypertension and carotid artery ligation
Jian Liu (China)

EP 1-11 Impact of fetal-type posterior cerebral artery on outcomes after endovascular treatment of posterior communicating artery aneurysms
Jinbiao Yao, Shengqi Hu (China)*

EP 1-12 Early clinical experience with Surpass elite™ flow diverters
Jung-Jae Kim, Minu Nahm, Suzy Youn, Hyun Jin Han, Yong Bae Kim, Keun Young Park (Korea)*

EP 1-13 Aneurysm selection using stent strut supporting technique
Baejae Kim, Jae Seong Kang (Korea)*

EP 1-14 Middle meningeal artery embolization for migraine headaches
Heng Yang, Wei Ni, Yuxiang Gu (China)

EP 1-15 Safety and Efficacy of Tirofiban in Ruptured Intracranial Aneurysms
Jiebo Li, Penghui Wei, Yuxiang Gu, Dengliang Wang (China)

Shunt Lesions & Miscellaneous Topics

EP 2-01 Association between spinal dysraphism and spinal arteriovenous fistula (AVF)
Abdullah Alhindi (Saudi Arabia), Yunsun Song (Korea)*

Acute Ischemic Stroke & CAS

EP 3-01 Rescue intracranial stenting in acute ischemic stroke: A preliminary Vietnamese study
Thang Le Minh, Cuong Tran Chi, Giang Nguyen Luu, Duc Nguyen Minh (Vietnam)*

EP 3-02 Extended time window (>6 hour) mechanical thrombectomy: Good clinical outcome in the young age population. Relationship between age and prognosis.
Jinmo Cho (Korea)

EP 3-03 Strategy for long-segment ICA–M1 occlusion in delayed acute ischemic stroke: Combined aspiration and stent-retriever thrombectomy
Jacub Pandelaki, Krishna Pandu Wicaksono, Prijo Sidipratomo, Heltara Ramandika, Jason Jason, Anthony Yusuf (Indonesia)*

EP 3-04 Association of non-invasive fractional flow with MR perfusion metrics in patients with anterior circulation stenosis
Jiong Wu, Rong Zou, Yixin Bai, Yumeng Hu, Jianping Xiang, Shu Wan (China)*

e-POSTER DISPLAY

EP 3-05 Outcomes of endovascular thrombectomy in large-core AIS by baseline kidney function: A single-center real-world cohort
Nakhoon Kim, Jonguk Kim, Do Yeon Kim, Jun Yup Kim, Sung Hyun Baik, Cheolkyu Jung (Korea)*

EP 3-06 Downstream occlusion during mechanical thrombectomy: Clinical implications and endovascular trajectory
Jang-Hyun Baek (Korea)

EP 3-07 Procedural determinants of embolic infarction after carotid artery stenting in symptomatic patients: A single-center retrospective study
Kwon-Duk Seo, Sang Hyun Suh (Korea)*

EP 3-08 CT-first imaging and door-to-puncture time in acute stroke
Jun Yup Kim, Jonguk Kim, Nakhoon Kim, Do Yeon Kim, Sung Hyun Baik, Cheolkyu Jung (Korea)*

EP 3-09 Herbal metabolites as adjuvant neuroprotective agents in acute ischemic stroke: A systematic review of experimental and clinical evidence
Andi Nursati, Nini Sahrianti (Indonesia)*

EP 3-10 Implant related infection after carotid artery stenting
Bo Kyu Kim (Korea)

EP 3-11 Basilar artery dissection in 18 years old antiphospholipid antibody syndrome patient
Sang Heum Kim (Korea)

EP 3-12 Thrombectomy for BAO with mild deficits: A multicenter prospective registry
Kai Qiu, Yu Hang, Jie Ji, et al. (China)

EP 3-13 Radiomics-based machine learning model for predicting clinically ineffective reperfusion in acute ischaemic stroke patients after endovascular treatment: A double center retrospective study
Xiaolong Hu, Shifei Ye, Yibin Fang (China)

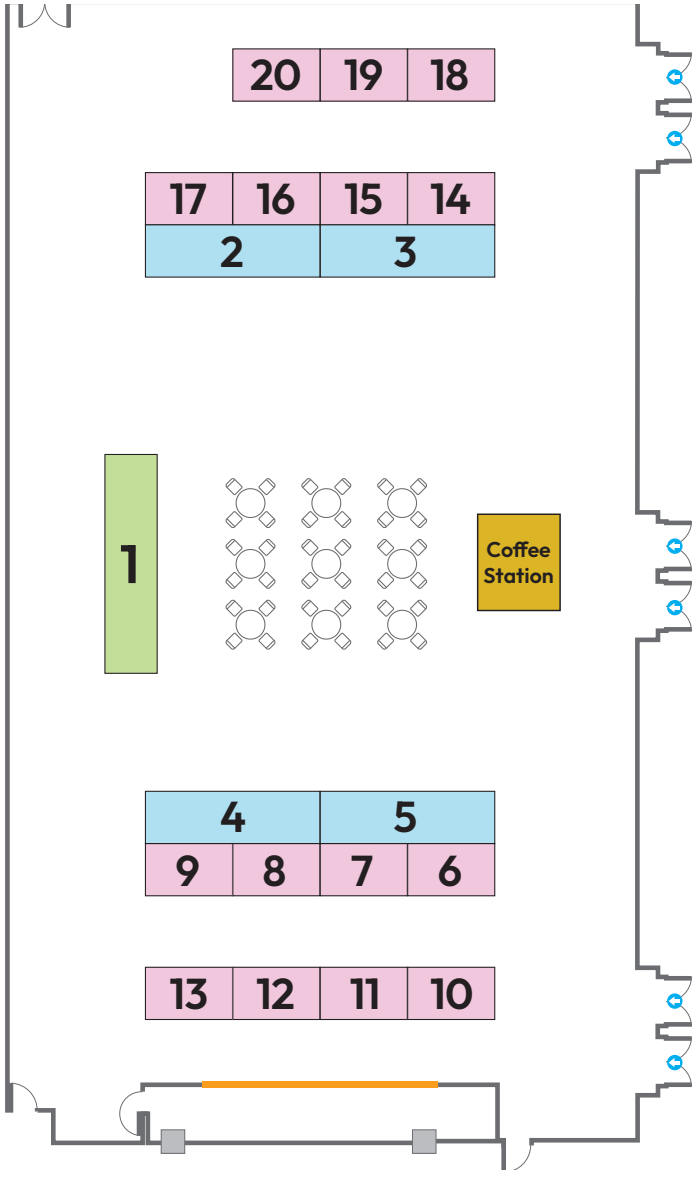
EP 3-14 Superlearner can predict in-hospital mortality risk in critically ill patients with ischemic stroke: Development and international validation
Shifei Ye, Xiaolong Hu, Yibin Fang (China)

EP 3-15 Gamma-glutamyltransferase as a potential contributor to the pathogenesis of ischemic stroke: Evidence from mendelian randomization and genetics
Penghui Wei, Jiebo Li, Niugang Niu, Yang Zhu, Dengliang Wang, Dezhi Kang (China)

INDUSTRIAL EXHIBITION

Division	Date	Time
Exhibition Schedule	December 12 (Fri)	10:00 - 17:20
	December 13 (Sat)	09:00 - 16:00

Booth No.	Company Name
1	Stryker Korea
2	GE HealthCare
3	Johnson & Johnson MedTech
4	Medtronic Korea
5	Terumo Neuro(MicroVention)
6	Balt International SAS
7	Wallabyphenox
8	DongKook Life Science
9	Bayer Korea Ltd.
10	Penumbra
11	Abbott Medical Korea
12	Intervention Medical
13	WiTH HEALTHCARE
14	Philips Korea
15	Central Medical Service
16	Daewoong Pharmaceutical
17	Daiichi Sankyo
18	Guerbet Korea
19	Canon Medical Systems Korea
20	Siemens Healthineers



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Invited Lectures

Day 1

December 12 (09:00-10:30)

International Education Program

Moderators

Hae Woong Jeong
Inje University Busan Paik Hospital, Korea

Yasushi Matsumoto
Tohoku University Hospital, Japan

Developmental and phylogenetic insights into neurovascular anatomy

Masaki Komiyama, MD, PhD

Department of Neurosurgery, Osaka City General Hospital, Osaka, Japan

During early vertebrate evolution, encephalization and expansion of the cephalic central nervous system required a parallel increase in vascular complexity. This progression was enabled by developmental innovations that integrated genetic, cellular, and vascular mechanisms. Here, the author emphasizes three key factors: (1) the Hox-free anterior pole, (2) the cephalic neural crest, and (3) the internal carotid artery (ICA), which collectively shaped the mammalian cerebral circulation.

Hox genes provide positional identity along the anterior-posterior axis; however, regions anterior to rhombomere 1, including the forebrain and face, are Hox-free. The absence of Hox patterning in these domains permitted structural plasticity and evolutionary diversification. The cephalic neural crest, often described as the "fourth germ layer," generated mural cells of the intracranial arteries through epithelial-mesenchymal transition. Consequently, the vascular supply of the arterial circle of Willis, including the anterior, middle, and posterior cerebral arteries, is fundamentally Hox-free and cephalic neural crest-derived.

The ICA, arising from the third aortic arch and dorsal aorta, underwent evolutionary modifications through crosstalk between endothelial cells and neural crest-derived pericytes and smooth muscle cells. Lasjaunias' "segmental concept" provides a framework for interpreting these processes, emphasizing that each embryological segment has distinct its identities and vulnerabilities. This perspective clarifies the basis of normal arterial recruitment, congenital anomalies, and phylogenetic relics, including ICA agenesis, persistent carotid-vertebrobasilar anastomoses, remnants of the first and second aortic arches, hypophyseal vascular plexi, and arteries such as the inferolateral trunk and ophthalmic artery.

In summary, the convergence of a Hox-free developmental field, cephalic neural crest contributions, and ICA evolution underpins both the robustness and variability of mammalian cerebral vasculature. This evo-devo framework offers a novel perspective for reinterpreting neurovascular anatomy, its anomalies, and its evolutionary origins.

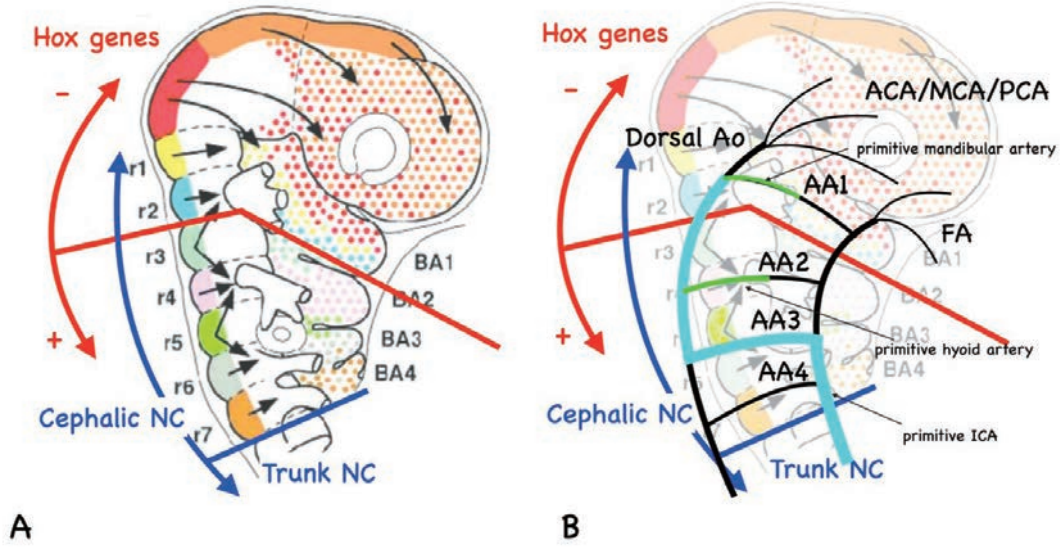


Figure 1.

A: Hox-negative and positive areas mapped on the cephalic and trunk neural crest (NC) distribution of the brain and face. Although rhombomere 1 (r1) is Hox-free, neural crest cell of r2 origin is also Hox-free by Hox-silencing.
B: Dorsal and ventral aortas and aortic arches are mapped on the Figure A. The internal carotid artery (ICA) is expressed in blue. AA: aortic arch, Ao: aorta, ACA: anterior cerebral artery, BA: branchial arch, FA: facial artery, MCA: middle cerebral artery, and PCA: posterior cerebral artery.

Modified from the original figure in "Le Douarin NM: The avian embryo as a model to study the development of the neural crest: a long and still ongoing story. Mech Dev 121:1089-1102, 2004".

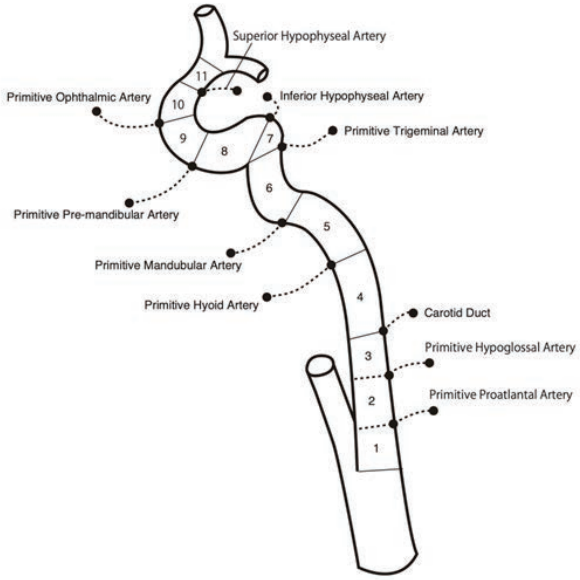


Figure 2.

Modified "segmental concept" of the primitive internal carotid artery. There are 11 conceptual segments. The primitive arteries are branched off from the origins of each segment.

Modified from the figure in "Komiyama M: Segmental vulnerability and vascular neurocristopathy of the internal carotid artery. Interv Neuroradiol 26:131-134, 2020".

Key Concepts in Neurovascular Anatomy

In Sup Choi, MD, FACR

Professor of Radiology Emeritus, Tufts University, School of Medicine, Boston, MA, USA

Purpose: We often regard erroneously the intracranial vascular anatomy into complete 2 separate circulations, anterior and posterior. In fact, each has distinct and separate anatomical pattern in adult form and doesn't have communication to each other until it reached the base of brain, via the circle of Willis. When there is any connection from the anterior circulation, the carotid system to the posterior circulation, the vertebra-basilar system, prior reaching the circle of Willis or so called normal artery(ies) is not existing, we have to go back to the embryonic vasculogenesis to explain such a variation(s). This presentation is to enforce key steps we should know, how the intracranial circulation forms in embryo.

Materials and Methods: On the basis of previous publications, especially by Dorcas Hager Padget in 1948 and Pierre Lasjaunias in 2001, and my understanding of embryonic vasculogenesis of the intracranial circulation and interpretation of many variations I have had faced, 7 important steps, I believe, we ought to know as Neurointerventionalists.

Results:

1.Continuation of 3rd Aortic Arch to Dorsal Aorta to establish initial arterial channel to CNS; Primitive ICA
2.Ophthalmic artery development from ACA and ICA
3.Growth of MCA from Cranial division of ICA(ACA)
4.Vertical Anastomosis of segmental arteries to conform the Vertebral artery
5.Fusion of 2 Ventral longitudinal arterial axes to form the Basilar Artery
6.Integration of the Caudal division of Primitive ICA to Basilar artery to become PCA
7.ransfer of Telencephalic supply of Ach.A to PCA

Conclusion: More distal arteries, close to the targets, contain less variations. However, more proximal sources of supply which are in fragile hemodynamic equilibrium are more vulnerable to moderate constraints to be interrupted, resulting in so called normal variations as late Professor Pierre Lasjaunias stated on his 2nd edition of "Surgical Neuroangiography" Thorough knowledge of these 7 key points will help , I believe, to interpret variations correctly and manage pathologies properly in treating neurovascular diseases.

Application of C-arm CT for intracranial stenting

Bo Hong, MD, PhD

Department of Neurovascular Intervention, Shanghai General Hospital, Shanghai, China

C-arm CT is a good tool in hand for neurovascular interventionists with excellent resolution and good signal to noise ration. It has been increasingly and widely used in our routine clinical practice. This is a sharing of personal experiences using C-arm CT in neurovascular intervention, mainly in intracranial stenting for aneurysms and stenoses.

Day 1

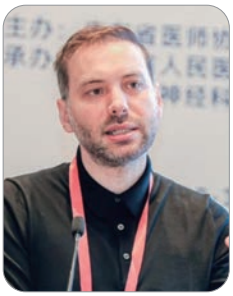
December 12 (10:50-11:50)

Special Focus Session
Advances in Neurointervention

Moderators

Jaeil Lee
Pusan National University Hospital, Korea

Yasushi Ito
Shinrakuen Hospital, Japan



Transarterial embolization of AVM

Yilmaz ONAL, MD
Health Sciences University FSM Hospital, Istanbul, Türkiye

Embolization has been used for the treatment of bAVMs for almost 60 years, and its current role is mainly adjuvant to microsurgical resection or palliative for non-resectable lesions. But there is also growing body literature that shows the curative embolization of AVMs. Despite increasing trend on transvenous embolization, transarterial route is still the first choice in terms of both downsizing the nidus and also in definitive treatment. Complete angioarchitectural mapping is important and it requires panangiography, including 3D rotational injections, followed by selective microcatheter injections of all feeders to determine how each compartment is vascularized and drained. An important point for transarterial embolization is; Which arteries shpuld be embolized first? The largest feeders are the easiest to access and their occlusion has the highest hemodynamic impact. The amount of contrast that can be selectively injected through a microcatheter, however, is limited and most often rapidly diluted by the arterial inflow. Best way in transarterial embolization in a similar fashion as microsurgery, like occluding the AVM progressively from the periphery to the center. To obtain a controlled, complete endovascular cure, the smaller and indirect feeders, as well as critical anastomoses should be embolized first, followed by the main feeders and their primary draining veins before finally closing the main outflow vein. Sometimes deep white matter medullary feeders are certainly the most technically difficult to control and may be the cause of most of the post-operative hemorrhages and subsequent neurologic morbidity observed. Retrograde occlusion of deep feeders may sometimes occur during transarterial embolization of one of the main pedicles this remains essentially unpredictable. Improving endovascular access and distal navigation inside such tortuous perforating feeders may increase the odds of a more complete and safer embolization.
This may be achieved by a number of adjunctive techniques, such as placing a balloon.

Development of novel endovascular electrodes for the diagnosis of epileptic focus

Yuji Matsumaru, MD, PhD

Department of Neurosurgery, Institute of Medicine, University of Tsukuba, Ibaraki, 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.

Distal vessel aspiration in acute ischaemic stroke using the RED 43 aspiration catheter (DIVA study): An international multicentre experience

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Department of Interventional Neuroradiology, Gold Coast University Hospital, Queensland, Australia

A. Background

For medium vessel occlusions (MeVOs), in acute ischaemic stroke (AIS), the clinical efficacy of mechanical thrombectomy (MT) is the topic of ongoing randomised clinical trials, and the optimal recanalization technique remains undetermined. We aim to assess the effectiveness and safety of the novel RED 43 distal reperfusion catheter.

B. Methods

We retrospectively reviewed cases of anterior and posterior circulation MT for MeVO where the RED 43 aspiration catheter was used at four comprehensive stroke centres in Australia and United Kingdom, from April 2023 to June 2024. Procedural outcomes, 90-day modified Rankin score, safety and procedural complications (haemorrhagic, vessel dissection or perforation) were analysed.

C. Results

Seventy-four patients were included (median age 72.8 years, 33.8% females). Median baseline NIHSS was 10, and median ASPECTS was 9. Primary MeVOs accounted for 58.1% of cases. The occlusion site was reached using the RED 43 in 100% of cases. In particular, the target was reached navigating the catheter over a microwire only in 83.8% of cases. Fifty-seven (77%) patients achieved nal eTICI 2c-3 and the FPE (eTICI 2c-3) for the RED 43 was 60.8%. Modi ed Rankin Scale (mRS) ≤ 2 at 90-days was 67.1%. No intraprocedural complications were recorded. Symptomatic intracranial haemorrhage and 90-day mortality rates were 4.1% and 19%, respectively.

D. Conclusion

The RED 43 distal aspiration catheter was shown to be safe and effective in achieving good technical and clinical outcomes amongst acute stroke patients presenting with MeVO.

Table 1. Summary of patient baseline characteristics.

Baseline Characteristics Variables	Overall (N = 74)	Primary (N = 43)	Secondary (N = 31)
Age (mean)(SD)	72.8 (13.1)	73.8 (14.5)	71.4 (11.1)
Female (%)	25 (33.8%)	14 (32.4%)	11 (35.5%)
Pre-stroke mRS - median (iQR)	0 (0–1)	0 (0–1)	0 (0–1)
Hypertension	42 (56.7%)	25 (58.1%)	17 (54.8%)
Coronary artery Disease	23 (31.1%)	14 (32.5%)	9 (29%)
Diabetes mellitus	14 (18.9%)	10 (23.2%)	4 (12.9%)
Atrial fibrillation	35 (47.3%)	19 (44.1%)	16 (51.6%)
Hyperlipidaemia	23 (31.1%)	15 (34.8%)	8 (25.8%)
Aetiology			
Thromboembolic	69 (93%)	41 (95%)	28 (90%)
ICAD	5 (7%)	2 (5%)	3 (10%)
Baseline NIHSS (Median)(iQR)	10 (5–15)	3 (3–12)	14 (9.5–20)
Baseline ASPECTS (Median) (iQR)	9 (8–10)	10 (9–10)	9 (8–9)
Procedural Information			
Intravenous Thrombolysis	26 (35.1%)	13 (30%)	13 (41.95%)
Alteplase or Tenecteplase			
Onset to puncture Time (Median)(Mins)(iQR)	235 (177–361)	230 (183–370)	240 (155–317)
Puncture to Recanalisation time (Median)(Mins)(iQR)	37 (24–77)	30 (21–58)	45 (25.5–87)
Primary occlusion Location			
ICA			8 (25.8%)
M1			18 (58.1%)
Basilar			4 (12.9%)
Vertebral			1(3.2%)
MeVO type			
Primary	43 (58.1%)	-	-
Secondary	31 (41.9%)		
MeVO location			
ACA (A2 - A4)	7 (9.5%)	1 (3%)	6 (19.3%)
MCA (M2 - M4)	53 (71.6%)	33 (76.7%)	20 (62.5%)
PCA (P2 - P4)	14 (18.9%)	9 (21%)	5 (18.2%)
Access Site			
Femoral	40 (54.5%)	19 (44.1%)	21 (67.7%)
Radial	34 (45.5%)	24 (55.9%)	18 (32.3%)
General anaesthesia	67 (90%)	36 (83.7%)	31 (100%)
Conscious sedation	7(10%)	7 (12.3%)	0
Total passes (all devices) (Median)(iQR)	2 (1 - 3)	2 (1-3)	3 (2–4)
Total passes (RED 43)			
1	50 (67.5%)	27 (62.7%)	23 (74.2%)
2	17 (23%)	11(25.5%)	6 (19.5%)
3	7 (9.5%)	5 (11.8%)	2 (6.3%)
Delivery system for RED 43			
Microwire only			
Aristotle 24 200cm	51 (69%)	32 (74.5%)	19 (61.3%)
Synchro 2 Soft 14	7 (9.5%)	3 (7%)	4 (13%)
Traxcess 14 EX	3 (4%)	3 (7%)	0
Aristotle 18 200cm	1 (1.5%)	1 (2.5%)	1(3.2%)
Microcatheter & Microwire			
Trevo Trak 21 + Aristotle 18	5 (6.5%)	0	4 (13%)
Trevo Trak 21 + Synchro 2 Soft 14	5 (6.5%)	3 (7%)	2 (6.5%)
Velocity 25 + Synchro 2 Soft 14	1 (1.5%)	1 (2.5%)	0
Headway Duo + Synchro 2 Soft 14	1 (1.5%)	0	1 (3.2%)
Adjunctive Stentriever	12 (16.2%)		

SD: standard deviation; mRS: modified Rankin Score; iQR: interquartile range); ICAD: intracranial atherosclerotic disease; NIHSS: National Institute of Health Stroke Scale; ASPECTS: Alberta Stroke Programme Early CT Score; ICA: internal carotid artery; ACA: anterior cerebral artery; MCA: middle cerebral artery; PCA: posterior cerebral artery.

Table 2. Summary of procedural outcomes.

Procedural & clinical outcome	Overall (N = 74)	Primary (N = 43)	Secondary (N = 31)
Final			
eTICI 2c - 3	57 (77%)	33 (76.7%)	24 (77.4%)
eTICI 2b – 3	70 (94.5%)	39 (90.7%)	31 (100%)
eTICI 3	34 (45.9%)	21 (63.6%)	13 (41.9%)
FPE - RED 43			
FPE (TICI 2c - 3)	45 (60.8%)	25 (58.1%)	20 (64.5%)
mFPE (TICI 2b - 3)	66 (89.1%)	37 (86.0%)	29 (93.5%)
Perfect FPE (eTICI 3)	25 (33%)	16 (47.1%)	9 (29%)
Any ICH	13 (17.5%)	4 (9.3%)	9 (29%)
sICH	3 (4.1%)	1 (2.3%)	2 (6.4%)
SAH	10 (77%)	3 (6%)	7 (22%)
Complications (vessel perforation/dissection)	0	0	0
Functional outcome - 90 days*			
(median)(iQR)	1 (0–3)	1 (0–2)	2 (0–6)
mRS 0 to 1	40 (54.1%)	27 (62.8%)	13 (41.9%)
mRS 0 to 2	50 (67.1%)	33 (76.7%)	17 (54.8%)

*21% of the patients had functional outcome (mRS) at discharge carried forward to 90 days.
FPE: first-pass effect; eTICI: extended Thrombolysis in Cerebral Infarction; mRS: modified Rankin Scale; SAH: subarachnoid haemorrhage.

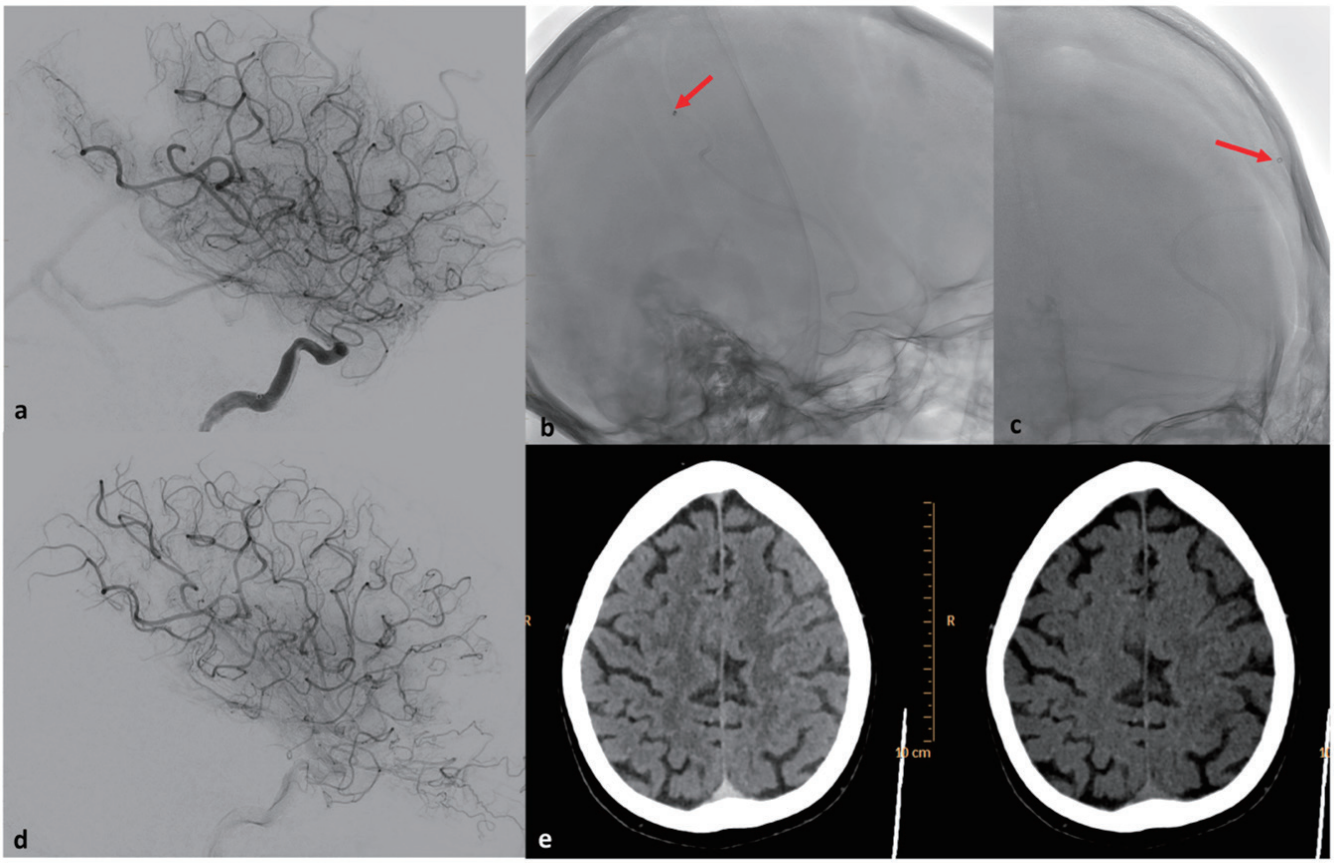


Figure 1. (a) Left internal carotid artery angiogram demonstrating secondary MeVO involving the M4 segment middle cerebral artery (MCA), following intravenous thrombolysis treatment of primary left M1 MCA embolic occlusion. (b) anteroposterior and (c) lateral radiographs obtained during Distal Vessel Aspiration (DIVA) thrombectomy. Red arrow demonstrating the RED 43 catheter tip in the left M4 middle cerebral artery, at the level of the occlusion, seamlessly navigated over an Aristotle 24 200 cm microwire. (d) Left ICA angiogram demonstrates completely recanalised left M4 segment MCA, after single-pass DIVA. (e) Spectral CT head 24 h post DIVA demonstrating no haemorrhagic complications.

Day 1

December 12 (12:00-13:00)

Luncheon Industrial Symposiums 1

Moderators

Jin Wook Baek
Inje University Busan Paik Hospital, Korea

Akira Ishii
Juntendo University Hospital, Japan

stryker

Surpass streamline to evolve to elite

Hae Woong Jeong (Inje University Busan Paik Hospital, Korea)

Medtronic
Engineering the extraordinary

Distal aneurysm procedure in NTUH

Chung-Wei Lee (National Taiwan University Hospital, Taiwan)

TERUMO
NEURO

WEB device: Our journey

Tariq Matin (Artemis Hospitals Gurugram, India)

balt
inspiring innovation

Silk Vista & Silk Vista Baby: Current design developments

Yilmaz Onal (Fatih Sultan Mehmet Teaching and Research Hospital, Turkiye)

Day 1

December 12 (13:20-15:00)

Invited Lectures Session 1
Aneurysm

Moderators

Hong Gee Roh
Konkuk University Medical Center, Korea

Nobuyuki Sakai
Seijinkai Shimizu Hospital, Japan

Bo Hong
Shanghai General Hospital, China

Treatment strategy for fetal-type IC-Pcom unruptured aneurysms

Akira Ishii, MD, PhD

Department of Neurosurgery, Juntendo University Hospital, Tokyo, Japan

A. Purpose

It is known that the efficacy of flow diverter (FD) treatment decreases for aneurysms at the posterior communicating artery (Pcom) origin, particularly when the Pcom is of the fetal type. Previous reports have also indicated that the curative rate of coil embolization is low, making treatment selection often challenging.

B. Materials & Methods

A fetal-type Pcom was defined as a Pcom branching from the internal carotid artery with a diameter equal to or greater than that of the ipsilateral P1 segment. When the aneurysm dome diameter was ≤ 9 mm, the WEB device was selected as the first-line treatment (Group A, n = 6). When the dome diameter was > 9 mm and the Pcom and P1 diameters were judged to be approximately equal, an FD with adjunctive coiling was performed. In these cases, coils were placed at the Pcom origin to promote its gradual occlusion over time (Group B, n = 11). When the dome diameter was > 9 mm and the Pcom diameter exceeded that of the P1, an FD with adjunctive coiling was also used; however, tight packing was performed without placing coils at the Pcom origin. If necessary, a neck-bridging stent was deployed at the Pcom (Group C, n = 5).

C. Results

The procedures were technically successful in all cases. Complete aneurysm occlusion was achieved in 4 cases (66.7%) in Group A, 4 cases (36.4%) in Group B, and 1 case (20.0%) in Group C.

D. Conclusion

Treatment of internal carotid artery aneurysms with a fetal-type Pcom remains challenging. However, WEB treatment for aneurysms ≤ 9 mm demonstrated favorable early and mid-term outcomes. The efficacy of FD treatment for aneurysms ≥ 10 mm with a fetal-type Pcom remains uncertain.

Technical advice for stent-assisted coil embolization

Shu Wan, MD, PhD

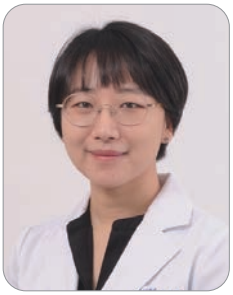
Neurosurgery, Zhejiang Hospital, Zhejiang University School of Medicine, Hangzhou, Zhejiang, China

Back Ground/Aim: As a common cerebrovascular disease in neurosurgery, intracranial aneurysms are characterized by high rates of disability and mortality upon rupture and bleeding. Stent-assisted coiling (SAC) prevents embolic materials from protruding into the parent artery through mechanical support and promotes neck healing via stent surface endothelialization, significantly improving packing density and reducing recurrence risk. It remains an indispensable treatment for complex intracranial aneurysms (e.g., wide-necked, irregularly shaped, or bifurcation aneurysms), even with the increasing use of flow diverters, due to the certain limitations of flow diverters (such as branch vessel events, acute embolic events, and failure to heal in the medium to long term).

Methods: Review and analyze relevant literature for discussion.

Results: Advances in materials science have continuously enriched stent types, from early balloon-expandable stents to self-expanding stents (e.g., Neuroform, Enterprise, Atlas) and further to braided intracranial stents with flow-diverting effects (e.g., LVIS series), enhancing the safety and efficacy of SAC.
Clinical studies show that the efficacy of SAC is closely related to stent selection, surgical skill, and postoperative antiplatelet management. Mainstream techniques include single-stent-assisted coiling (Jailing, Semi-jailing, Stent-first), Y/T-shaped stenting, stent combined with dual microcatheters, and special neck-management techniques (e.g., rivet technique, lantern technique), personalized to aneurysm location, size, and vascular anatomy. This article provides a detailed explanation of the operational key points and application scopes of various techniques.
However, SAC still faces challenges such as intraoperative thrombosis, in-stent stenosis, and postoperative bleeding. Treatment strategies for special populations (e.g., the elderly, patients with complex vascular malformations) require further optimization. With advances in image-guided navigation and new devices (e.g., bioabsorbable stents, drug-eluting stents), SAC is moving toward minimally invasive, individualized, and functionalized treatment, offering better prognosis for patients.

Keywords: Aneurysm



Microballoon catheter techniques during endovascular aneurysm treatment

Jieun Roh*, Bora Chung, Hye Jin Baek, Seung Kug Baik, MD, PhD

Diagnostic and Interventional Neuroradiology, Pusan National University Yangsan Hospital, Yangsan, Korea

Balloon-assisted coil embolization (BACE) once played a pivotal role in treating wide-neck aneurysms by allowing temporary neck remodeling and controlled coil placement. With recent improvements in stent technology, including superior trackability and wall apposition, the use of balloons has gradually declined. Nevertheless, balloon assistance still provides distinct advantages in specific procedural settings.

At our institution, we have adopted a sequence known as the balloon-then-stent technique, in which balloon-assisted coiling is performed first, followed by stent deployment through the balloon catheter. Unlike the conventional jailing technique, this approach enables fine adjustment of coil framing before stent placement and avoids the need to navigate through a newly deployed device.

This strategy may offer greater control of microcatheters in unfavorable anatomy, for example, in ICA dorsal wall aneurysms. While our experience remains limited, these cases suggest that balloon assistance retains value, especially when microcatheter stability is a concern.

The balloon-then-stent technique should be viewed not as a replacement for standard stent-assisted methods but as a complementary option in selected aneurysms. Even in the current era of advanced stents, balloon-assisted coil embolization continues to demonstrate subtle yet meaningful procedural benefits that justify its place in the field of neurointervention.

Braid deformation in flow-diverting stents: Mechanisms, clinical consequences, and determinants of risk

Nathan W Manning, MD

Senior Neurointerventional Consultant, Prince of Wales and Liverpool Hospitals, Sydney & Director, MIRI Research Centre (Medical Innovation Re-Imagined), Ingham Institute, UNSW Sydney, Australia

Purpose:
To examine the mechanisms, timing, and clinical impact of braid deformation in flow-diverting stents (FDS) for intracranial aneurysm treatment, and to identify procedural and design factors that influence susceptibility to deformation.

Materials and Methods:
Recent biomechanical, computational, and clinical literature was reviewed to characterise common deformation patterns—including ovalisation, fish-mouthing, and braid collapse—and to correlate these with angiographic and clinical outcomes. Factors assessed included device construction, vessel anatomy, sizing strategy, and deployment technique, as well as the timing and success of corrective interventions.

Results:
Braid deformation may occur at the time of deployment or develop later due to vessel remodelling or device migration. Although infrequent, it can have clinically significant consequences, including incomplete wall apposition, in-stent stenosis, and ischaemic stroke. Deformation risk increases with excessive oversizing, marked vessel tortuosity, or imbalanced push–pull forces during deployment. Conversely, controlled expansion and balanced radial support promote stability. Certain devices appear more or less prone to deformation depending on braid density, wire material, and structural design. While balloon angioplasty or adjunct scaffolding can restore shape and apposition, these measures are not always successful, particularly in tortuous or tapered anatomy.

Conclusion:
Braid deformation is an uncommon but clinically consequential phenomenon in flow diversion. Its occurrence reflects a complex interplay between device design, anatomy, and operator technique. Preventive strategies—careful sizing, deliberate deployment, and awareness of device-specific behaviour—remain essential to minimise risk and optimise patient outcomes.

Day 1

December 12 (15:20-17:20)

Room 401D

Japan-Korea Friendship Case Conference

Moderators

Jieun Roh
Pusan National University Yangsan Hospital, Korea

A case of giant fusiform vertebral artery aneurysm

Koichi Arimura

Kyushu University, Japan

Comparing diagnostic modalities for rotational vertebral artery syndrome

JoonNyung Heo

Severance Hospital, Korea

Endovascular treatment of a Non-sinus type parasagittal dural arteriovenous fistula using an external compression technique

Yoshinobu Horio

Fukuoka University Chikushi Hospital, Japan

Ischemic stroke following cervical artery dissection caused by a bicycle handlebar injury: A case report

Dong-Hyun Shim

Ulsan Medical Center, Korea

Superselective transvenous embolization and sinus angioplasty for TSS-dAVF (Borden Type III)

Yasuyuki Kaku

Kumamoto University Hospital, Japan

Transarterial and transvenous embolization of CCF

Bo Kyu Kim

Korea University Anam Hospital, Korea

Isolated sinus DAVF treated with Onyx TAE under ECA flow control by mechanical compression

Ryota Kurogi

Kyushu University Hospital, Japan

Case review of acute stroke with tandem occlusion: Managements and considerations

Jae Woong Kim

Chonnam National University Hospital, Korea

A case of transverse sinus DAVF with pial arterial supply

Hironori Haruyama

Kyushu University Hospital, Japan

During MMA embolization for chronic subdural hematoma: What we can see, what we can't see

Youngsoo Kim

Pohang Stroke and Spine Hospital, Korea

Day 2

December 13 (09:00–10:40)

Invited Lectures Session 2
Shunt Lesions & Miscellaneous Topics

Moderators

Dae Chul Suh
Gangnam St. Peter's Hospital, Korea

Masaki Komiyama
Osaka City General Hospital, Japan

Endovascular treatment strategy for intracranial dural AVF

Seung Kug Baik, MD, PhD
Department of Radiology, Pusan National University Yangsan Hospital, Yangsan, Korea

Intracranial dural AVFs exhibit diverse angioarchitectures and clinical behaviors depending on their venous drainage patterns. The modified Cognard classification provides a valuable framework for tailoring endovascular strategies according to hemodynamic grade and lesion anatomy.

For low-grade DAVFs without cortical venous reflux, transarterial embolization using liquid embolic agents such as Onyx or n-BCA is generally effective. Arterial flow control is applied to reduce inflow pressure, facilitating stable and deep embolic penetration into the shunt pouch. This can be achieved through microcatheter wedging c/s other flow controls, plug and push, balloon application (ipsi and contra-lateral) and pressure cooker technique. In selected cases, venous balloon assistance (e.g., Copernic RC, Scepter, Hyperform balloon) may be used to stabilize the venous side and prevent reflux of embolic material.

For high-grade DAVFs with cortical venous reflux, transarterial approaches often play a central role, especially when venous access is limited. In these cases, feeder morphology and configuration critically influence the therapeutic strategy:

In tapering feeders, the microcatheter can be advanced close to the nidus, allowing a wedged position that provides local flow arrest and enables safe, controlled delivery of the embolic agent.

In non-tapering feeders, the arterial route may reach directly to the dural sinus or draining vein, permitting arterial access to the venous side and potential direct disconnection of the pathologic drainage.

When a dominant main feeder is present, selective embolization via that vessel is often sufficient to achieve near-complete or complete occlusion. Conversely, in lesions without a distinct main feeder and supplied by multiple small dural branches, a multivessel and/or flow controls are required.

This time will outline practical endovascular strategies for DAVFs based on the modified Cognard classification, emphasizing the integration of arterial flow control, venous balloon assistance, and feeder morphology–based planning to achieve both safety and durable cure.

Spinal sacral arteriovenous fistulas associated with spinal lipoma

Hiro Kiyosue, MD, PhD
Department of Radiology, Kumamoto University Hospital, Japan

A. Purpose
Spinal lipoma and tethered cord can rarely coexist with spinal arteriovenous fistulas (SAVFs). The relationship between these conditions involves complex interactions that may contribute to clinical symptoms and challenges in treatment.
B. Materials & Methods
We retrieved cases of SAVFs associated with spinal lipoma at our institutions for the last 3 years. The clinical presentation, MR imaging/MRA and angiographic imaging, treatment outcomes were analyzed.
C. Results
Four patients with SAVFs with spinal lipoma were included in this study. All showed tethered cord. The mean age at presentation was 62 years, and the most common presenting symptoms were sensory disturbances of the lower extremity followed by muscle weakness and bladder/bowel dysfunction. SAVFs were located within the lipoma at the sacral level in all cases. The levels were S1, S2-3, S3-4, and blow S4 in each one patient. Types of AVFs were single fistula in one and multiple fistulas in the other 3 patients. The AVFs were fed by both the lateral sacral artery and the artery of filum terminalis in three patients, and inferior gluteal artery in one patient with AVFs below S4 level. Three cases showed intradural drainage alone and one showed intradural and extra spinal drainages. Treatments were direct surgery alone in two patients, transarterial embolization with NBCA alone in one patient, and combined transarterial embolization followed by direct surgery in one. Angiographical cure was obtained in each one patient with direct surgery and embolization alone. Symptoms were improved in all 4 patients in various degree, and stable for 7-14 months (mean 8.7 months) follow-up periods.
D. Conclusion
SAVFs within the spinal lipoma can show highly complicated features of multiple AVFs, and adequate treatment strategy must be selected by angioarchitectures.

Table 1. Characteristics of patients and AVS

Case	Age/ Gender	Symptoms	Symptom Duration	Spina bifida	AVF Locations	Feeders	Type of AVF	Drainage veins	AKA
1	76M	progressive myelopathy	2 months	Yes	S1	LSA, AFT (ASA)	single	intradural	L T10 (feeder)
2	70 F	progressive myelopathy	3 years	Yes	S3-4	LSA, AFT	multiple	intradural	L T9
3	57 M	progressive myelopathy	1 year	Yes	S2-3	LSA, AFT	multiple	intradural and extradural	Not detected
4	46 M	progressive myelopathy	3 months	Yes	below S4	LSA, IGAs	multiple	intradural	L T9

Table 1

Case	Treatment	Occlusion of AVF	clinical outcomes	FU
1	Surgery	CO	improve	8 months
2	TAE	CO	improve	10 months
3	TAE (attempt), surgery	nearly occlusion	improve	6 months
4	TAE and Surgery	nearly occlusion	improve	14 months

Figure 1

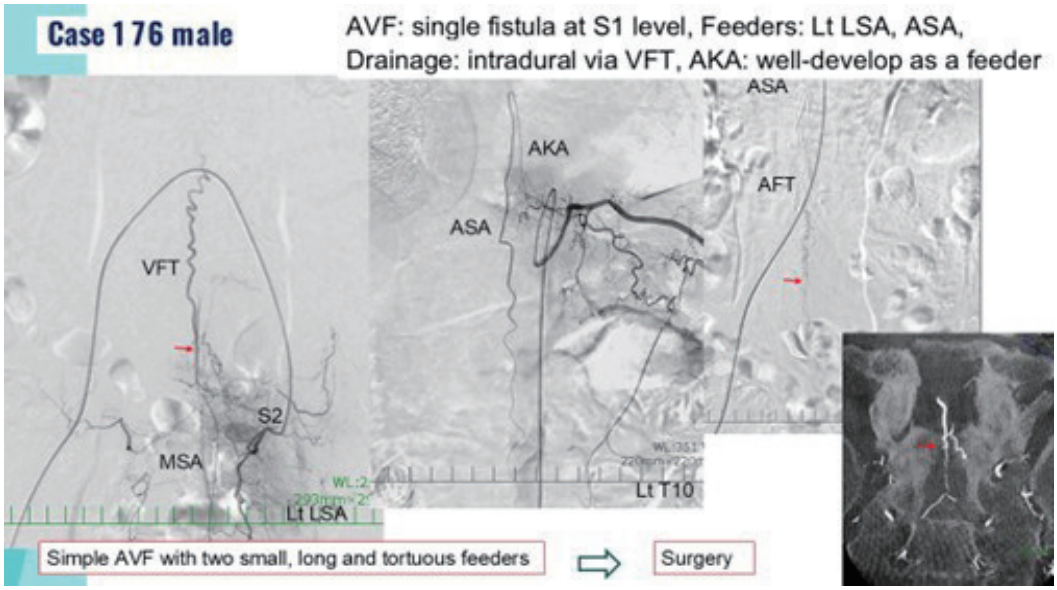
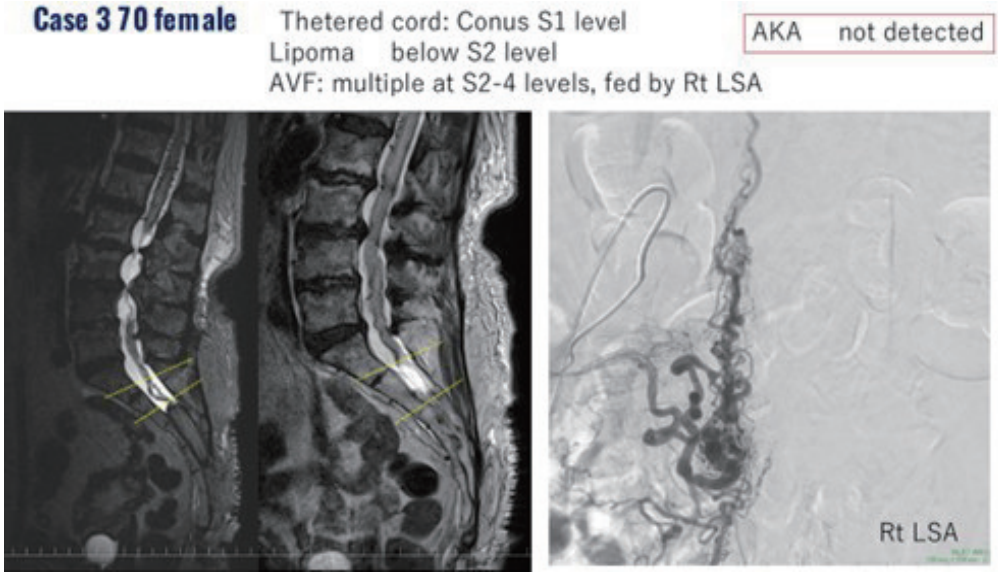


Figure2



Endovascular treatment strategy for direct and indirect Carotid–Cavernous Fistulas (CCFs)

Vu Dang Luu, PhD
Bach Mai Hospital, Hanoi medical University, Vietnam

Carotid–cavernous fistulas (CCFs) are abnormal vascular communications between the carotid arterial system and the cavernous sinus. Endovascular management is the primary therapeutic modality, and the treatment strategy differs markedly between **direct (high-flow)** and **indirect/dural (low-flow)** fistulas.

I. Direct Carotid–Cavernous Fistula (High-Flow CCF)

Treatment Objectives

The goals are to achieve complete occlusion of the fistulous tract, preserve patency of the internal carotid artery (ICA) whenever possible, and promptly alleviate ocular venous congestion and cranial neuropathies.

Key Anatomical and Hemodynamic Features

- Typically post-traumatic or caused by rupture of a cavernous ICA aneurysm.
- Characterized by a single, large, high-flow defect between the ICA and the cavernous sinus.
- The cavernous sinus is often markedly dilated, facilitating coil embolization.

Endovascular Treatment Strategy

1. Trans-arterial Approach (First-line Option)

Preferred when a microcatheter can be navigated directly through the fistulous opening.

Techniques include:

- Navigation from the ICA into the cavernous sinus followed by **coil embolization** (progressing from loose to dense packing).
- **Detachable balloon occlusion** for large defects (classic method).
- **Stent-assisted coiling, covered stent deployment,** or **flow-diverter (FD) placement** when:
- The fistulous opening is wide, or
- ICA wall reconstruction is required, particularly in fistulas secondary to ruptured aneurysms.

2. Trans-venous Approach (Alternative Option)

Utilized when arterial access to the cavernous sinus is not feasible.

Venous access routes:

- Inferior petrosal sinus (IPS) – preferred route.
- Superior ophthalmic vein (SOV).
- Facial vein, pterygoid plexus, or superior petrosal sinus.

Technique:

Retrograde catheterization of the cavernous sinus followed by coil packing. Liquid embolic agents (Onyx/PHIL) may be used selectively as adjuncts but require caution.

3. Parent Artery Occlusion

When ICA preservation is not possible, **therapeutic ICA sacrifice** may be performed after confirming adequate collateral circulation using a balloon occlusion test.

II. Indirect (Dural) Carotid–Cavernous Fistula (Low-Flow CCF)

Treatment Objectives

To eliminate the dural arteriovenous shunt within the cavernous sinus and reduce orbital venous hypertension, thereby improving symptoms.

Key Features

- Low-flow shunts supplied by dural branches of the ICA and/or ECA.
- Often multiple small feeders, making trans-arterial catheterization insufficient to reach the precise shunt pouch.

Endovascular Treatment Strategy

1. Trans-venous Approach (Preferred and Standard Treatment)

This is the **treatment of choice** for most dural CCFs.

Venous access routes:

- Inferior petrosal sinus (IPS) – first-line choice.
- If the IPS is occluded: SOV, superior petrosal sinus, facial vein, or pterygoid plexus.

Technique:

- Microcatheterization of the cavernous sinus.
- **Coil embolization** to create a framework, followed by
- **Onyx/PHIL/Squid injection** to fill the shunt compartment.
- The therapeutic target is occlusion of the **receiving compartment** of the cavernous sinus rather than individual arterial feeders.

2. Trans-arterial Approach (Secondary Option)

Considered only when a dominant arterial feeder is identified or when venous access is not possible.

Technique:

- Superselective catheterization of the feeder (commonly branches of the MMA or IMA).
- Embolization using **NBCA** or **Onyx/Squid.**
- Extreme caution is required to prevent reflux into the ICA or ophthalmic artery.

3. Combined Arterial and Venous Approaches

Employed in complex fistulas with multiple compartments or extensive collateral supply. Coordinated arterial embolization and venous coil/Onyx packing may be necessary for complete occlusion.

Summary: A complete four-vessel DSA is crucial for accurate diagnosis, classification, and treatment planning. In direct CCFs, preserving the ICA is a priority, with stent-assisted reconstruction or flow-diverters increasingly preferred. In indirect CCFs, the main goal is complete occlusion of the cavernous sinus compartment rather than targeting individual arterial feeders. Prompt intervention within 24–48 hours is recommended for patients with vision loss, severe proptosis, or progressive cranial neuropathies.

Managing Non-Acute SDH using liquid material (MAGIC-MT)

Wei Ni, MD, PhD
Department of neurosurgery, Huashan Hospital, Fudan University, China

A. Purpose
The effect of embolization of the middle meningeal artery in patients with subacute or chronic subdural hematoma is uncertain.

B. Materials & Methods
We performed a multicenter, open-label, randomized trial in China, involving patients with symptomatic nonacute subdural hematoma with mass effect. Patients were assigned to undergo burr-hole drainage or receive nonsurgical treatment at the surgeon's discretion, and patients in each group were then randomly assigned, in a 1:1 ratio, to undergo middle meningeal artery embolization with liquid embolic material or to receive usual care. Patients whose condition warranted craniotomy were excluded. The primary outcome was symptomatic recurrence or progression of subdural hematoma within 90 days after randomization. Secondary outcomes included clinical and imaging outcomes. The main safety outcome was any serious adverse event (including death).

C. Results
The analysis included 722 patients, of whom 360 were assigned to the embolization group and 362 to the usual-care group. Burr-hole drainage was performed in 78.3% of the enrolled patients; among the patients who underwent burr-hole drainage, the procedure occurred after embolization in 99.6%. Symptomatic recurrence or progression of subdural hematoma within 90 days occurred in 24 patients (6.7%) in the embolization group and in 36 (9.9%) in the usual-care group (between-group difference, −3.3 percentage points; 95% confidence interval, −7.4 to 0.8; P=0.10). The incidence of serious adverse events was lower in the embolization group than in the usual-care group (6.7% vs. 11.6%, P=0.02).

D. Conclusion
Among patients with symptomatic nonacute subdural hematoma (of whom 78% underwent burr-hole drainage), middle meningeal artery embolization resulted in a 90-day incidence of symptomatic recurrence or progression similar to that with usual care but was associated with a lower incidence of serious adverse events.

Therapeutic neurointervention with radial access

Vikas Bhatia, MD, DNB, DM
Section of Neuroimaging and Intervention Neuroradiology, PGIMER, Chandigarh, India

A. Purpose

Radial access is gaining considerable popularity in the neurointervention community. However, Radial access can pose challenges in the form of hardware issues, technical challenges, and anatomy-related issues involving the radial artery, arch and supraaortic vessels.

B. Materials & Methods

With an experience of over 5 years with transradial access, important learning cases with radial access encountered during Neurointervention will be shown. In addition, a few cases with the exclusive benefit of using a transradial access will be shown. Novel techniques, such as "Mother and daughter technique" and "reflection through the aortic valve", are described. The benefits of using transradial access in complicated scenarios, such as subclavian steal, aortic occlusion, will be shown.

C. Results

Radial access was used successfully for the management of various neurointervention-related pathologies. It can be primarily used for all neurointervention cases. It is important to understand the learning curve, technical issues, and bailout strategies for the successful utilization of radial access

D. Conclusion

Radial access holds a promising future and an important addendum for the Neurointerventionist.

Table 1

Our experience: Randomised trial Verapamil + NTG vs NTG alone	
N	58
Technical success	100%
Difference in RAO	insignificant
Difference in complications	insignificant
Difference in angiographic and clinical spasm	Insignificant
Patient comfort	Very good

Table 2

Our experience	Left radial access
N	32
Technical success	100%
Ability to catheterize LICA	>75%
RAO on follow-up	<1%
Complications	Nil
Patient comfort	Very good

Figure 1

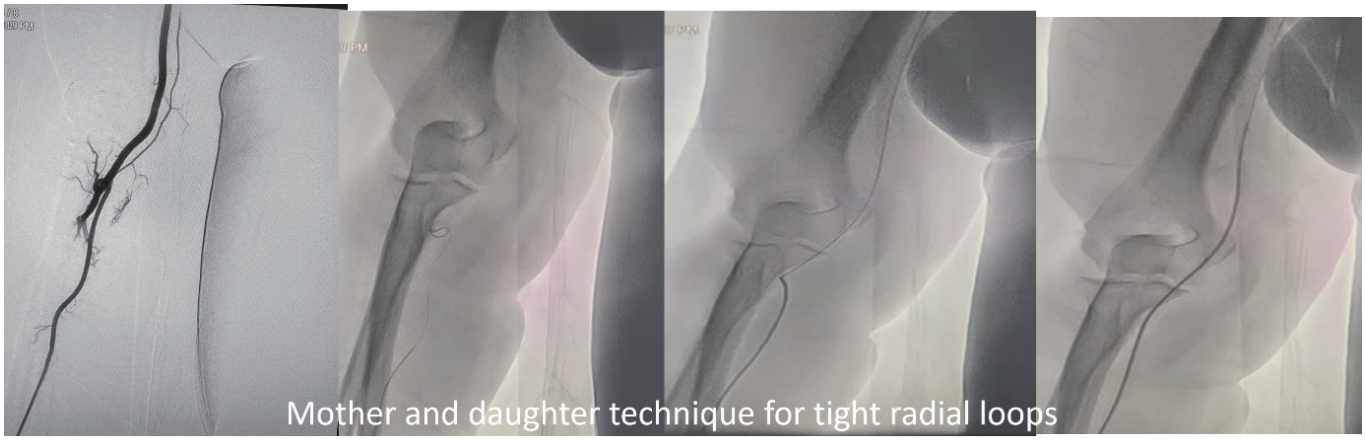
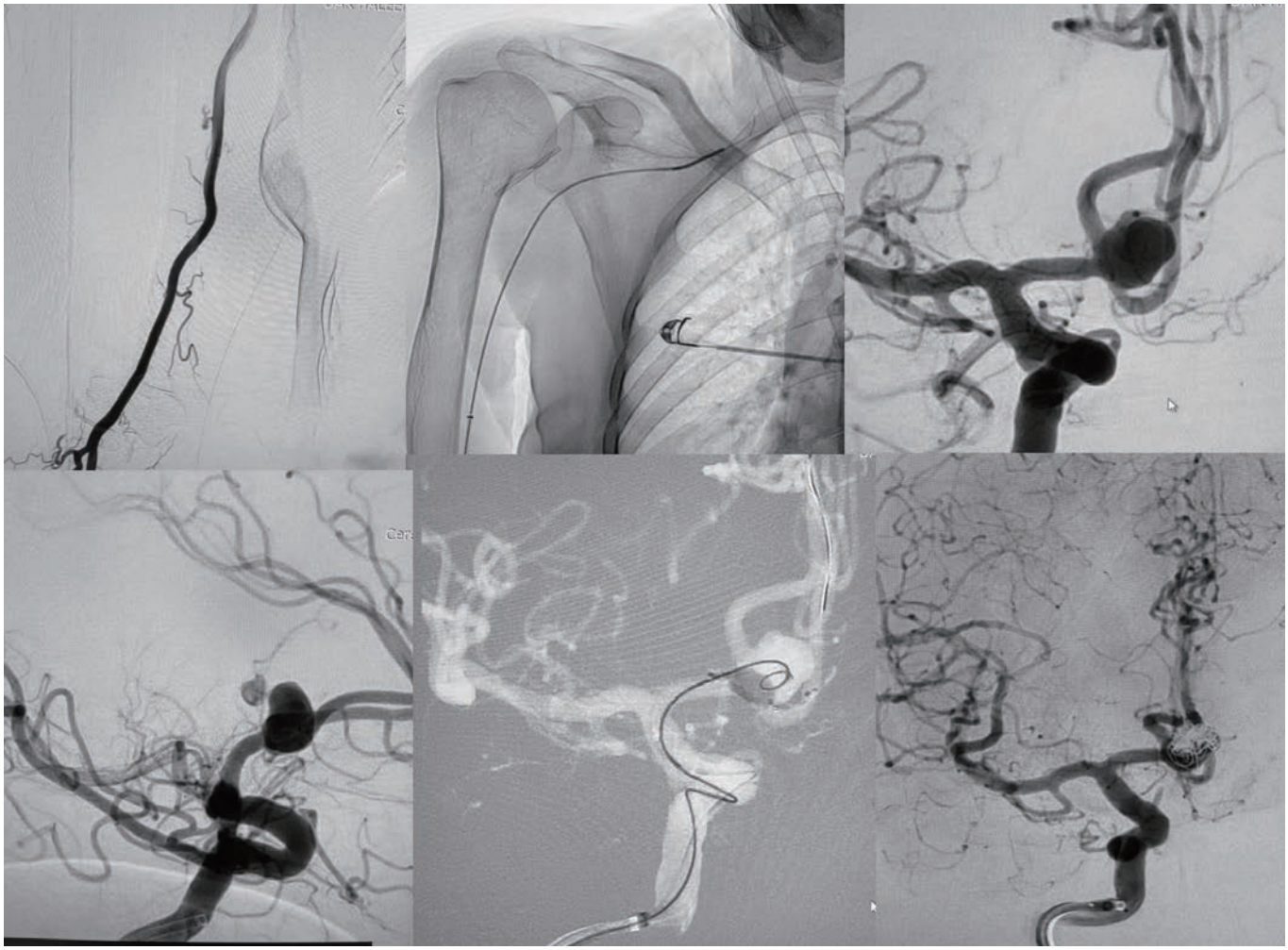


Figure 2



Day 2

December 13 (12:00-13:00)

Luncheon Industrial Symposiums 2

Moderators

Byungjun Kim
Korea University Anam Hospital, Korea

Wei Ni
Huashan Hospital, China

GE HealthCare

Considering the care of vulnerable patients - The role of isosmolar contrast media

Joon Hong Bae (GE HealthCare, Korea)

Johnson&Johnson MedTech

New concept of end-to-end thrombus control: EPIC-PRO

Zhenyu Jia (The First Affiliated Hospital with Nanjing Medical University, China)

wallaby phenox

Clinical application of the new Paragon BGC: Korean experience and insights

Yunsun Song (Asan Medical Center, Korea)

Penumbra

DIVA Study - Distal vessel aspiration in acute ischemic stroke using the RED 43 in Australia

Vinicius Carraro do Nascimento (Gold Coast University Hospital, Australia)

Day 2

December 13 (13:20–14:50)

Invited Lectures Session 3
Acute Ischemic Stroke

Moderators

Woong Yoon
Chonnam National University Hospital, Korea

Hiroshi Yamagami
Osaka National Hospital, Japan

Blood pressure management after endovascular treatment for acute stroke: Insights from the OPTIMAL-BP study

Jae Wook Jung, MD, PhD

Department of Neurology, Severance Hospital, Yonsei University College of Medicine, Seoul, Korea

A. Purpose

The OPTIMAL-BP randomized trial demonstrated that intensive systolic blood pressure (SBP) lowering (<140 mm Hg) after successful endovascular thrombectomy (EVT) did not improve outcomes compared with conventional control (140–180 mm Hg). To clarify when and in whom post-EVT BP modulation influences prognosis, multiple post-hoc analyses were conducted addressing clinical, radiologic, and hemodynamic factors.

B. Materials & Methods

Using the OPTIMAL-BP dataset of 302 reperfused patients from 19 Korean stroke centers, secondary analyses explored (1) medication-induced BP decrease <100 mm Hg, (2) intravenous antihypertensive exposure, (3) BP threshold effects, (4) influence of IV tPA pretreatment, (5) presence of intracranial atherosclerotic stenosis (ICAS), (6) impact of multiple thrombectomy passes, and (7) mediation by time-related BP variability. Multivariable regression, interaction, and causal mediation models were applied with adjustment for major confounders.

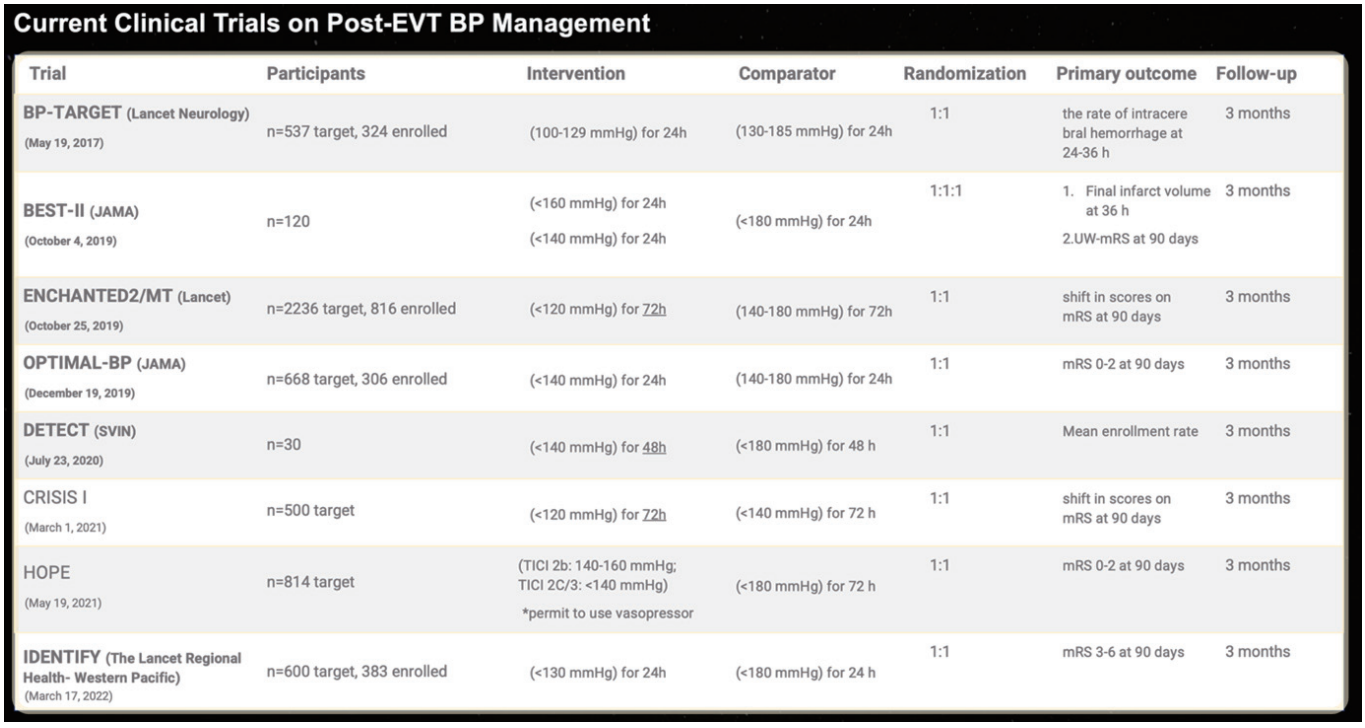
C. Results

Across analyses, early or excessive SBP reduction, especially medication-induced or antihypertensive-related, was consistently associated with poorer 3-month functional independence and increased mortality, without reduction of symptomatic intracerebral hemorrhage. Intensive BP lowering was particularly harmful in patients receiving IV tPA or requiring multiple passes, whereas ICAS presence did not modify the effect. Greater BP variability mediated the link between intensive management and larger infarct growth.

D. Conclusion

The integrated post-hoc findings from the OPTIMAL-BP trial suggest that abrupt or aggressive BP reduction immediately after EVT adversely affects recovery. Stable, individualized BP control avoiding rapid declines and variability may represent a more appropriate therapeutic target in the post-reperfusion phase of acute ischemic stroke.

Figure 1. Current Clinical Trials om Post-EVT BP Management



Current Clinical Trials on Post-EVT BP Management

Trial	Participants	Intervention	Comparator	Randomization	Primary outcome	Follow-up
BP-TARGET (Lancet Neurology) (May 19, 2017)	n=537 target, 324 enrolled	(100-129 mmHg) for 24h	(130-185 mmHg) for 24h	1:1	the rate of intracere bral hemorrhage at 24-36 h	3 months
BEST-II (JAMA) (October 4, 2019)	n=120	(<160 mmHg) for 24h (<140 mmHg) for 24h	(<180 mmHg) for 24h	1:1:1	1. Final infarct volume at 36 h 2.UW-mRS at 90 days	3 months
ENCHANTED2/MT (Lancet) (October 25, 2019)	n=2236 target, 816 enrolled	(<120 mmHg) for 72h	(140-180 mmHg) for 72h	1:1	shift in scores on mRS at 90 days	3 months
OPTIMAL-BP (JAMA) (December 19, 2019)	n=668 target, 306 enrolled	(<140 mmHg) for 24h	(140-180 mmHg) for 24h	1:1	mRS 0-2 at 90 days	3 months
DETECT (SVIN) (July 23, 2020)	n=30	(<140 mmHg) for 48h	(<180 mmHg) for 48 h	1:1	Mean enrollment rate	3 months
CRISIS I (March 1, 2021)	n=500 target	(<120 mmHg) for 72h	(<140 mmHg) for 72 h	1:1	shift in scores on mRS at 90 days	3 months
HOPE (May 19, 2021)	n=814 target	(TICI 2b: 140-160 mmHg; TICI 2C/3: <140 mmHg) *permit to use vasopressor	(<180 mmHg) for 72 h	1:1	mRS 0-2 at 90 days	3 months
IDENTIFY (The Lancet Regional Health- Western Pacific) (March 17, 2022)	n=600 target, 383 enrolled	(<130 mmHg) for 24h	(<180 mmHg) for 24 h	1:1	mRS 3-6 at 90 days	3 months

Endovascular treatment for acute intracranial large vessel occlusion due to atherothrombosis: Insights from the RESCUE AT-LVO study

Shinichi Yoshimura, MD, PhD

Department of Neurosurgery, Hyogo Medical University, Nishinomiya City, Japan

A. Purpose

Atherothrombotic stroke-related large vessel occlusion (AT-LVO) can arise from two distinct mechanisms: in situ intracranial artery occlusion (intracranial group) and embolic occlusion from cervical carotid stenosis or occlusion (tandem group). This study aimed to compare the prognosis and rate of recurrent ischemic events after endovascular therapy (EVT) between these two etiologies.

B. Materials & Methods

We conducted a retrospective, multicenter registry study involving 51 stroke centers across Japan. A total of 582 patients with AT-LVO who underwent EVT were included: 338 in the intracranial group and 244 in the tandem group. The primary outcome was a composite of recurrent ischemic stroke or reocclusion of the treated vessel within 90 days after EVT. Patient demographics, stroke severity, imaging scores, and outcomes were analyzed between groups.

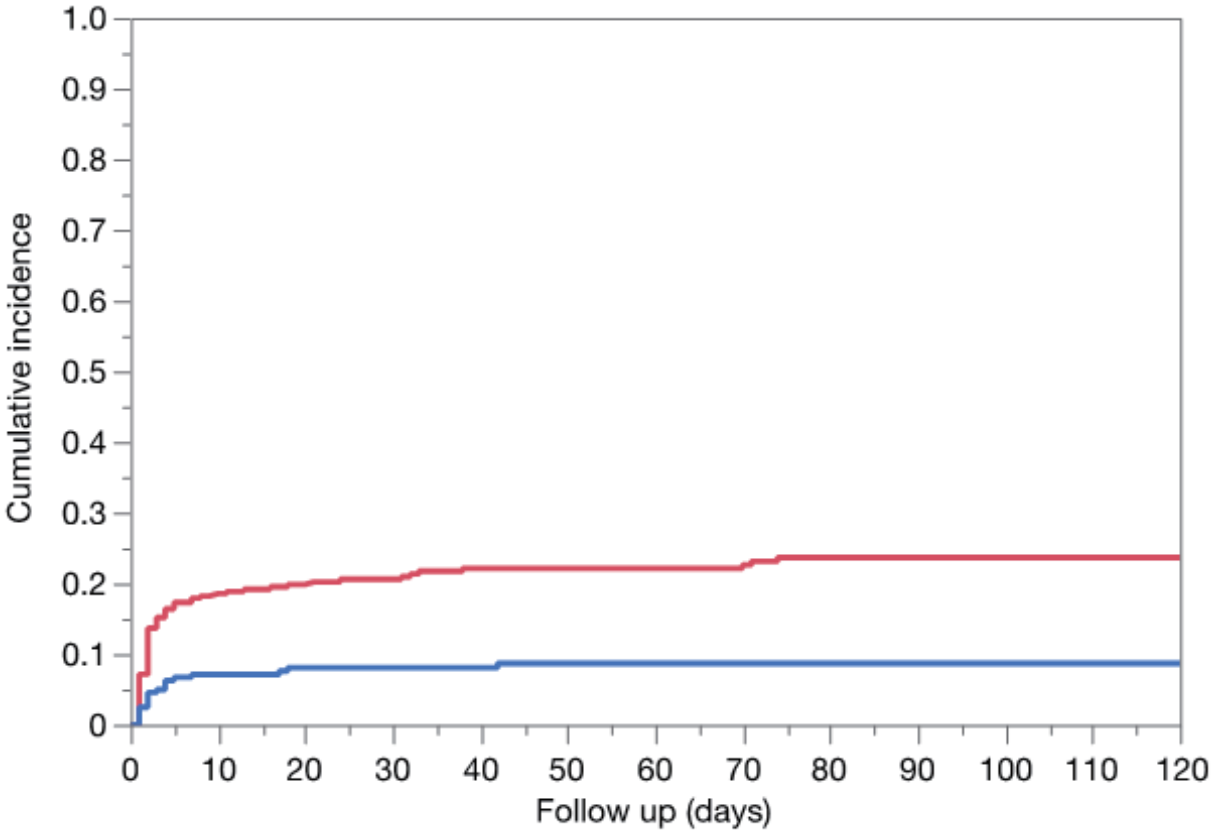
C. Results

Patients in the intracranial group were younger (mean age: 71.9 vs. 74.5, p=0.003), more likely to be female, and less frequently current smokers. The tandem group had a higher NIHSS on admission (15 vs. 13, p=0.006), shorter onset-to-puncture time (median: 232 vs. 299 minutes, p=0.03), and lower ASPECTS (median: 8 [6–9] vs. 8 [7–9], p=0.0002). The primary outcome occurred significantly more frequently in the intracranial group (22.5% vs. 8.2%, p<0.0001). However, rates of intracranial hemorrhage and mortality were not significantly different between groups.

D. Conclusion

Patients with intracranial in situ occlusion had a higher risk of recurrent ischemic stroke or reocclusion within 90 days after EVT compared to those with tandem lesions. This finding suggests that tailored post-EVT management strategies may be necessary based on underlying etiology.

Figure 1. Cumulative incidences of outcomes. A: recurrent ischemic stroke or reocclusion.



Revisiting the role of balloon guided catheters in mechanical thrombectomy: Insights from the PROTECT-MT study

Pengfei Xing, MD

Neurovascular Center, Changhai Hospital, Naval Medical University, Shanghai, China

A. Purpose

Balloon guide catheter (BGC) is recommended by current guideline for endovascular thrombectomy in patients with acute ischemic stroke due to reducing distal emboli, improving reperfusion quality and shorten the procedural time. Whether it could improve the functional outcome is uncertain. Herein, we present the main results of the Proximal Temporary Occlusion using Balloon Guide Catheter for Mechanical Thrombectomy (PROTECT-MT) trial, which aimed to assess the efficacy and safety of using a balloon BGC endovascular thrombectomy in patients with acute ischemic stroke due to large-vessel occlusion of the anterior circulation.

B. Materials & Methods

We used PROBE design to determine superiority of balloon guided catheter versus conventional guide catheter. The primary outcome was shift in mRS score. We planned to randomize 1074 patients for 87% power to established superiority of BGC, this sample also considered 5% drop-out and 5% cross-over. Randomization was performed in a 1 to 1 ratio and stratified by site, preferred thrombectomy strategy and time from symptom onset to randomisation (< 6 vs. ≥6 h). Trial terminated due to persistent safety concerns.

C. Results

During this period, a total of 1698 patients were assessed for eligibility, and 329 were randomised. 164 participants assigned to balloon guide catheter group and 165 participants to the conventional guide catheter group. There were 7 patients in the balloon guide catheter group and 5 patients in the conventional guide catheter group with major protocol violations and excluded from the final analysis.

Of the 329 participants, 328 (99.7%) had endovascular thrombectomy, and one (0.3%) had only an angiogram. Most of the participants were treated via a femoral approach (322 [98%] of 329 participants), and general anesthesia was used in 129 (39%) of them, in similar proportions for each group. The distribution of thrombectomy strategies was similar between groups. Most participants (253 [77%] of 329 participants) received a combination of aspiration and stent-retriever as the first-line thrombectomy strategy, followed by aspiration strategy (55 [17%] of 329 participants).

Data on the primary outcome (scores on the mRS at 90 days) was complete. Participants in the balloon guide catheter group had significantly worse scores on the mRS compared to those allocated to conventional guide catheter group. The adjusted common odds ratio was 0.66, and the P value was 0.037, indicating worse outcome for patients treated with balloon guide catheter. Results were similar in unadjusted analysis. Compared with conventional guide catheter group, those participants in the BGC group had lower rate of fair or better outcome (mRS scores 0-3, 41% [68 of 164

participants] vs. 56% [92 of 165 participants], adjusted OR 0·56, 95% confidence interval 0·35 to 0·88]). In procedure outcome, procedure time was longer in patients treated balloon guide catheter.
All-cause mortality at 90 days was higher in the balloon guide catheter group than in the conventional guide catheter group (39 [24%] of 164 patients vs. 26 [16%] of 165 patients), but this difference was not statistically significant (Risk Ratio 1·51 [95% confidence interval 0·97 to 2·36]). There were no statistically significant differences between groups in intracranial haemorrhage, symptomatic intracranial haemorrhage or other serious adverse events. However, severe vasospasm in carotid artery was more frequent in the BGC group (7 [4·3%] of 164 patients) as compared to the conventional guide catheter group (1 [0·6%] of 165 patients; risk ratio 7·04, 95% confidence interval 1·15 to 43·75).

D. Conclusion

The balloon guide catheter did not result in better technique outcomes, i.e. better revascularisation quality or fewer distal embolism. Moreover, use of balloon guide catheter was associated with longer time from groin puncture to revascularisation.

However, the results of PROTECT-MT trial did not completely negate the value of BGC used for endovascular thrombectomy, even the worse functional outcome of this study. There are still many other applications for BGC, and many studies are needed to confirm the relationship between BGC and functional outcomes.

Free Paper

Day 1

December 12 (15:20-17:20)

Scientific (Free Paper) Session 1
Aneurysm

Moderators

Chang Woo Ryu
Kyung Hee University Hospital at Gangdong, Korea

Shu Wan
Zhejiang Hospital, China

FP-1-01

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

Back Ground/Aim: 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%).

Conclusions: 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.

Keywords: Target Tetra Coil, Small Aneurysm, Prospective

FP-1-02

Evaluation of coil embolization status changes six months after cerebral aneurysm coil embolization: What factors are essential for status maintenance?

Keisuke Sato[1*], Tetsurou Takao[1], Hitoshi Hasegawa[2]

[1]*Neurosurgery, Nagaoka Red Cross Hospital, Nagaoka, Japan,*
[2]*Neurosurgery, Brain Research Institute, Niigata University, Niigata, Japan*

Back Ground/Aim: Coil embolisation is widely performed for cerebral aneurysm treatment, with reports indicating its efficacy is comparable to clipping. However, situations requiring re-treatment do occur. Using cases treated at our institution, we investigated factors associated with changes in embolization status six months post-procedure and report our findings.

Methods: This study included 82 patients who underwent cerebral aneurysm coiling between April 2021 and July 2024. The association between changes in coiling status at 6 months postoperatively (CO→NR, etc.) and the aneurysm maximum diameter, aneurysm volume, final VER, and Hydro coil use was statistically analyzed using Fisher's exact test. Furthermore, the proportion of VER was similarly analyzed within the Hydro coil group.

Results: Of the 82 cases, 28 (34.1%) showed changes in the embolization status. Analysis dividing patients into two groups based on maximum aneurysm diameter (5 mm) and final VER (30%) showed no significant difference. However, analysis dividing patients into two groups based on aneurysm volume (≤60 mm^3) and Hydro use revealed significantly fewer changes in the group with a volume of less than 60 mm^3 and in the Hydro-treated group. Analysis dividing the Hydro group into two subgroups based on various VER percentages showed no significant difference in the occurrence of changes in embolization status.

Conclusions: Hydro coil use was found to be effective in maintaining the occlusion state. Given that extremely flexible coils are now available, the VER is likely to be elevated. Consequently, VER alone may prove insufficient as an indicator for maintaining the occlusion state. In coil embolization, attention to the type of coil inserted, alongside the VER, may contribute to maintaining a favorable post-embolization occluded state.

FP-1-03

Isolated peripheral unruptured posterior inferior cerebellar artery (PICA) aneurysm treatment outcomes from single tertiary center experience

Abdullah Alhindi[1,2], Deok Hee Lee[2*]

[1]*Radiology, Ministry of Health, Qassim, Saudi Arabia,*
[2]*Radiology, Asan Medical Center, Seoul, Korea*

Back Ground/Aim: Isolated aneurysms of the posterior inferior cerebellar artery (PICA) are a rare condition. Recent publications and case reports indicate an increasing incidence, particularly among Asian patients. The majority of isolated PICA aneurysms are saccular, with fewer cases involving dissecting aneurysms. The pathophysiology, clinical presentation, and natural history of these aneurysms are not well understood. Previous studies have primarily focused on the treatment of ruptured PICA aneurysms, and there is no standard management approach for isolated, unruptured cases. This study presents a single tertiary center's experience in the management of unruptured PICA aneurysms and compares outcomes across different endovascular treatment methods.

Methods: We conducted a retrospective review of all 128 patients diagnosed with PICA aneurysms between 2002 and 2024 at a single tertiary care center. 6 Ruptured PICA aneurysms were excluded. We included 33 patients with unruptured PICA aneurysms. Patients were managed with various endovascular techniques, including coiling, stent-assisted coiling, flow diversion, and surgical clipping. Outcomes were assessed in terms of angiographic occlusion (Raymond Scale), modified Rankin Scale (mRS), aneurysm recurrence, and retreatment. We further compared our findings with existing literature.

Results: Median age 68 (60–76), 64.6% female; saccular 75.4%. Lesions were predominantly proximal (86.2%). Overall treatment: endovascular 76.9% (coiling 43.1%, stent-assisted coiling [SAC] 26.2%, flow diverter [FD] 7.7%); surgery 15.4%. Technique choice differed by aneurysm location (p=0.008): proximal favored reconstructive strategies (SAC/FD), distal more often deconstructive (parent-artery occlusion/trapping). Among endovascular cases (n=27), RR I–II 75.2%. Good outcome (mRS 0–1) 93.9%. Complications 30.2%, mostly asymptomatic microembolic infarction; symptomatic PICA infarct was present in one patient. Recurrence and retreatment 9.2%. Size ≥10 mm was associated with recurrence; location was not.

Conclusions: For unruptured PICA aneurysms, treatment choice was mainly guided by the location of the aneurysm, with good occlusion rate and clinical outcomes.

Keywords: Aneurysms, Pica, Endovascular

FP-1-04

Embolization of intracranial aneurysm with Target Tetra coils: Initial clinical experience and short-term follow up results

Dong Hyun Yoo[1], Hyun-Seung Kang[2*], Young Dae Cho[1], Kang Min Kim[2]

[1]*Radiology, Seoul National University Hospital, Seoul, Korea,*
[2]*Neurosurgery, Seoul National University Hospital, Seoul, Korea*

Back Ground/Aim: The Target Tetra coil (Stryker, Kalamazoo, MI, USA) is a recently marketed coiling device comprised of complex tetrahedral loops and a soft helical tail. This study examined its safety and efficacy in embolization of small intracranial aneurysms, evaluating short-term (6-month) results as well.

Methods: A total of 123 treated aneurysms (mean size, 3.7±0.9 mm) in 114 consecutive patients qualified for study, each involving use of at least one Target Tetra coil. Specifics of Tetra coil usage were assessed, and procedural outcomes were addressed, including occlusion status and associated complications.

Results: Of the 331 coils utilized overall, 156 (47.12%) were Tetra coils, with their length comprising a mean of 68.8% of total coil length inserted per aneurysm. Mean packing density was 33.0±6.5%. Stent assistance was required in 78 (63.4%). Postprocedural angiography showed complete occlusion in 53 aneurysms (43.1%), neck remnants in 32 (26.0%), and saccular residuals in 38 (30.9%). Among procedure-related complications, there were no instances of rupture, and thrombus formation was detected on three occasions (2.4%) without clinical consequences. Follow-up imaging 6 months after procedures confirmed 113 complete occlusions (91.9%), 9 neck remnants (7.3%), and no cases of saccular residual.

Conclusions: In this population of patients with small intracranial aneurysms, embolization by Target Tetra coils showed acceptable safety and efficacy.

Keywords: Aneurysm, Coil, Embolization, Endovascular, Tetra

FP-1-05

Efficacy and outcomes of accero intracranial braided stent in wide-neck bifurcation aneurysms: A single-center experience

Ahmed Albaqshi[1,2], Deok Hee Lee[2*], Yunsun Song[2], Abdullah Alhindi[2], Boseong Kwon[2]

[1]*Radiology, King Fahad Hospital Al Hofuf, Al Hofuf, Saudi Arabia,*
[2]*Radiology, Asan Medical Center, Seoul, Korea*

Back Ground/Aim: To evaluate the efficacy and safety of the Accero braided stent in the endovascular management of wide-neck bifurcation intracranial aneurysms, based on a single-center experience.

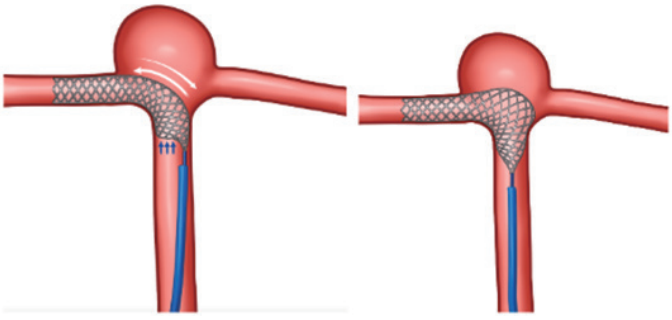
Methods: We retrospectively reviewed 125 consecutive patients treated with Accero intracranial stents between 2022 and 2024. A total of 86 aneurysm met the inclusion criteria, which required aneurysms to be non-ruptured aneurysm and of initial presentation, originate from major intracranial bifurcation sites—such as the ACA, ACoA, fetal-type PCoA, ICA, MCA, or top of BA—and to exhibit a wide-neck configuration (neck size ≥4 mm or dome-to-neck ratio

Results: The mean patient age was 61.7 years, with 72.4% being female. All aneurysms were saccular, with 93.1% located in the anterior circulation, and the mean maximum aneurysm diameter was 4.9 mm. Complete aneurysm occlusion was achieved in 97.7% of cases on follow-up imaging. DWI revealed asymptomatic microembolic lesions in 16.1% of patients. One case demonstrated recurrence at follow-up imaging, and one intraprocedural hemorrhage occurred without resulting neurological deficit. No symptomatic thromboembolic complications were observed.

Conclusions: Accero braided stent demonstrated a high technical success rate and six-month complete occlusion outcomes on MRA in the treatment of WNBAs. While WNBAs often require multiple stents, our findings suggest that treatment with a single Accero stent employing the Push-and-Pull technique is safe and effective, offering high occlusion rates, minimal complications, and promising clinical outcomes.

Keywords: Wide-Neck, Bifurcation, Braided, Sten, Accero

Table/Graph/Figure-1:



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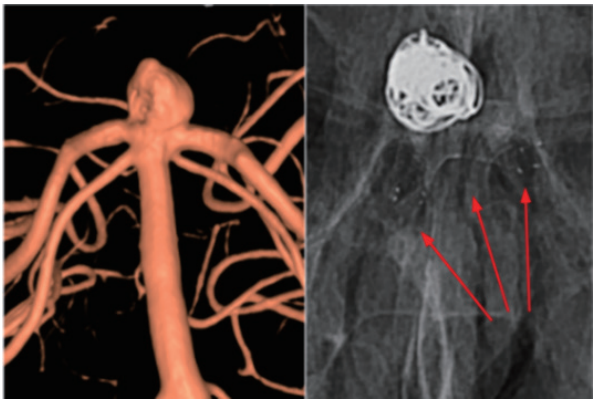

FP-1-06

Longitudinal braid stability of Surpass EvolveTM: In the aspect of Fish-mouthing deformation

Minu Nahm, Jung-Jae Kim*, Yong Bae Kim, Keun Young Park, Hyun Jin Han, Susy Youn

Neurosurgery, Yonsei University Severance Hospital, Seoul, Korea

Back Ground/Aim: Flow diverters (FDs) are increasingly utilized as promising tools in the management of complex cerebral aneurysms, achieving acceptable rates of morbidity and mortality. 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 following FD deployment.

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, 3month, 6months and 1 year follow-up skull X-rays were systematically compared to assess the presence of FM, defined as a >30% reduction in the distal 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. In addition, procedure-related complications were collected to investigate the clinical relevance of FM.

Results: Of the 124 patients, 94 patients (with 115 aneurysms) completed postoperative and one-month imaging follow-up. FM was identified in 10 patients (10.6%), each proximal 3 and distal 8. FM was identified in 2 (2.3%) patients in 1 year follow up (1 proximal and 1 distal). Temporal change of FD ends, showed decrease until 1 month and gradually increase until 12months, both proximal and distal. In regards to potential risk factor of FM, Young age, Absence of hyperlipidemia, Fusiform shape was more common in FM group.

Conclusions: Surpass evolve showed incidence of 10.6% in 1month period and 2.3% in 1 year period. Knowing the tendency to self resolving and low relativity of ischemic complications, we can observe carefully when the FM deformity occurs.

Keywords: Flow, Diverter, Braid-Deformity, Fish-Mouthing, Aneurysm

FP-1-06

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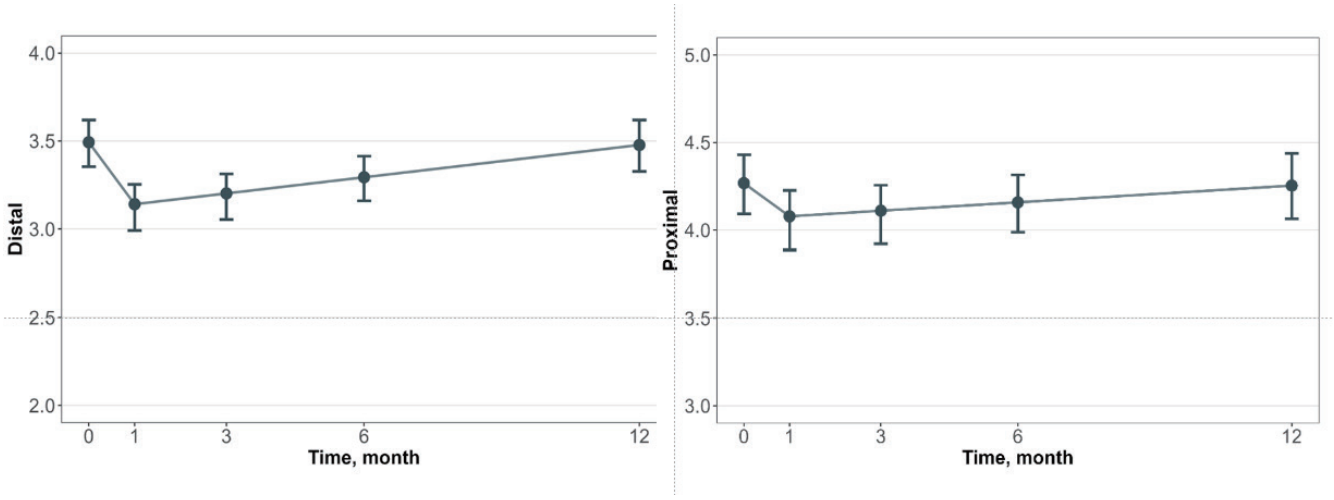

Table/Graph/Figure-1:

	1month	12months
Patient	94	86
FM incidence	10(10.6%)	2(2.3%)
Distal FM	8	1
Proximal FM	3	1
FM degree	33.4%	38.1%

FP-1-07

Woven EndoBridge embolization for intracranial aneurysms: Single center experiences in South Korea

Jung-Jae Kim*, Minu Nahm, Suzy Youn, Hyun Jin Han, Yong Bae Kim, Keun Young Park

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Back Ground/Aim: Endovascular treatment for intracranial bifurcation aneurysm with wide-neck remains challenging and is prone to complications. Currently, the Woven Endobridge (WEB) is widely utilized for intracranial aneurysm treatment. However, the safety and efficacy of this approach requires conclusive establishment. This presentation aims to evaluate clinical and radiological outcomes of intracranial aneurysm embolization using the WEB device.

Methods: From August 2021 to April 2025, 281 consecutive patients (male:female = 108:173, mean age 63.9) with 286 aneurysms underwent treatment with the WEB device in single center. Demographic characteristics, procedural details and complications, clinical outcomes, and one-year radiological findings were retrospectively reviewed. Aneurysm occlusion was assessed using the modified WEB Occlusion Scale (WOS).

Results: The cohort comprised 23 ruptured and 263 unruptured aneurysms, including 5 cases of recurrent aneurysms (4 post-coiling and one post-clipping). Mean aneurysm diameter was 5.66 mm (range: 2.75–13.67). The most common locations were anterior communicating artery (Acom, 41.3%), followed by middle cerebral artery bifurcation (35.3%), basilar apex (18.9%), and internal carotid artery (ICA) bifurcation (4.5%). Except for one intraprocedural rupture, all aneurysms were successfully treated with the WEB device (technical success rate: 99.6%). WEB size adjustments were needed in 69 cases (24.1%), and assisting techniques were required in 39 cases (13.6%). Procedure-related complications occurred in 19 cases (6.7%), including 4 transient ischemic attacks (TIA), 4 strokes, 4 intraprocedural ruptures, 3 puncture site complications, and 4 iatrogenic parent artery injuries. Permanent morbidity and mortality rates were 0.7% (two in mRS 1) and 0.3%, respectively. One-year angiographic follow-up was available for 144 cases (50.3%), with a complete occlusion rate (WOS A and B) of 78.5%. There were 3 recurrent aneurysms, which were successfully treated by additional coiling (0.2%).

Conclusions: WEB is a safe and effective alternative to SAC for the treatment of wide-neck bifurcation aneurysms with high occlusion rates and low complication risks.

Keywords: Aneurysm, Woven Endobridge Device, WEB

FP-1-08

Technical strategy in Woven EndoBridge (WEB) embolization of boot-shaped cerebral aneurysms

Dae Chul Suh

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Back Ground/Aim: This study aimed to identify three representative types of WEB axes in the embolization of boot-shaped aneurysms and to apply these technical strategies in WEB embolization of boot-shaped aneurysms.

Methods: Boots-shaped (or Beoseon-shaped) aneurysms were observed in 14% of aneurysms (n=10/71) that were embolized using the WEB device over the past three years. Because the dome of these aneurysms is deviated to one side, the positioning of the WEB within the aneurysm sac varies depending on the approach used to deploy the device. We present three types of WEB positioning orientations within the aneurysm: longitudinal, transverse, and body-centered axes. Each scenario is illustrated with a schematic diagram to demonstrate how these orientations occur. Any events, including recurrence, were monitored during a mean follow-up period of 6 months using MRA (range: 1 to 15 months) and a mean of 12 months for clinical evaluations (range: 1 to 31 months).

Results: Good angiographic results were achieved by applying three different embolization techniques in WEB embolization of boot-shaped aneurysms. Understanding this phenomenon can help operators achieve better WEB device positioning during embolization. One major recurrence during the follow-up period was successfully retreated using coiling.

Conclusions: The orientation of WEB positioning within the aneurysm and the measurement of aneurysm volume can vary depending on the dome size relative to the aneurysm body in boot-shaped aneurysms. When the deviated dome is smaller than the aneurysm body, it is important to select an appropriate WEB size by adjusting the volume in the dome portion.

FP-1-09

Combined microsurgical and endovascular approach in the hybrid operating angiosuite: A case series on blood-blister intracranial aneurysms

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Neurosurgery, Kangdong Sacred Heart Hospital, Hallym University College of Medicine, Seoul, Korea

Back Ground/Aim: Blood blister-like aneurysms (BBAs) are small, fragile vascular lesions that develop on the walls of the supraclinoid internal carotid artery. The absence of a defined aneurysmal neck presents challenges in both surgical and endovascular management. The hybrid operating angiosuite (HOA), which integrates microsurgical and endovascular techniques, provides a potential approach for treating these complex aneurysms.

Methods: This study retrospectively evaluated a series of BBAs treated using a combination of microsurgical extracranial-intracranial (ECIC) bypass and endovascular trapping within the HOA between 2014 and 2022. Three neurosurgical centers participated, employing a standardized protocol executed by experienced neurovascular surgeons.

Results: Seven patients(mean age: 45 years) were included in the study. Five underwent high-flow bypass, and two received superficial temporal artery double-barrel bypass. Clinical outcomes were assessed using the Glasgow Outcome Scale (GOS) at discharge and the modified Rankin Scale (mRS) at follow-up, with scores of 0–2 considered favorable. At discharge, five patients had a GOS score of 5, one had a score of 4, and one had a score of 3. In long-term follow-up (mean: 20 months), five patients improved to an mRS score of 0, one remained at 2, and one improved from an initial score of 4 to 3. Follow-up imaging, performed at an average of 6–12 months, confirmed no recurrence of BBAs and maintained bypass flow patency.

Conclusions: While our findings suggest that a hybrid approach may be a viable treatment strategy for BBAs, further research with larger sample sizes and comparative analyses is necessary to elucidate its long-term efficacy and safety.

Keywords: Aneurysm, Anastomosis, Trapping, Subarachnoid Hemorrhage

FP-1-10

Preclinical animal models for cerebral aneurysms

Mohamed Deniwar[1,2*], Deok Hee Lee[2]

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Back Ground/Aim: Dr. Nobuo Hashimoto developed the first intracranial aneurysm model in rodents for the first time. Since then, variations of this model have been utilized for about 40 years followed by animal scarification. In very few reports, MRA and CTA have been utilized as adjuvant techniques for analyzing the cerebral vasculature in animals. We adopted one of the developed variations of the Hashimoto model to create a cerebral aneurysm and follow its development and asses its progression utilizing MRA.

Methods: Ligation of the left carotid artery, (lower neck incision) 3-0 silk threads applied on CCA to induce hyper dynamic circulation in contralateral carotid artery. Systemic hypertension was induced by the ligation of left renal artery at same session. MRA imaging on 1 and 3 months. Rats are subdivided to four Groups: 1. Control group (1): 2 rats underwent Sham surgery in add to high salt diet. 2. Sole surgery group (2): 12 rats under went surgery only. 3. Combined surgery group (3): 12 rats underwent surgery in add to high salt diet. 4. Ultimate surgery group (4): 12 rats underwent surgery in add to high salt diet mixed in add to 0.12% b- aminopropionitrile (BAPN) an inhibitor of lysyl oxidase that catalyzes the crosslinking of collagen and elastin.

Results: On MRA; the remarkable change of signal intensity and the tortuous change in the anterior circulation in response to a ligation of a left common carotid artery was detected in all rats of groups 2,3 after 4 weeks. Advanced aneurysm is an outward bulging of the arterial wall was detected in 7 rats of group 3, Group 4. (Figure)

Conclusions: Hashimoto model for intracranial aneurysm creation in rodents is still an effective method. MRA can be used for evaluation of model creation instead of animal euthanasia and possibly re-experiment with them in new studies.

Keywords: Aneurysm, Cerebral, Rat, Model, MRA

Table/Graph/Figure-1:

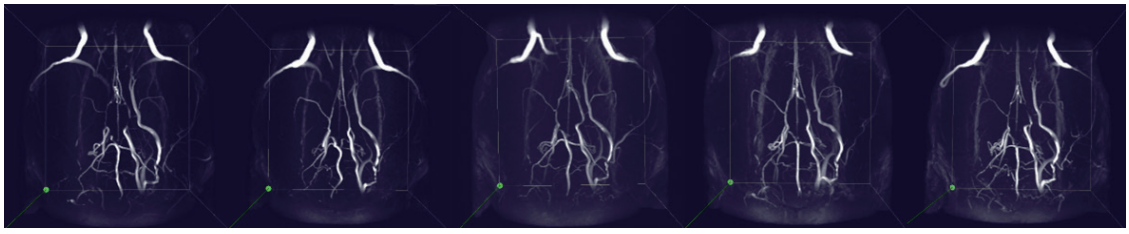

Figure 1. MRA imaging in rodents showing aneurysm creation

FP-1-11

Longitudinal 7T MRI biomarkers in a rat cerebral aneurysm model: A preliminary platform for future unruptured cerebral aneurysm stabilization trials

Yeon Soo Kim[1], Sungbin Hwang[1,2], Mi Hyeon Kim[1,2], Kyubong Lee[4], Mohamed Adel Deniwar[3], Boseong Kwon[1,2], Yunsun Song[1,2], Deok Hee Lee[1,2*]

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Back Ground/Aim: To present the clinical rationale and mechanistic basis for pharmacologic stabilization of unruptured cerebral aneurysms (UIAs), and to describe our translational platform that pairs a stable creation of rat aneurysm model with longitudinal imaging for candidate drug prioritization in the stabilization of UIAs.

Methods: Six-week-old female Sprague–Dawley rats undergo oophorectomy; left common carotid artery ligation with concomitant right renal branch ligation; and postoperative exposure to a high-salt diet containing BAPN to induce cerebral aneurysms. Each animal receives serial 7T MRI (TOF-MRA, T2-weighted, and black-blood sequences) at D00, D0, D2, W1, W4, W8, and W12 to quantify hemodynamic–morphologic changes, including tortuosity of the Circle of Willis and the occurrence of aneurysm-related events (unruptured cerebral aneurysms or SAH with or without aneurysms). Vascular corrosion casting and scanning electron microscopy serve as reference standards; in selected cases, autopsy confirms infarction or hemorrhage. This platform is designed to support future randomized, mechanism-anchored drug screens (e.g., ARBs, statins, metformin, low-dose aspirin, antioxidants, MMP modulators) using low or ultra-low dosing or short "window-of-susceptibility" regimens.

Results: We established a reproducible rat model of cerebral aneurysm induction and imaging workflow with high survival to W12, reliable longitudinal MRI readouts, and consistent phenotypes—progressive tortuosity, segment-specific caliber dynamics, and COW channel dilation—that mirror hypothesized hemodynamic–inflammatory pathways. We report no treatment effects here; rather, we demonstrate feasibility, measurement reliability, and readiness for prospective pharmacologic testing through development of a stable rat cerebral aneurysm model.

Conclusions: UIA care requires options beyond surveillance and procedures. A pathophysiology-informed pharmacologic strategy is plausible but demands convergent evidence. Our program aligns a curated candidate list with a stable, imaging-rich rat model to directly observe signals of aneurysm stabilization, de-risking agent selection for future controlled clinical studies.

Keywords: Unruptured Intracranial Aneurysm, Pharmacologic Management

FP-1-12

KSIN Achievement Award Paper Presentation

Optimizing image quality in cerebral 3D rotational angiography: A study on the impact of voxel size

Yunsun Song

Asan Medical Center, Korea

BACKGROUND AND PURPOSE: 3D rotational angiography (3DRA) is a crucial diagnostic tool for assessing neurovascular diseases. Despite its superior spatial resolution, challenges arise in visualizing minute vasculatures. This study investigates the impact of voxel size on the spatial resolution and noise of cerebral 3DRA.

MATERIALS AND METHODS: 3DRA data from January 2022 to May 2022 were retrospectively analyzed, including a total of 10 patients with 50 small vessels (< 1.0 mm in diameter) analyzed (5 vessels per patient). Using the Artis Q biplane angiography machine, 3DRA data sets were acquired and reconstructed at various voxel sizes ranging from 0.05 mm to 0.30 mm. Quantitative assessment included measurement of vessel visibility (maximum grayscale intensity within the vessel), vessel sharpness (slope of grayscale intensity calculated between 20% and 80% of maximum intensity), and background noise (standard deviation within a nonvascular region). Qualitative assessments—sharpness, noise, and overall image quality—were evaluated by 3 neuroradiologists.

RESULTS: A total of 50 vessels were analyzed quantitatively. Both the maximum intensity and slope of grayscale intensity at vessel walls decreased with increasing voxel size. There was a significant 2.94% increase in vessel intensity for every 0.05 mm decrease in voxel size ($P < .001$). Background noise significantly decreased as the voxel size increased ($P < .001$). Qualitatively, as the voxel size decreased, the sharpness of the image improved, and the amount of noise decreased. The overall image quality generally improved with decreasing voxel size. A good interrater agreement was observed among the neuroradiologists ($k = 0.601$).

CONCLUSIONS: Voxel size significantly influences 3DRA image quality. Smaller voxel sizes enhance spatial resolution and overall image clarity despite increased noise and reduced field of view. Strategic application of smaller voxel sizes is crucial for detailed vascular assessments, such as aneurysm morphology and fine vascular structures.

ABBREVIATIONS: 3DRA = 3D rotational angiography; EE = edge-enhanced; FOV = field of view

http://dx.doi.org/10.3174/ajnr.A8672

Day 2

December 13 (11:00-12:00)

Scientific (Free Paper) Session 2
Shunt Lesions & Miscellaneous Topics

Moderators

Dong Joon Kim
Severance Hospital, Korea

Yuji Matsumaru
University of Tsukuba Hospital, Japan

FP-2-01

Characteristics and angioarchitecture of brain arteriovenous malformation with transdural Blood Supply: A multicenter retrospective study in Japan

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[1]*Department of Neurosurgery, Kumamoto University, Kumamoto, Japan,*
[2]*Department of Diagnostic Image Analysis, Kumamoto University, Kumamoto, Japan*

Back Ground/Aim: Transdural blood supply (TDBS) to brain arteriovenous malformations (bAVMs) is relatively uncommon and has been underrecognized due to its complex and variable angioarchitecture. However, TDBS may influence treatment strategies and outcomes. This study aimed to estimate the clinical features and detailed angioarchitectural characteristics of bAVMs with TDBS.

Methods: We retrospectively reviewed clinical and imaging data of patients diagnosed with bAVMs who underwent complete subtraction angiography between April 2013 and March 2023 from 16 neurovascular centers in Japan. Angiography and MRI were centrally reviewed to confirm diagnoses and classify lesions. Clinical features, presence of TDBS, types of bAVMs: nidal, fistulous and unclassified, and fistulous points of TDBS were evaluated.

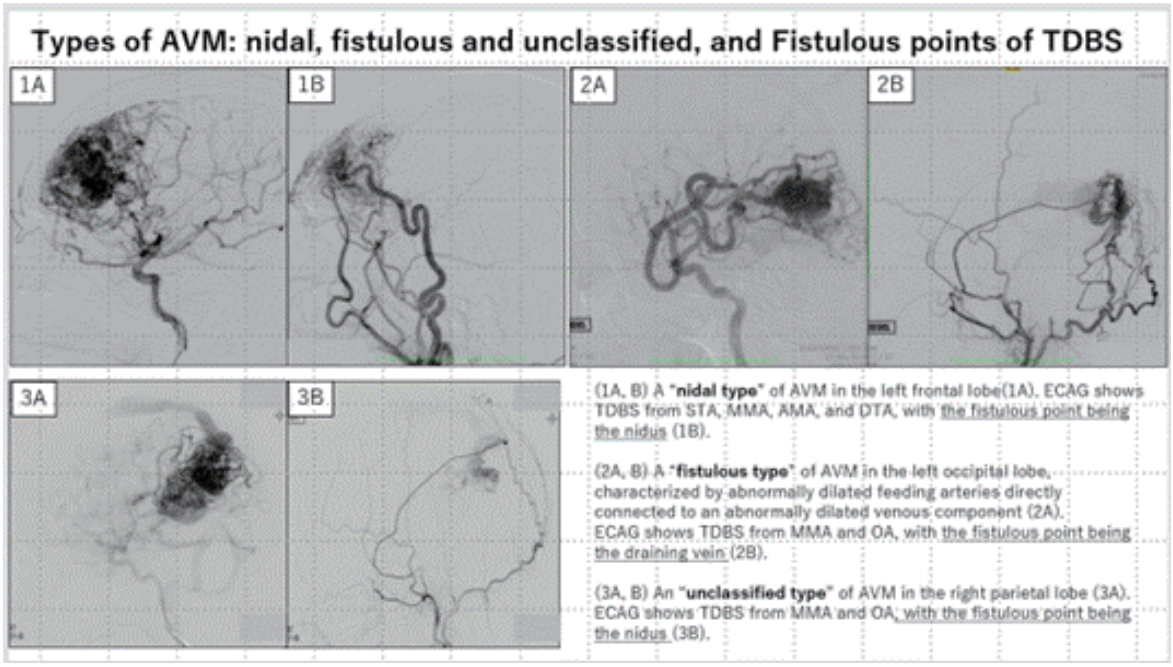
Results: Among 521 patients (524 bAVMs) 88(16.8%) had TDBS. Multivariate analysis revealed that TDBS was significantly associated with older age (OR 1.04, 95% CI 1.02-1.06), larger AVM size (OR 1.95, 95%CI 1.60-2.42), eloquent area involvement (OR 3.2, 95% CI 1.61-6.50), headache (OR 2.85, 95% CI 1.26-6.44), and occipital lobe involvement compared to the frontal lobe (OR 3.12, 95% CI 1.28-7.61). Fistulous and unclassified types were more frequent in TDBS cases than non-TDBS cases (18% vs. 10%) (p

Conclusions: Brain AVMs with TDBS are associated with older age and exhibit distinctive angioarchitectures including large size, eloquence and occipital locations, non-nidal type, and a higher frequency of headache. In approximately one-third of bAVMs with TDBS, transdural feeders directly connect to the draining vein. Those characteristics may have implications for both pathogenesis and treatment strategy.

Keywords: AVM, TDBS, Fistulous

FP-2-01

Table/Graph/Figure-1:



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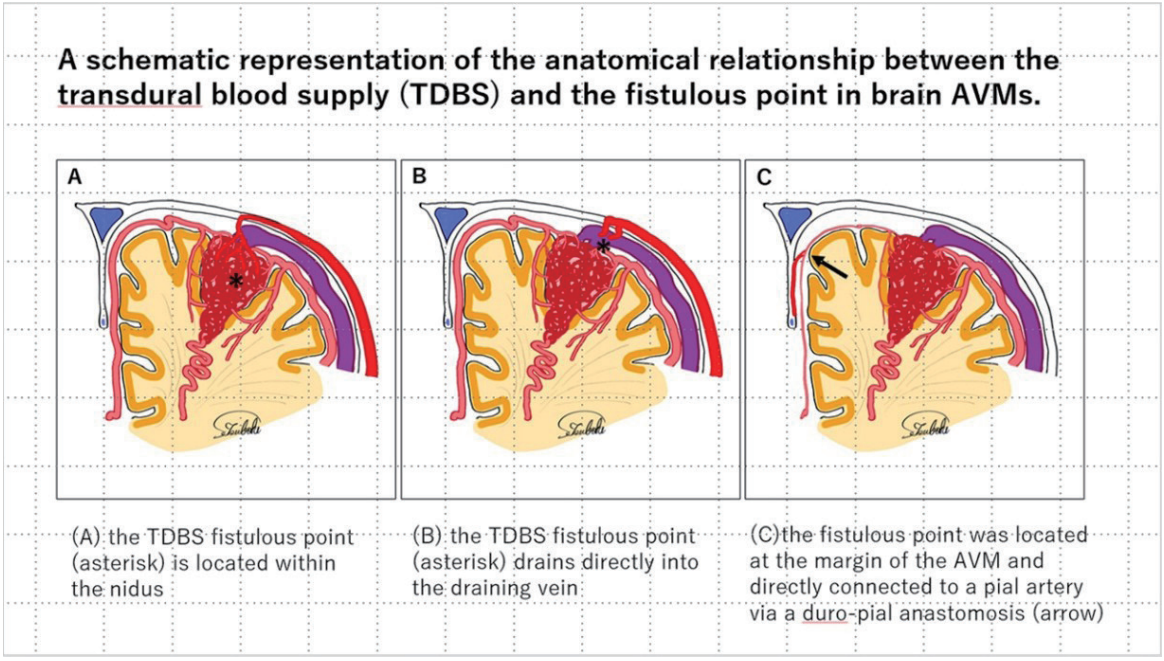

FP-2-02

Unveiling the osseous and extracranial venous anatomy of the cranio-cervical junction using CT-DSV

Katsuhiro Mizutani[1*], Takenori Akiyama[1], Hiroki Yamada[1,2], Takahiro Iinuma[1], Masahiro Toda[1]

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[2]*Neurosurgery, Mihara Memorial Hospital, Isezaki, Japan*

Back Ground/Aim: Introduction: The craniocervical junction has a complex anatomical structure that is closely related to various clinical conditions including dural arteriovenous shunts (dAVSs); however, its venous network has not been fully elucidated. In this study, we investigated the venous structures of the cranio-cervical junction using computed tomography–digital subtraction venography (CT-DSV).

Methods: Materials and Methods: Head CT-DSV images from 323 patients (aged 6 months to 93 years) obtained prior to neurosurgical procedures in our department were retrospectively analyzed. We examined the intraosseous and extracranial venous structures in this region and their connections with surrounding veins.

Results: Results: Intraosseous veins around the hypoglossal canal were frequently observed in nearly half of the subjects (46.0%). These veins were connected to the anterior condylar vein, internal jugular vein, lateral condylar vein, posterior condylar vein, inferior petroclival vein, and clival diploic veins. Intraosseous veins within the atlas and odontoid process were less common but were connected to the vertebral vein, internal vertebral venous plexus, and suboccipital cavernous sinus. A venous structure located anterior to the condyle—referred to in previous literature as the prevertebral vein but poorly characterized—was identified in almost half of the subjects. Furthermore, we observed veins or venous plexuses at the midline around the tip of the odontoid process connecting with the precondylar vein. These venous structures have not been previously described, and our study is the first to identify them using CT-DSV.

Conclusions: Conclusion: CT-DSV enabled detailed visualization of the intraosseous and extracranial venous architecture at the cranio-cervical junction. We believe that several subtypes of dAVSs, including anterior condylar dAVSs and intraosseous AVSs of the atlas, may originate from these venous structures. The insights obtained from this study may aid interventional neuroradiologists in better understanding the pathophysiology of vascular diseases in this region.

Keywords: Hypoglossal, Condylar, Clivus, Atlas, Vein

FP-2-03

AI-enhanced segmentation of cerebral vasculature on non-contrast CT in acute ischemic stroke with large vessel occlusions

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Back Ground/Aim: Back Ground and purpose: Traditional imaging methods, like CT angiography (CTA), are unable to visualize vascular structures beyond large vessel occlusions (LVOs) in acute ischemic stroke (AIS) patients. We aimed to develop a deep learning based segmentation model for reconstructing the vasculature of the anterior cerebral circulation from non-contrast CT (NCCT) in LVO-AIS patients.

Methods: Methods: Three datasets were utilized in this study. A nnU-Net model was trained and validated on retrospectively collected paired NCCT-CTA head images without LVOs from December 2018 to April 2024. Model performance was evaluated using several metrics including Dice Similarity Coefficient (DSC). Clinical validation was performed on NCCT images of LVO-AIS patients from two hospitals with a subjective scoring system.

Results: Results: Images from 120 patients (Dataset 1) were included for model development (training: n=100, median age=56 years, 38 [38%] female; internal testing: n=20, median age=60 years, 7 [35%] female). The nnU-Net 3D-fullres model achieved a Dice score of 0.64 ± 0.06 on the internal test. In Dataset 2 (n=120, median age=67 years, 35 [29%] female), 99.2% (119/120) of patients received high subjective visual scores. In Dataset 3 (n=120, median age=67 years, 35 [29%] female), 91.7% (110/120) of patients received high subjective visual scores. Among the clinical and imaging characteristics, CT slice thickness was the only factor that significantly affected the segmentation results.

Conclusions: Conclusion: The proposed deep learning model could accurately segment cerebral vasculature from NCCT images in LVO-AIS patients, highlighting its potential to improve thrombectomy planning and recanalization outcomes.

Keywords: Ischemic, Stroke, Occlusion, Artificial, Intelligence

FP-2-04

Collateral perfusion score as a surrogate of infarct growth rate and predictor of futile endovascular thrombectomy in acute anterior circulation ischemic stroke

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Back Ground/Aim: Infarct growth rate (IGR) in anterior circulation ischemic stroke determines the therapeutic window and clinical outcomes. Rapid assessment of IGR is critical for personalized endovascular thrombectomy (EVT) decision-making. This study examined whether collateral perfusion score (CPS) can serve as a surrogate marker for IGR and predict futile EVT.

Methods: This secondary analysis of a prospective observational study included patients with acute ischemic stroke caused by steno-occlusion of the unilateral internal carotid artery and/or middle cerebral artery (M1 and M2) within 6 hours of symptom onset. IGR was calculated as baseline diffusion-weighted imaging lesion volume divided by the onset-to-imaging time (ml/min). CPSs were categorized as 5 (excellent), 4 (good), 3 (intermediate-to-good), 2 (intermediate-to-poor), 1 (poor), and 0 (very poor). IGR and CPS were compared using pairwise two-sided multiple comparison analyses. Multiple logistic regression analyses were conducted to assess their predictive value for futile EVT, defined as a modified Rankin Scale score ≥3 at 90 days despite successful recanalization (TICI 2b-3).

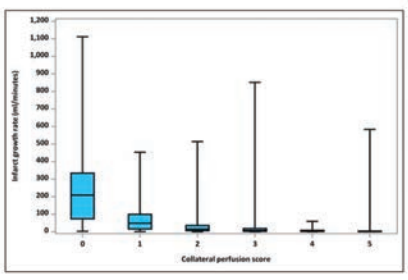
Results: A total of 467 participants (mean age ± standard deviation, 72 ± 12; 270 men) were included. CPS showed a significant inverse correlation with IGR (p

Conclusions: CPS was inversely associated with IGR and independently predicted futile EVT, along with age, baseline stroke severity, and onset-to-recanalization time. These findings support CPS as a practical surrogate for infarct growth dynamics and a useful tool for identifying patients at high risk of futile EVT in clinical practice.

Keywords: Collateral, Stroke, Reperfusion, Thrombectomy, Infarction

Table/Graph/Figure-1:

Correlation between CPS and IGR



Results of Multivariable Analysis: Independent Predictors of Futile EVT

Predictor	Multivariable Model OR (95% CI)	*P* value
Age	**2.05 (1.49-2.82)**	**<.001**
Systolic BP	1.05 (0.94-1.18)	0.377
Baseline NIHSS	**1.09 (1.03-1.16)**	**0.007**
Baseline DWI lesion volume	1.06 (0.96-1.18)	0.234
Baseline CT ASPECTS		
< 6	2.06 (0.82-5.14)	0.122
≥ 6	Reference	
Collateral Perfusion Score		
0	**11.16 (2.11-58.90)**	**0.005**
1	2.51 (0.66-9.56)	0.177
2-3	3.19 (0.96-10.54)	0.057
4-5	Reference	
P for trend		**0.030**
Onset-to-recanalization time	**1.10 (1.03-1.19)**	**0.006**

FP-2-05

Utilization of flat panel perfusion image, RAPID Angio, for various neuroendovascular therapy

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Back Ground/Aim: Flat panel perfusion image, RAPID Angio (RA), is available in various neuroendovascular therapy. We retrospectively analyzed cases with RA.

Methods: During May 2021 to Sep 2024, RA was performed in total 51 times, 48 cases in our institute. RA was performed 29 times in 29 cases with direct transfer to angio suite (DTAS) RA was also performed 22 times in 19 cases.

Results: In DTAS cases, MT was performed in 18 cases of 29 cases with direct transfer to angio suite (DTAS). D2P, D2R were 33min (IQR 29.3-38), 85.5 min (IQR, 75.3-122), respectively, which were reduced statistically significant compared with cases before utilization of DTAS and RA in our institute. For carotid stenosis (CS) and ICAD cases, RA was performed 12 times in10 case and 10 times in 9 cases, respectively. In 14 tims in 12 times of CS/ICAD cases, SPECT was performed before RA. There were no quite discrepancy between RA and SPECT data. In one case of CAS, extensive stage II area was observed in SPECT before treatment. RA at the time of treatment showed also extensive area with Tmax>6sec. Staged angioplasty was conducted and stage II area in SPECT and Tmax >6 sec area in RA both were markedly reduced just before second stage treatment.

Conclusions: RA with DTAS contributed time reduction of MT. RA showed perfusion status in CAS/ICAD just before treatment, which may lead more accurate treatment strategy. RA has potential of utilizing in various neuroendovascular cases.

Keywords: RAPID Angio, CAS, ICAD

FP-2-06

Diagnostic performance of CT perfusion in detecting contralateral aplasia of the A1 segment in acute internal carotid artery occlusion

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Back Ground/Aim: Acute occlusion of the internal carotid artery (ICA) accompanied by contralateral A1 segment agenesis (CA-A1) presents distinct clinical and radiological features. Differentiating CA-A1 from non-CA-A1 cases in acute ICA occlusion based on preoperative angiography images is challenging. We hypothesized that CT perfusion (CTP) could help to quickly and accurately recognize acute ICA occlusions with CA-A1 and that the double stent retriever (DSR) technique might improve radiological outcomes in ICA occlusion with CA-A1.

Methods: ICA occlusion cases were categorized into CA-A1 and non-CA-A1 groups. The diagnostic performance of CTP for CA-A1 was assessed, and radiological outcomes were compared between DSR and non-DSR groups in the CA-A1 group.

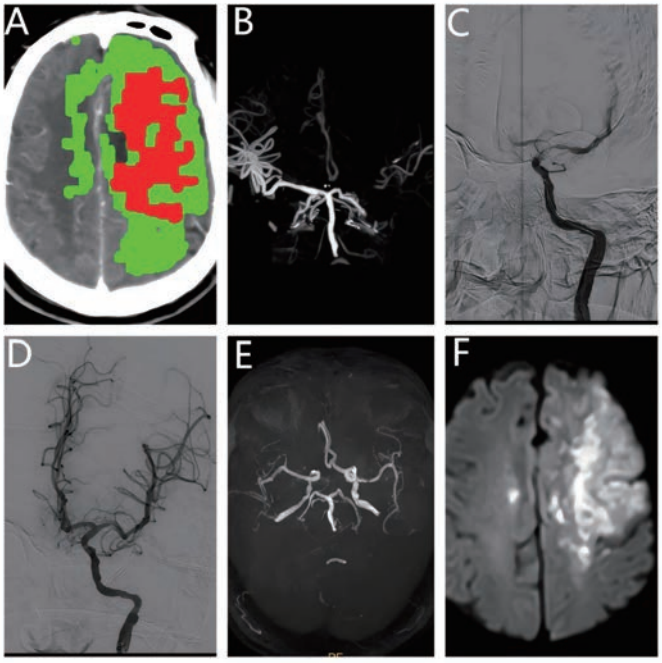
Results: A total of 281 cases of acute ICA occlusion were included: 34 with CA-A1 and 247 without CAA1. Bilateral anterior cerebral artery (ACA) perfusion abnormalities on CTP were more frequent in the CA-A1 group (97.1% vs 5.3%, P

Conclusions: CTP can accurately and quickly detect CA-A1 in acute ICA occlusion. Distal embolism into the ipsilateral ACA is common in the CA-A1 group, and the DSR technique significantly reduces its incidence, showing promise as a first-line strategy.

Keywords: CT Perfusion, AIS, AICAO

FP-2-06

Table/Graph/Figure-1:



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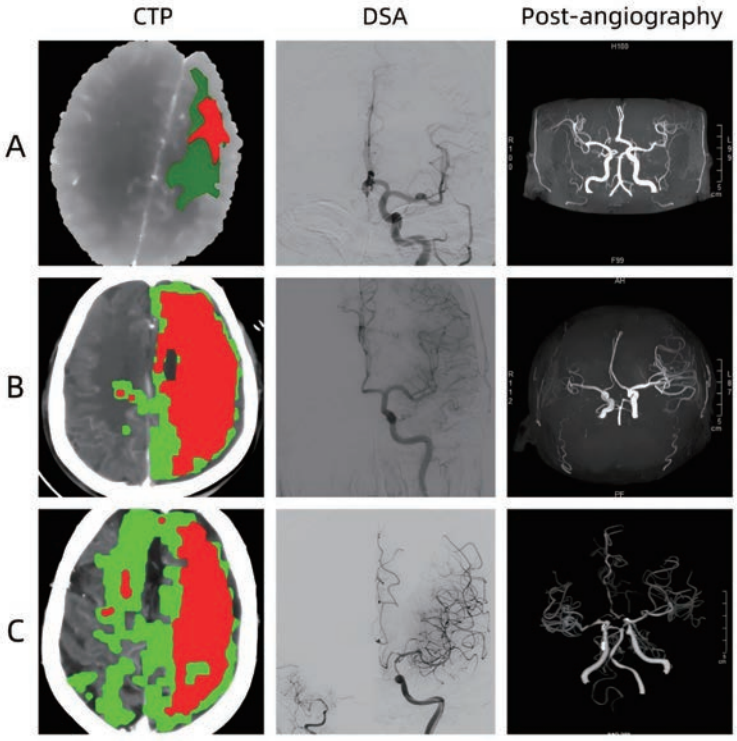

FP-2-07

Impact of magnified 3D rotational angiography on eye lens radiation dose: A phantom and clinical study

Ahmed Albaqshi[1,2], Yunsun Song[2*], Abdullah Alhindi[2], Boseong Kwon[2], Deok Hee Lee[2]

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[2]Radiology, Asan Medical Center, Seoul, Korea

Back Ground/Aim: In diagnostic cerebral angiography, especially during 3D rotational angiography (3DRA) for intracranial aneurysm evaluation, radiation exposure to the eye lens is anatomically unavoidable. Given the radiosensitivity of the lens, such exposure carries a potential risk of radiation-induced cataract. This study aimed to assess whether using 22 cm or 32 cm field-of-view (FOV) instead of the standard 42 cm FOV in 3DRA can reduce lens radiation dose without compromising diagnostic image quality.

Methods: Twenty patients requiring bilateral 3DRA based were prospectively enrolled. Imaging was performed using Siemens Artis Q and Z biplane systems. Each patient underwent bilateral 3DRA acquisitions, with one hemisphere randomly assigned to a zoomed FOV (22 cm or 32 cm) and the other to the standard 42 cm FOV. A photoluminescent dosimeter was attached to the lateral canthus of both eyes to measure lens dose. Air Kerma (AK) and Dose-Area Product (DAP) were recorded, and image quality was rated on a 5-point scale by three blinded interventional neuroradiologists.

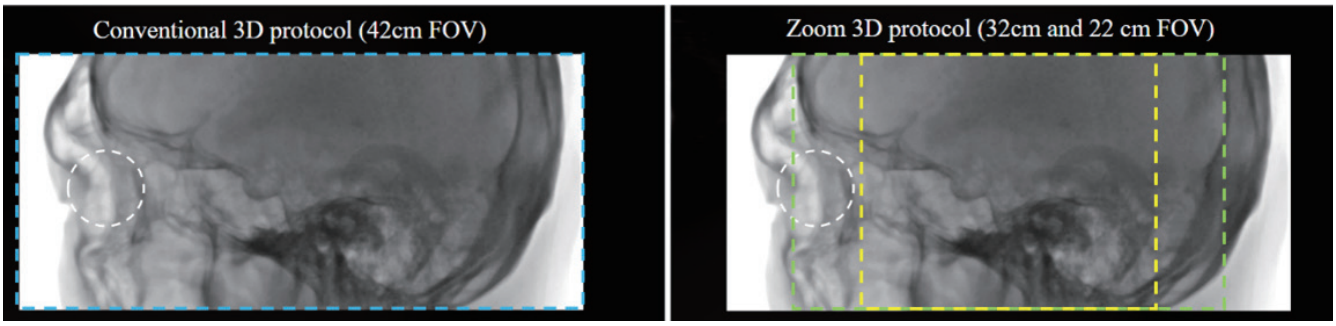
Results: Application of zoomed protocols significantly reduced eye lens radiation dose compared to the standard 42 cm FOV. However, radiation output as measured by AK increased by 66.3% with the 22 cm FOV and 60.3% with the 32 cm FOV. In terms of DAP, the 22 cm FOV resulted in a 7.9% decrease, while the 32 cm FOV was associated with a 19.9% increase, relative to the standard protocol. Despite these changes in radiation output, image quality assessments showed no statistically significant difference between zoomed and standard acquisitions.

Conclusions: Zoomed 3DRA with 22 cm or 32 cm FOV significantly reduces eye lens radiation without loss of diagnostic confidence. While the 22 cm FOV achieves the highest lens dose reduction, the 32 cm FOV may offer a more practical compromise between radiation dose reduction and adequate anatomical coverage.

Keywords: Magnified , Angiography , Lens , Eye , Radiation

FP-2-07

Table/Graph/Figure-1:



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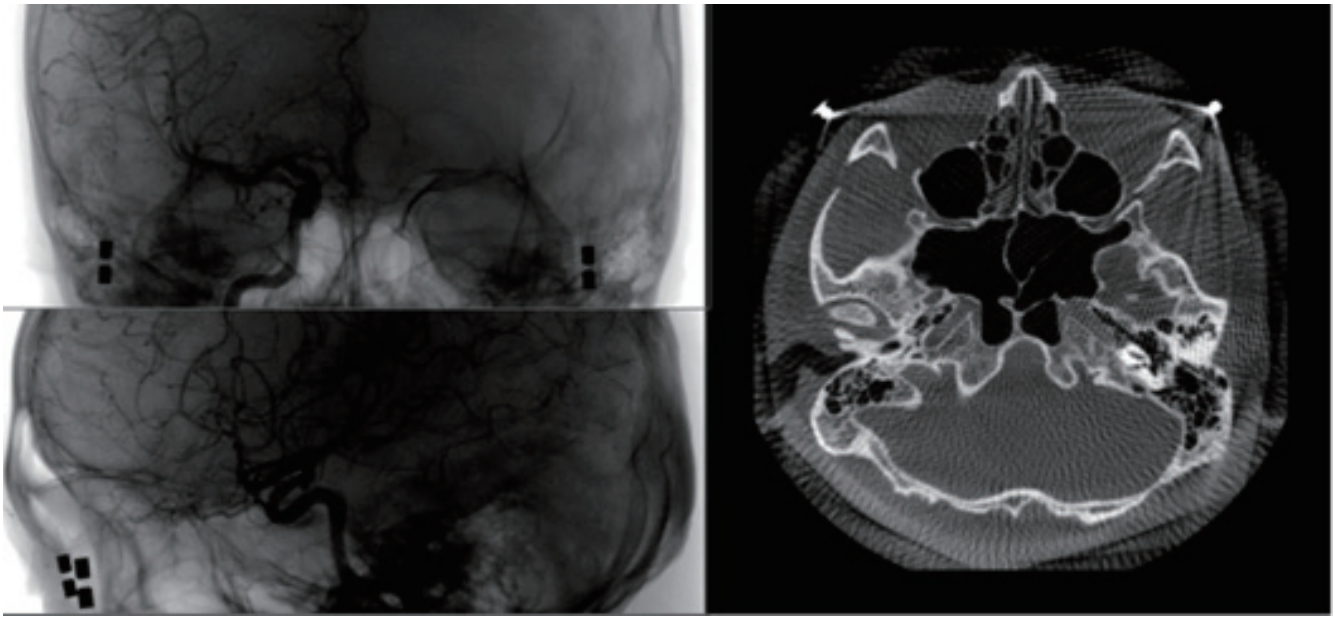

Day 2

December 13 (15:10-17:10)

Scientific (Free Paper) Session 3
Acute Ischemic Stroke & CAS

Moderators

Hyun Jeong Kim
Daejeon St. Mary's Hospital, Korea

Yu Zhou
Changhai Hospital, Naval Medical University, China

FP-3-01

Dual-layered stent retriever for cancer-related stroke endovascular thrombectomy

Jaeseob Yun[1,2], Kwang Hyun Kim[2,3], Solbi Kim[2,4], Kyu Seon Chung[2,4], Hyo Suk Nam[5], Ji Hoe Heo[6], Byung Moon Kim[2], Young Dae Kim[5], Dong Joon Kim[2*]

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Back Ground/Aim: Cancer-related stroke (CRS) is frequently associated with fibrin-/platelet-rich and mechanically stiff thrombi, for which optimal first-line thrombectomy strategy remains uncertain. This study reassessed endovascular treatment (EVT) outcomes in CRS with a device-focused perspective, comparing a dual-layered stent retriever (SR) with conventional SRs

Methods: In a retrospective cohort of 78 CRS patients treated with EVT (February 2011–July 2024), outcomes were contrasted by (i) first-line EVT technique (combined vs SR-only vs contact aspiration [CA]) and (ii) SR type (dual-layered Embotrap vs Trevo vs Solitaire). The primary efficacy endpoint was the first-pass effect (FPE: mTICI 2c/3 after a single pass). The primary safety endpoint was symptomatic intracranial hemorrhage (sICH). Multivariable logistic regression was used to evaluate the association between SR type and FPE.

Results: Across first-line techniques, FPE did not differ significantly (combined 34.5% vs SR-only 17.1% vs CA 35.7%; P=0.20). In the device subgroup comparison, the dual-layered Embotrap achieved a higher FPE than Trevo and Solitaire (53.8% vs 25.0% vs 14.3%, P=0.023) and showed an independent association with FPE (adjusted odds ratio 11.0; 95% CI 1.4–126.0; P=0.031). sICH incidence did not differ among groups.

Conclusions: In CRS thrombectomy, a dual-layered SR was associated with a higher first-pass reperfusion rate without increasing sICH, supporting its consideration as a preferred first-line device when CRS is suspected. Disclosure (add if the conference requires prior-presentation statements) Portions of these data were previously presented in a technique-focused abstract at ESMINT 2025; the present submission emphasizes a device-class subgroup analysis.

Keywords: Ischemic, Stroke, Thrombus, Thrombectomy, Cancer

FP-3-01

Table/Graph/Figure-1:

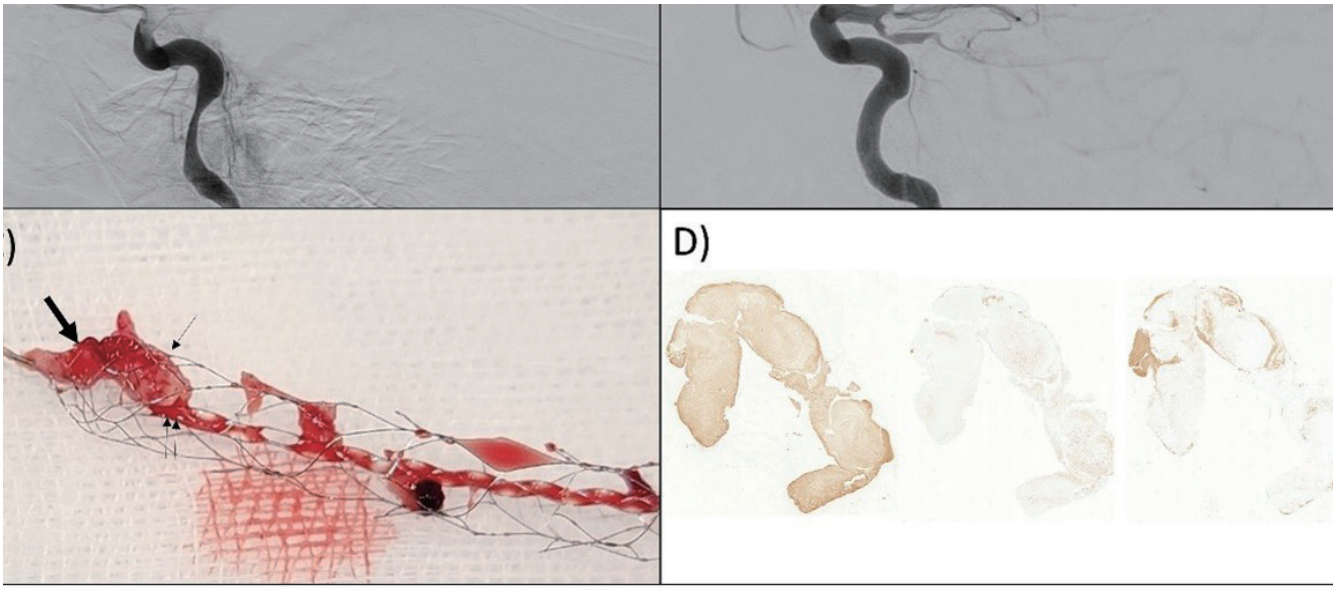

Figure 1. Figure. Cancer related white thrombus captured by the dual-cage and distal mesh structure of dual-layered stent retriever
A 24-year-old male with underlying metastatic cardiac sarcoma presented with acute onset left side weakness and underwent emergent endovascular thrombectomy. A) Right distal ICA occlusion was noted on DSA. B) Complete recanalization was achieved. C) Notice the white clot trapped between the outer (single arrow) and the inner (double arrows) cages and the distal mesh (thick arrow) of the dual-layered stent retriever. D) Immunohistochemical staining demonstrates the distribution of fibrin (left), platelets (middle), and red blood cells (RBC, right). The thrombus was composed predominantly of platelet/fibrin-rich material (40%) with a low RBC content (9%). Although the patient showed marked improvement of the neurological symptoms (initial/7day NIHSS scores of 17/0) the patient died about 40 days later due to symptoms of heart failure.

FP-3-02

Modified two-stage aspiration technique (TSAT) for primary MeVO

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Back Ground/Aim: The efficacy of mechanical thrombectomy (MT) for medium vessel occlusion (MeVO), such as M2 occlusion, has not yet been established. One reason may be the wide anatomical variability of the M2 segment. In proximal M2 occlusions with a shallow branching angle from M1, the occluded vessel can be treated as an extension of M1, requiring a large-bore aspiration catheter (LBAC). In contrast, distal M2 occlusions with a steep takeoff angle are difficult to reach with LBACs, and the use of a stent retriever (SR) carries a risk of vessel stretching and hemorrhagic complications. Small-bore aspiration catheters (SBACs) are safer in such cases but may provide insufficient suction when used alone. Therefore, a tailored device setup that accommodates individual M2 anatomy is crucial for effective thrombectomy in MeVO.

Methods: We have applied a modified two-stage aspiration technique (TSAT) using coaxial SBAC and LBAC for MeVO thrombectomy. This method is adapted from the original TSAT, which was developed to prevent distal embolization during contact aspiration for large vessel occlusion. In the modified TSAT, the LBAC is advanced and wedged from the distal M1 to the proximal M2 segment, while the SBAC engages the thrombus distally. The clot captured by SBAC aspiration is withdrawn to the LBAC tip, then suction is switched to the LBAC during SBAC removal, allowing the clot to be retrieved by contact aspiration.

Results: Technical details and treatment outcomes will be presented.

Conclusions: This approach enables safe clot extraction without excessive traction on tortuous M2 segments, utilizing both distal reach and proximal aspiration force.

Keywords: Modified TSAT, AIS, MeVO, Thrombectomy

FP-3-03

Analysis of the influence of vascular patterns on mechanical thrombectomy for distal middle cerebral artery embolism

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Back Ground/Aim: The influence of middle cerebral artery (MCA) vascular trajectory on the outcomes of mechanical thrombectomy (MT) for distal M1 (M1d) occlusion remains unclear. At our institution, all initial MT procedures are performed using a stent retriever alone, enabling precise localization of the clot. This study aimed to evaluate the association between MCA trajectory, clot position, and procedural outcomes.

Methods: We retrospectively analyzed patients who underwent MT for acute M1d occlusion between April 1, 2024, and April 30, 2025. Patients with tandem lesions or requiring adjunctive intracranial/extracranial percutaneous transluminal angioplasty were excluded. Based on MCA morphology, patients were classified into two groups: Group A, in which the MCA curved convexly downward relative to a straight line connecting the ipsilateral internal carotid artery (ICA) terminus and the distal clot edge; and Group B, which did not exhibit this curvature. Clinical and procedural outcomes were compared between groups.

Results: A total of 22 patients were included (median age 82.5 years; 50% female; median NIHSS 19.5). Successful reperfusion (TICI ≥2b) was achieved in 21 cases (95.4%), and a favorable outcome at discharge (mRS 0–2) in 9 cases (40.9%). Group A consisted of 14 patients and Group B of 8. No significant differences were observed in age, sex, NIHSS score, or premorbid mRS. All patients initially underwent MT with a stent retriever alone. The mean number of passes did not differ significantly (2.7 vs 1.75). First pass effect (35.7% vs 62.5%) and TICI ≥2b (100% vs 87.5%) were not significantly different. However, complete reperfusion (TICI 3) was significantly more frequent in Group B (87.5% vs 35.7%, p = 0.031). No significant differences were observed in hemorrhagic complications.

Conclusions: A non-convex MCA trajectory was associated with higher rates of TICI 3 without increased adverse events. Vascular configuration may assist in planning MT strategies.

Keywords: Thrombectomy, LVO, Stroke

FP-3-04

Facilitating angioplasty and stenting with dual-lumen balloon microcatheter for intracranial atherosclerotic stenosis-related large vessel occlusion: A comparative study

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Background and Purpose: Intracranial large vessel occlusion due to atherosclerotic stenosis (ICAS) complicates acute ischemic stroke (AIS) management, with challenges such as reocclusion, thrombus migration. This study provides a preliminary evaluation of a novel technique—Facilitating Angioplasty and Stenting with a Dual-Lumen Balloon Microcatheter—for ICAS-related large vessel occlusions, using data from a single-center registry and comparing them to a reference cohort from a multicenter trial.

Methods: This retrospective study utilized data from two sources: the OCEAN-AIS-EVT REGISTRY for the FAST-ICAS group and the DIRECT-MT trial for the traditional treatment group. A total of 60 patients were included, with 17 patients in the FAST ICAS group and 43 in the traditional group. Although group comparisons are presented, the differing data sources and limited sample size warrant caution. Clinical and procedural outcomes were examined, focusing on time from puncture to reperfusion, eTICI scores, and 90-day functional outcomes.

Results: The FAST ICAS group demonstrated a shorter median time from puncture to reperfusion (38 min vs. 62 min, $p = 0.023$) and a higher rate of eTICI 3 scores (82.4 % vs. 34.9 %, $p = 0.006$). Although a greater proportion of patients in the FAST ICAS group achieved excellent functional outcomes (mRS ≤ 1) compared to the traditional group (47.1 % vs. 34.9 %), this difference was not statistically significant ($p = 0.562$). Two patients in the FAST ICAS group required conversion to traditional methods due to severe vascular tortuosity.

Conclusions: FAST ICAS may offer improved procedural efficiency and angiographic results in ICAS-related AIS, potentially achieving faster reperfusion and higher eTICI 3 rates. However, these findings are exploratory, and further large-scale, multicenter trials are essential to validate the efficacy of FAST ICAS, optimize its application, and assess its long-term benefits across diverse patient populations..

FP-3-05

Transradial versus transfemoral endovascular thrombectomy for posterior circulation large vessel occlusion: A prospective multicenter study

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Back Ground/Aim: We aimed to compare the safety and efficacy of TRA versus TFA thrombectomy in patients with acute LVO in the posterior circulation.

Methods: In this multicenter prospective cohort study, we identified patients with acute posterior circulation LVO who underwent thrombectomy from January 2022 to September 2024. Patients were categorized according to the primary vascular access site into TRA and TFA groups. The primary endpoint was good neurological recovery (modified Rankin Scale 0–2) at 90 days. Secondary endpoints included mRS distribution at 90 days, successful revascularization (modified Thrombolysis in Cerebral Infarction [mTICI] ≥ 2b), puncture-to-recanalizationt ime and the length of hospital stay. The safety indicators included puncture site complications, symptomatic intracranial hemorrhage, in-hospital mortality, and mortality at 90 days. We used multivariable logistic regression to compare binary outcomes, poisson regression to compare count data, and proportional odds ordinal logistic regression for ordinal shift in mRS.

Results: Among 379 patients with acute posterior circulation LVO treated by thrombectomy, 83 (21.9%) received TRA thrombectomy. There were no statistical differences in the rates of good neurological recovery 90 days (TRA vs TFA: 48% vs 41.4%, aOR 1.19, 95%CI 0.70–2.03, P = 0.518), mRS distribution at 90 days (aOR 1.03, 95%CI 0.63–1.68, P = 0.919), and successful recanalization (97.6% vs 93.2%, aOR 4.44, 95%CI 0.50–38.7, P = 0.181). Puncture-to-recanalization time (44 [32–73] vs 59 [34–88] mins, P = 0.026) and length of hospital stay (7 [5–11] vs 9 [IQR 6– 15] days, P 0.001) with TRA thrombectomy were shorter. No statistical differences were observed with all safety indicators between the two groups.

Conclusions: TRA thrombectomy had comparable safety and efficacy compared to TFA thrombectomy but was associated with shorter puncture-to-recanalization and hospital length of stay

Keywords: Trans-Radial, Approch, Thrombectomy, Stroke, Posterior Circulation

FP-3-06

Why is a large-bore catheter necessary in large vessel occlusion from a biomechanical perspective?

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Back Ground/Aim: Aspiration thrombectomy is a widely adopted treatment for acute ischemic stroke due to large vessel occlusion. Among several technical factors, the diameter of the aspiration catheter plays a critical role in determining thrombus fixation, aspiration efficiency, and overall procedural success. This study aimed to investigate the biomechanical effects of a larger catheter diameter on thrombus behavior and vessel wall response during aspiration thrombectomy.

Methods: Finite element analysis was employed to simulate aspiration using three clinically relevant aspiration catheters with different diameters. Thrombi of two lengths and two compositions, varying in red blood cell content, were modeled to reflect clinical variability. Mechanical outcomes, including thrombus deformation, internal stress distribution, and vessel wall loading, were analyzed under standardized aspiration pressure conditions.

Results: 0.080 and 0.084-inch large-bore catheters produced greater thrombus deformation and internal stress than the 0.072-inch catheter, particularly in softer thrombi with higher red blood cell content. In both 3 and 5 mm thrombus with red blood cells, deformation increased by approximately 12.3% with the 0.084-inch catheter compared to the 0.072-inch catheter. These changes indicate improved clot engagement and aspiration efficiency, while vessel stress remained within physiological limits.

Conclusions: Large-bore aspiration catheters can enhance thrombus fixation and aspiration performance without compromising vascular integrity. These findings support the broader clinical use of larger-bore catheters in patients with large artery occlusion, particularly in cases requiring strong clot engagement and efficient recanalization.

Keywords: Stroke, Thrombectomy, Catheter, Simulation

FP-3-07

Syringe vs pump aspiration in acute large vessel occlusion: Single-center retrospective comparative study

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Back Ground/Aim: In thrombectomy, the aspiration component can be powered by either an aspiration syringe or a vacuum pump. Whether the vacuum source affects clinical outcomes is unclear; we compared syringe aspiration with pump aspiration in an aspiration-first practice.

Methods: We retrospectively reviewed 165 consecutive procedures performed from January 2023 through May 2025 at a single center and grouped cases by vacuum source: Syringe (no pump use, n=145) and Pump (any pump use, n=20). Our center follows an aspiration-first workflow; syringe aspiration is considered first, and pump use is at operator discretion. Primary outcomes were final reperfusion (TICI 2b-3 and 2c-3) and symptomatic intracranial hemorrhage (sICH, Heidelberg). Secondary outcomes were first-pass effect (FPE, TICI 2c-3 after the first attempt), procedure time, NIHSS change (discharge minus baseline; negative values indicate improvement), and distal embolism. Prespecified subgroup analyses focused on initial aspiration-only and combined techniques.

Results: Final reperfusion was similar between Syringe and Pump groups (TICI 2b-3: 85.5% vs 85.0%, p=1.00; TICI 2c-3: 52.4% vs 55.0%, p=1.00). sICH occurred less often with Syringe than with Pump (3.45% vs 15.0%, p=0.058). FPE numerically favored Syringe (34.5% vs 20.0%, p=0.309). Distal embolism rates were comparable (34.5% vs 35.0%, p=1.00). Procedure time was similar (53.6 vs 56.9 minutes, p=0.483). NIHSS improvement did not differ (−3.34 vs −1.67 points, p=0.557). In prespecified subgroup analyses by initial technique, patterns were consistent in combined-technique cases and directionally similar in aspiration-only cases, with precision limited by smaller Pump cohorts.

Conclusions: In an aspiration-first practice, syringe aspiration achieved reperfusion rates comparable to pump aspiration while showing a lower observed rate of sICH and no excess distal embolism. These single-center comparative findings warrant confirmation in larger multicenter studies with standardized capture of vacuum source and procedural covariates.

Keywords: Thrombectomy, Aspiration, Syringe, Pump, Hemorrhage

FP-3-08

Angioplasty versus angioplasty plus stenting for underlying intracranial atherosclerotic stenosis in acute large vessel occlusion

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Back Ground/Aim: The optimal treatment strategy for patients with acute large vessel occlusion (LVO) due to underlying intracranial atherosclerotic stenosis (ICAS) is unclear. The purpose of this study was to investigate the efficacy and safety of angioplasty alone and angioplasty plus stenting for underlying atherosclerotic stenosis in such patients.

Methods: From January 2010 to June 2022, a total of 168 patients underwent angioplasty with or without stenting to treat underlying atherosclerotic stenosis during endovascular treatment for acute LVO in the anterior and posterior circulations. All patients underwent follow-up CT angiography during hospitalization. Procedure-related complications, treatment, and clinical outcomes were compared between the two groups. The patency of the treated artery was assessed with follow-up CT angiography by evaluating restenosis, early reocclusion, and luminal gain of the treated artery. A favorable clinical outcome was defined as a modified Rankin Scale (mRS) score of 0 to 2 at 90 days post-treatment.

Results: Among patients, 63 underwent angioplasty alone and 105 received angioplasty plus stenting. Instant reocclusion occurred in 11.3% during the procedure. Extravasation occurred in 2 stenting cases, and subarachnoid hemorrhage was found in 17.3% on follow-up CT. Procedure-related complication rates were not different between the two groups. However, suboptimal angiographic results were more frequent in the angioplasty group (34.9% vs. 17.1%, p=0.009), while luminal gain was more common with stenting (22.9% vs. 9.5%, p=0.004). No significant differences were observed in successful reperfusion rate, restenosis, early reocclusion, hemorrhagic complications, or favorable clinical outcome.

Conclusions: Both angioplasty alone and angioplasty plus stenting appear safe and effective for treating underlying ICAS in acute stroke patients with LVO. While additional stenting after angioplasty may have an advantage in luminal gain, angioplasty alone may provide comparable clinical efficacy.

Keywords: Angioplasty, Atherostenosis, Stenting, LVO

FP-3-09

Determining the optimal timing of dual-energy CT for prediction of hemorrhagic complications after endovascular thrombectomy

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Back Ground/Aim: Iodine extravasation on dual-energy CT (DECT) predicts hemorrhagic complications after endovascular thrombectomy (EVT), but the optimal timing remains unclear. This study evaluated the predictive value of DECT performed at different time intervals using a simple region of interest (ROI) ratio.

Methods: We retrospectively analyzed 307 patients with anterior circulation stroke who underwent EVT and subsequent DECT. The maximal ROI within the EVT area and its contralateral reference were measured to calculate the ROI ratio. Hemorrhagic complications, including hemorrhagic infarction, parenchymal hematoma (PH), and subarachnoid hemorrhage, were confirmed by follow-up MRI within 24 hours. Predictive performance was assessed using area under the curve (AUC), sensitivity, specificity, chi-square tests, and logistic regression.

Results: Mean age was 70.3 years, 56.7% were male, and 85.7% achieved successful reperfusion (mTICI ≥2b). Any hemorrhage occurred in 51.5% (PH in 19.2%). DECT was performed ≤1 hour (n=92), 1–2 hours (n=29), 2–3 hours (n=132), and >3 hours (n=55) post-EVT. The ROI ratio showed strong predictive performance for any hemorrhage (AUC 0.834) and PH (0.777). Even without apparent hemorrhage on the hemorrhage map, AUCs remained high (0.814 and 0.794, respectively). DECT ≤1 hour better predicted any hemorrhage than >1 hour (AUC 0.884 vs. 0.812, p=0.040), and ≤2 hours better than >2 hours (0.877 vs. 0.805, p=0.046). Among those without visible hemorrhage, DECT ≤3 hours predicted any hemorrhage and PH better than >3 hours (all p

Conclusions: The ROI ratio on DECT effectively predicts hemorrhagic complications, even in the absence of visible hemorrhage on hemorrhage map. DECT within 1 hour after EVT provided the best prediction of hemorrhagic complications. If early DECT is not feasible, scanning within 3 hours is acceptable, whereas DECT beyond 3 hours offers limited predictive value.

Keywords: DECT, EVT, Hemorrhage

FP-3-10

Delayed white matter injury after endovascular thrombectomy in acute anterior circulation large vessel occlusion: A two-center retrospective study

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Back Ground/Aim: Following successful endovascular thrombectomy (EVT) for acute ischemic stroke due to anterior circulation large vessel occlusion, some patients experience delayed neurological deterioration despite initial improvement, attributed to progressive white matter injury without new infarction. This entity remains poorly characterized.

Methods: In a prospective two-center study in China, we enrolled EVT-treated patients with at least two postprocedural MRI scans obtained ≥1 week apart. White matter lesion (WML) growth was quantified using automated segmentation of FLAIR sequences. We analyzed associations between WML growth volume and new neurological symptoms, NIHSS score improvement, and 90-day functional outcome (modified Rankin Scale score 0-2).

Results: Of 246 screened patients, 34 (13·8%) met inclusion criteria (median baseline NIHSS 11; 41·2% female). Successful recanalization (mTICI ≥2b) was achieved in 94·1%. Mean WML growth volume was 8·26 mL. While some patients developed new or worsening symptoms (e.g., memory decline 8·8%, slowed response 8·8%), WML growth volume was not significantly associated with occurrence of new neurological symptoms, NIHSS improvement, or 90-day favourable functional outcome (64·7% of patients).

Conclusions: In patients with anterior circulation LVO stroke treated with EVT, delayed white matter injury was not significantly associated with short-term neurological or functional outcomes. This under-recognised complication warrants further investigation through dedicated prospective registries.

Keywords: Stroke, endovascular thrombectomy, acute anterior circulation large vessel occlusion, delayed white matter injury

FP-3-11

Rescue carotid stenting in tandem occlusions: 5 years' experience from a comprehensive stroke center

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Back Ground/Aim: 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.

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

Keywords: CAS, Stenting, MRI, ICH, DAPT

FP-3-11

Table/Graph/Figure-1:

Baseline characteristics	Outcome		p value
	Poor n (%)	Good n (%)	
Age ≥ 60	21 (77.8)	39 (61.9)	0.143[a]
Male	25 (92.6)	58 (92.1)	1.000[b]
Risk factors			
Smoking	25 (92.6)	38 (60.3)	0.002[a]
Hypertension	22 (81.5)	48 (76.2)	0.580[a]
Dyslipidemia	1 (3.7)	20 (31.8)	0.004[a]
Chronic kidney disease	2 (7.4)	4 (6.4)	1.000[b]
Diabetes	3 (11.1)	13 (20.6)	0.374[b]
Parameters on admission			
Admission NIHSS > 14	19 (70.4)	27 (42.9)	0.017[a]
Onset > 3 hours	19 (70.4)	29 (46.0)	0.034[a]
Left side	16 (59.3)	35 (55.6)	0.745[a]
DWI-ASPECTS < 7	12 (44.4)	17 (27.0)	0.104[a]
Door-to-groin puncture > 120 mins	7 (25.9)	13 (20.6)	0.580[a]
Parameters of procedure			
General anaesthesia	27 (100)	59 (93.7)	0.312[b]
Procedural time > 60 mins	17 (63.0)	19 (30.2)	0.004[a]
Proximal-to-distal approach	5 (18.5)	5 (7.9)	0.159[b]
Mechanical thrombectomy	18 (66.7)	26 (41.3)	0.027[a]
Unused EPD	22 (81.5)	35 (55.6)	0.019[a]
Closed-cell stents	18 (66.7)	42 (66.7)	1.000[a]
Parameters of post-procedure			
Sedation after procedure	20 (74.1)	39 (61.9)	0.266[a]
Complication	12 (44.4)	9 (14.3)	0.002[a]
Hemorrhagic transformation	10 (37.0)	8 (12.7)	0.008[a]
Without antiplatelet therapy	6 (22.2)	0 (0)	< 0.001[b]
Decompressive craniectomy	3 (11.1)	0 (0)	0.025[b]
Unrehabilitation	6 (22.2)	7 (11.1)	0.198[b]
Length of stay in ICU > 6 days	18 (66.7)	10 (15.9)	< 0.001[a]
Length of hospital stay > 14 days	14 (51.9)	9 (14.3)	< 0.001[a]

[a] Chi-square test; [b] Fisher's exact testst

Figure 1. Association between patient characteristics with clinical outcome in mRS at 3 months

FP-3-11

Table/Graph/Figure-2:

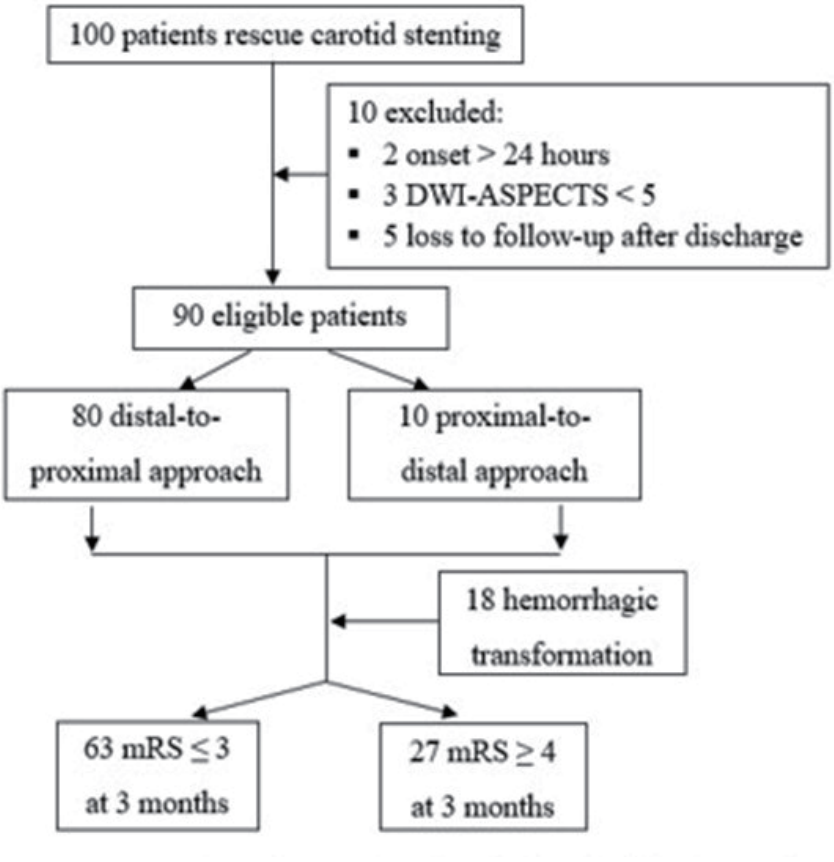

Figure 2. Flow-chart of patient inclusion in the study

FP-3-12

Factors associated with post-procedural hypotension following carotid artery stenting: Preliminary study of deployed stent configuration

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Back Ground/Aim: Carotid artery stenting (CAS) is an established endovascular treatment for severe stenosis of the proximal internal carotid artery. However, postprocedural hypotension frequently occurs, often prolonging hospitalization and requiring additional management. This study aimed to evaluate the incidence of post-CAS hypotension and identify predictive factors to improve risk stratification and patient care.

Methods: Between January 2023 and April 2025, 65 patients underwent elective CAS at our institution. All patients received preprocedural diagnostic angiography, including 7-, 9-, or 14-second cone-beam CT angiography. After stent placement, 3D rotational angiography was performed to assess deployment configuration. Our standard procedure included distal embolic protection, pre-stenting angioplasty, open-cell stent placement, and post-stenting angioplasty. The blood pressure (BP) change group was defined as patients who required intravenous vasopressors during and after the procedure due to a systolic BP below 90 mmHg.

Results: Among patients whose most stenotic segment was located within 10 mm of the external carotid artery (ECA) bifurcation—a known risk factor for postprocedural hypotension—14 experienced significant BP changes, while 19 did not. The mean degree of stenosis was higher in patients with BP changes (80.5%) than in those without (74.1%). Outward stent expansion was observed in 66.7% of patients with BP changes, whereas 89.5% of patients without BP changes exhibited inward expansion ($p = 0.001$). Stent eccentricity did not significantly differ between groups.

Conclusions: Severe stenosis near the ECA bifurcation remains a strong predictor of post-CAS hypotension. However, not all proximal lesions led to hypotension, suggesting additional factors. Our findings indicate that outward stent expansion may cause hypotension by stretching the arterial wall and stimulating baroreceptors. Preprocedural evaluation of plaque characteristics and expected stent expansion direction may help predict and manage this complication.

Keywords: Carotid Artery Stenting, Postprocedural Hypotension

FP-3-13

KSIN Achievement Award Paper Presentation

Optimal duration of dual antiplatelet therapy after carotid artery stenting: A nationwide cohort study

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BACKGROUND: Carotid artery stenting (CAS) is an alternative treatment for patients with carotid artery stenosis who are not eligible for carotid endarterectomy. Dual antiplatelet therapy (DAPT) after CAS aims to prevent ischemic stroke. However, its optimal duration remains unclear. We aimed to determine the optimal duration of DAPT by identifying the differences in clinical events that occur depending on the DAPT maintenance period.

METHODS: Data were obtained from the nationwide database of the Korean Health Insurance Review and Assessment Service between 2007 and 2019. Patients who received CAS, as identified by procedure codes, were divided into 2 groups according to the duration of DAPT (aspirin and clopidogrel): those who maintained DAPT for at least 90 days but for <6 months (short-DAPT group) and those who maintained it for longer (long-DAPT group). The primary outcome was a composite of ischemic stroke, gastrointestinal bleeding, and intracranial hemorrhage within 12 months of switching to single antiplatelet therapy. Statistical analyses used inverse probability of treatment weighting to balance baseline characteristics, with Cox regression and Fine and Gray competing risk models used to assess outcomes.

RESULTS: Of the 12 034 patients who underwent CAS, 2529 and 9505 were assigned to the short-DAPT and long-DAPT groups, respectively. In the short-DAPT group, ischemic stroke, gastrointestinal bleeding, and intracranial hemorrhage occurred in 41 (1.6%), 22 (0.9%), and 4 (0.2%) patients, respectively. In the long-DAPT group, ischemic stroke, gastrointestinal bleeding, and intracranial hemorrhage occurred in 108 (1.1%), 87 (0.9%), and 4 (0.04%) patients, respectively. The primary outcome did not differ significantly between the groups (2.5% versus 2.1%; adjusted hazard ratio of long-DAPT to short-DAPT, 0.869 [95% CI, 0.652–1.158]; P=0.337).

CONCLUSION: Short-duration DAPT can be recommended, as it does not differ from long-duration DAPT in terms of clinical efficacy and adverse events after CAS.

GRAPHIC ABSTRACT: A graphic abstract is available for this article.

Key Words: carotid artery ■ endarterectomy, carotid ■ intracranial hemorrhage ■ ischemic stroke ■ stents

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e-Poster Display

Aneurysmal rupture of posterior cerebral artery dissection due to Stent graft-induced new entry

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BackGround/Aim: Stent graft-induced new entry (SINE) is defined as a new tear caused by the stent graft itself or iatrogenic injury from the endovascular manipulation. These tears can occur in the proximal or distal ends of the endograft. Although SINE has been mostly observed after thoracic endovascular aortic repair for aortic dissection, SINE may be rarely occurred in cerebral artery with the stent graft.

Methods: We report the case of a 55-year-old woman with spontaneous SAH. She had the history of SAH with basilar artery dissection treated with palliative endovascular multiple stent graft coverage before 13 years ago and also treated the concomitant PCA unruptured aneurysm, Rt with stent assisted coil embolization. In this event of SAH, we performed the diagnostic TFCA at the time of admission and after I week later.

Results: First TFCA at the time of admission showed the decrease of size of basilar dissection markedly and complete occlusion of PCA aneurysm. Rt before 13 years ago. And very small sac-like appearance at distal end of stent in PCA, Rt was showed. We waited a week and did TFCA again for confirmation of sac-like lesion with dissection. In follow up TFCA, we found the increase of size of sac at distal end of stent. She finally required the stent assisted coil embolization after a spontaneous SAH with PCA aneurysm due to a symptomatic SINE. The complete occlusion of dissection aneurysm due to SINE have achieved successfully without complication. After 3 month follow up, the sac also had occluded completely well.

Conclusions: Although SINE is a rare complication, it can lead to severe outcomes. Therefore, prevention, early detection, and timely intervention are critical. There is a growing awareness of SINE, a potentially lethal complication could be occurred and the reintervention should be required.

Keywords: SINE, Dissection

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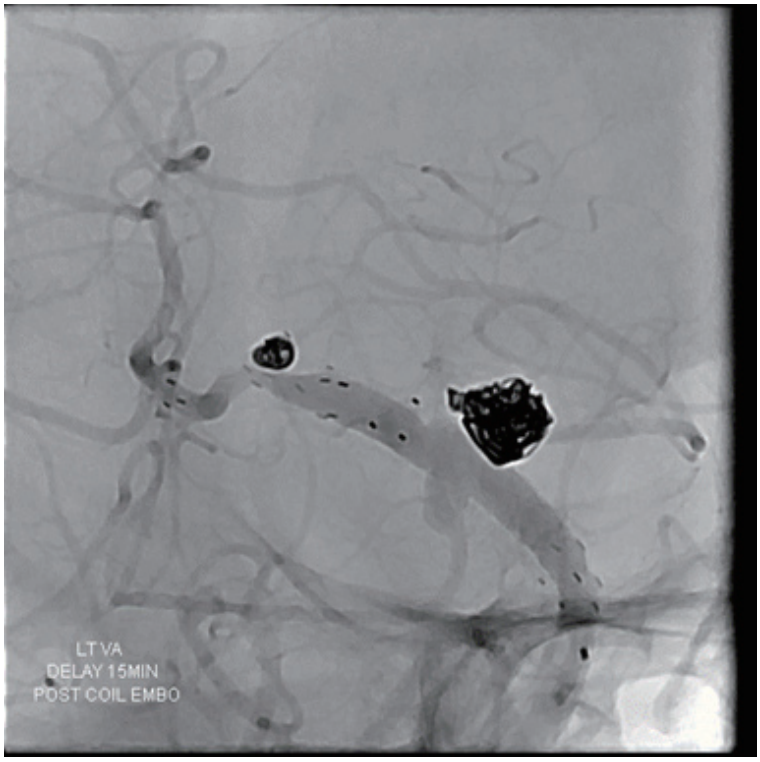

A case of successful two-stage treatment with coil embolization and flow diverter stenting for a ruptured anterior wall aneurysm of the internal carotid artery

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Contents: We report a case of an anterior wall aneurysm of the internal carotid artery presenting with SAH. Coil embolization was performed acutely, but recurrence and enlargement occurred within a short period. A flow diverter stent was subsequently placed in a second stage, resulting in a favourable outcome. A 56-year-old woman was emergency transferred to our hospital presenting with headache, vomiting, and impaired consciousness. On arrival, her level of consciousness was GCS=E3V4M6. Head CT revealed SAH, and DSA diagnosed a dissecting aneurysm of the right internal carotid artery at C1. The initial DSA at admission showed a very small aneurysm measuring 1.8mm. Under sedation and intubation, repeat DSA on the 5th hospital day showed the aneurysm had enlarged to 2.8mm. Stent use in the acute phase of ruptured cerebral aneurysms is not covered by health insurance in Japan. Therefore, coiling was performed in the acute phase using two coils under balloon assistance without a stent. Repeat DSA on the 24th hospital day revealed recurrent enlargement of the aneurysm. The total length of the aneurysm was 5mm, meeting the criteria for the Pipeline Premier study. A flow diverter stent placement was performed on day 25. An attempt was made to extubate the patient the day after flow diverter stent placement. However, supraglottic granuloma formation associated with prolonged intubation caused upper airway stenosis, necessitating reintubation. A tracheostomy was performed on the 31st hospital day. The supraglottic granuloma improved, and the speech cannula was removed on the 43rd hospital day. The tracheostomy fistula has now closed, and the patient is attending outpatient clinics with an modified Rankin Scale 0. We report a case where a two-stage treatment approach, comprising coil embolization followed by flow diverter stent placement, proved successful for an aneurysm of the anterior wall of the internal carotid artery.

Keywords: Aneurysm, Endovascular, Pipeline, Coil, Subarachonoid

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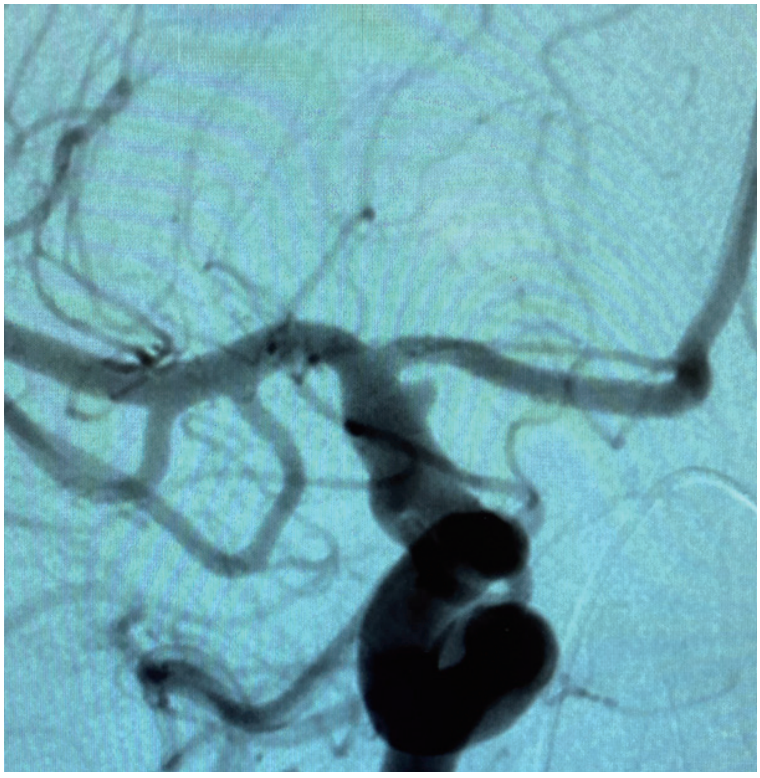

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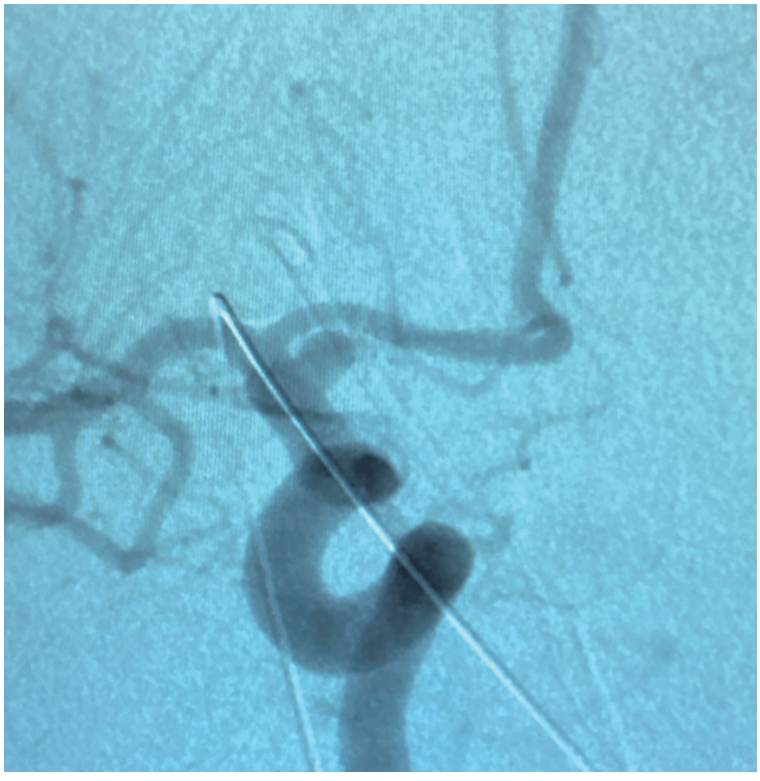

Long-term follow-up of clipped intracranial aneurysms using PETRA-MRA

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BackGround/Aim: Long-term imaging surveillance after surgical clipping of intracranial aneurysms is essential, as a subset of patients develop recurrent or de novo aneurysms. Digital subtraction angiography (DSA) remains the reference standard but carries procedural risk, while time-of-flight MR angiography (TOF-MRA) is noninvasive but often limited by metallic artifacts. Pointwise Encoding Time Reduction with Radial Acquisition MRA (PETRA-MRA) may overcome these limitations due to its resilience to metallic artifacts. This study aimed to evaluate whether PETRA-MRA can serve as a clinically viable modality for postoperative surveillance of clipped intracranial aneurysms.

Methods: Patients who underwent surgical clipping for intracranial aneurysms at our institution from April 1983 to August 2024 were included in this study. Of these patients, those who underwent follow-up brain MRI that included PETRA-MRA sequence between January 2021 and August 2024 were retrospectively analyzed. Examinations with substantial motion or severe image degradation were excluded. Two radiologists independently evaluated PETRA-MRA for the presence of recurrent or de novo aneurysms. The diagnostic performance of PETRA-MRA was determined using DSA and CT angiography (CTA) as the reference standard.

Results: Of 546 clipped aneurysms analyzed, 20 recurrent or de novo aneurysms were identified (0.59% per patient-year). PETRA-MRA detected 18 of 20 (90.0% sensitivity) recurrent or de novo aneurysms, whereas TOF-MRA detected 7 of 19 (36.8% sensitivity). There were one false-positive finding with PETRA-MRA (specificity 91.7%). The interobserver agreement for PETRA-MRA was weighted $\kappa = 0.56$, indicating moderate agreement.

Conclusions: This study demonstrated that PETRA-MRA may serve as a viable surveillance tool for postoperative follow-up of intracranial aneurysms. PETRA-MRA showed substantial sensitivity for detecting recurrent or de novo aneurysms. However, prospective multicenter validation will be needed for further evaluation.

Keywords: Aneurysm, Postoperative, PETRA-MRA, Surveillance, Follow-Up

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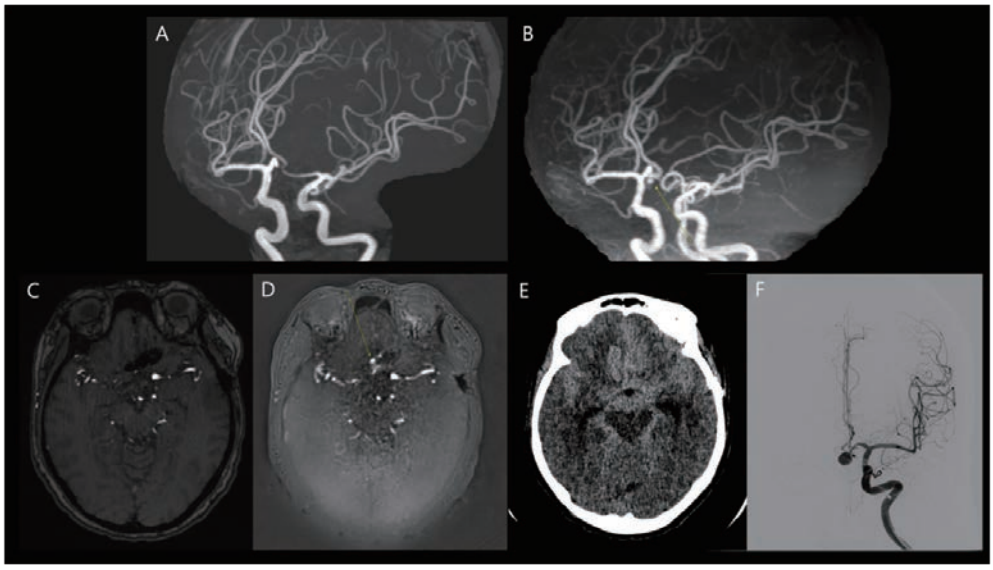

Figure 1. A 9.5mm recurred aneurysm at the anterior communicating artery (ACOM) was detected on PETRA-MRA (B, D), but was not visualized in previous and concurrent TOF-MRA (A, C) due to metallic artifact. Even though the patient was recommended an elective embolization, the patient did not follow up. 3 years after the MRA, the patient presented to the emergency room due to severe headache, for which emergency brain CT revealed extensive subarachnoid hemorrhage (E). The patient had to undergo emergency embolization of the recurred aneurysm but has remaining sequelae (F).

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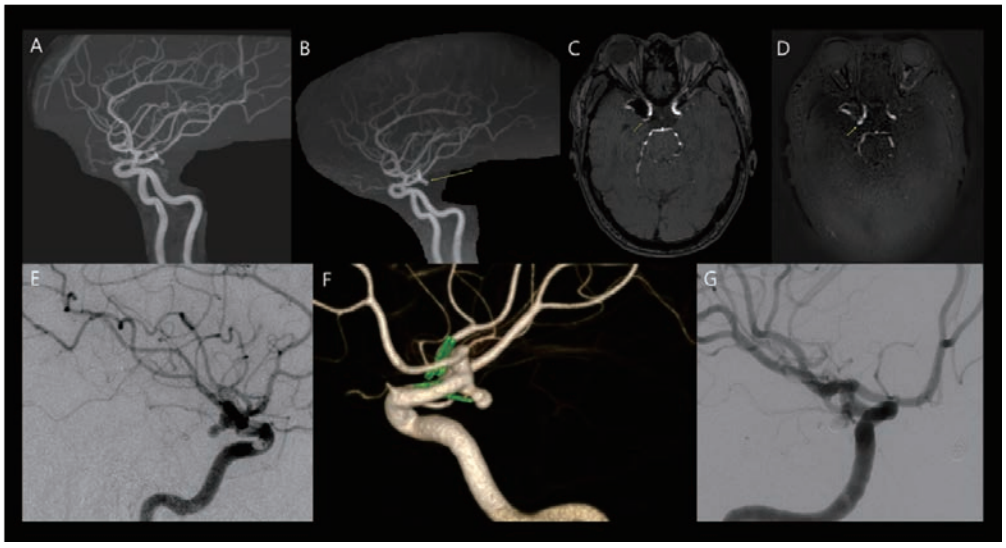

Figure 2. A 3 mm recurrent aneurysm at the right internal cerebral artery bifurcation (ICBIF) was classified as grade 3 on PETRA-MRA (B, D), but only as grade 2 on TOF-MRA due to faint opacification on the reconstructed 3D image (A) and obscuration on the source image caused by a metallic artifact (C). DSA was conducted for confirmation of the lesion and showed a recurrent aneurysm, which was subsequently treated with an elective embolization (D, E, F). Figures 2 and 3 show that PETRA-MRA can serve as a surveillance tool for postoperative intracranial aneurysms due to its high detection performance.

Mid-term results of the Surpass flow diverter stent: A comparison between evolve and streamline

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BackGround/Aim: In Japan, the Surpass Streamline (SS) has been replaced by its improved version, the Surpass Evolve (SE), since January 2024. We compared the mid-term outcomes of flow diverter treatment using SE and SS at our institution.

Methods: A total of 43 cases of internal carotid artery aneurysms treated with SE (n=21) or SS (n=22) between August 2014 and October 2024 were retrospectively analyzed. Procedural time, postoperative complications, 12-month angiographic occlusion status, and clinical outcomes were compared between the two groups.

Results: The mean age was 63 (±11) years, with a female predominance (12:31). Symptomatic lesions accounted for 26%, mean aneurysm size was 15.0 (±5.2) mm, and mean neck size was 8.4 (±3.0) mm, with no significant differences between groups. Aneurysms located at the C1 segment were more frequent in the SE group (33% vs 5%). Procedural time was significantly shorter in the SE group compared with the SS group (53 ± 26 min vs 72 ± 29 min, p = 0.03). Symptomatic ischemic complications occurred in 0% of SE and 5% of SS cases. At 12 months, the rate of complete or near-complete occlusion (OKM grade C+D) was 71% in SE and 76% in SS, with no significant difference. The proportion of patients with worsened modified Rankin Scale scores was 5% in SE and 9% in SS, while improvement was observed in 5% of each group.

Conclusions: Mid-term outcomes were comparable between SE and SS. The improved deliverability and expansion properties of SE may contribute to enhanced procedural safety, and long-term outcomes are anticipated.

Keywords: Surpass, FD, Aneurysm

A case of compressive optic neuropathy due to an internal carotid artery aneurysm treated with flow diverter placement and coil embolization

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Contents: [Introduction] Cranial nerve palsy associated with internal carotid artery (ICA) aneurysms may present with visual impairment, ocular motor paralysis, or trigeminal neuropathy due to their close anatomical proximity. We report a case of rapidly progressive optic neuropathy caused by an ICA aneurysm treated with flow diverter (FD) placement and coil embolization. [Case] A 35-year-old woman with hypertension, COVID-19 infection, and prior surgery for a ruptured right ICA dissecting aneurysm presented with decreased visual acuity and field defects in the left eye. CT and MRI revealed a de novo dissecting aneurysm in the left ICA paraclinoid segment compressing the optic nerve. FD stenting with intra-aneurysmal coiling achieved aneurysm obliteration, but visual decline persisted. Five days after onset, endoscopic transnasal optic canal decompression was performed under dual antiplatelet therapy. The pupillary light reflex improved immediately, and subjective visual recovery appeared by postoperative day 7. Corrected visual acuity reached 1.5 at 8 months. [Discussion] FD placement yields cranial nerve recovery in 70–80% of cases and is considered a safe, minimally invasive option. In this patient, given prior contralateral rupture, combined FD and coiling were necessary for both reconstruction and rupture prevention. Early optic canal decompression was likely effective for rapid visual improvement.

Keywords: Carotid, Aneurysm, Pipeline, Optic, Neuropathy

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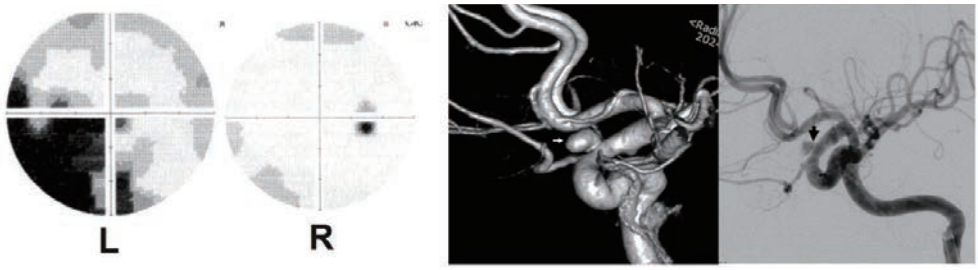

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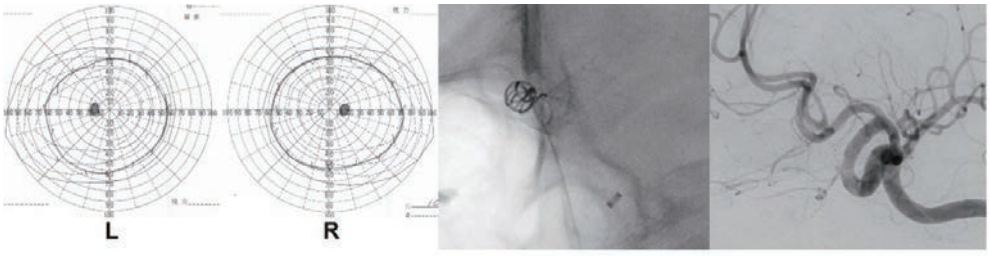

Spinal arterial aneurysms and vascular malformations: Review and own experience

Mohamed Deniwar

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BackGround/Aim: • Although spinal vascular anomalies are uncommon, it is crucial to be aware of them since, if undetected and mistreated, they can cause major consequences. The four basic forms include cavernous malformations, arteriovenous fistulae, and capillary telangiectasia. • Spinal aneurysms (SAs) are even rare lesions. The clinical presentation, associated comorbid conditions, imaging findings, and outcomes of their management by microsurgical and endovascular techniques have not been clearly defined. • We report our experience with the treatment of these lesions and review the literature trying to scope out their diagnostic and therapeutic protocols.

Methods: • A review of the literature was done, all papers that described SAs were considered (case reports, reviews, and etc..) • Retrospective review of our archives since 2016 was done. • We reported from our experience; 2 cases of spinal arterial aneurysms at the cervical region and 3 other cases of spinal Vascular malformations.

Results: 5 cases of spinal vascular lesions. 2 females and 3 males with mean age 55 years old. The cases presentation ,digital subtraction angiographic (DSA) finding and treatment procedure were summarized in table (1). Fig (1,2,3,4) showing (cases 1,2,3,4) respectively.

Conclusions: Spinal aneurysms are rare and often occur with AVM or other conditions that induce hemodynamic stress, such as bilateral vertebral occlusion DSA remains the gold standard for diagnosis as it provides detailed angio-architecture for spinal vascular malformations. Surgery still can be sought beside recently applied endovascular therapy nowadays.

Keywords: Aneurysm, vascular, malformations, microsurgery, endovascular

Table/Graph/Figure-1:

Case Number	Presentation	Digital subtraction angiographic (DSA) finding	Treatment procedure
1	Sever headache and Fisher grade 3 subarachnoid hemorrhage	Cervical Isolated aneurysm originating from anomalous communication between the left posterior spinal artery and the anterior spinal artery	Surgical clipping and trapping of the anomalous parent Artery using far-lateral approach
2	Neck pain, left brachialgia and spastic gait.	Cervical AVM with multiple feeders mainly from left posterior spinal artery and descending branch of left vertebral artery with intra-nidal aneurysm	Surgical excision of AVM and clipping of aneurysm using lateral Sub occipital approach
3	Low back pain and paraparesis	Dorsal dural arteriovenous fistula with single radicular feeder arising at dorsal 8 intercostal.	Surgical transection and Obliteration.
4	Low back pain, sciatica and saddle shape area hypothesia.	Sacral arteriovenous malformations supplied mostly with the left lateral sacral artery and to less extent with median	Perioperative Endovascular particles embolization followed surgical excision.
5	Low back pain and paraparesis	Lumbar dural arteriovenous fistula with double radicular feeder arising at lumbar artery on both	Surgical transection and Obliteration.

Figure 1. Table 1

Table/Graph/Figure-2:

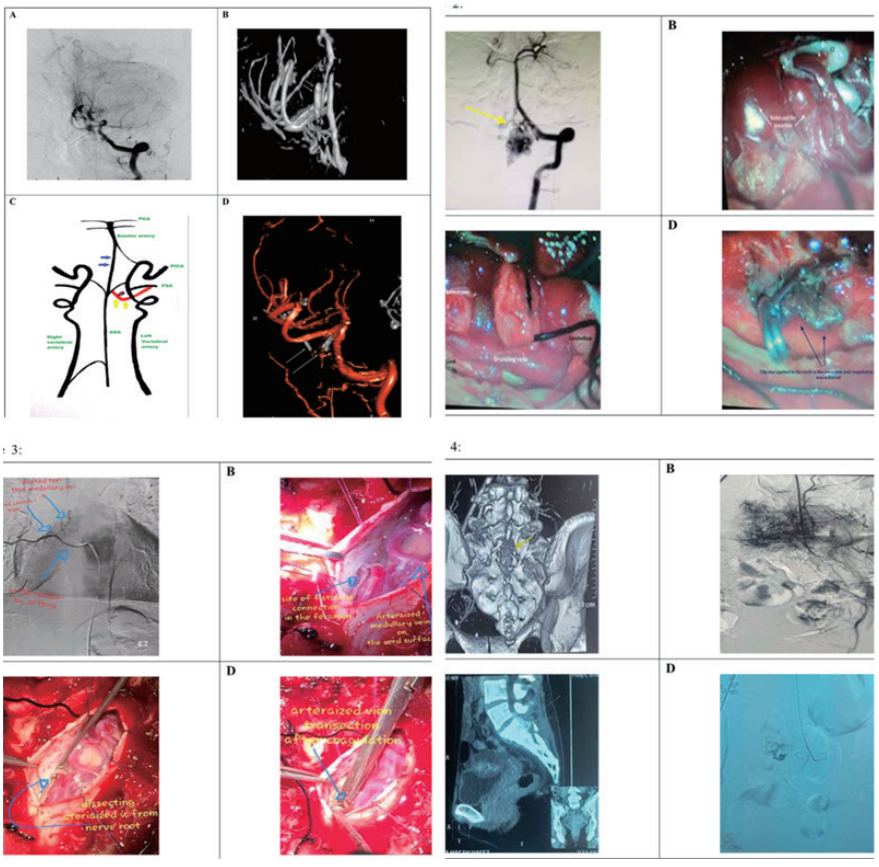

Figure 2. Fig (1,2,3,4) showing (cases 1,2,3,4) respectively

Endovascular treatment of extra cranial large aneurysms with multiple overlapped stenting using LVIS stents

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BackGround/Aim: Less than 1% of all arterial aneurysms and 0.1% to 2% of all carotid artery interventions are extra cranial related. This could be because of the fact that these extra cranial carotid arterial aneurysm (ECAA) varieties go undiagnosed: rarely rupture. The management of the ECAA remained controversial. Therefore, we thought multiple overlapped stenting might be an alternative measure to achieve the flow diversion effect since the particular stent, such as the new Low-profile Visualized Intraluminal Support (LVIS® D) (LVIS blue).

Methods: Five patients underwent a total of six procedures using the overlapped LVIS stents. We thought that simple overlapping stenting would be enough at first. The primary outcome was the aneurysm occlusion. According to the primary angiographic out come and the follow up imaging in each case the procedures did vary.

Results: Four patients were females and one male with a mean age of 60 years old. Double overlapping stent were applied in 3 cases and more number of stents in other 2 cases. We assessed the angiographic outcome upon the intra-aneurysmal flow and patency of the parent artery. Mean radiological follow-up was 24 months. 5 cases were summerized in table 1 and 2. Figure 1,2,3,4,5 showing final angiographic outcome for cases 1,2,3,4,5 respectively

Conclusions: It is evident that overlapped stenting with LVIS stent for the extra cranial aneurysms showed variable angiographic outcome primarily, however long term follow up showed fair outcome. Some refractory cases required stent grafts in the long run.

Keywords: Aneurysm, Extra cranial, Overlapping stents, Flow diverter, carotid artery

Table/Graph/Figure-1:

The clinical and angiographic characteristics of the study cohort are summarized in Table 1.

Patient NO.	Sex	Age/years	Clinical presentation	Location	Side
1	F	62	Incidental on investigating neck neoplasm	Cervical ICA (from carotid bulb)	Left
2	M	42	Intermittent headache	Cervical/petrous ICA	Right
3	F	73	Incidental on investigating dizziness	Cervical ICA	Right
4	F	67	Protruding vascular mass/ middle ear cavity	Cervical/petrous ICA	Left
5	F	58	Incidental on follow-up pervious treated intracranial multiple aneurysms	Cervical	Left

The results are summarized in Table 2.

Patient NO.	Applied procedure	Immediate angiographic outcome	Long term angiographic outcome		
			Radiology	Time	Finding
1	Double overlapping stenting	Intra-aneurysmal flow reduction and patent parent artery	CTA	3 years	Minimal residual filling
2	Double overlapping stenting	Intra-aneurysmal flow reduction and patent parent artery	MRA	2 years	Persistent small aneurysmal sac
3	Triple overlapping stenting followed by PTA* and further double overlapping stenting**	No intra-aneurysmal flow reduction and stenotic parent artery	CTA/DSA	3 years	Occlusion of aneurysm with persistent mass effect
4	Triple overlapping stenting	Intra-aneurysmal flow reduction and patent parent artery	MRA	3 years	Occlusion of aneurysm
5	Double overlapping stenting***	No Intra-aneurysmal flow reduction and patent parent artery	MRA	3 years	Persistent small aneurysmal sac

- **PTA means balloon angioplasty, ** Complementary procedure in case 3 using flow diverter stent application later on and *** single coil embolization in case 5 in same session.**

Figure 1. 5 cases were summerized in table 1 and 2.

Table/Graph/Figure-2:

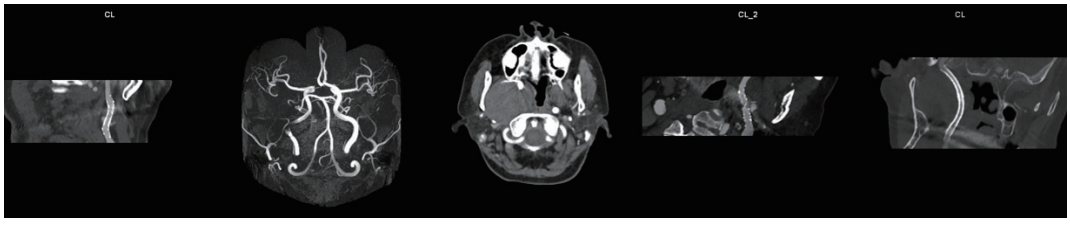

Figure 2. Figure 1,2,3,4,5 showing final angiographic outcome for cases 1,2,3,4,5 respectively

From looped to linear: A stent-based technique to unloop microcatheters in wide-neck basilar tip aneurysm flow-diversion

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BackGround/Aim: Case Presentation: A patient presented with a 16 × 11 mm basilar tip aneurysm with a dome-to-neck ratio of 1.05 and incorporation of both posterior cerebral arteries (PCAs) at the aneurysm base. Digital subtraction angiography (DSA) revealed absence of the right posterior communicating artery (PCOM), with a well-developed left PCOM. An initial attempt at treatment involved advancing a 0.027-inch catheter for FD deployment via the right PCA. However, looping of the microcatheter within the aneurysm sac impeded safe distal placement of the microcatheter, necessary for stent deployment. Due to the high risk associated with surgical clipping, a second endovascular attempt was planned instead.

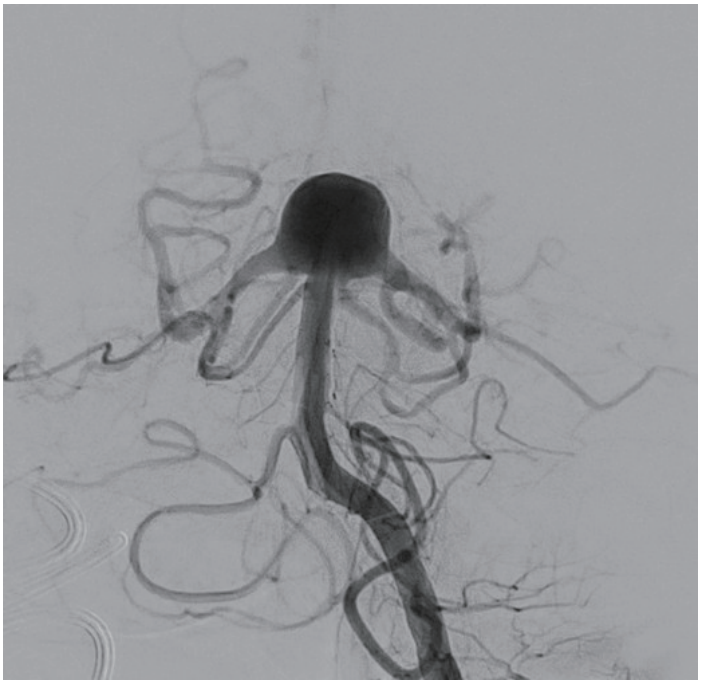
Methods: A revised strategy involved positioning an 8-Fr Cerebase guide catheter in the left vertebral artery. Angiographic assessment and 3D rotational imaging confirmed persistent aneurysm morphology. A Headway-21 microcatheter with a Synchro-14 wire was advanced into the right PCA. Given persistent looping, a 3 × 20 mm Preset Light thrombectomy stent was temporarily deployed in the right P2/P3 segment to anchor the system. This allowed controlled unlooping of the microcatheter, stabilizing its distal position. Once adequate distal support was secured, a Neuroslider-17 microcatheter was navigated into the aneurysm sac. A 5 × 18 mm P64 flow-diverting stent, compatible with a 0.021-inch catheter, was deployed from the right PCA into the basilar artery, jailing the coiling catheter.

Results: Final angiographic runs demonstrated complete embolization of the aneurysm sac with preserved patency of critical branch vessels. The use of a thrombectomy stent to anchor the catheter was critical in correcting intrasaccular looping and enabling precise device delivery without compromising distal vessel access.

Conclusions: In situations where traditional FD or coiling approaches are hindered by catheter instability or looping, adjunctive use of a temporary anchoring stent can facilitate safe navigation and effective treatment.

Keywords: Anurysm, Basilar, Wide-Neck, Anchoring

Table/Graph/Figure-1:



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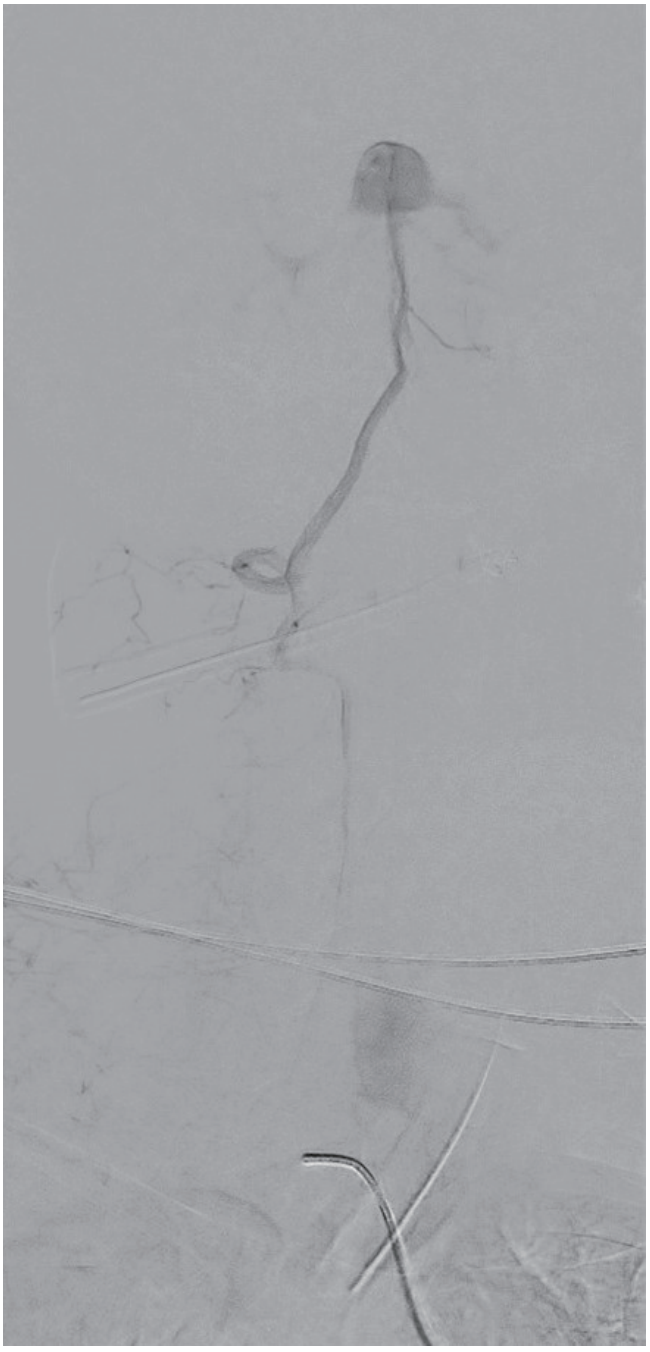

The affection of smoking on pharmacological treatment outcomes in patients with intracranial aneurysms in Indonesia

Haryanto Ah, Andi Nursanti*

Pharmacology, Wallacea University, Indonesia

BackGround/Aim: Intracranial aneurysms carry a risk of causing fatal subarachnoid hemorrhage. Smoking is recognized as a risk-modifying factor through endothelial dysfunction and vascular damage. In Indonesia, a national survey shows that tobacco use reaches 34.5% among adults (with a prevalence of 65.5% among men) as one of the major health burdens. A study of aneurysm patients in Indonesia reported that of 275 patients, 231 (84%) experienced aneurysm rupture. However, evidence on how smoking affects the effectiveness of pharmacological therapy (antiplatelet/antithrombotic) in the aneurysm population is still minimal. The objective of this study is to synthesize evidence regarding the relationship between smoking habits and pharmacotherapy response as well as clinical outcomes in intracranial aneurysms, with a specific focus on the Indonesian context.

Methods: This study employed a systematic literature review (SLR) using the keywords "intracranial aneurysm," "smoking," "pharmacological therapy," "antiplatelet," "antithrombotic," and "Indonesia." The selection was made based on the PRISMA 2020 guidelines and inclusion criteria.

Results: The results of the Indonesian study found three data points. In Indonesia, the burden of smoking is very high (2021: 34.5%; 2022: 36.7% or ±76.7 million smokers). In the Indonesian hospital cohort (n=275), 84% of aneurysm patients experienced rupture; independent predictors were anterior circulation location (OR 4.91; 95% CI 1.47–16.48) and saccular type (OR 5.45; 95% CI 1.42–20.93), while smoking status did not emerge as an independent factor in multivariate analysis.

Conclusions: The conclusion shows that active smokers have a higher risk of rupture and that smoking cessation reduces the risk; conversely, smoking is not clearly associated with UIA growth. Evidence regarding the effect of smoking on antiplatelet/antithrombotic response in aneurysm patients, especially in Indonesia, is still limited; cardiovascular findings on the "smoker's paradox" in P2Y12 drugs need to be confirmed in a neurointervention setting.

Keywords: Intracranial Aneurysm, Smoking, Pharmacotherapy, Indonesia

A mouse model of intracranial aneurysm: Cisterna magna elastase injection combined with hypertension and carotid artery ligation

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BackGround/Aim: The existing mouse model of ruptured intracranial aneurysm (IA) involves stereotactic injection of elastase into basal cistern. Cisterna magna (CM) injection is also a well-established and reliable drug delivery method. We propose a mouse model inducing IA rupture through injection of elastase into CM, combined with hypertension and carotid ligation.

Methods: Male C57/BL6 mice underwent injection of 2.5 μL bromophenol blue through stereotaxis or CM to assess the accuracy and stability of both methods. For aneurysm induction, left common carotid artery ligation was performed and hypertension was induced. CM injection was performed using 2.5 or 5 μL elastase. Mice with neurological symptoms or 3 weeks after modeling received bromophenol blue/gelatin perfusion to observe formation and rupture of aneurysm. Hematoxylin-eosin, Masson, and immunohistochemical staining were performed to observe IA histopathological features.

Results: In stereotactic injection group, the stained vessels were predominantly localized around the injection site (Figure 1A,B). However, CM injection effectively stained the majority of the arteries in the circle of Willis (Figure 1C). CM injection resulted in more stained arteries around the circle of Willis than stereotactic injection (13.4 ± 0.84 vs. 2.6 ± 1.84, p

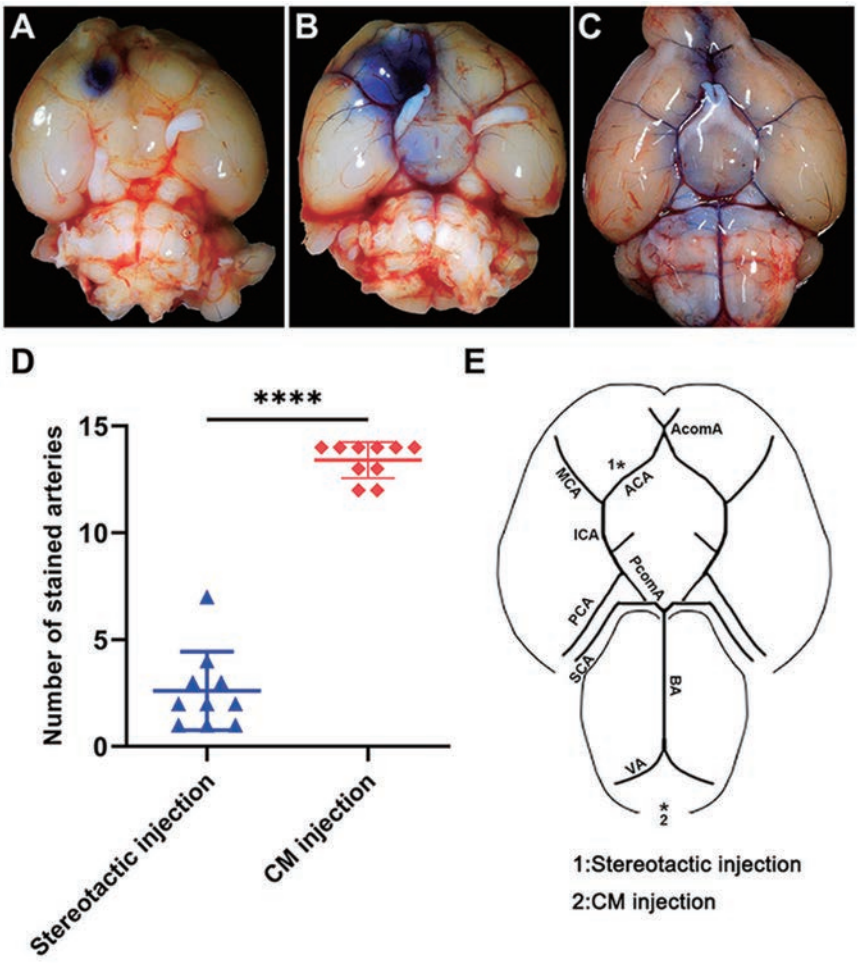
Conclusions: We propose a mouse model of IA that employs injection of elastase into CM. The protocol provides a stable and efficient mouse model of ruptured IA.

Keywords: Mouse, Aneurysm, Stroke, Rupture

EP 1-10

Aneurysm

Table/Graph/Figure-1:



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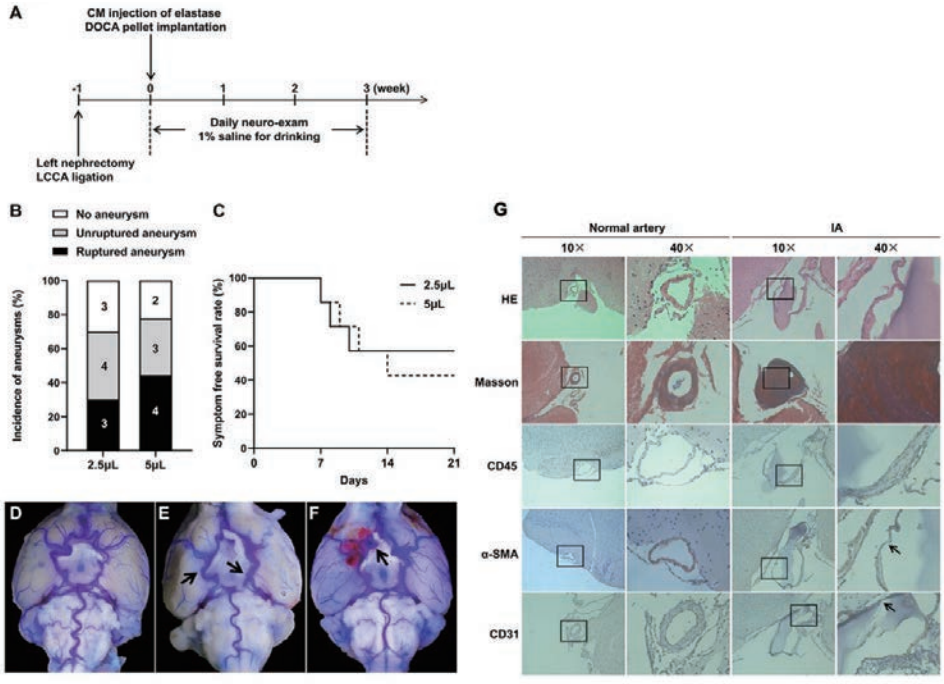

Impact of fetal-type posterior cerebral artery on outcomes after endovascular treatment of posterior communicating artery aneurysms

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BackGround/Aim: The posterior communicating artery (PComA) is a common site of intracranial aneurysms, accounting for approximately 25% of all cases. The impact of a fetal-type posterior cerebral artery (fPCA) on outcomes after endovascular treatment of PComA aneurysms remains controversial, especially with the growing use of flow-diverting devices. This study aimed to evaluate whether fPCA influences clinical and angiographic outcomes following endovascular treatment of PComA aneurysms.

Methods: Consecutive patients with PComA aneurysms treated endovascularly between 2015 and 2022 were retrospectively analyzed. According to preoperative digital subtraction angiography, patients were classified into fPCA and non-fPCA groups. The primary outcome was incomplete aneurysm occlusion at follow-up angiography; secondary outcomes included periprocedural and overall complications and patency of the PComA/fPCA at last follow-up.

Results: A total of 498 patients (498 aneurysms) were included, comprising 111 (22.3%) in the fPCA group and 387 in the non-fPCA group. The incidence of incomplete aneurysm occlusion at the final angiographic follow-up was significantly higher in the fPCA group than in the non-fPCA group [30.9% (25/81) vs. 18.8% (53/282); adjusted OR = 1.93, 95% CI: 1.10–3.37; P = 0.021]. In addition, the patency rate of the PComA/fPCA at the last follow-up was significantly higher in the fPCA group compared with the non-fPCA group [88.9% (72/81) vs. 78.0% (220/282); adjusted OR = 2.20, 95% CI: 1.02–4.74; P = 0.044]. There were no significant differences in safety outcomes, and no significant interaction was detected between treatment strategy and the presence of an fPCA (P for interaction = 0.954)

Conclusions: The presence of a fPCA was associated with a higher rate of incomplete occlusion after endovascular treatment of PComA aneurysms but did not affect procedural safety. Moreover, fPCA was correlated with an increased postoperative patency rate of the PComA. The efficacy of flow diverter treatment was comparable to that of conventional endovascular strategies for PComA aneurysms.

Keywords: Aneurysm, Endovascular, Flow-Diverter, Complications, Patency

Early clinical experience with Surpass elite™ flow diverters

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BackGround/Aim: 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 40 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 (

Results: A total of 41 SE flow diverters were utilized in the treatment of 51 intracranial aneurysms (maximal diameter 2.7-21.56 mm), affecting 39 patients (32 female, age 34-80 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 (7.5%) and balloon-angioplasty was performed in 18 patients (45%) to promote wall-apposition. One patient treated for vertebral artery dissecting aneurysm exhibited symptoms of motor weakness and recovered as mRS 1 on discharge Another patient with a symptomatic ICA aneurysm over 20 mm developed diplopia on month after the procedure. On short-term follow-up (≈6 months), 25 of 32 aneurysms assessable on the imaging were completely obliterated (OKM grade D, 78.1%)

Conclusions: Preliminary findings might indicate the credible performance of SE flow diverters for intracranial aneurysms enhancing wall apposition and precise delivery, attributable to their evolved design and properties.

Keywords: Aneurysm, Flow, Diverter, Surpass

Aneurysm selection using stent strut supporting technique

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Contents: When selecting an aneurysm, the direction of the aneurysm dome may differ significantly from the parent artery's course, sometimes by as much as 180 degrees. In such cases, it is extremely difficult to achieve natural selection into the aneurysm using microcatheter steam shaping alone. Even with wire-guided selection, the procedure inevitably involves applying significant tension to the aneurysm wall during selection. Furthermore, if a pre-existing coil mass is present within the aneurysm, the microcatheter may become snagged on the coil loops during advancement. This can result in the microwire entering the aneurysm while the microcatheter remains outside. In such cases, the stent supporting technique can be employed to successfully select the aneurysm and proceed with coil embolization. On June 28, 2024, coil embolization without a stent was performed for a ruptured right middle cerebral artery bifurcation aneurysm. Several months later, on May 13, 2025, stent-assisted coil embolization was planned for the residual middle cerebral artery bifurcation aneurysm. The residual aneurysm was bent at an angle nearly 180 degrees parallel to the M1 segment. A microwire-guided technique was used for aneurysm selection, but the tip of the microcatheter became snagged on the existing coil loop. While the microwire could enter the aneurysm, the microcatheter could not. An Atlas stent (3×15mm) was deployed over the aneurysm neck on the M1 segment. The aneurysm was selected using the stent strut-through technique. The stent struts supported the microcatheter, allowing its tip to enter the aneurysm without touching the coil mass loop. Using 8 coils, the procedure was successfully completed with a total coil length of 27cm and a packing density of 29%

Keywords: Aneurysm, Selection

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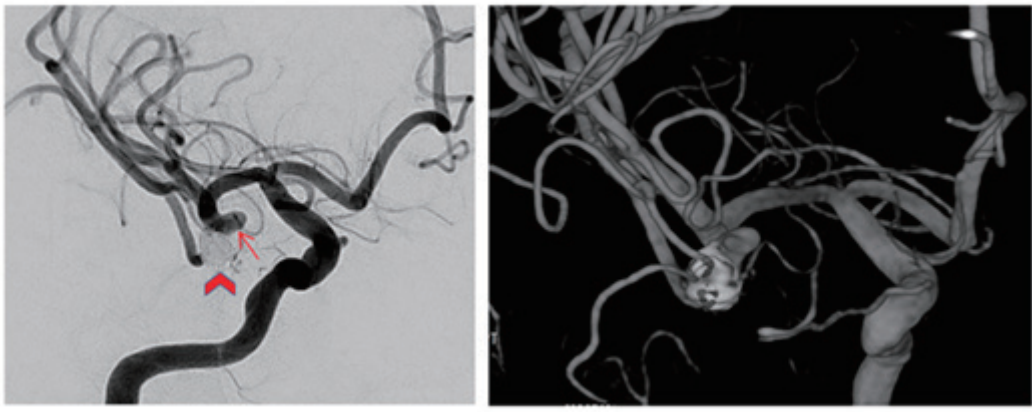
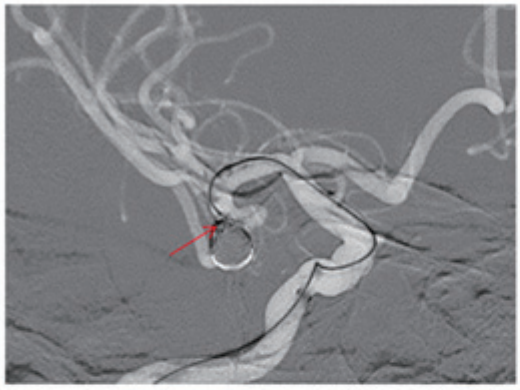
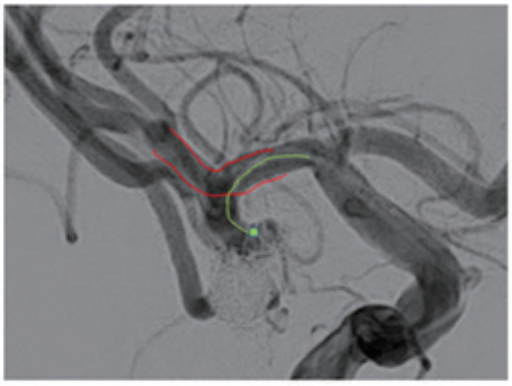


A. Arrow : residual right bifurcation aneurysm
Arrow head : coiled right bifurcation aneurysm

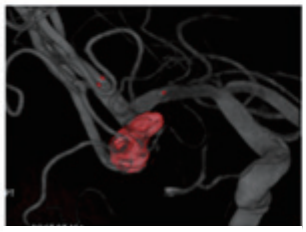
Table/Graph/Figure-2:



Microcatheter tip is caught in the coil mass loop



Microcatheter has passed through
the stent strut and is supported
by the strut while selecting the aneurysm



Final 3D angiography

Middle meningeal artery embolization for migraine headaches

Heng Yang, Wei Ni, Yuxiang Gu (China)

Safety and Efficacy of Tirofiban in Ruptured Intracranial Aneurysms

Jiebo Li, Penghui Wei, Yuxiang Gu, Dengliang Wang (China)

Association between spinal dysraphism and spinal arteriovenous fistula (AVF)

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BackGround/Aim: Several case reports document the association between spinal dysraphism such as tethered cord syndrome, spinal lipoma, and lipomyelomeningocele and spinal vascular malformation such as dural arteriovenous fistulae (DAVFs) and spinal arteriovenous fistula (AVM), suggesting a potential causal relationship. The incidence of spinal dysraphism worldwide is approximately 1 to 3 in 1000 live births. Spinal dysraphism is a subtype of neural tube defect (NTD). To further investigate this connection, we present seven additional cases of spinal dysraphism coexisting with spinal vascular malformation.

Methods: We identified 307 patients with spinal dural arteriovenous fistula (dAVFs) and spinal arteriovenous malformation (AVM) from the period of 2002 to 2024. The majority of our patients have spinal dAVFs (243 patients), and 64 patients had spinal AVMs. The majority of patients were treated with endovascular embolization. We identified 10 cases of coexisting spinal DAVFs and spinal dysraphism. Comprehensive analyses of imaging findings—including MRI, MRA, and angiographic results—were conducted alongside assessments of clinical presentations, long-term outcomes, and treatment responses.

Results: The mean age of the patients was approximately 68 years, with a distribution of 6 females and 4 males. The most frequently observed spinal dysraphism was spinal lipomas in 5 patients and lipomyelocele in 3 patients. The predominant symptom was motor weakness. MRI findings revealed vascular flow voids and increased signal intensities predominantly in the sacral and lumbar regions. The lateral sacral artery was the primary arterial feeder, with intradural perimedullary veins as the main drainage pathway. Treatment outcomes was different among our patients, with 3 patients undergoing initial embolization followed by surgery, another 4 patients undergone endovascular embolization treatment only and one patient undergone surgical treatment with good outcome following treatment in majority of patients.

Conclusions: Spinal dysraphism was present in 3.26% of spinal vascular malformations.

Keywords: Spinal vascular malformation, Spinal dysr

Rescue intracranial stenting in acute ischemic stroke: A preliminary Vietnamese study

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BackGround/Aim: 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).

Conclusions: 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.

Keywords: Stroke, MRI, DAPT, ICH, Stenting

Table/Graph/Figure-1:

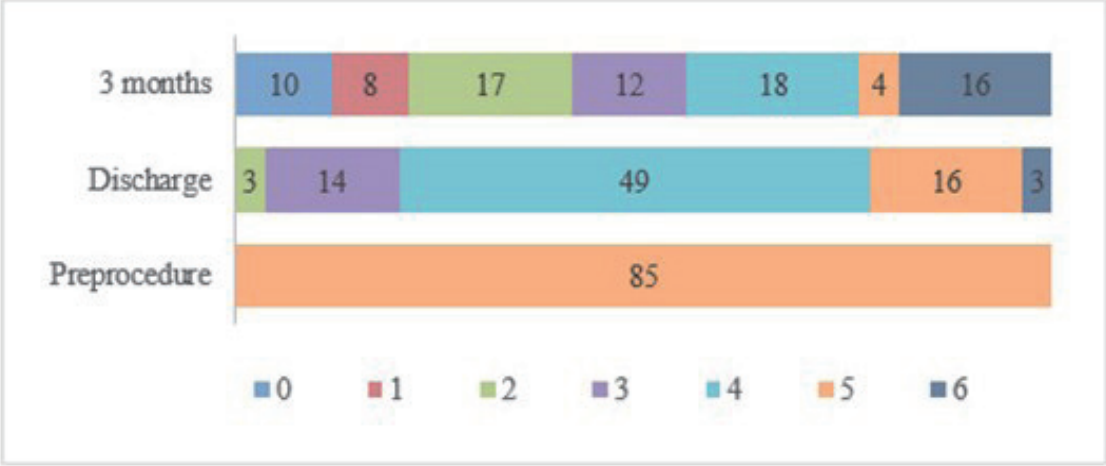

Figure 1. Distribution of mRS of patients before and after RIS

Table/Graph/Figure-2:

Baseline Variables	Poor outcome	RR (95% CI)	p value	NNH
Age ≥ 70	16 (18.8%)	1.9 (1.3 - 3)	0.002	
Women	15 (17.6%)	1.6 (0.9 - 2.5)	0.06	
Smoking	23 (27.1%)	1.7 (1.1 - 2.8)	0.03	
Hypertension	38 (44.7%)	0.9 (0.1 - 6.4)	0.9	
AF	1 (1.2%)	2.3 (1.8 - 2.9)	< 0.0001	
CKD	5 (5.9%)	2.3 (1.8 - 2.9)	< 0.0001	
Diabetes	21 (24.7%)	1.5 (0.9 - 2.3)	0.1	
Myocardial infarction	14 (16.5%)	1.1 (0.7 - 1.7)	0.8	
rTPA	3 (3.5%)	0.8 (0.3 - 2.1)	0.7	
DAPT	38 (44.7%)	0.9 (0.1 - 6.4)	0.9	
Onset over 6 hours	24 (28.2%)	1.7 (1.1 - 2.8)	0.04	
Dysphagia	13 (15.3%)	1.8 (1.1 - 2.7)	0.01	
DWI -ASPECTS < 8 points	15 (24.2%)	2.3 (1.1- 4.6)	0.02	
pc-ASPECTS < 6 points	8 (34.8%)	2.1 (1.2- 3.7)	0.01	
Posterior circulation lesion	15 (17.6%)	1.8 (1.1 - 2.7)	0.01	
Anaesthesia (Sedation)	1 (1.2%)	2.3 (1.8 - 2.9)	< 0.0001	2
Stent self-expanding	24 (28.2%)	1.2 (0.7 - 1.9)	0.5	
Number of procedures: Only RIS	17 (20%)	0.9 (0.6 - 1.5)	0.8	
Total procedure time > 60 minutes	32 (37.6%)	2.2 (1.1 - 4.6)	0.03	
Complication	13 (15.3%)	1.7 (1.1 - 2.7)	0.02	
Postprocedural new infarcts	2 (2.4%)	1.5 (0.7 - 3.5)	0.3	
sICH	4 (4.7%)	2.4 (1.8 - 3.1)	< 0.0001	
Decompressive craniectomy	3 (3.5%)	2.3 (1.8 - 3.1)	< 0.0001	2
Unrehabilitation	7 (8.2%)	1.7 (1.1 - 2.8)	0.03	3

Figure 2. Association between preprocedural and postprocedural characteristics with poor functional outcome in mRS at 3 months

Extended time window (>6 hour) mechanical thrombectomy: Good clinical outcome in the young age population. Relationship between age and prognosis

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BackGround/Aim: Mechanical thrombectomy (MT) is the standard treatment for acute ischemic stroke (AIS) caused by large vessel occlusion within six hours of symptom onset. However, the efficacy of MT in the extended time window (6 to 24 hours) is still uncertain. Our study aims to evaluate the outcomes of MT in the extended time window for AIS patients.

Methods: We conducted a review of data on AIS patients who received MT beyond six hours of stroke onset from 2014 to 2021. The patients had occlusions in the middle cerebral artery (MCA) or the posterior circulation. Our evaluation included the modified Rankin Scale (mRS) and 90-day mortality rates, as well as complications such as symptomatic intracranial hemorrhage (sICH).

Results: Thirty-one patients were included in the study, with a mean age of 65.6 ± 16.1 years, of whom 52.3% were male. The median NIHSS score at presentation was 17. Successful recanalization (TICI 2b to 3) was achieved in 95.6% of patients and the rate of sICH was 3.5%. No difference was observed between the two age groups. Young age group
(

Conclusions: Our study, the first series of MT for AIS in the extended time window, demonstrates that MT can be effectively and safely performed, leading to satisfactory functional outcomes, especially in the young age group.

Keywords: Thrombectomy, Infarctiono, Old Age

Strategy for long-segment ICA–M1 occlusion in delayed acute ischemic stroke: Combined aspiration and stent-retriever thrombectomy

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Contents: Background/Aim: Combined aspiration and stent-retriever thrombectomy has been shown to achieve higher recanalization rates in acute ischemic stroke, particularly in occlusions involving the intracranial internal carotid artery (ICA) and proximal middle cerebral artery (M1) segments. However, data on its efficacy in delayed-treatment settings and long-segment occlusions remain limited. We report a case demonstrating a successful endovascular strategy using combined aspiration and stent-retriever thrombectomy for delayed-treatment acute ischemic stroke with extensive occlusion from the proximal ICA to the M1 segment of the MCA, and additional external carotid artery (ECA) involvement. Methods: A 32-year-old male presented with right-sided weakness, aphasia, and unconsciousness one hour before admission. Initial brain CT revealed left insular involvement without hemorrhage (ASPECTS 10). Digital Subtraction Angiography (DSA) performed 10 hours after onset showed complete occlusion from the proximal C1 segment of the left ICA extending to the M1 segment of the left MCA and left ECA. Initial aspiration thrombectomy total of three attempts achieved partial flow up to the distal ICA. Subsequently, a stent-retriever was deployed through the distal ICA, with the microguidewire advanced to the M2 segment. The stent-retriever was expanded and withdrawn under continuous aspiration, allowing synergistic clot retrieval. A 5.5 mm × 50 mm stent-retriever and 5.7 F (1.90 mm) aspiration catheter were utilized. Results: Final angiography confirmed complete recanalization with restoration of antegrade flow from the C1 ICA to the M1 MCA. Follow-up MRI at 48 hours showed a left MCA territory infarct with perilesional edema (DWI-ASPECTS 5). The patient exhibited marked neurological improvement with minimal residual deficits. Conclusion: Combined stent-retriever and aspiration thrombectomy achieved successful revascularization in a delayed-treatment long-segment ICA–MCA occlusion, highlighting its potential efficacy beyond conventional time windows. Post-procedurally patients showed remarkable clinical improvement with minimal residual neurological deficit. Further studies are still needed to confirm its efficacy and safety.

Keywords: Long, Segment, Occlusion, ICA-MCA, Thrombectomy

Association of non-invasive fractional flow with MR perfusion metrics in patients with anterior circulation stenosis

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BackGround/Aim: The value of hemodynamics in intracranial atherosclerotic stenosis patients has not been fully studied. The purpose of this study was to analyze the correlation between fractional flow and magnetic resonance perfusion parameters in patients with intracranial artery stenosis of the anterior circulation.

Methods: This study included 87 patients with anterior circulation artery stenosis. Perfusion parameters, including cerebral blood flow, cerebral blood volume, mean transit time, time to peak, and time to maximum tissue residue function, were calculated on the basis of the magnetic resonance imaging perfusion images. Affected cortical flow territories of the middle cerebral artery on magnetic resonance imaging perfusion maps at the same basal ganglia level were manually defined to calculate absolute and relative values. FF values were calculated on the basis of digital subtraction angiography images.

Results: Fractional flow was negatively correlated with relative time to peak (r=-0.41, p=0.002) and relative mean transit time (r=-0.27, p=0.037). In groups with a larger time to maximum tissue residue function, fractional flow has a lower distribution interval. Fractional flow was significantly different between normal perfusion patients and hypoperfusion patients (0.71±0.17 vs. 0.52±0.18, p

Conclusions: There is a correlation between magnetic resonance imaging perfusion and fractional flow in patients with anterior circulation intracranial atherosclerotic stenosis. A low fractional flow may indicate a higher time to maximum tissue residue function and a poorer hypoperfusion stage. The fractional flow has the potential to serve as a hemodynamic evaluation index for intracranial atherosclerotic stenosis patients.

Keywords: Stroke, Atherosclerotic, Stenosis, Fractional, Hemodynamics

Table/Graph/Figure-1:

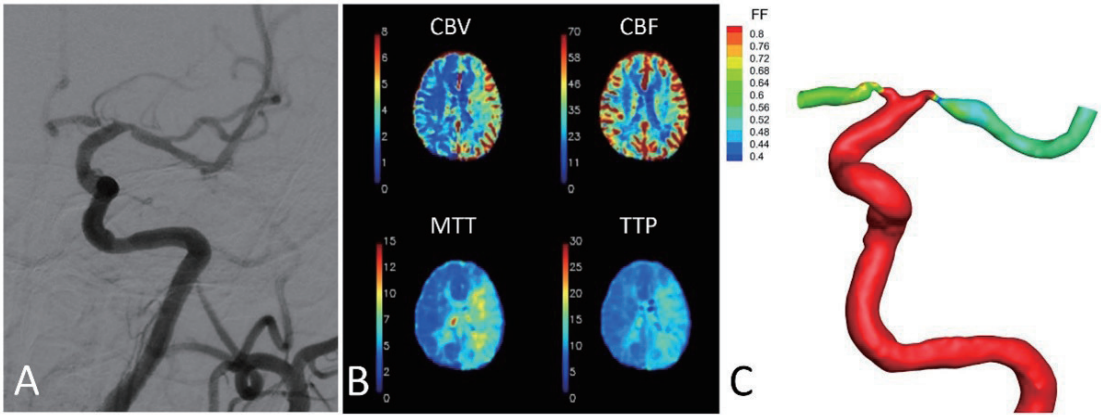

Figure 1. A representative example of AccuFFicas and AccuMRP analysis. (A) DSA image showing stenosis at the left-sided MCA of a 52-year-old female. (B) The MRP map shows prolonged TTP and MTT and a slightly increased CBV on the ipsilateral side. (C) The FF result indicates that the distal FF of the stenosis is 0.39. DSA = digital subtraction angiography, MCA = middle cerebral artery, MRP = magnetic resonance perfusion, TTP = time to peak, MTT = mean transit time, CBV = cerebral blood volume, FF = fractional flow.

Table/Graph/Figure-2:

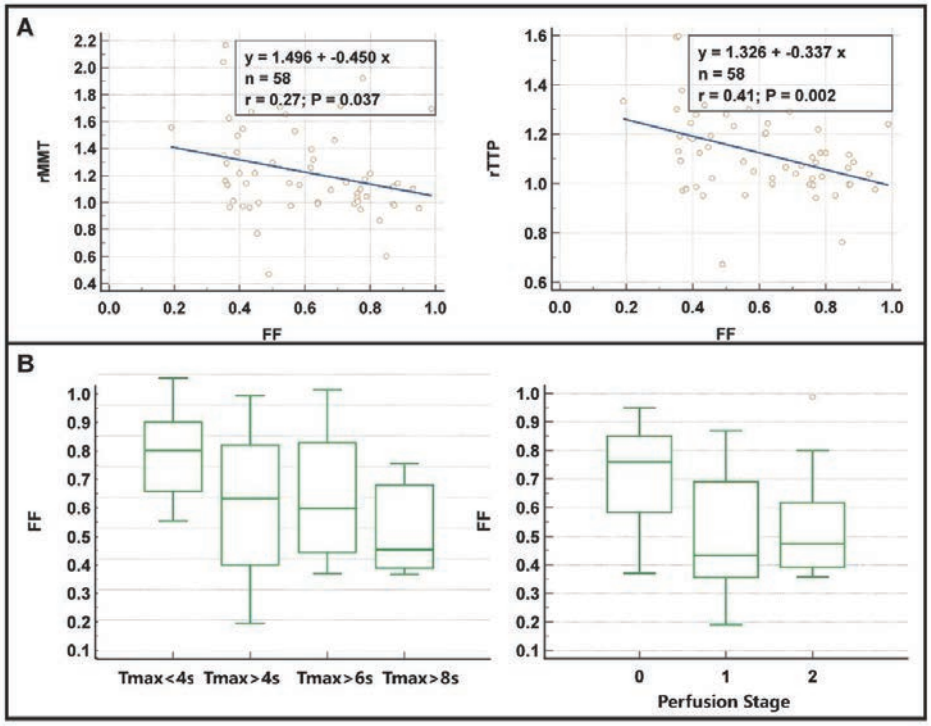

Figure 2. (A) FF was negatively correlated with rTTP (r=-0.41, p=0.002) and rMTT (r=-0.27, p=0.037). (B) FF distribution in groups with different Tmax values (left) and differences in FF among the three perfusion status groups judged by MRP (right). In groups with a larger Tmax, FF has a lower distribution interval. MRP = magnetic resonance perfusion, FF = fractional flow.

Outcomes of endovascular thrombectomy in large-core AIS by baseline kidney function: A single-center real-world cohort

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BackGround/Aim: Large-core acute ischemic stroke (AIS) is increasingly treated with endovascular thrombectomy (EVT), yet the impact of kidney function on technical success and outcomes in real-world practice remains uncertain.

Methods: We retrospectively analyzed consecutive EVT-treated AIS patients at a tertiary center. Large core was defined as RAPID CT-CBF

Results: Sixty-six large-core EVT patients were included (CKD, n=14; no CKD, n=52). Patients with CKD were older (median 83.5 [80.0–89.5] vs 73.0 [62.8–82.0] years; p=0.0003) and had larger cores (110.5 [78.0–159.2] vs 82.0 [67.2–109.2] mL; p=0.045). Technical success was high and similar (TICI 2b/3: 92.9% vs 88.5%; p=1.00). Safety was comparable (sHT: 21.4% vs 17.3%; p=0.71). Functional outcomes showed a right-shift in CKD: mRS 0–2 occurred in 7.1% versus 28.8% (p=0.16). Higher eGFR trended toward greater odds of mRS 0–2 (OR 1.23 per 10 mL/min, 95% CI 0.94–1.69; p=0.17) without evidence of association with sHT (OR 0.95, 95% CI 0.73–1.26; p=0.72).

Conclusions: In a real-world cohort of EVT-treated large-core AIS, kidney dysfunction was associated with older age and larger infarct core but did not reduce reperfusion success or increase sHT. The mRS distribution was worse among patients with CKD, with a non-significant trend toward better functional independence at higher eGFR. Larger, adjusted studies are needed to determine whether renal function independently influences outcomes after EVT in large-core AIS.

Keywords: Large-Core, SICH, EVT, AIS, CKD

Table/Graph/Figure-1:

	No CKD (≥60)	CKD (<60)	p
Baseline			
Age, years	73.0 [62.8, 82.0]	83.5 [80.0, 89.5]	<0.001
Ischemic core, mL	82.0 [67.2, 109.2]	110.5 [78.0, 159.2]	0.045
Procedural			
Successful reperfusion (TICI 2b/3)	46/52 (88.5%)	13/14 (92.9%)	1.000
Outcomes			
mRS 0–2 at 90 days	15/52 (28.8%)	1/14 (7.1%)	0.159
Symptomatic ICH	9/52 (17.3%)	3/14 (21.4%)	0.708

Large-core defined as RAPID core ≥50 mL. P-values: Wilcoxon for continuous; Chi-square/Fisher for categorical.

Figure 1. Table 1. Baseline characteristics and key outcomes by CKD status in large-core EVT. Continuous variables are reported as median [IQR] and compared with Wilcoxon rank-sum tests; categorical variables are n/N (%) and compared with χ^2 or Fisher's exact tests as appropriate. Large core defined as RAPID CT-CBF

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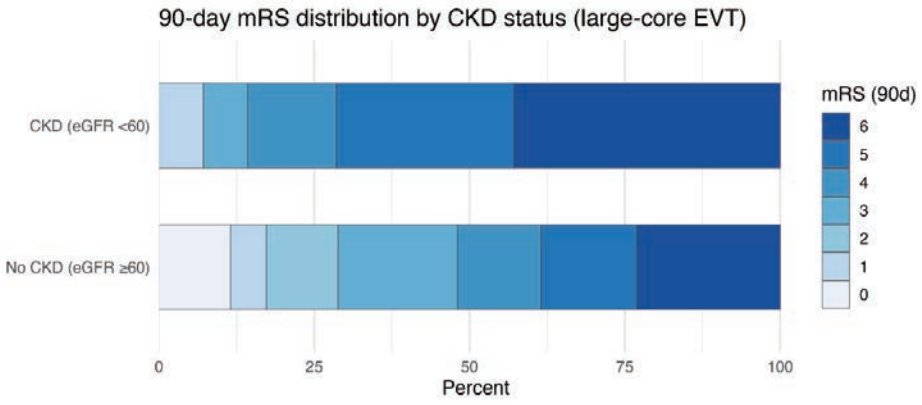

Figure 2. Figure 1. 90-day mRS distribution by CKD status in large-core EVT. Horizontal 100% stacked bars show the proportion of patients in each mRS category (0–6; lighter to darker shades) for No CKD (eGFR ≥60) and CKD (eGFR

Downstream occlusion during mechanical thrombectomy: Clinical implications and endovascular trajectory

Jang-Hyun Baek

Neurology, Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine, Seoul, Korea

BackGround/Aim: Downstream occlusion (DOC) is a commonly observed, yet frequently overlooked, angiographic event during mechanical thrombectomy (MT) for acute large vessel occlusion (LVO). This phenomenon has the potential to complicate procedures and influence outcomes. However, its prevalence, predictors, and endovascular trajectories remain poorly understood.

Methods: A retrospective analysis of 703 patients who underwent MT for acute intracranial LVO between 2010 and 2021 at a tertiary stroke center was conducted. DOC was angiographically identified as a newly developed occlusion in a downstream artery following recanalization of the primary occlusion. Multivariate logistic regression was employed to analyze the clinical and procedural predictors of DOC. Endovascular and clinical outcomes were compared between patients with and without DOC. The DOC trajectory, including immediate reperfusion status, subsequent recanalization attempts, and final outcomes, was analyzed based on the occlusion location.

Results: DOC was identified in 254 patients (36.1%). Atrial fibrillation and proximal occlusion were independently associated with DOC. Despite DOC adversely affecting endovascular procedural details, patients with DOC demonstrated comparable rates of final successful recanalization (92.5% vs. 91.3%; p = 0.577) and 90-day functional independence (40.2% vs. 46.3%; p = 0.114). Notably, over half of the patients exhibited an immediate modified Thrombolysis In Cerebral Infarction (mTICI) grade 2b at the time of DOC. Further recanalization attempts were undertaken in 67.7% of DOC cases, resulting in enhanced mTICI grades in 76.7% of cases and achieving final successful recanalization in 94.2% of cases. The functional advantages of additional recanalization attempts varied depending on DOC location but were generally limited.

Conclusions: DOC occurred relatively frequently during MT and adversely affected certain endovascular details. However, this did not necessarily compromise the final recanalization or functional outcomes. Most DOCs were effectively managed using additional recanalization procedures.

Keywords: Thrombectomy, Embolism, Trajectory, DMVO

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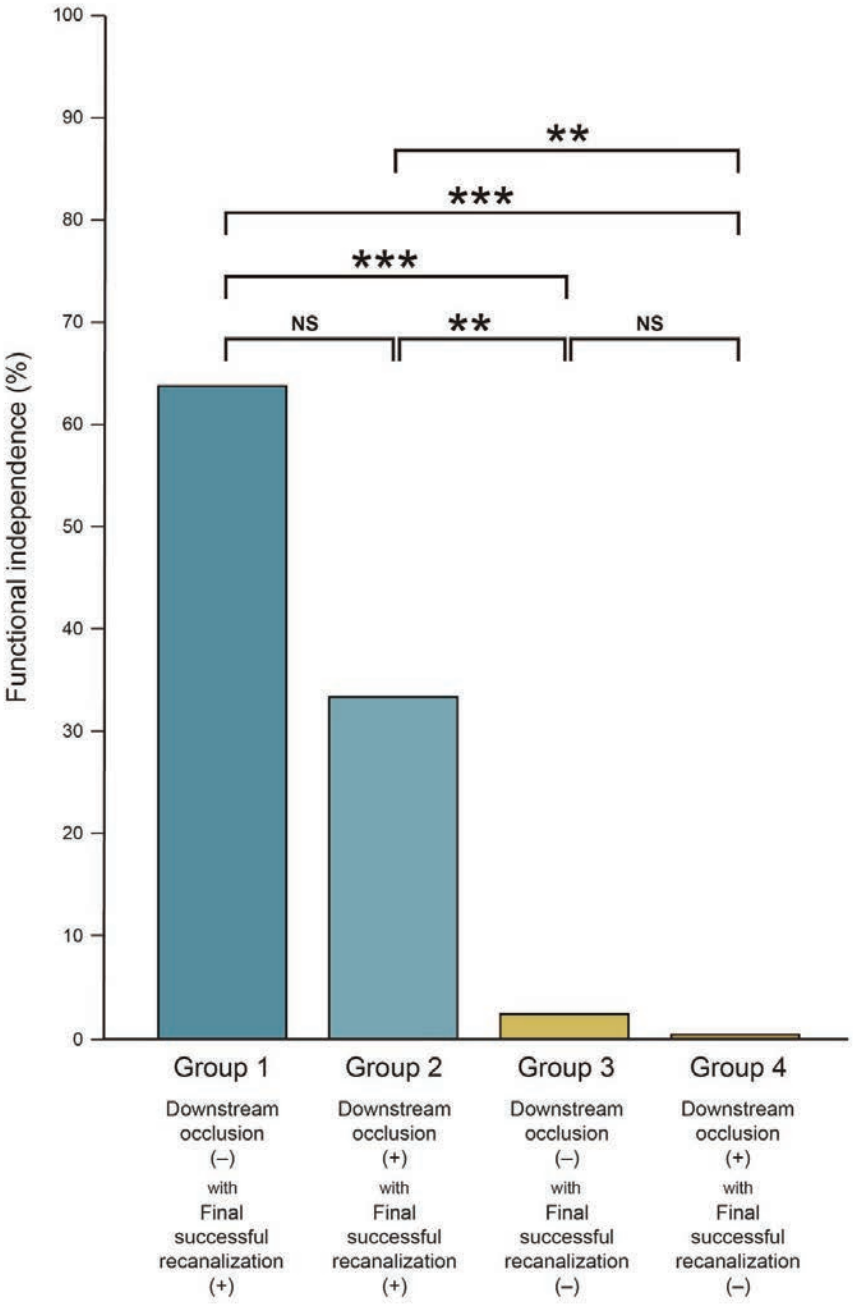

Figure 1. Comparison of functional independence according to downstream occlusion and final recanalization status. Functional independence was defined as a modified Rankin Scale score of 0–2 at 3 months after stroke. *adjusted p-value < 0.05; **adjusted p-value < 0.01; ***adjusted p-value < 0.001; NS = not significant.

Table/Graph/Figure-2:

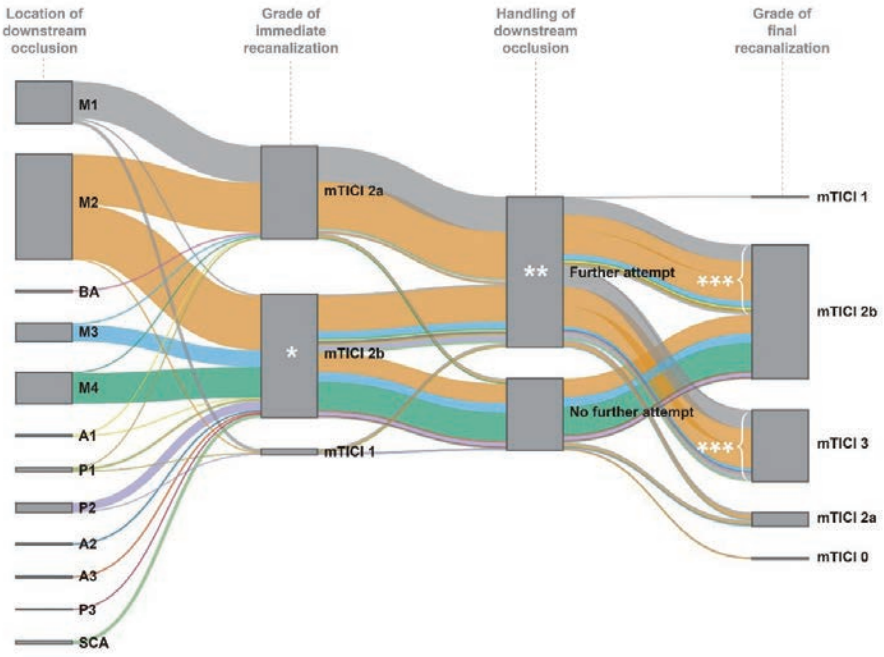

Figure 2. The fate of downstream occlusion in recanalization outcomes. The Sankey diagram was created based on the analysis of 254 patients who had downstream occlusion after thrombectomy attempts. *Although downstream occlusions occurred, 141 (55.5%) patients had an immediate modified Thrombolysis In Cerebral Infarction (mTICI) grade 2b. **One hundred seventy-two (67.7%) patients were managed by further recanalization attempts. ***Finally, 162 patients (94.2%) achieved a final mTICI grade 2b or 3 following the further recanalization attempts.

Procedural determinants of embolic infarction after carotid artery stenting in symptomatic patients: A single-center retrospective study

Kwon-Duk Seo, Sang Hyun Suh*

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BackGround/Aim: Periprocedural embolic infarction is frequently observed on diffusion-weighted imaging (DWI) after carotid artery stenting (CAS). Although pre-balloon angioplasty (predilatation) is commonly performed to facilitate stent delivery, it has been regarded as a potential source of distal embolization. This study aimed to identify procedural predictors of embolic infarction and to determine whether DWI-detected embolic lesions affect long-term functional outcomes.

Methods: We retrospectively analyzed 190 patients who underwent CAS for symptomatic carotid stenosis at a single tertiary center. Procedural variables, including pre- and post-balloon angioplasty, were evaluated for their association with new embolic infarction on post-procedural DWI. Functional outcomes were assessed at 1 year using the modified Rankin Scale (mRS). Logistic regression analyses were performed to identify independent predictors of embolic infarction and unfavorable outcome (mRS>3), adjusting for age, vascular risk factors, stenosis degree, and baseline NIHSS.

Results: New embolic infarction occurred in 27.4% of patients. According to procedural details, 111 patients (58.4%) underwent both pre- and post-balloon angioplasty, 58 (30.5%) pre-dilatation only, 15 (7.9%) post-dilatation only, and 6 (3.2%) no ballooning. The incidence of embolic infarction was 24.3%, 34.5%, 20.0%, and 33.3% across these groups, respectively, with no significant difference (p = 0.534). After adjustment for clinical and procedural covariates, pre-balloon angioplasty was not an independent risk factor (adjusted OR = 1.25, 95% CI: 0.45–3.44, p = 0.67). In multivariable analysis, embolic infarction was not associated with unfavorable 1-year mRS (>3) (adjusted OR = 0.67, 95% CI: 0.19–2.37, p = 0.54).

Conclusions: Pre-balloon angioplasty was not an independent determinant of embolic infarction after CAS, and most DWI-positive lesions were clinically silent, showing no adverse effect on 1-year functional recovery. Embolic risk during CAS appears to be influenced mainly by baseline lesion characteristics, comorbidities and procedural technique rather than by predilatation itself.

Keywords: Balloon, Angioplasty, Embolic, Infarction, Outcome

CT-first imaging and door-to-puncture time in acute stroke

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BackGround/Aim: The choice of the first imaging modality is a key determinant of workflow efficiency in endovascular thrombectomy (EVT) for acute ischemic stroke (AIS). Previous studies have demonstrated that using CT as the initial imaging can shorten door-to-puncture time (DPT) compared with MRI. In July 2023, our comprehensive stroke center revised its critical pathway to a CT-first imaging protocol for EVT candidates, regardless of the last known normal time (LNT). We evaluated the impact of this protocol change on key EVT workflow metrics and clinical outcomes.

Methods: Before July 2023, AIS patients presenting within 6 hours of onset underwent CT as the first imaging modality, while those outside the window underwent MRI. After the protocol change, all patients with disabling deficits or an NIHSS ≥ 6 received CT as the initial imaging. We retrospectively analyzed single-center quality indicators—including DPT, door-to-image time, door-to-reperfusion time, and symptomatic intracerebral hemorrhage (sICH)—before and after the change.

Results: The number of AIS patients undergoing EVT increased from 396 (first half of 2022) to 442 (second half of 2023). Median DPT improved from 71 minutes to 60 minutes, with the proportion of patients achieving DPT ≤ 60 minutes increasing from 37.5% to 52.2%. Median door-to-image time for CT decreased from 27 to 22.5 minutes, with 94% imaged within 30 minutes post-change versus 70% pre-change. MRI door-to-image time slightly improved (30 to 28.5 minutes), but only 50% achieved imaging within 30 minutes. Median door-to-reperfusion time decreased from 130 to 105 minutes, and the proportion of patients achieving reperfusion ≤ 120 minutes increased from 37.9% to 62.5%. The sICH rate remained stable.

Conclusions: Adopting a CT-first imaging protocol significantly improved EVT workflow efficiency, particularly reducing door-to-puncture time and door-to-reperfusion time, without increasing hemorrhagic complications. Streamlined imaging strategies may be a key driver of faster treatment and improved stroke care quality.

Keywords: Stroke, EVT, Image, Door-To-Puncture, Workflow

Herbal metabolites as adjuvant neuroprotective agents in acute ischemic stroke: A systematic review of experimental and clinical evidence

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BackGround/Aim: Ischemic stroke is the leading cause of neurological morbidity and mortality worldwide. Conventional therapies have limitations, leading to increased interest in herbal therapies with a neuroprotective approach. However, the molecular mechanisms of these neuroprotective effects are often not fully understood. Advances in multi-omics technology offer opportunities to gain comprehensive insights into the complexity of herbal phytochemical actions. This study aims to synthesize the latest evidence on the neuroprotective mechanisms of herbal plants in ischemic stroke revealed through a multi-omics approach.

Methods: A systematic literature search was conducted using the SLR method. Studies that met the inclusion criteria were in vivo (animal) and in vitro studies that investigated the neuroprotective effects of herbal extracts or single phytochemicals in ischemic stroke models using at least one omics approach (genomics, transcriptomics, proteomics, or metabolomics).

Results: The results show that multi-omics reveals the neuroprotective mechanisms of herbal phytochemicals in ischemic stroke. The proteomic approach (16 studies) dominated the research, followed by genomic/transcriptomic (6 studies), which identified targets such as SRC and the PI3K-Akt pathway, as well as metabolomic (6 studies). Compounds such as ginsenoside-Rb1, salvianolic acid B, tanshinone IIA, and ligustrazine significantly modulate three major protective pathways: anti-apoptosis through caspase-3 reduction, anti-inflammation by reducing pro-inflammatory cytokines, and anti-oxidation through increased superoxide dismutase enzyme and BDNF neurotrophic factor. Functional data showed that salvianolic acid B reduced neurological deficit scores (-0.86) and infarct volume (-16.93), while ligustrazine recorded a standard mean difference of -1.84 for neurological deficit and -2.97 for infarct volume. Clinical studies report significant improvements in the NIHSS scale, modified Rankin scale, and Barthel Index in ischemic stroke patients receiving herbal phytochemical-based interventions.

Conclusions: Overall, the papers demonstrate that herbal phytochemicals act via multiple targets, including anti-apoptotic, anti-inflammatory, and anti-oxidative mechanisms, to confer neuroprotection in ischemic stroke.

Keywords: Herbal, Ischemic Stroke, Multi-Omics

Implant related infection after carotid artery stenting

Bo Kyu Kim

Radiology, Korea University Anam Hospital, Seoul, Korea

Contents: We report a case of an asymptomatic patient with severe right carotid artery stenosis who underwent carotid artery stenting (CAS) without peri-procedural complications and was discharged uneventfully. Six weeks after the procedure, the patient presented with neck swelling and pain. Computed tomography revealed abscess formation and a pseudoaneurysm around the stent. Despite initiation of antiplatelet therapy, the symptoms did not improve. A balloon occlusion test demonstrated sufficient cross-filling through the posterior communicating artery. Subsequently, endovascular trapping using a vascular plug was performed, followed by surgical removal of the stent. The patient was discharged without any neurological deficits. Carotid stent infection is an extremely rare but life-threatening complication, usually caused by Staphylococcus aureus or coagulase-negative staphylococci. It may present weeks after stenting with neck pain, swelling, or pseudoaneurysm formation. Early diagnosis with imaging and cultures is essential. While prolonged intravenous antibiotic therapy (at least 4–6 weeks) is required, conservative treatment alone is often insufficient. Definitive management typically involves surgical removal of the infected stent with arterial reconstruction or endovascular trapping in selected high-risk patients. Covered stents have been reported in few cases to seal pseudoaneurysms; however, in the presence of infection, they may entrap infectious material within the vessel, making their use highly controversial. They may be considered as a temporary or bridging option in high-risk patients, but they do not provide a definitive long-term solution.

Keywords: CAS, Infection, Endovascular Trapping

Basilar artery dissection in 18 years old antiphospholipid antibody syndrome patient

Sang Heum Kim

Radiology, CHA Medical School, Bundang CHA Hospital, Sungnam, Korea

Contents: 18 years old female was presented at emergency room, with left weakness and dysarthria (NIHSS 20p) in 1 hour of onset. CT angio showed occlusion of basilar artery tip. Direct aspriation with large bore catheter was done, without visible thrombus. angio showed persistent bilateral PCA occlusions. Stent retrievals were done without effect. Small membranous materials were noted on the struts. after multiple ineffective trials, Aggrastatin was infused. final angio showed only proximal recanalizations of bilateral PCAs. No visible thalamoperforater from BA top was noted. Fine mural structures were suspecrted at bilateral proximal PCAs. Laboratory tests showed equivocal anti-cardiolipin antibody and possive Anti-beta 2 glycoprotein 1 (anti-B2GP1) antibodies, suggesting antiphospholipid antibody syndrome.

Keywords: Basilar Artery, Dissection, Antiphospholipid Antibody

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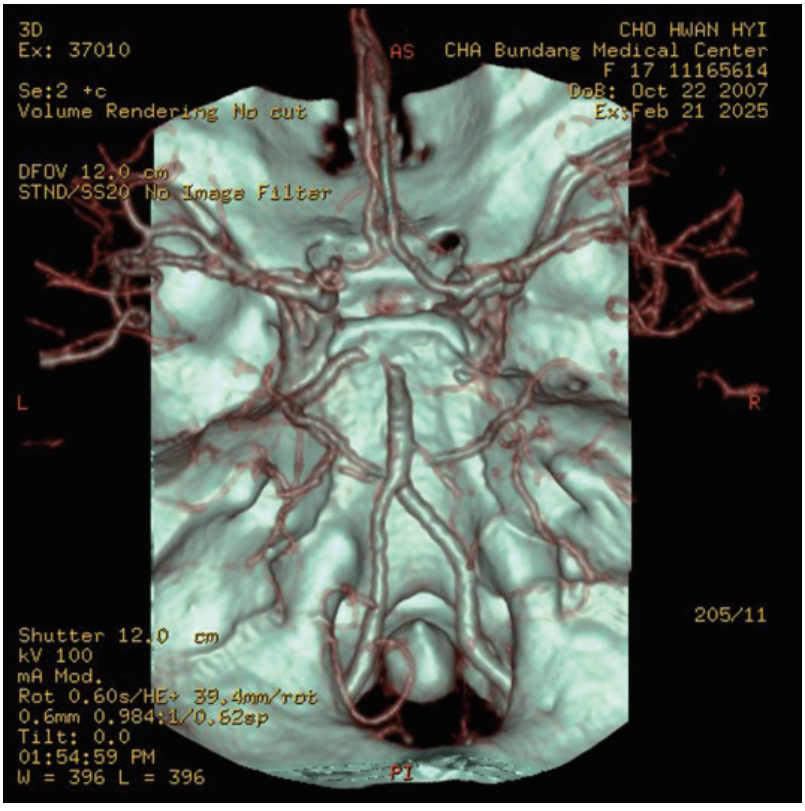

Figure 1.
initial CT angio showed BA top occlusion.

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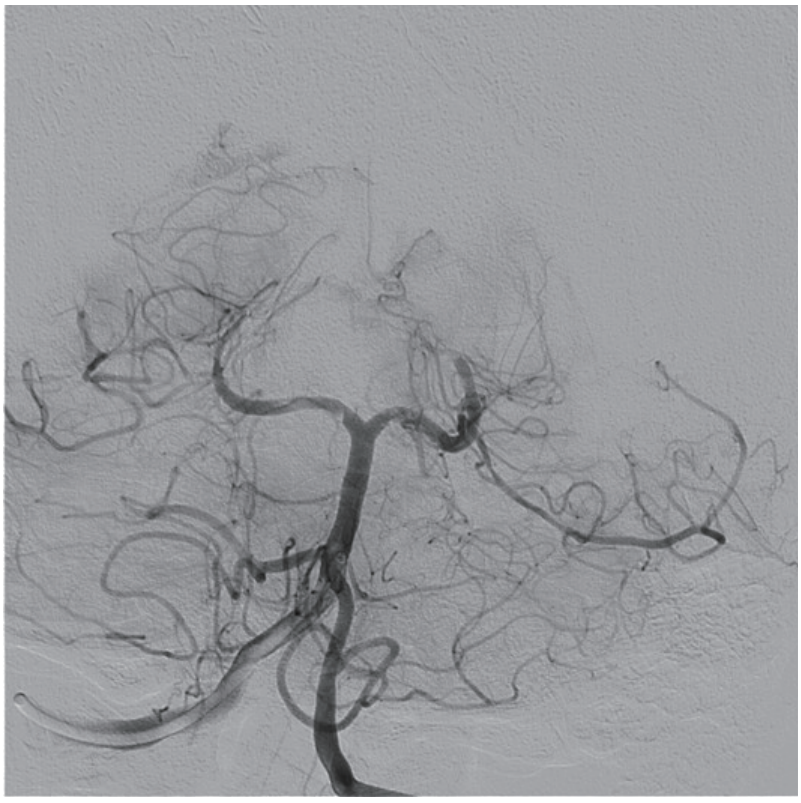

Figure 2. Final angio showed fine mural filling defects, no thalamoperforator and distal PCA occlusions.

Thrombectomy for BAO with mild deficits: A multicenter prospective registry

Kai Qiu, Yu Hang, Jie Ji, et al. (China)

Radiomics-based machine learning model for predicting clinically ineffective reperfusion in acute ischaemic stroke patients after endovascular treatment: A double center retrospective study

Xiaolong Hu, Shifei Ye, Yibin Fang (China)

Superlearner can predict in-hospital mortality risk in critically ill patients with ischemic stroke: Development and international validation

Shifei Ye, Xiaolong Hu, Yibin Fang (China)

Gamma-glutamyltransferase as a potential contributor to the pathogenesis of ischemic stroke: Evidence from mendelian randomization and genetics

Penghui Wei, Jiebo Li, Niugang Niu, Yang Zhu, Dengliang Wang, Dezhi Kang (China)

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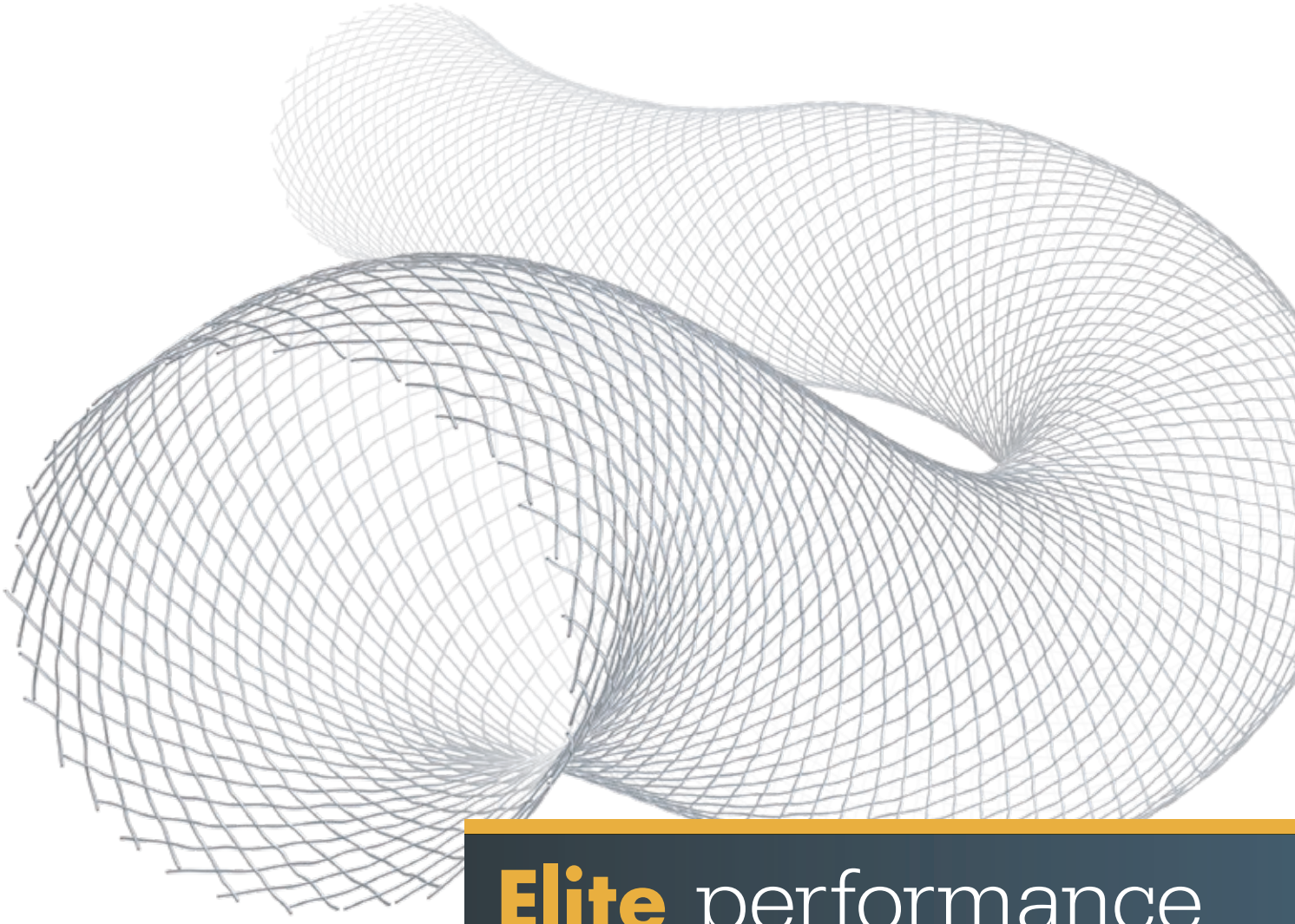

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비지파크 제품정보

References: 1. Prasad A et al. Catheter Cardiovasc Interv 2021; doi: 10.1002/ccd.30006 **2.** McCullough P et al. Cardiorenal Med 2021; doi:10.1159/000517884. **3.** Almén T. Acta Radiol 1995; 36(Suppl.399): 2-18. **4.** Ronco F et al. Rev Cardiovasc Med. 2020; 21:9-23 **5.** Keuffel E et al. J Med Econ. 2018;21:356-364. **6.** Fountaine H et al. Acad Radiol 1996; 3(Suppl.3): S475-84.

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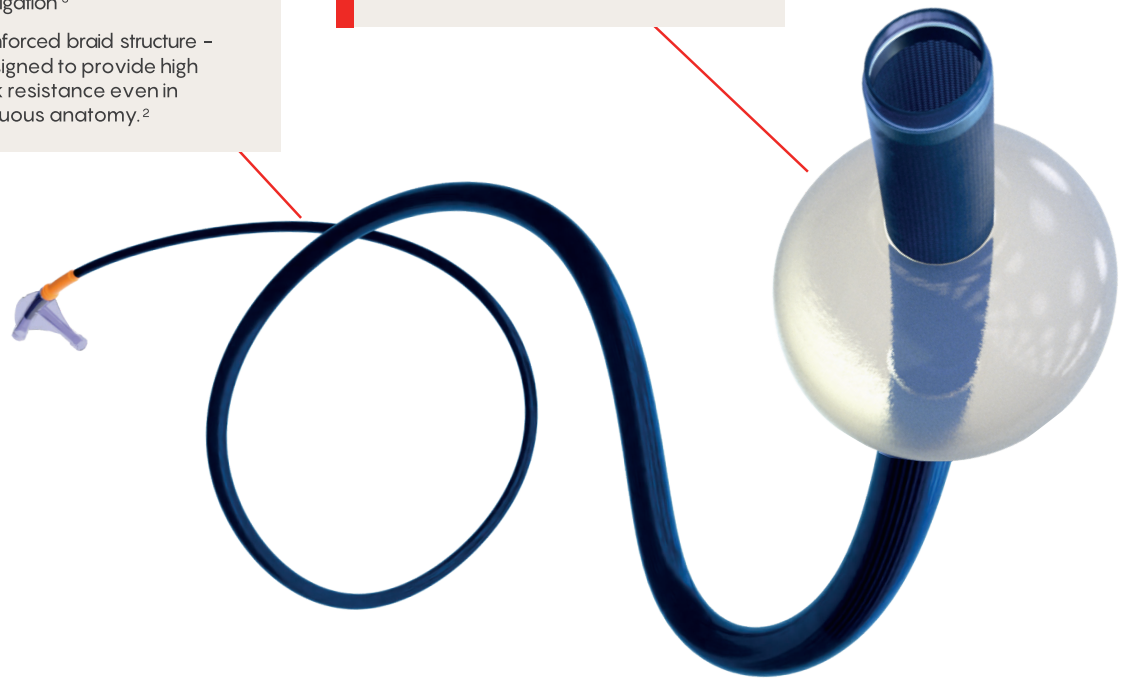

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1 2020. EMBOGUARD Physician Assessments. TR434. Buffalo: Jacobs Institute.
2 500770428 EMBOGUARD™ Predicate Device Test Report.
3 DMR SA031 Rev G.2 EMBOGUARD Balloon Guide Catheter - 95cm.
4 2022. EMBOGUARD Specification Rationale Report. 500596156. Neuravi Ltd.
5 EMBOGUARD Evidence Generation Test Report 3. Rev B. April 14, 2023. 501114659
6 2021. EMBOGUARD BGC and Predicate Device Simulated Use Without Clot Test Report. 500756676
7 Emboguard instruction for use. 500761458 Rev E, May 2022

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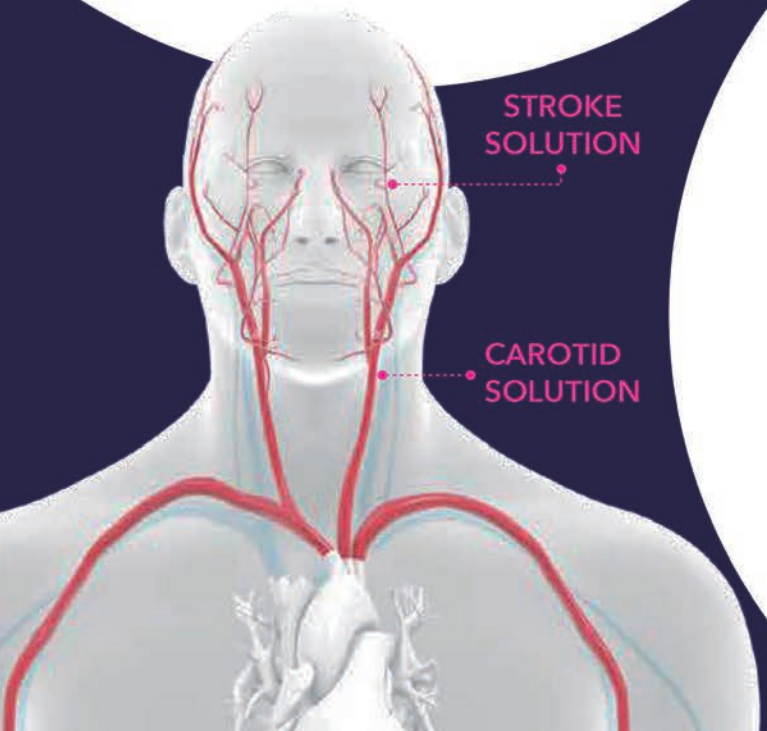

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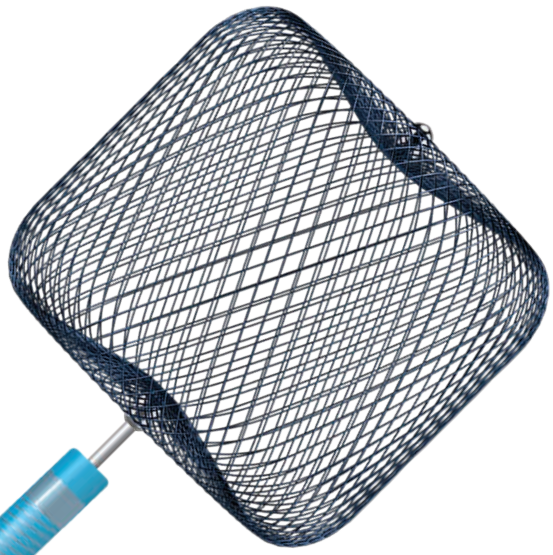

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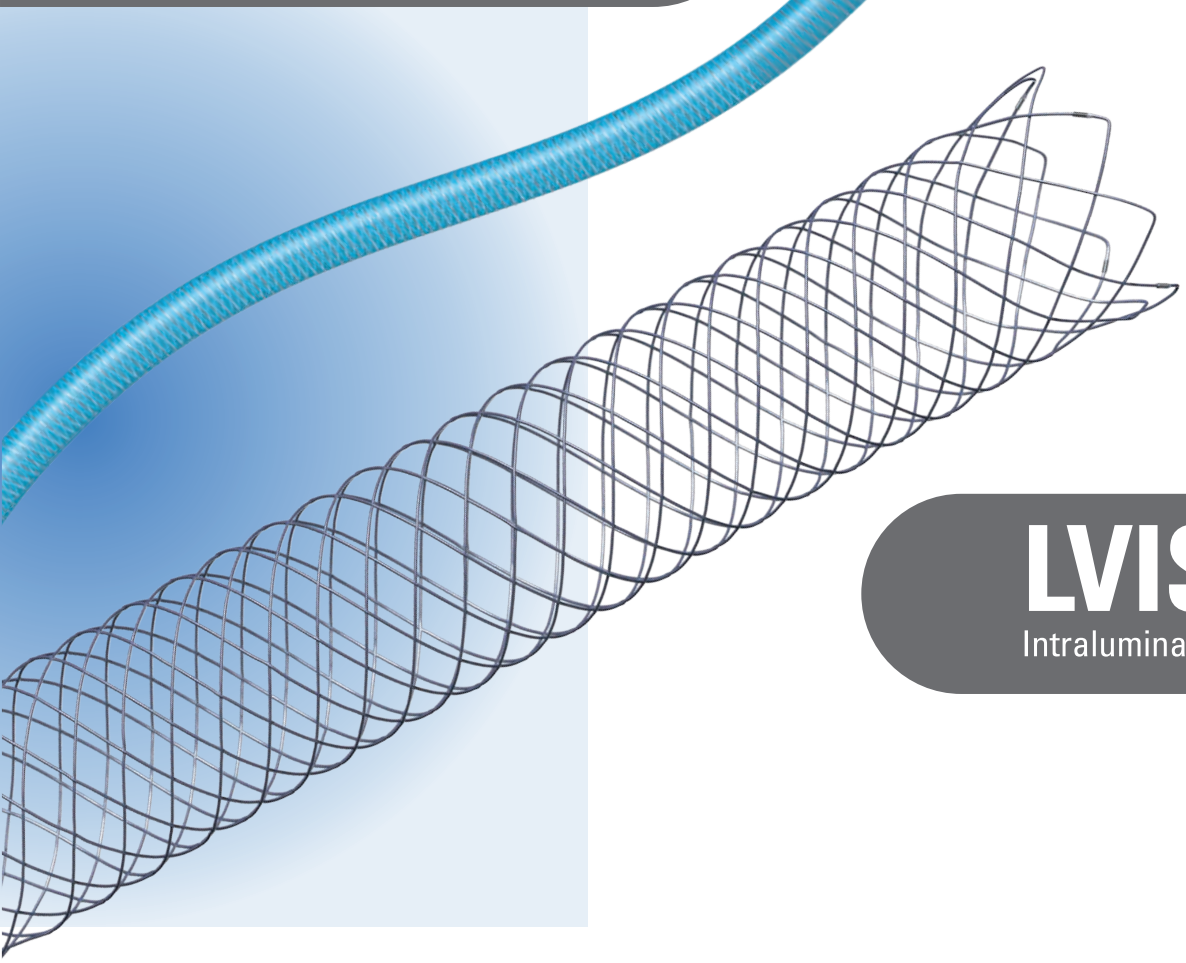

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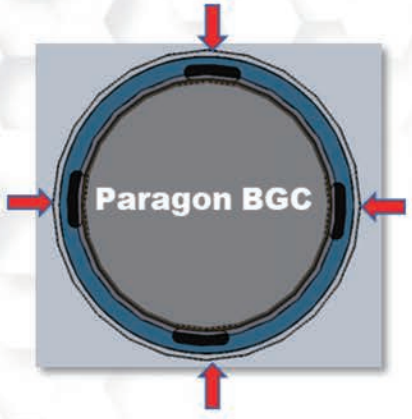

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울트라비스트®듀의 안전성 프로파일

- 울트라비스트®듀는 출시 후 30년 이상 판매되었으며,[2] 2억 5천만건 이상의 진단에서 사용[2]
- 매년 1천 6백만 건의 검사, 15만명의 환자가 포함된 관찰 연구가 뒷받침하는 입증된 안전성 프로파일을 보유[3,4]

[a] A prospective, randomized, phase 3, parallel-group, open-label, non-inferiority trial of patients at risk of contrast-induced nephropathy according to current guidelines to assess whether giving no prophylaxis is non inferior to standard care of prophylactic hydration. High-risk patients(with eGFR of 30–59 mL per min/1.73 m²) were randomly assigned(1:1) to receive intravenous 0.9% NaCl or no prophylaxis. The primary outcome was incidence of contrast-induced nephropathy, defined as an increase in serum creatinine from baseline of more than 25% or 44 μmol/L within 2–6 days of contrast exposure, and cost-effectiveness.

† AMACING 연구에서 사용된 Ultravist® 은 현재 국내에서 Ultravist® DEU 로 판매되고 있습니다.
AMACING Prophylactic hydrAtion to protect renal function from intravascular iodinated contrast MA terial in patients at high risk of Contrast- Induced Nephropathy; ESUR European Society of Urogenital Radiology

References **1.** van der Molen AJ, Reimer P, Dekkers IA, et al. Post-contrast acute kidney injury – Part 2: risk stratification , role of hydration and other prophylactic measures , patients taking metformin and chronic dialysis patients Recommendations for updated ESUR Contrast Medium Safety Committee guidelines *Eur Radiol* 2018; 30–5247-4 **2.** Bayer data reported to Health Authorities. PSUR/PBER Ultravist® (Iopromide) (01 JUL 2017 30 JUN 2018), August 2018. **3.** Chen Y et al. Safety and tolerability of iopromide in patients undergoing cardiac catheterization: real-world mulitcenter experience with 17,513 patients from the TRUST Trial. *Int J Cardiovasc Imaging*. 2015 Oct; 31 (7): 1281-91 **4.** Palkowitsch P, Bostelamm S, Lengsfeld P. Safety and tolerability of iopromide intravascular use: a pooled analysis of three no-interventional studies in 132,012 patients. *Acta Radiologica* 2014;55(6):707-714

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- 뇌졸중 환자와 ***그 가족의 삶의 질 개선***[5†,6]
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*Propensity score matched cohort study, 738 matched pairs, 10-years follow-up. † Study design: In IST-3, done at 156 hospitals in 12 countries (Australia, Europe, and the UK), participants (aged >18 years) were randomly assigned with a telephone voice-activated or web-based system in a 1:1 ratio to treatment with intravenous 0·9 mg/kg alteplase plus standard care or standard care alone within 6 h of ischaemic stroke.

1. Jenny Simon et al. Acta Neurologica Scandinavica Vol. 2025 2. EMA. Actilyse® (Alteplase) Summary of Product Characteristics. Available at: www.medicines.org.uk/emc/product/898/smpc Last accessed January 2024; 3. World Health Organisation. Model List of Essential Medicines. 23rd List. 2023. Available online at: https://www.who.int/publications/i/item/WHO-MHP-HPS-EML-2023.02. Last accessed January 2024; 4. Muruet W, et al. Stroke 2018;49:607–613; 5. Berge E, et al. Lancet Neurol 2016;15:1028–1034; 6. NICE. Alteplase for treating acute ischaemic stroke. NICE Technology Appraisal Guidance [TA 264] 2012. Available online at: www.nice.org.uk/guidance/ta264/chapter/4-Consideration-of-the-evidence Last accessed January 2024; 7. 식품의약품안전처, 액티라제®50밀리그램 제품정보(available at https://nedrug.mfds.go.kr/pbp/CCBBB01/getItemDetailCache?cacheSeq=199504213aupdateTs2025-02-21%2013:08:14.0b accessed on Mar 24, 2025)

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1. Perclose™ ProStyle™ SMCR System – Instructions for Use (IFU). Refer to IFU for additional information.
2. As compared to A, B, C, D, E, F, G, H, I, J. Data on file at Abbott.
3. July 2024 Finance Report. Data on file at Abbott.
4. On Nov. 8, 1993, the first (Perclose) patent was filed for the percutaneous suture vascular closure device.
5. Fabbricatore D et al. (2023) Ambulatory PV isolation workflow using suture-mediated vascular closure devices: a prospective observational cohort study. (PRO-PVI Study). Europace. 25(4):1361-1368.
6. Bhatt, Deepak L. et al. Successful "Pre-Closure" of 7Fr and 8Fr Femoral Arteriotomies With a 6Fr Suture-Based Device (The Multicenter Interventional Closer Registry). *American Journal of Cardiology* Vol 89. March 2002.

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