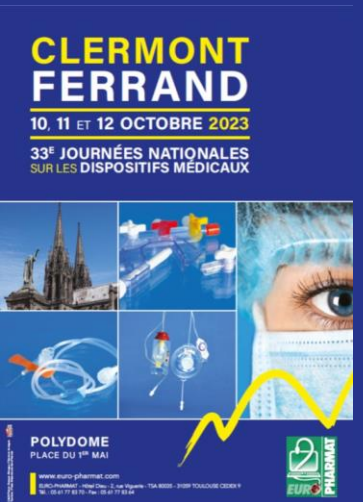
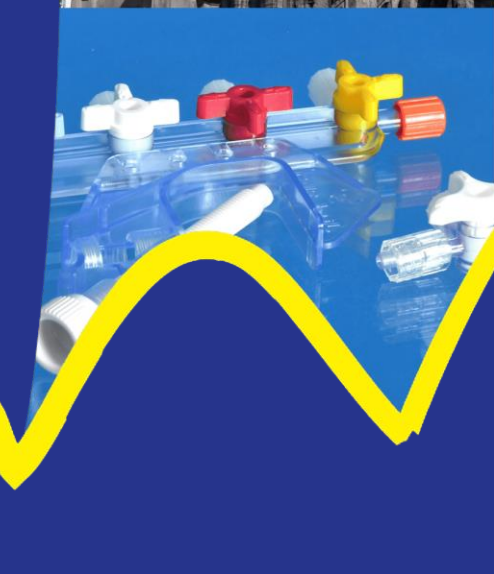
Prise en Charge de l'AVC en NRI

Saleme S, Rouchaud A, Mounayer C
Service de Neuroradiologie Interventionnelle
CHU Limoges





Déclaration liens d'intérêts

Je n'ai pas de conflit d'intérêt à déclarer.

FAITS CONNUS

L'évolution clinique favorable est fortement corrélée à la recanalisation précoce

NINDS study, N Engl J Med. 1995 ; Hacke W, Lancet 2004

Les patients avec NIHSS ≥ 15 ont le plus souvent des occlusions des vaisseaux proximaux et une moins bonne évolution clinique

Les patients avec un score ASPECT inférieur à 6 (AVC de gros volume), ont un risque de transformation hémorragique augmenté

ECASS Berger, C. et al. Stroke 2001;32:1330-1335

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 — JANUARY 1, 2015 — VOL. 372 NO. 1

A Randomized Trial of Intraarterial Treatment for Acute Ischemic Stroke

O.A. Berkhemer, P.S.S. Fransen, D. Beumer, L.A. van den Berg, H.F. Lingsma, A.J. Yoo, W.J. Schonewille, J.A. Vos, P.J. Nederkoorn, M.J.H. Wermer, M.A.A. van Walderveen, J. Staals, J. Hofmeijer, J.A. van Oostayen, G.J. Lycklama à Nijeholt, J. Boiten, P.A. Brouwer, B.J. Emmer, S.F. de Bruijn, L.C. van Dijk, L.J. Kappelle, R.H. Lo, E.J. van Dijk, J. de Vries, P.L.M. de Kort, W.J.J. van Rooij, J.S.P. van den Berg, B.A.A.M. van Hasselt, L.A.M. Aerden, R.J. Dallinga, M.C. Visser, J.C.J. Bot, P.C. Vroomen, O. Eshghi, T.H.C.M.L. Schreuder, R.J.J. Heijboer, K. Keizer, A.V. Tielbeek, H.M. den Hertog, D.G. Gerrits, R.M. van den Berg-Vos, G.B. Karas, E.W. Steyerberg, H.Z. Flach, H.A. Marquering, M.E.S. Sprengers, S.F.M. Jenniskens, L.F.M. Beenen, R. van den Berg, P.J. Koudstaal, W.H. van Zwam, Y.B.W.E.M. Roos, A. van der Lugt, R.J. van Oostenbrugge, C.B.L.M. Majoie, and D.W.J. Dippel, for the MR CLEAN Investigators*

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Randomized Assessment of Rapid Endovascular Treatment of Ischemic Stroke

M. Goyal, A.M. Demchuk, B.K. Menon, M. Eesa, J.L. Rempel, J. Thornton, D. Roy, T.G. Jovin, R.A. Willinsky, B.L. Sapkota, D. Do
W.J. Montanera, A.Y. Poppe, K.J. Ryckborst, F
D. Williams, O.Y. Bang, B.W. Baxter, P.A
C.A. Holmstedt, B. Jankowitz, M. Kelly, G. L
S.-I. Sohn, R.H. Swartz, P.A. Barber, S.B. C
A. Weill, S. Subramaniam, A.P. Mitha, J
T.T. Sajobi, and M.D. Hill for the ES

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Endovascular Therapy for Ischemic Stroke with Perfusion-Imaging Selection

B.C.V. Campbell, P.J. Mitchell, T.J. Kleinig, H.M. Dewey, L. Churilov, N. Yassi,
T.J. Oxley, T.Y. Wu, M. Brooks,
ause, T.J. Harrington, K.C. Faulder,
roop, P.A. Barber, B. McGuinness,
andra, C.F. Bladin, M. Badve, H. Rice,
G.A. Donnan, and S.M. Davis,
nvestigators*

Mechanical thrombectomy after intravenous alteplase versus alteplase alone after stroke (THRACE): a randomised controlled trial

*Serge Bracard, Xavier Ducrocq, Jean Louis Mas, Marc Soudant, Catherine Oppenheim, Thierry Moulin, Francis Guillemin, on behalf of the THRACE investigators**

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 — JUNE 11, 2015 — VOL. 372 NO. 24

Stent-Retriever Thrombectomy after Intravenous t-PA vs. t-PA Alone in Stroke

Jeffrey L. Saver, M.D., Mayank Goyal, M.D., Alain Bonafe, M.D., Hans-Christoph Diener, M.D., Ph.D., Elad I. Levy, M.D., Vitor M. Pereira, M.D., Gregory W. Albers, M.D., Christophe Cognard, M.D., David J. Cohen, M.D., Werner Hacke, M.D., Ph.D., Olav Jansen, M.D., Ph.D., Tudor G. Jovin, M.D., Heinrich P. Mattle, M.D., Raul G. Nogueira, M.D., Adnan H. Siddiqui, M.D., Ph.D., Dileep R. Yavagal, M.D., Blaise W. Baxter, M.D., Thomas G. Devlin, M.D., Ph.D., Demetrius K. Lopes, M.D., Vivek K. Reddy, M.D., Richard du Mesnil de Rochemont, M.D., Oliver C. Singer, M.D., and Reza Jahan, M.D., for the SWIFT PRIME Investigators*

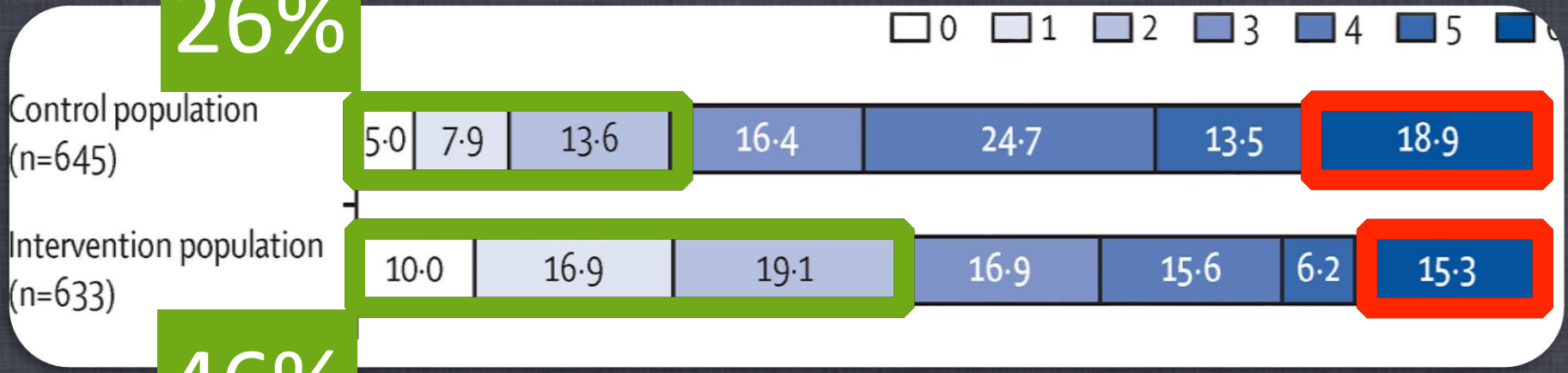
ORIGINAL ARTICLE

Thrombectomy within 8 Hours after Symptom Onset in Ischemic Stroke

T.G. Jovin, A. Chamorro, E. Cobo, M.A. de Miquel, C.A. Molina, A. Rovira, L. San Román, J. Serena, S. Abilleira, M. Ribó, M. Millán, X. Urra, P. Cardona, E. López-Cancio, A. Tomasello, C. Castaño, J. Blasco, L. Aja, L. Dorado, H. Quesada, M. Rubiera, M. Hernández-Pérez, M. Goyal, A.M. Demchuk, R. von Kummer, M. Gallofré, and A. Dávalos, for the REVASCAT Trial Investigators*

Hermes

26%



46%

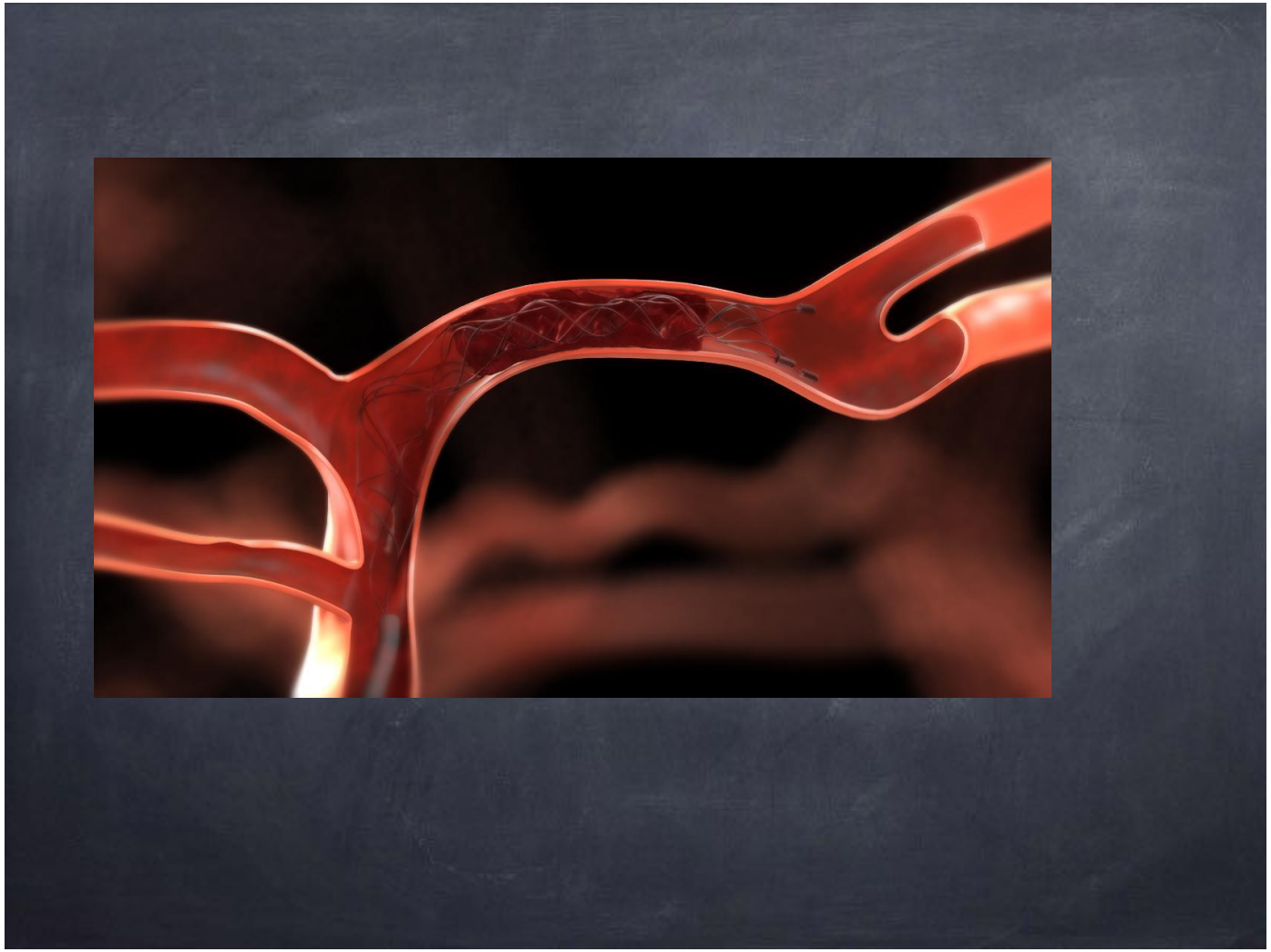
NNT: 2.6

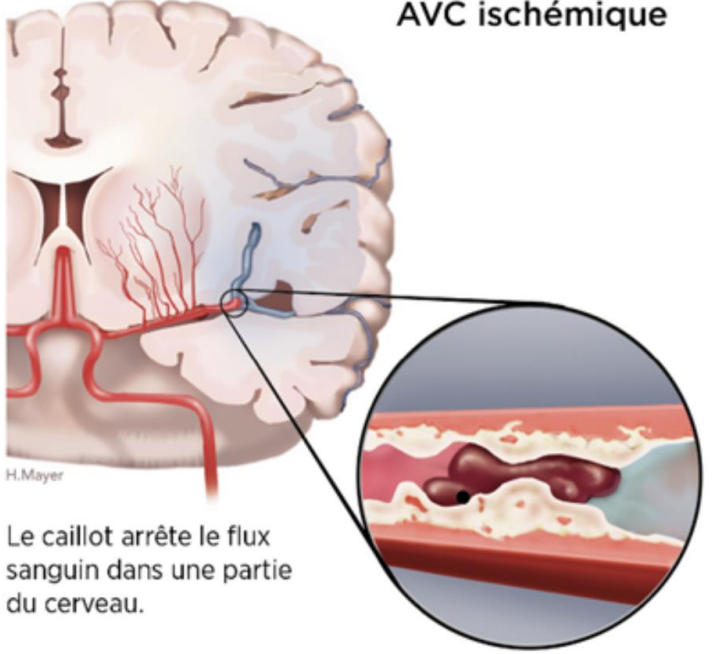
Lancet. 2016 Apr 23;387(10029):1723-31

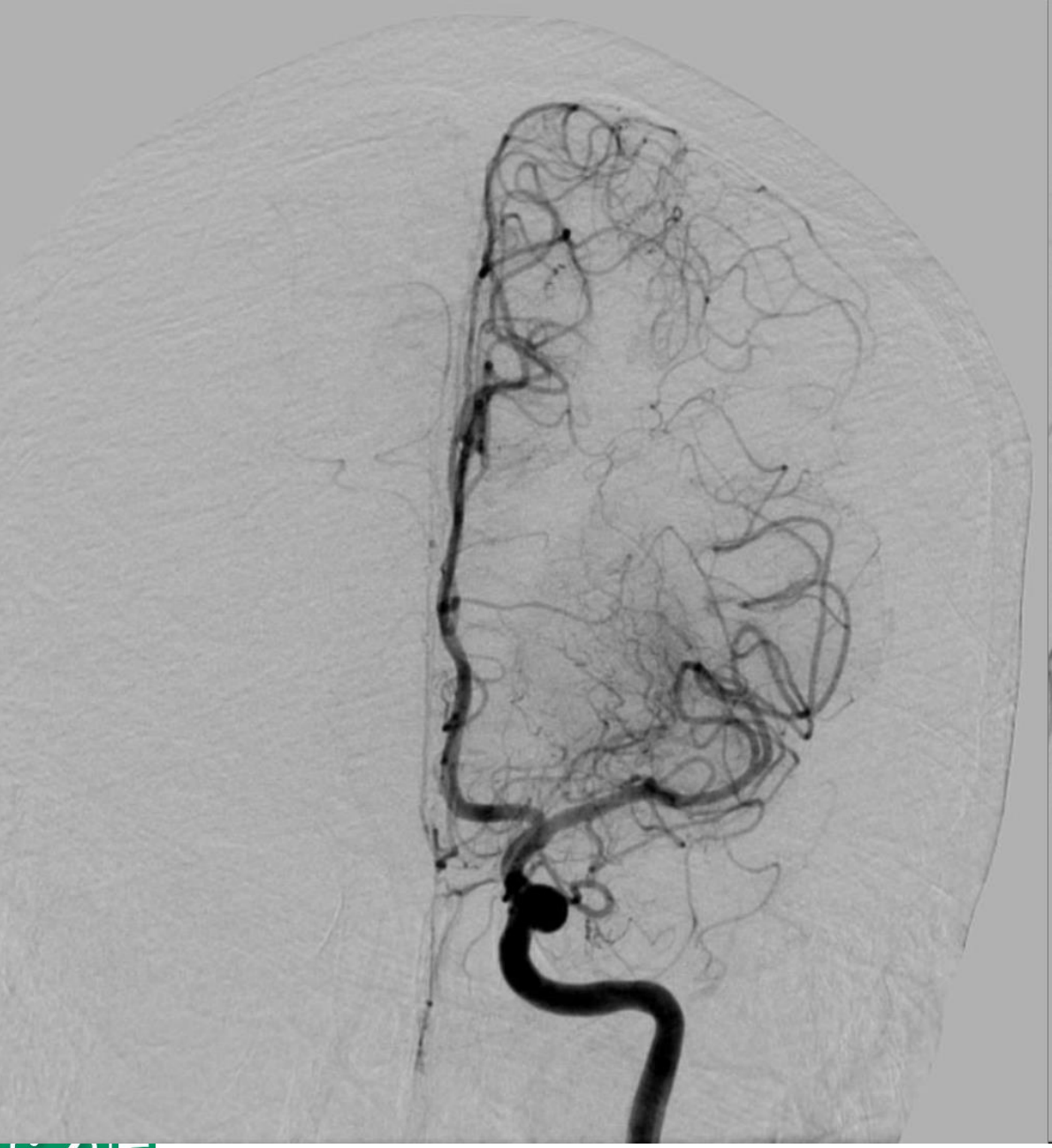
Recommandations européennes pour la thrombectomie

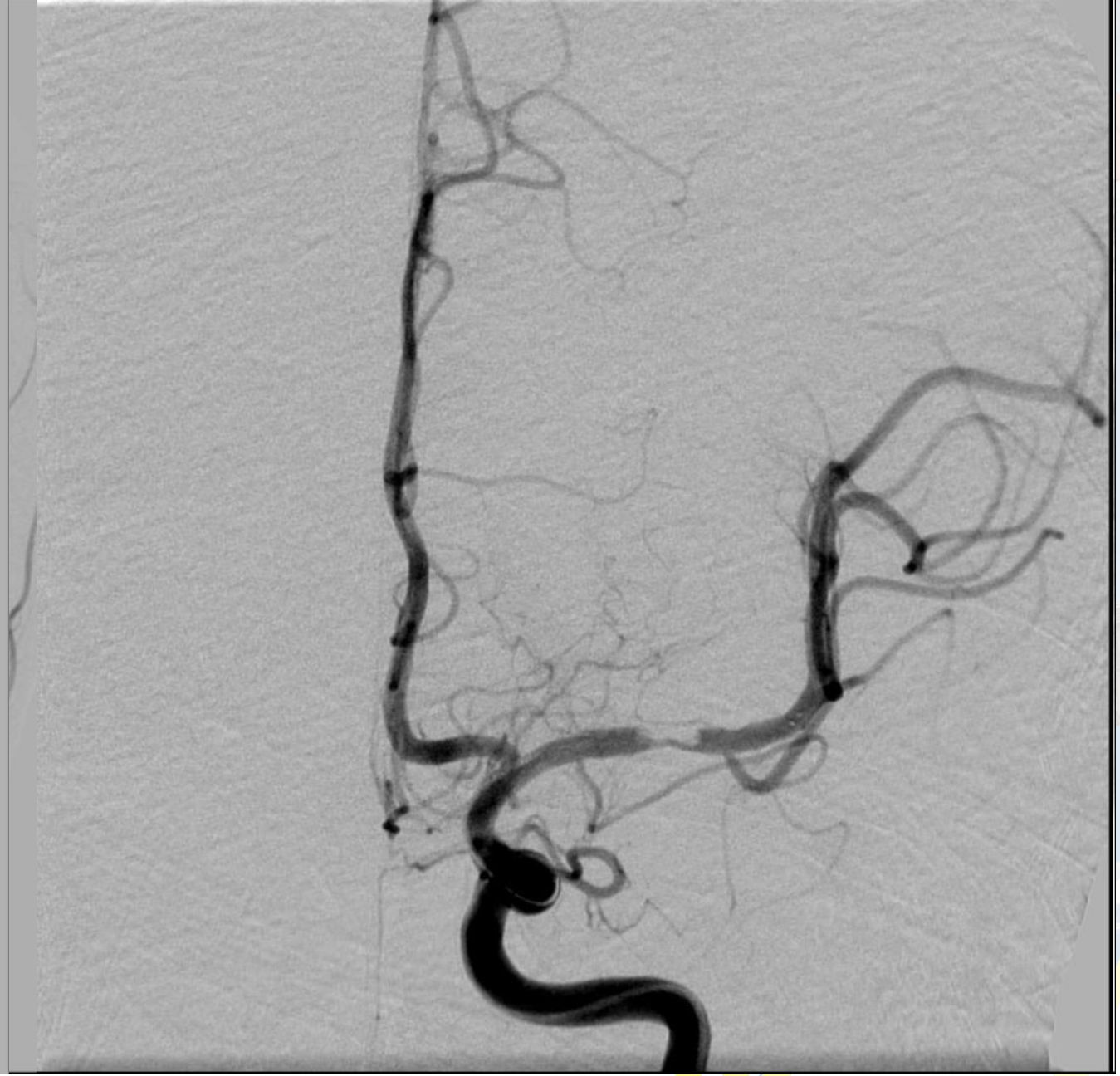
Thrombectomie recommendée pour AVC ischémique avec occlusion de grande artère de la circulation antérieure en association avec la thrombolyse IV jusqu'à 6h du début des symptomes

STENT- RETRIEVER



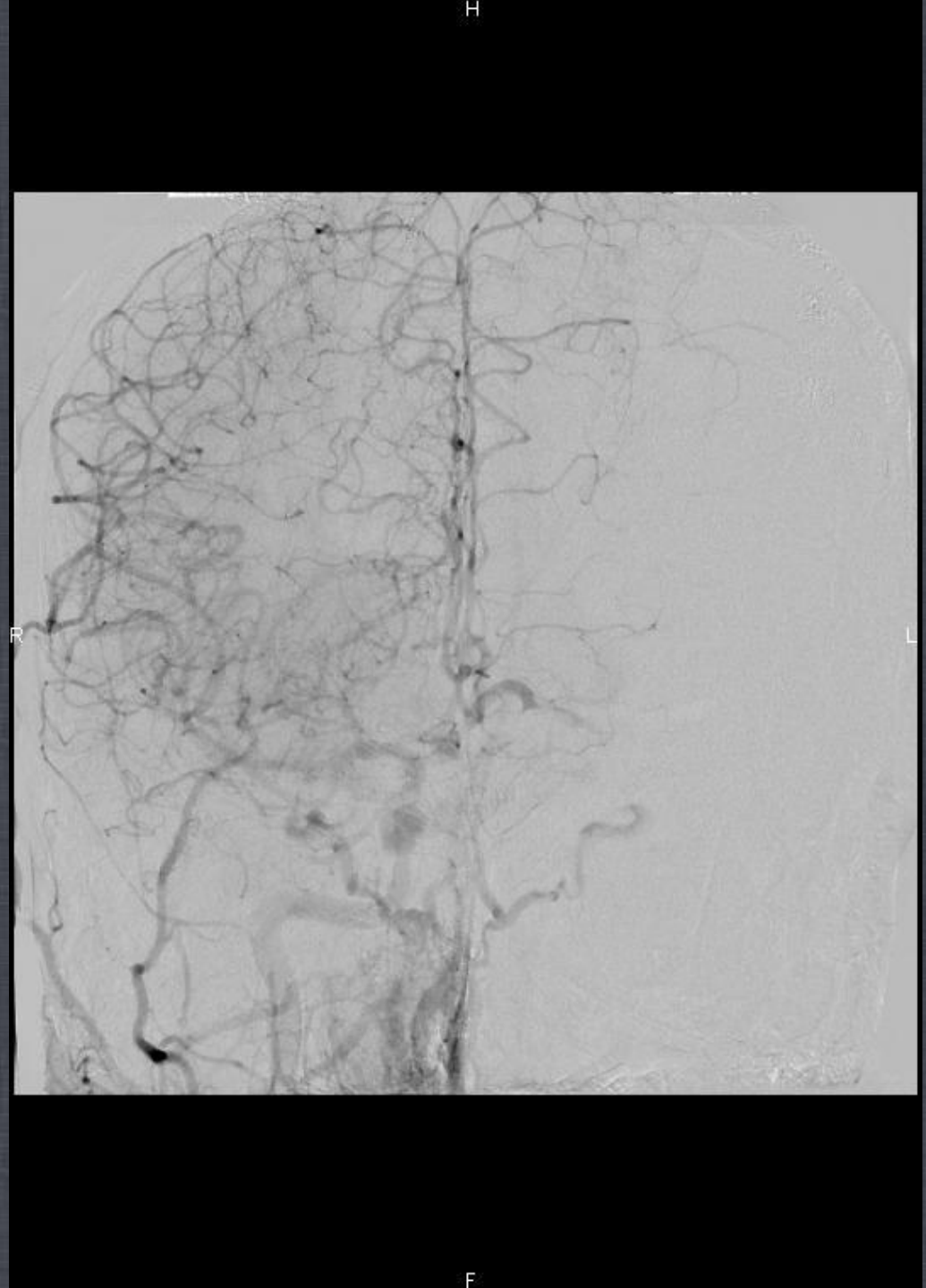






TICI

- Grade 0: Complete occlusion
- Grade 1: Partial occlusion
- Grade 2a: Partial filling (2/3) of the entire vascular territory is visualized
- Grade 2b: Complete filling of all of the vascular territory is visualized, but the filling is slower than normal
- Grade 3: Complete recanalization with full return of Perfusion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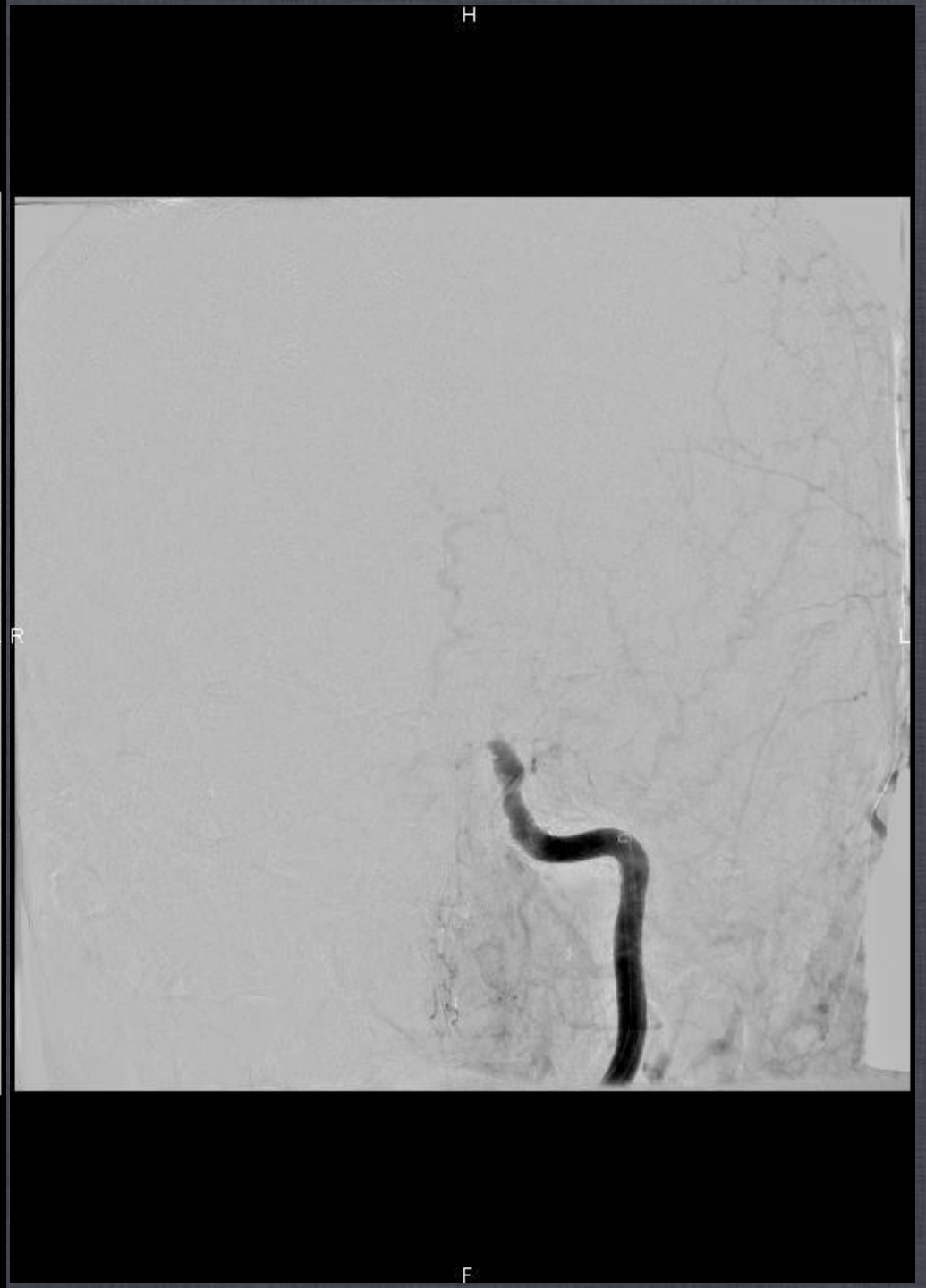
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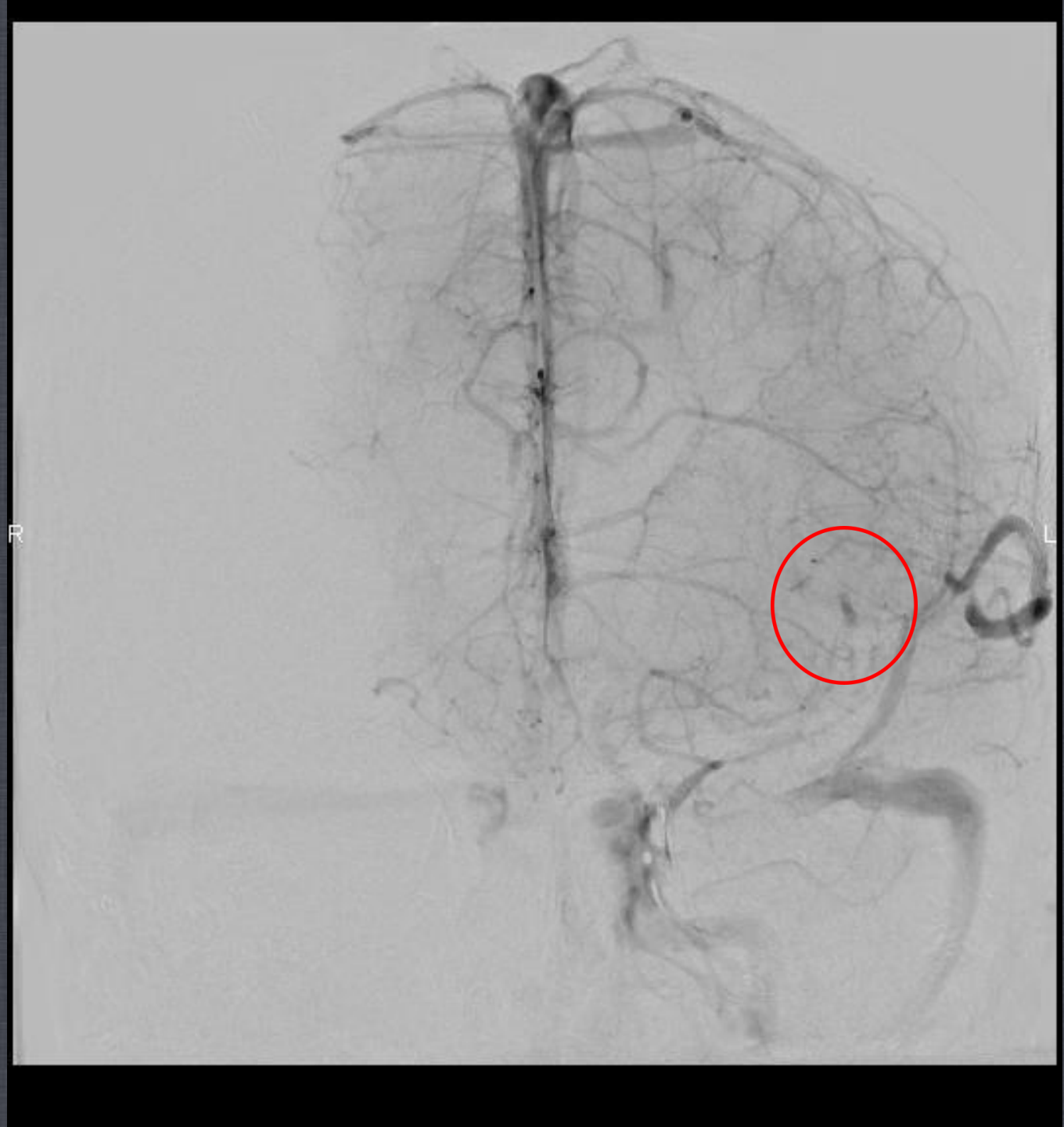
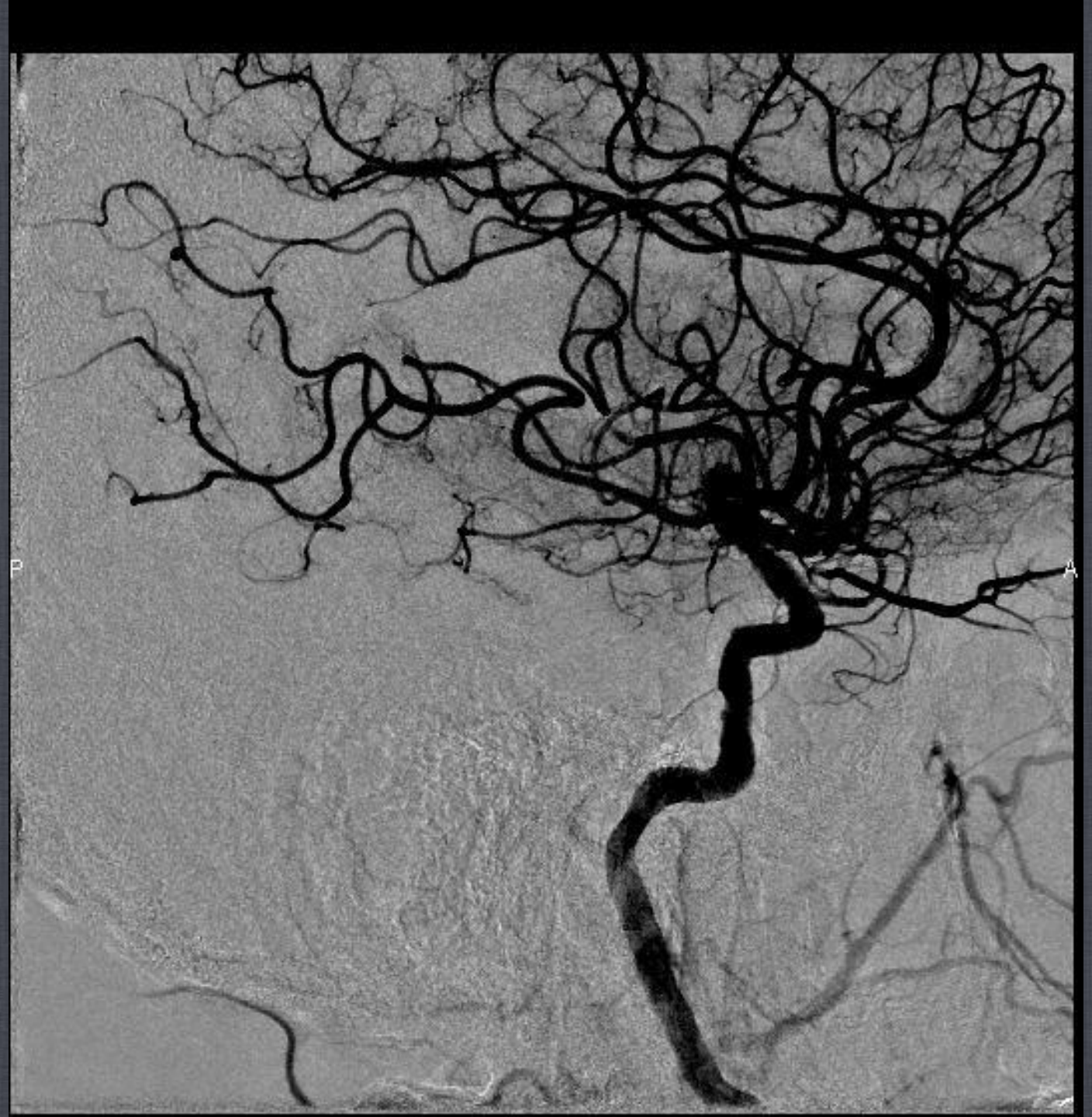
Stent retriever 6x40mm




P
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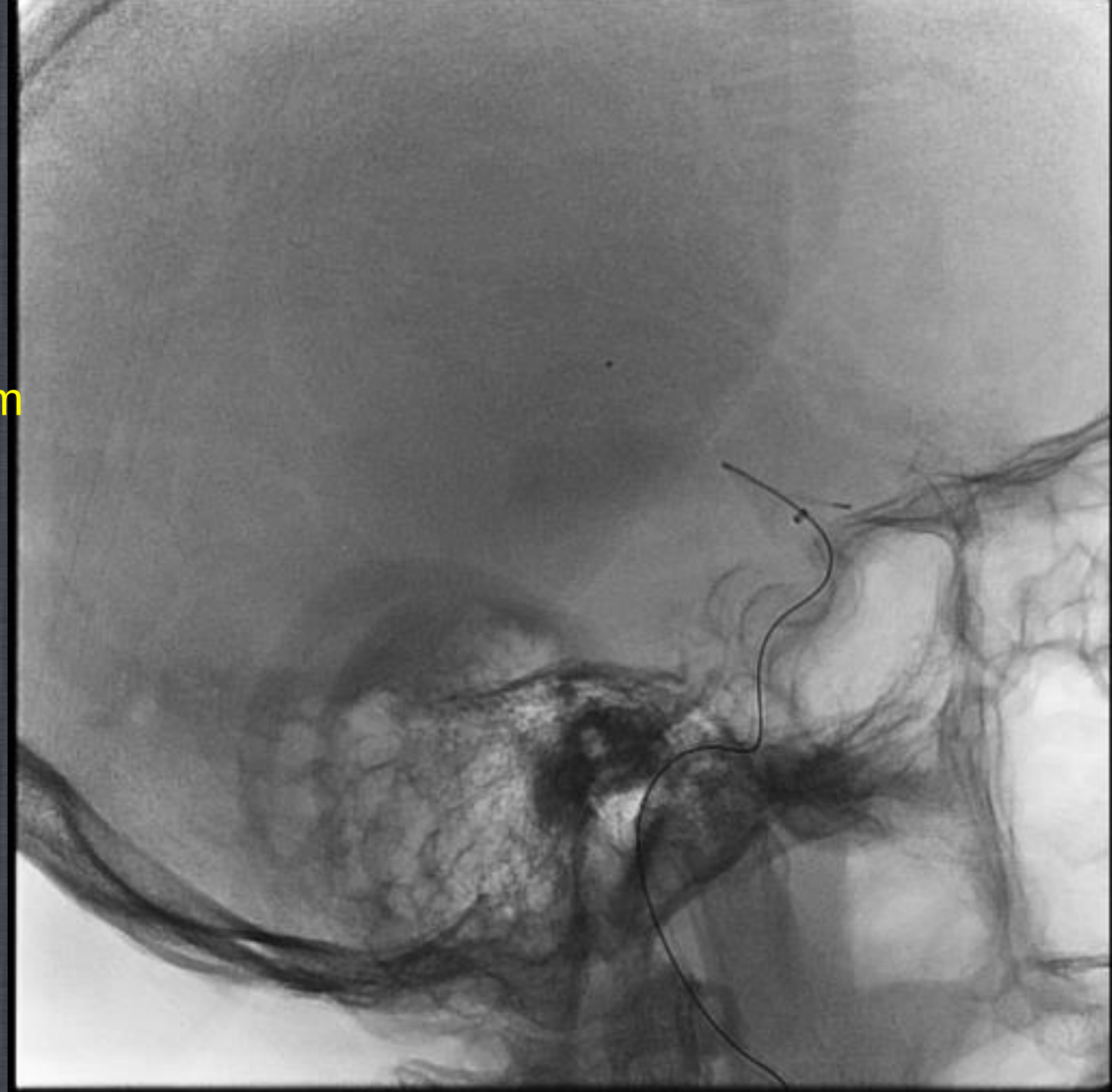
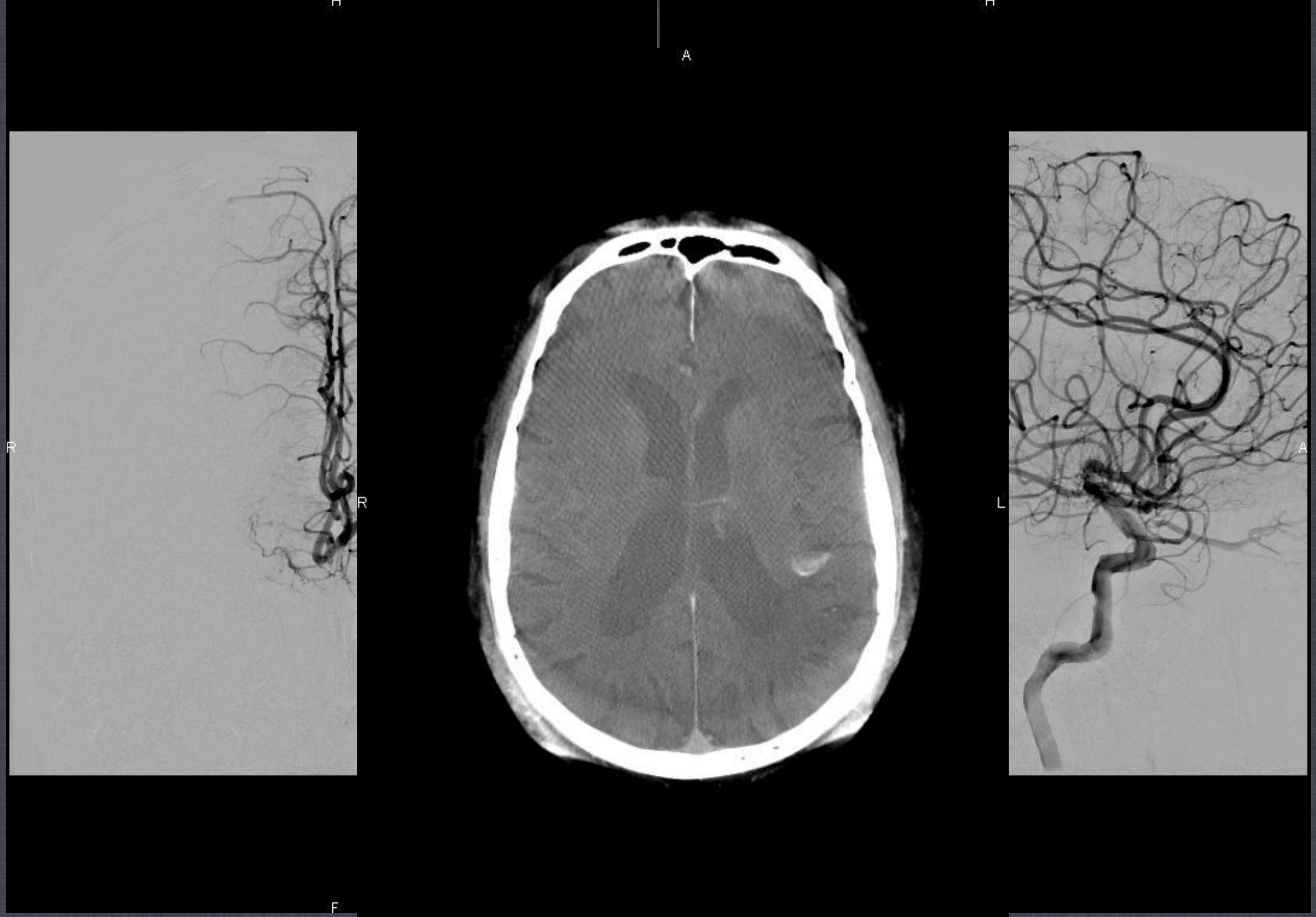
Stent retriever 3x20mm




H
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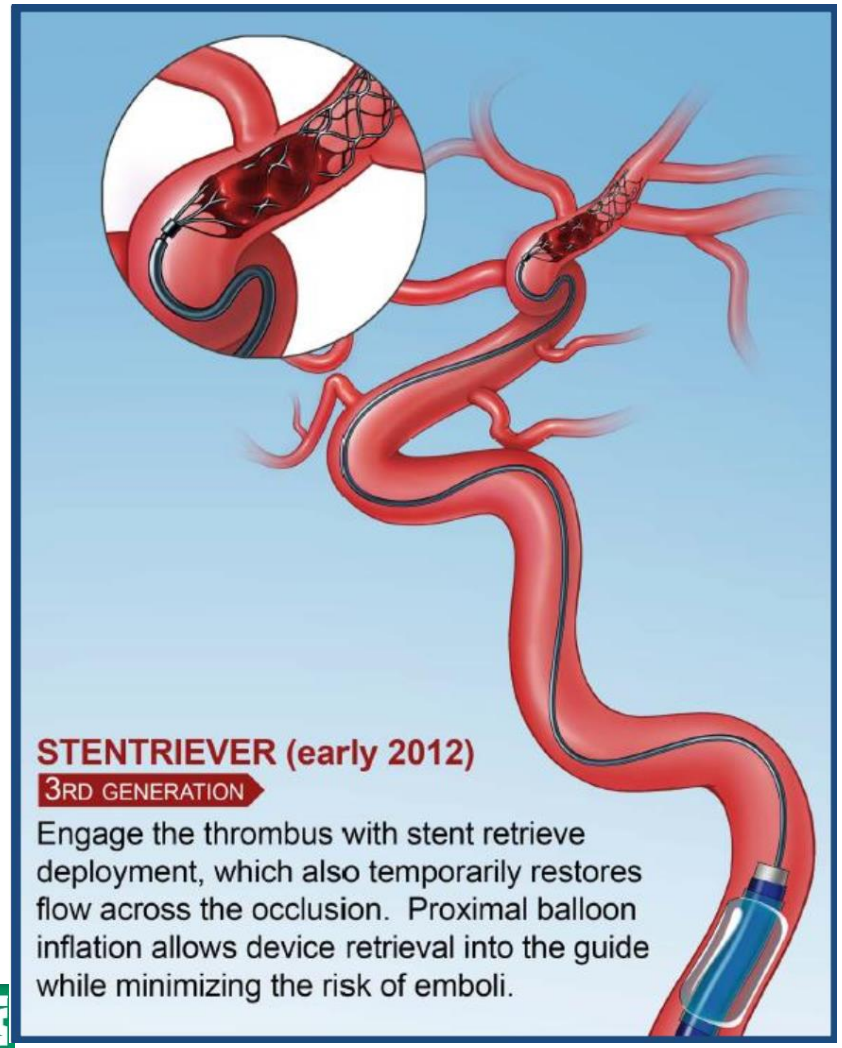
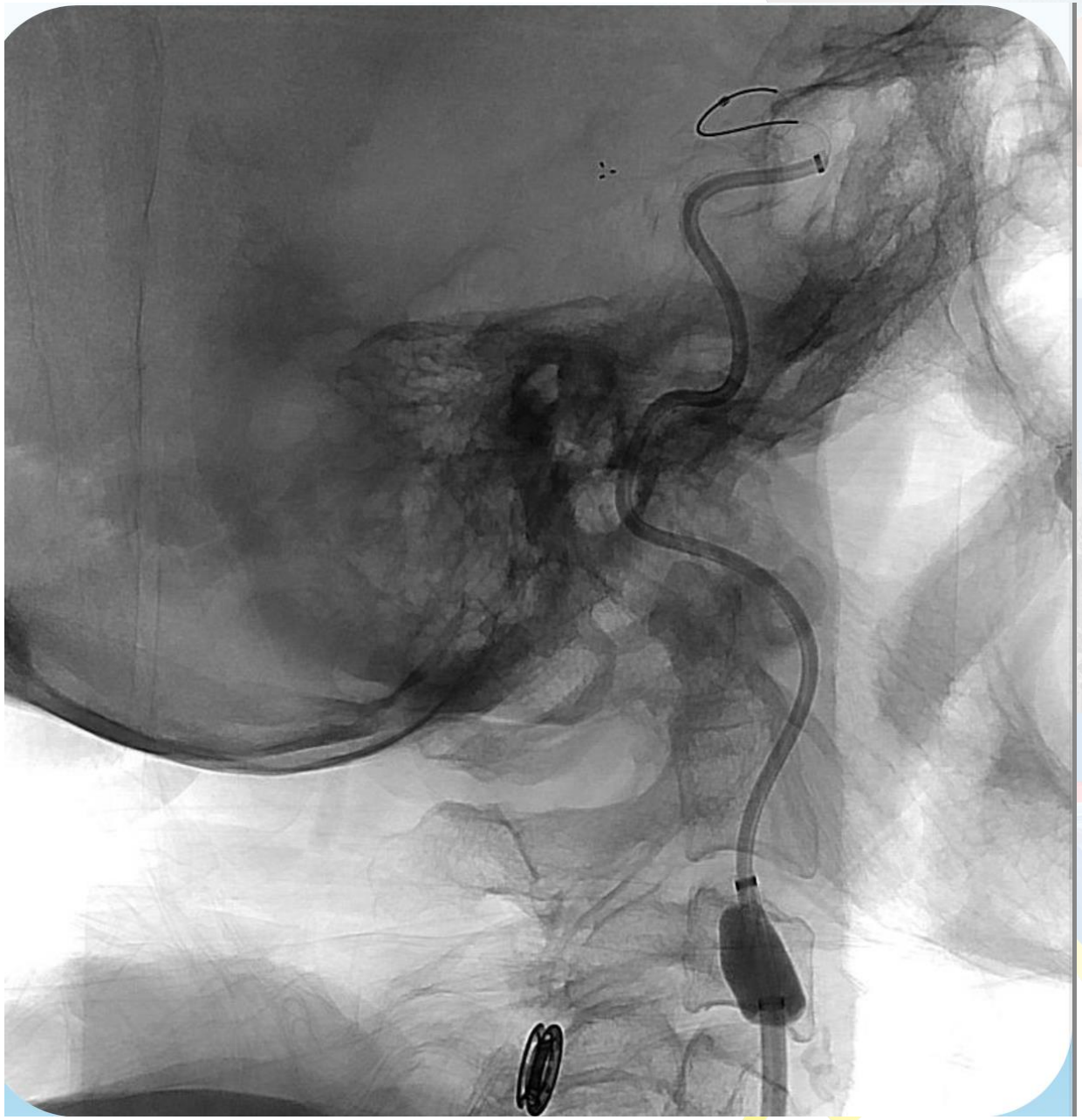
Cathéter à ballon





Cathéter à ballon

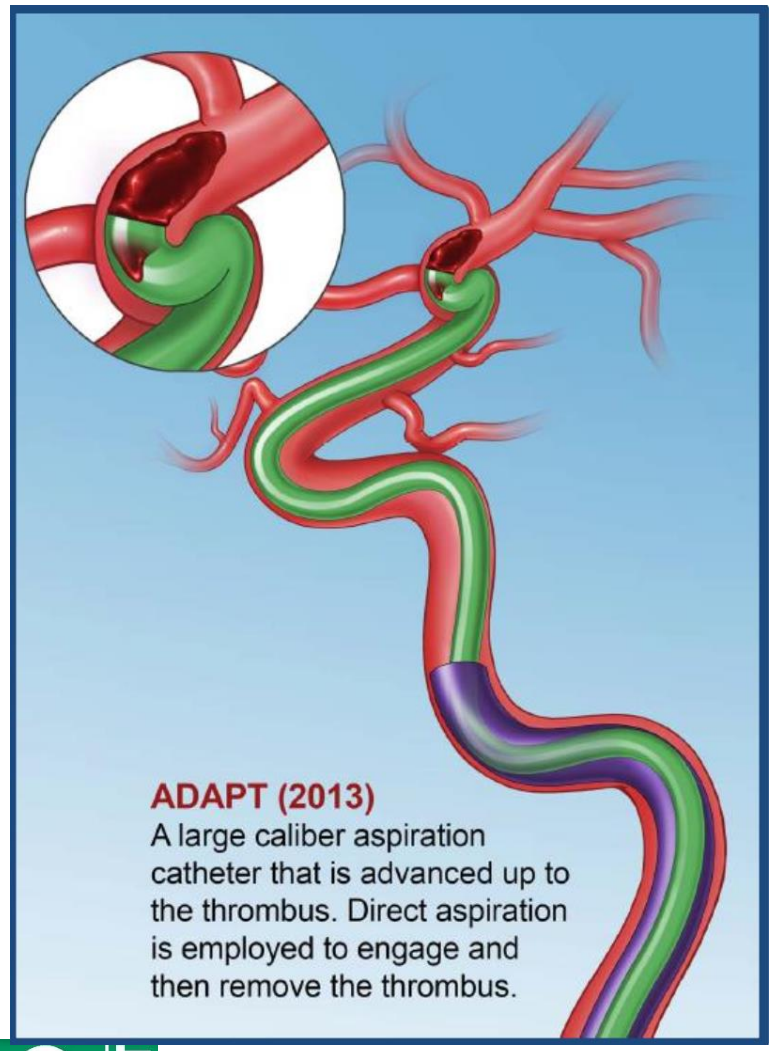
- Avantages:

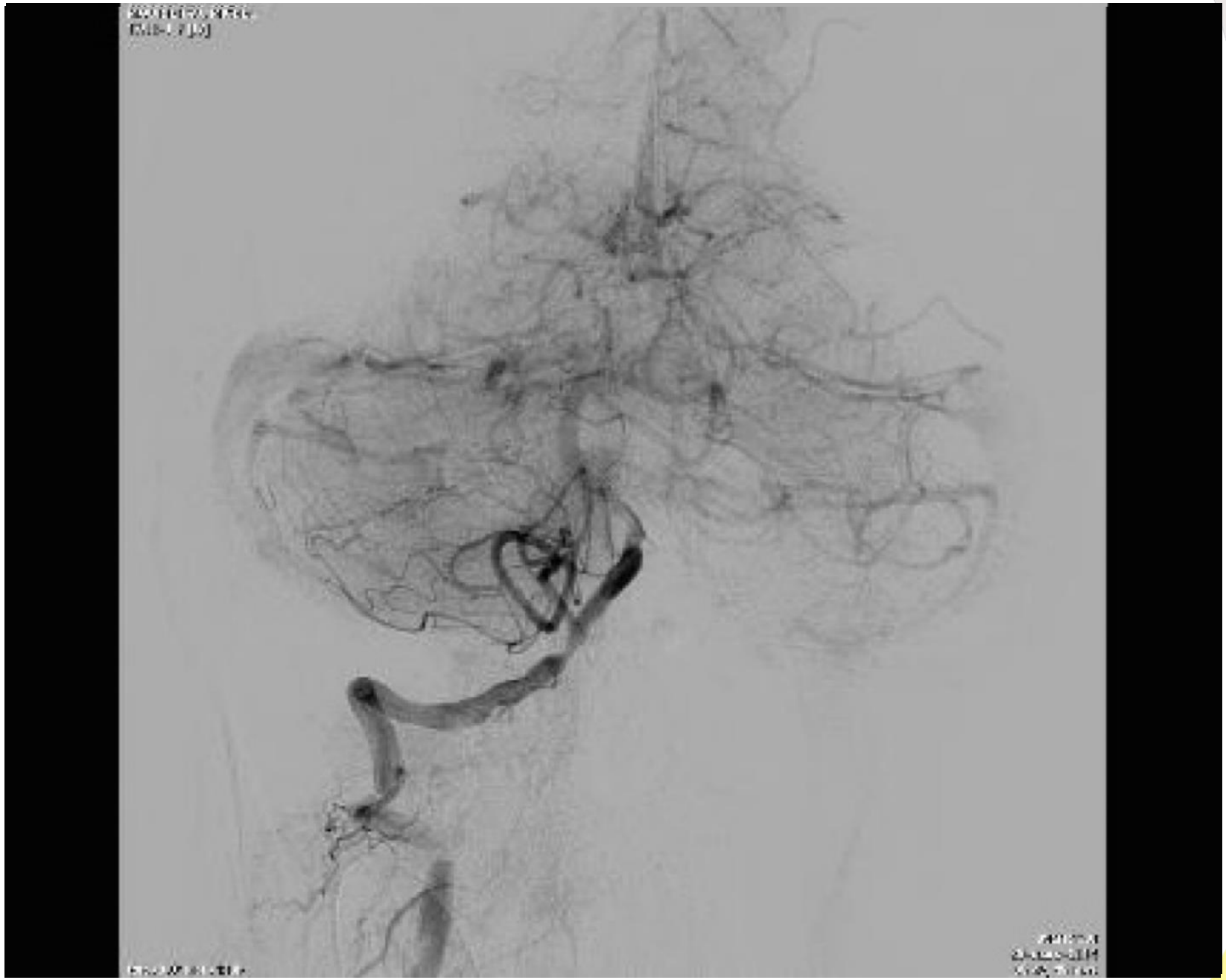
- Meilleur contrôle du flux pendant retrait du stent
- Réduction de la fragmentation

- Inconvénients:

- Besoin d'un introducteur 9F
- Risque de vasospasme et dissection artérielle

ASPIRATION


ADAPT (2013)
A large caliber aspiration catheter that is advanced up to the thrombus. Direct aspiration is employed to engage and then remove the thrombus.



ASTER

JAMA | Original Investigation

Effect of Endovascular Contact Aspiration vs Stent Retriever on Revascularization in Patients With Acute Ischemic Stroke and Large Vessel Occlusion

The ASTER Randomized Clinical Trial

Bertrand Lapergue, MD, PhD; Raphael Blanc, MD, MSc; Benjamin Gory, MD, PhD; Julien Labreuche, BST; Alain Duhamel, PhD; Gautier Marnat, MD; Suzana Saleme, MD; Vincent Costalat, MD, PhD; Serge Bracard, MD; Hubert Desal, MD, PhD; Mikael Mazighi, MD, PhD; Arturo Consoli, MD; Michel Piotin, MD, PhD; for the ASTER Trial Investigators

2015-2016

Etude prospective, randomisée, multicentrique

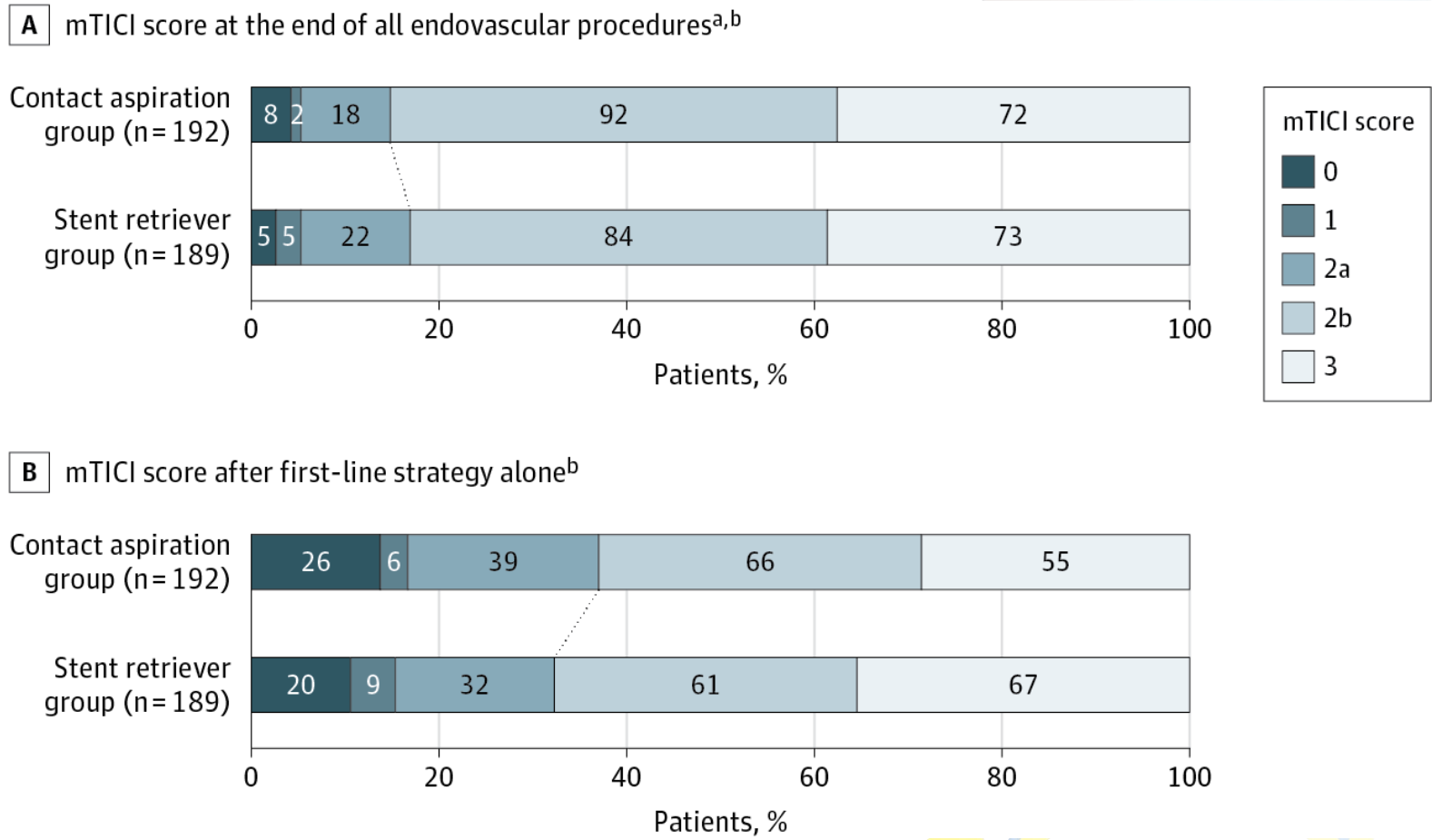
8 centres en France

380 patients

Stent retreiver x Aspiration

ASTER

- Résultats comparables
- 85% recanalisation groupe Aspiration
- 83% recanalisation groupe Stent



Effet Premier Passage

Your first shot is Your best shot

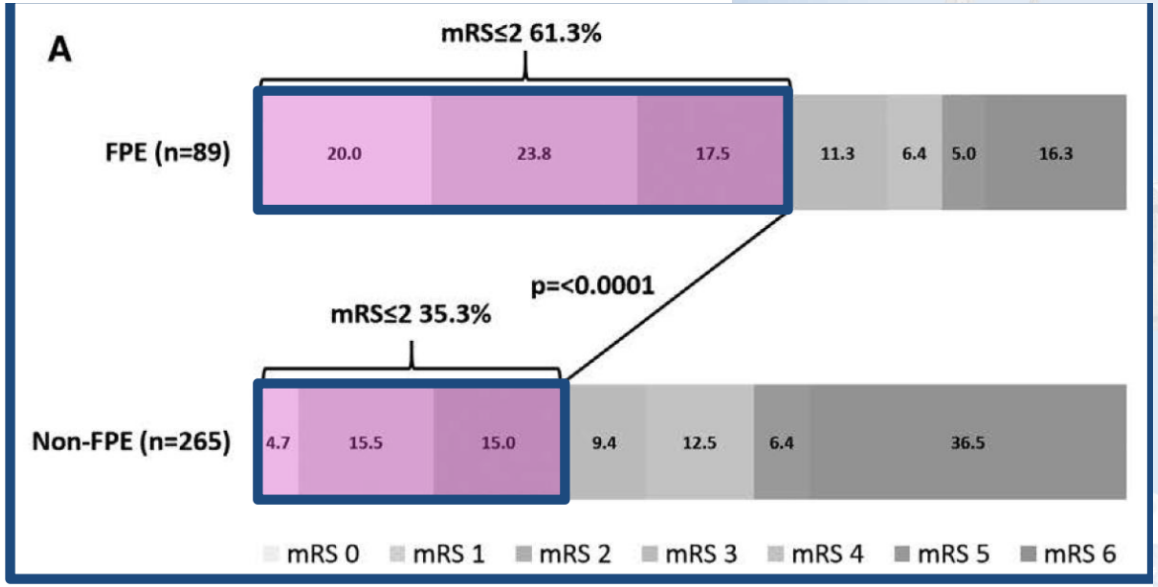
« First-Pass Effect » (FPE): mTICI3 en 1 passage

Original Contribution

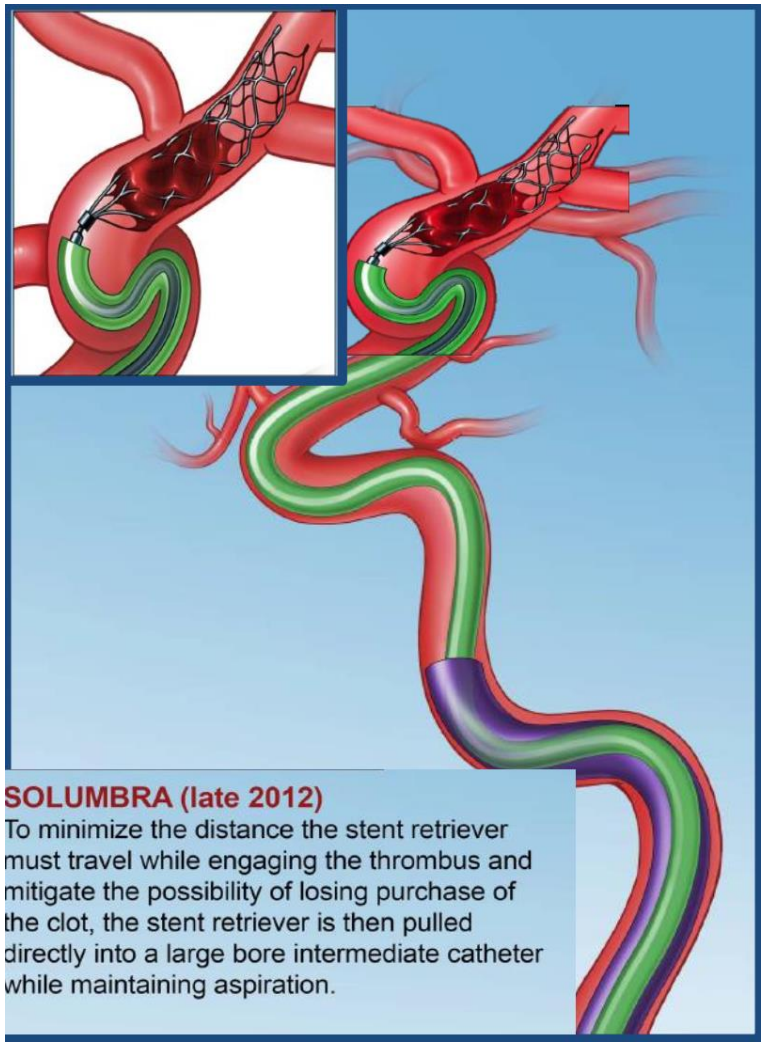
First Pass Effect

A New Measure for Stroke Thrombectomy Devices

Osama O. Zaidat, MD; Alicia C. Castonguay, PhD; Italo Linfante, MD; Rishi Gupta, MD; Coleman O. Martin, MD; William E. Holloway, MD; Nils Mueller-Kronast, MD; Joey D. English, MD, PhD; Guilherme Dabus, MD; Tim W. Malisch, MD; Franklin A. Marden, MD; Hormozd Bozorgchami, MD; Andrew Xavier, MD; Ansaar T. Rai, MD; Michael T. Froehler, MD, PhD; Aamir Badruddin, MD; Thanh N. Nguyen, MD; M. Asif Taqi, MD; Michael G. Abraham, MD; Albert J. Yoo, MD, PhD; Vallabh Janardhan, MD; Hashem Shaltoni, MD; Roberta Novakovic, MD; Alex Abou-Chebl, MD; Peng R. Chen, MD; Gavin W. Britz, MD; Chung-Huan J. Sun, MD; Vibhav Bansal, MD; Ritesh Kaushal, MD; Ashish Nanda, MD; Raul G. Nogueira, MD



TECHNIQUE COMBINÉE



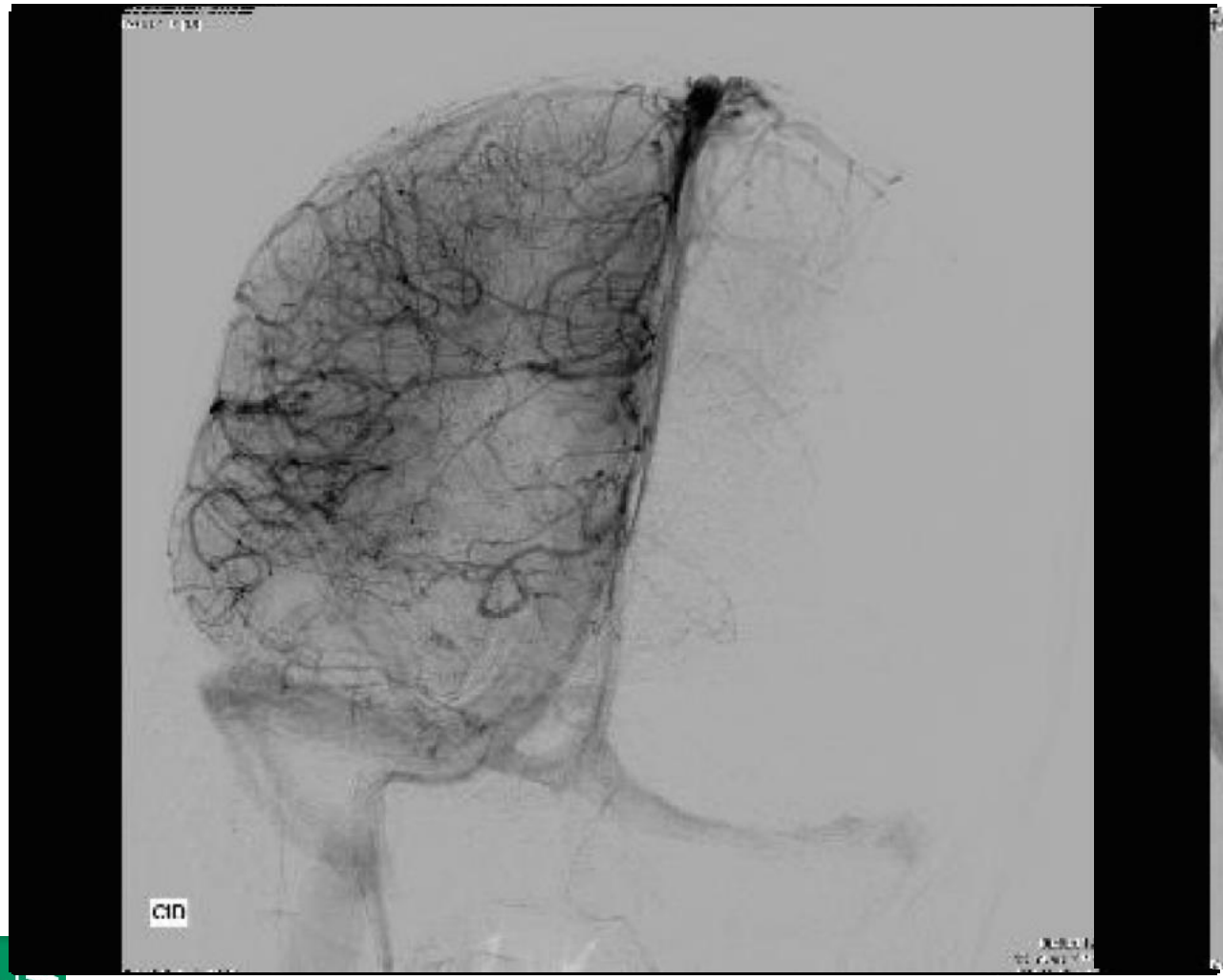
ASTER 2 COMBINED

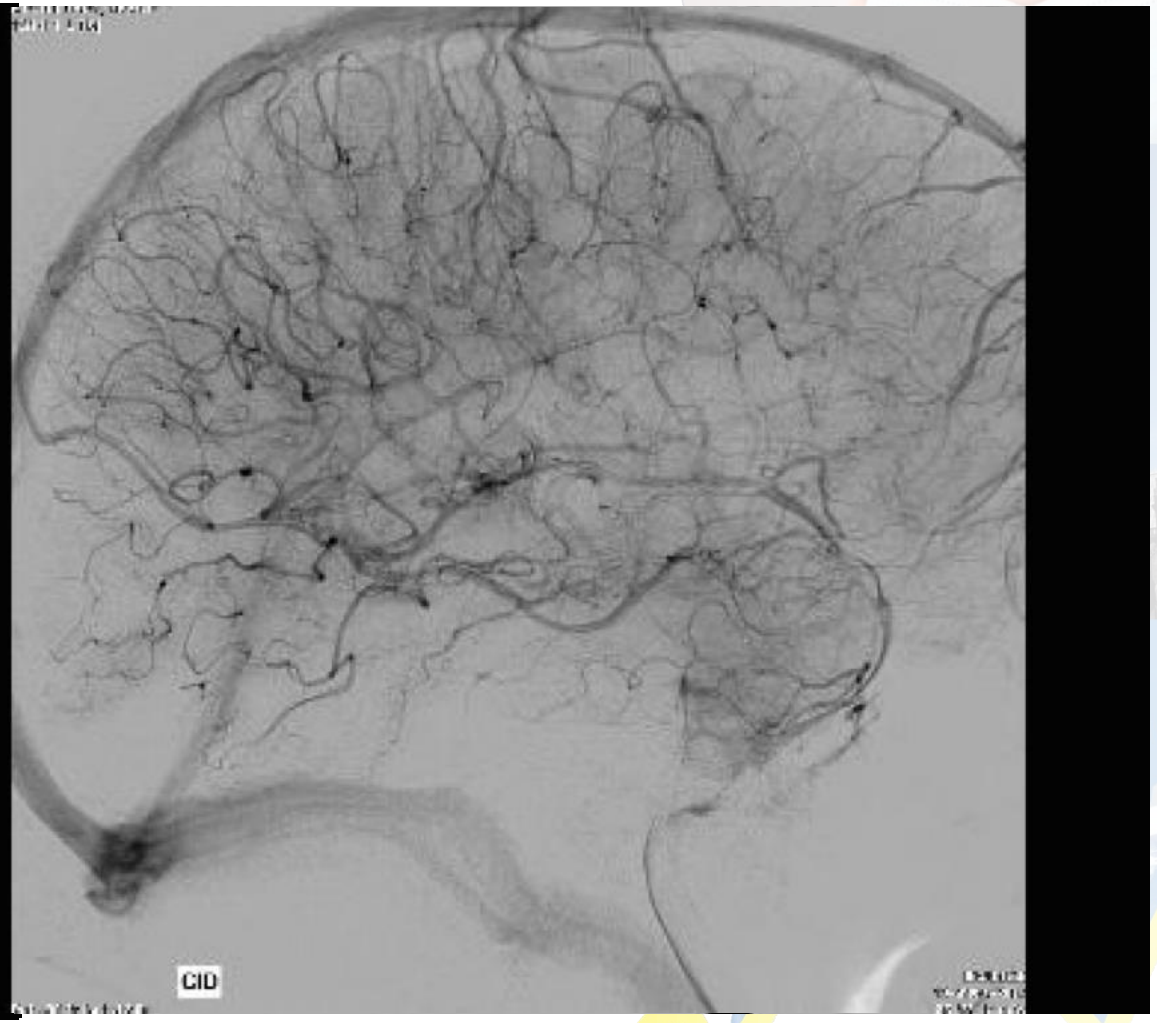
ASTER 2 J Neurointerv Surg. 2020 May;12(5):471-476

TECHNIQUE COMBINEE X STENT RETRIEVER

- 2017 -2018
- 248 Patients
- 8% plus de recanalisation groupe Combinée mais pas statistiquement significatif

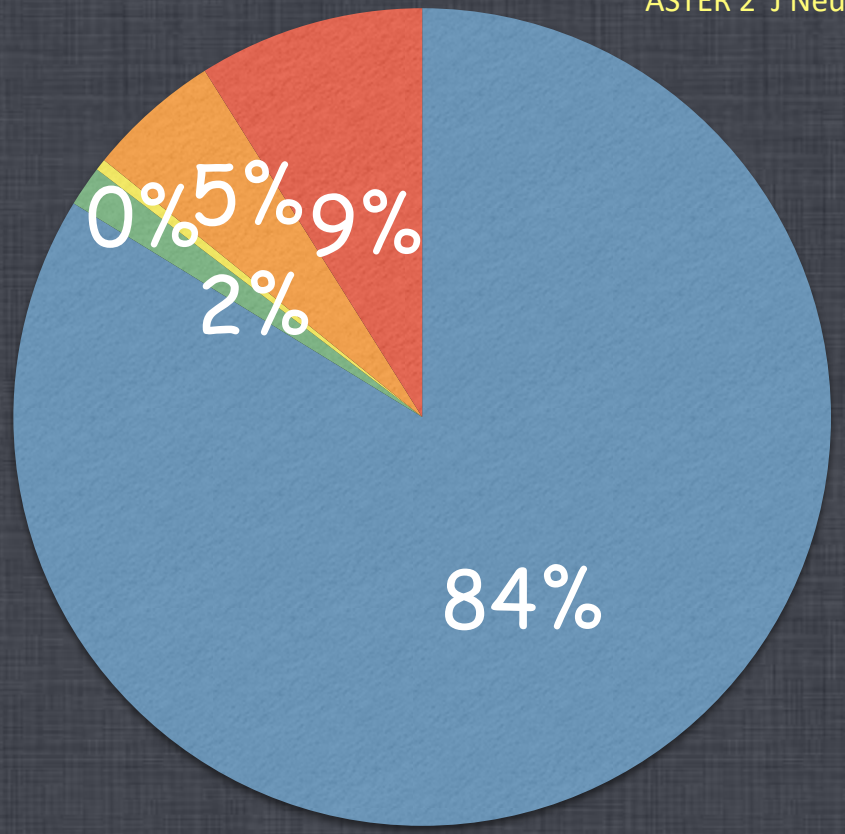
TECHNIQUE COMBINÉE





Complication Per Procédure

ASTER 2 J Neurointerv Surg. 2020 May;12(5):471-476

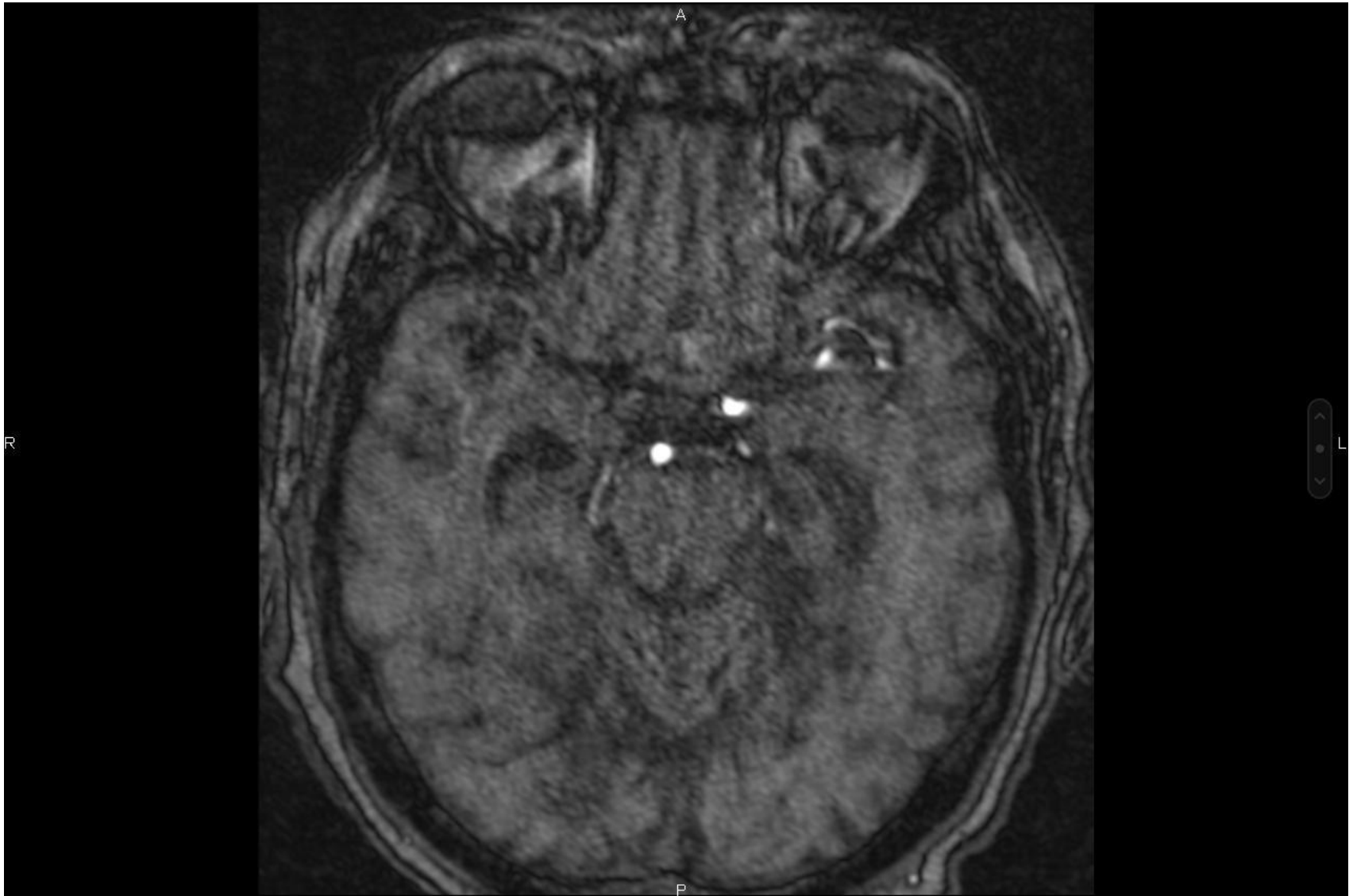


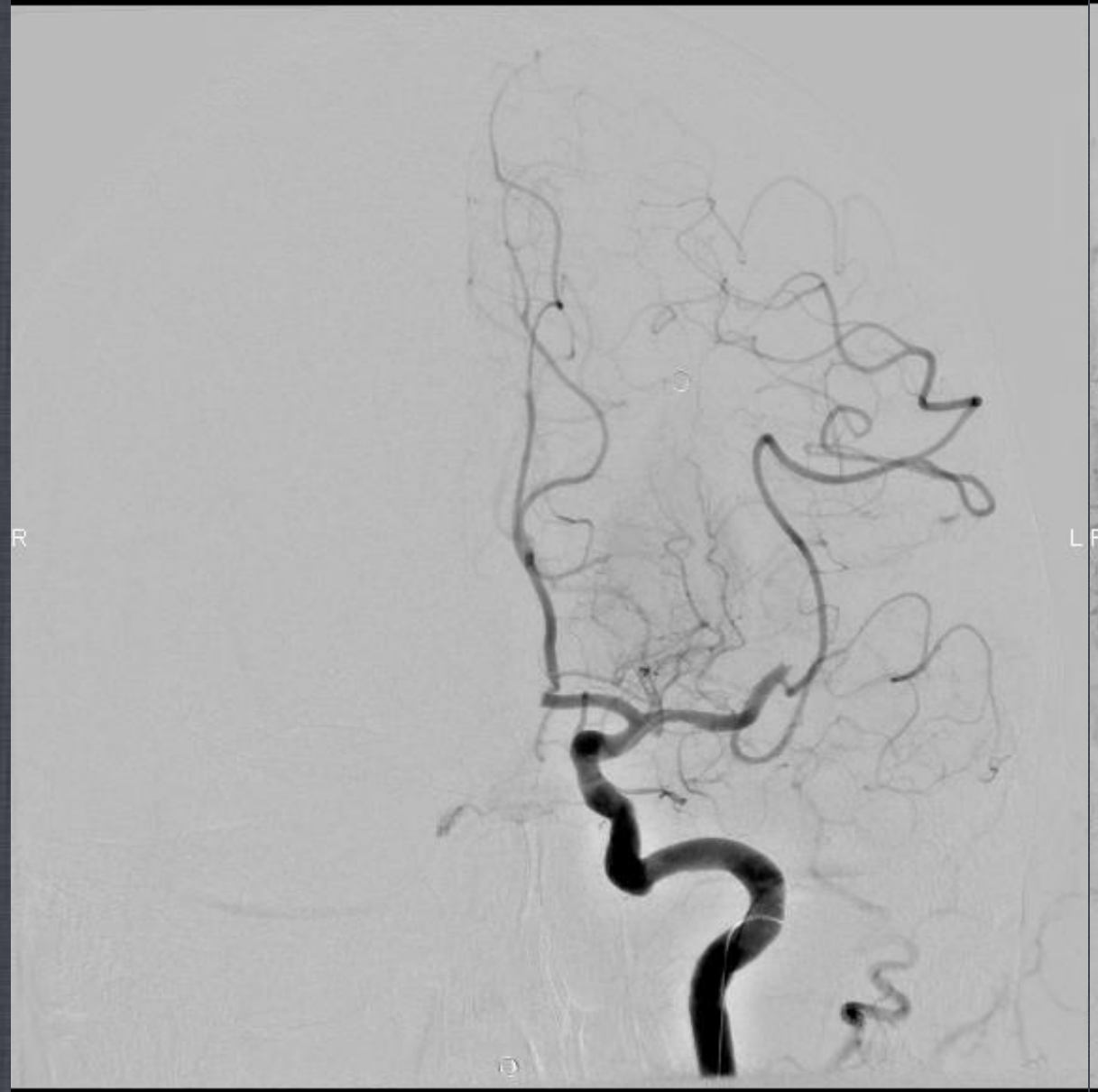
Fragmentation du thrombus:

- Après thrombolyse IV;
- Pendant la navigation du micro cathéter;
- Pendant le retrait du thrombus.

Patient hémiplégie gauche à Brive

Thrombolyse IV pendant le transport à Limoges (1h)

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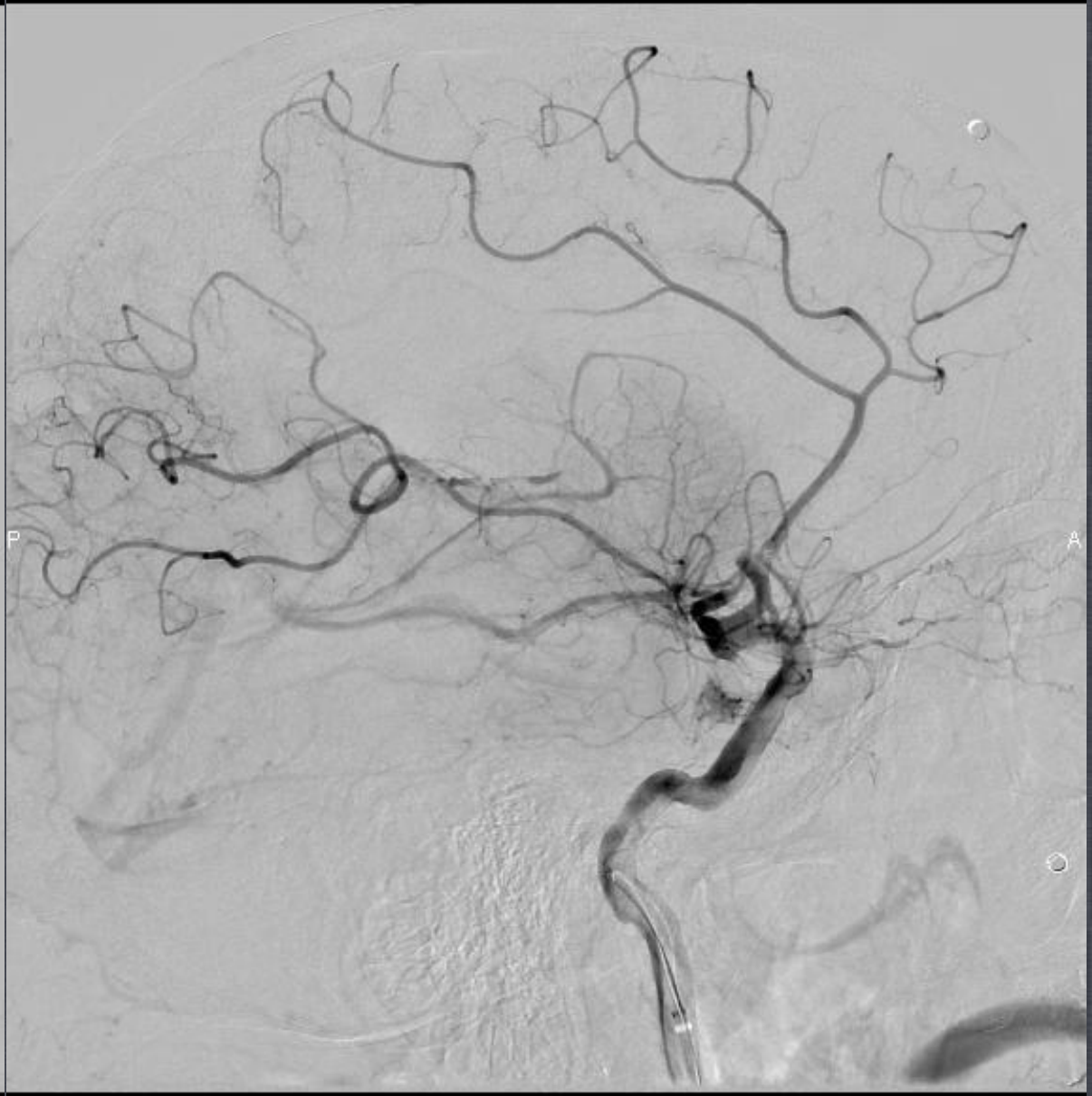
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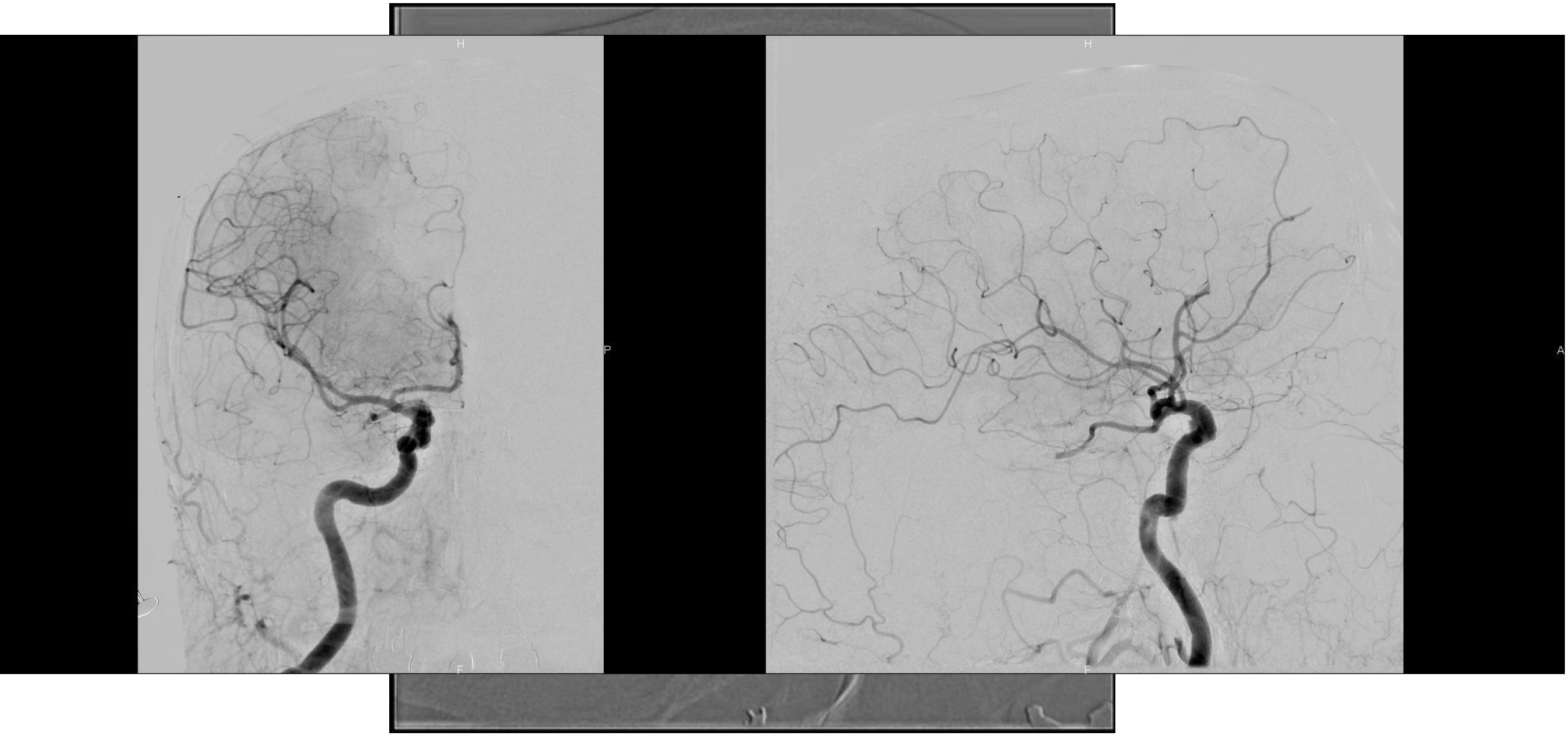
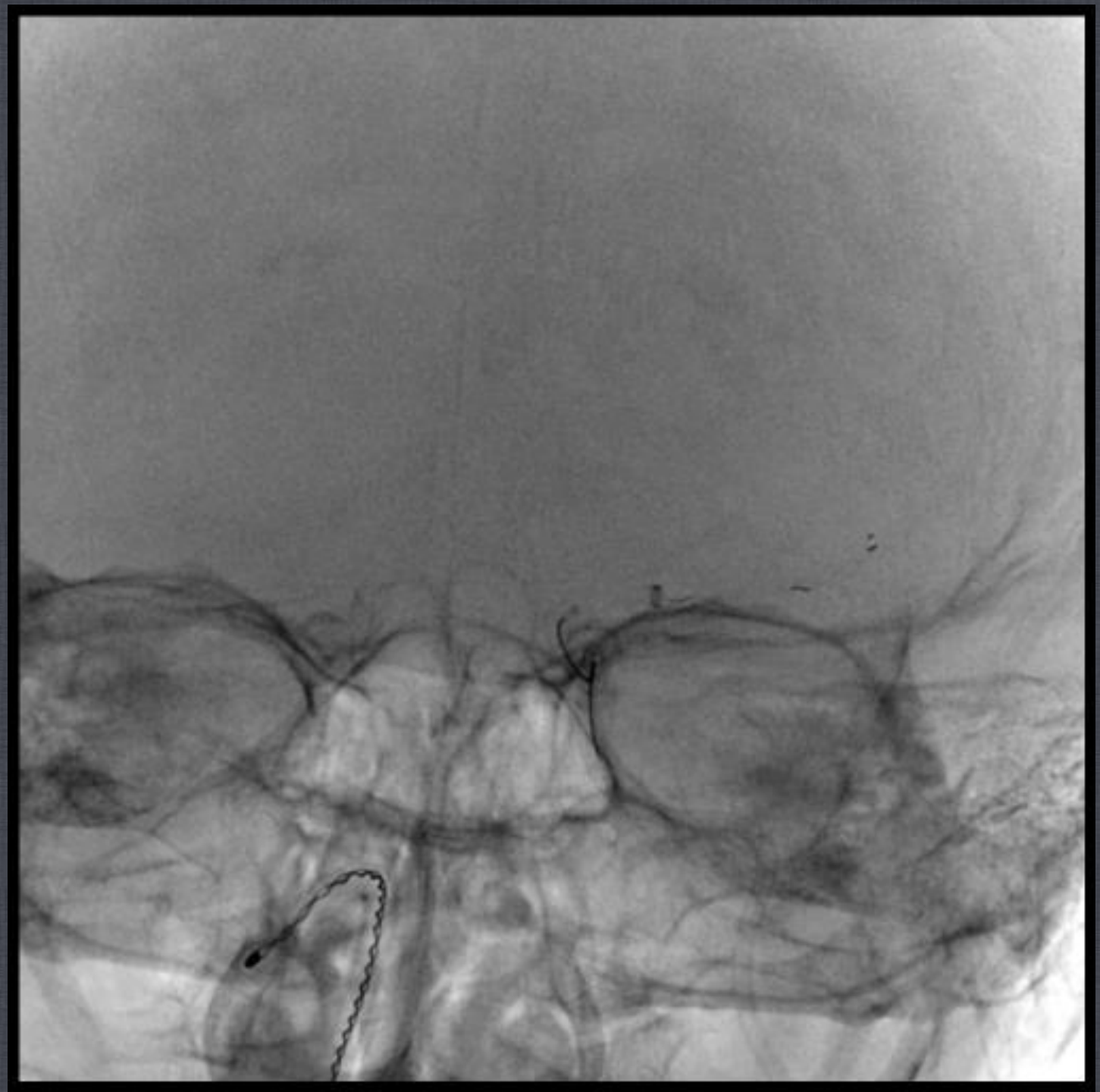
Pendant navigation

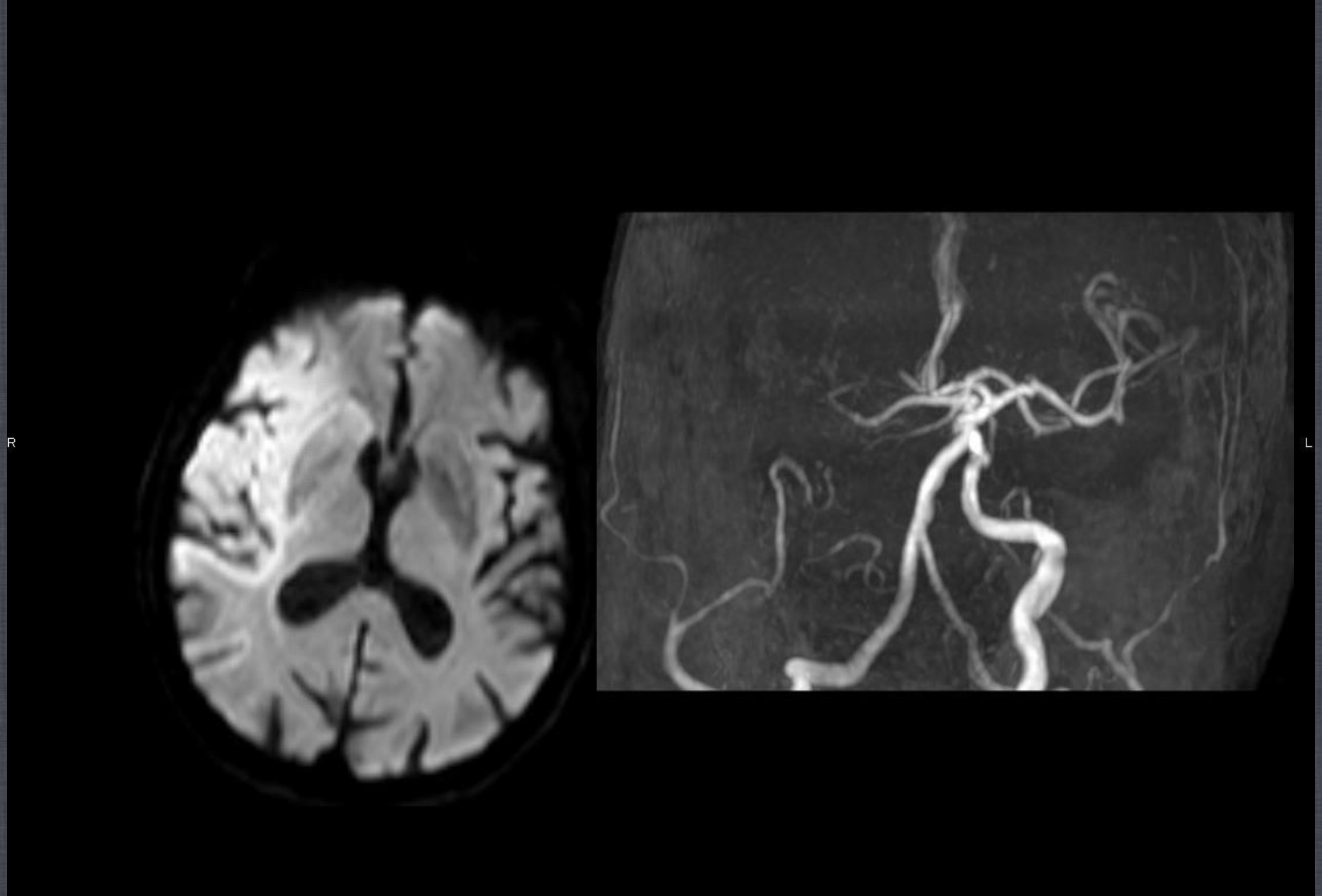


Pendant retrait



Hémorragie

- Perforation pendant la navigation;
- Navigation distale;
- Retrait du thrombus;
- Injection du produit de contraste.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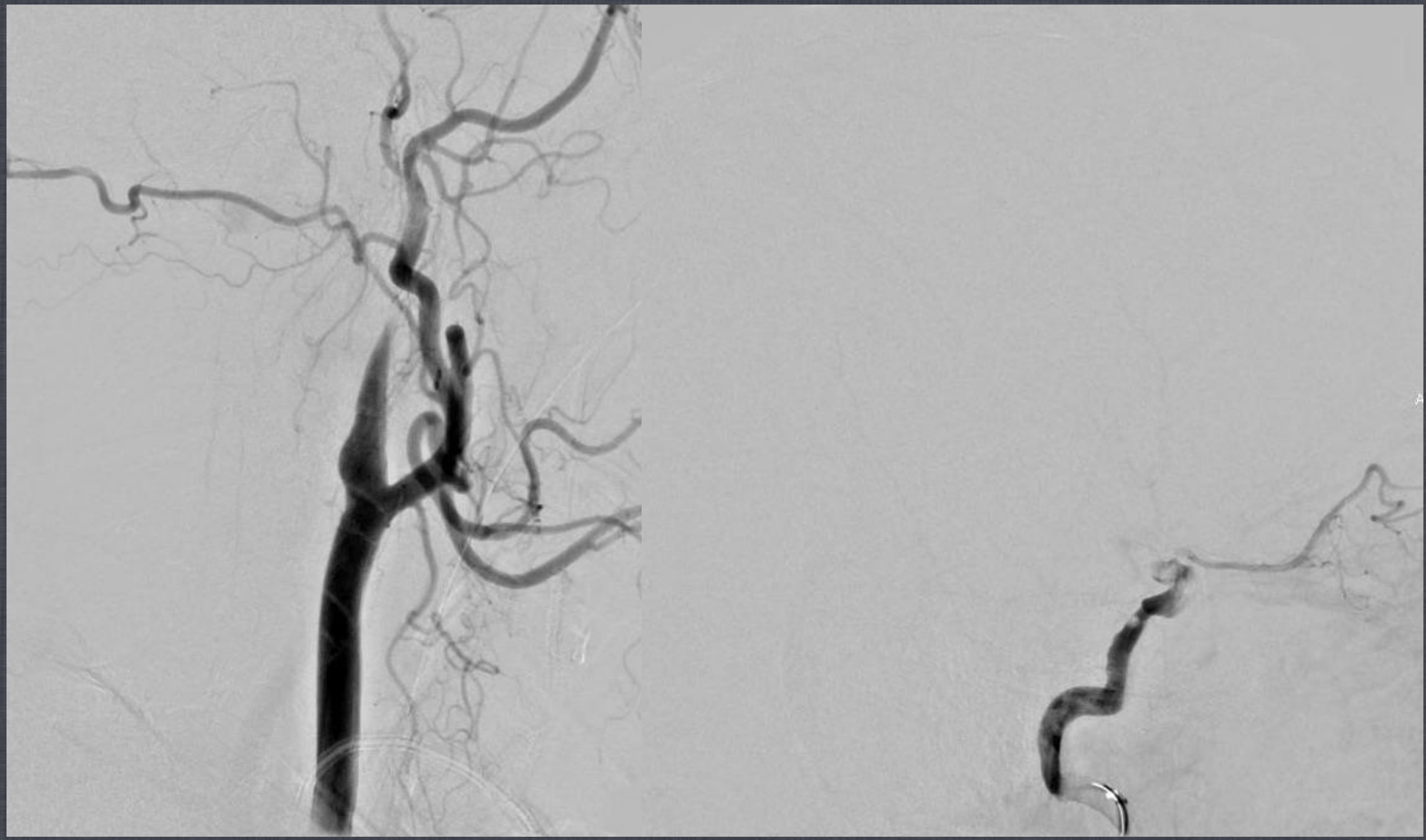
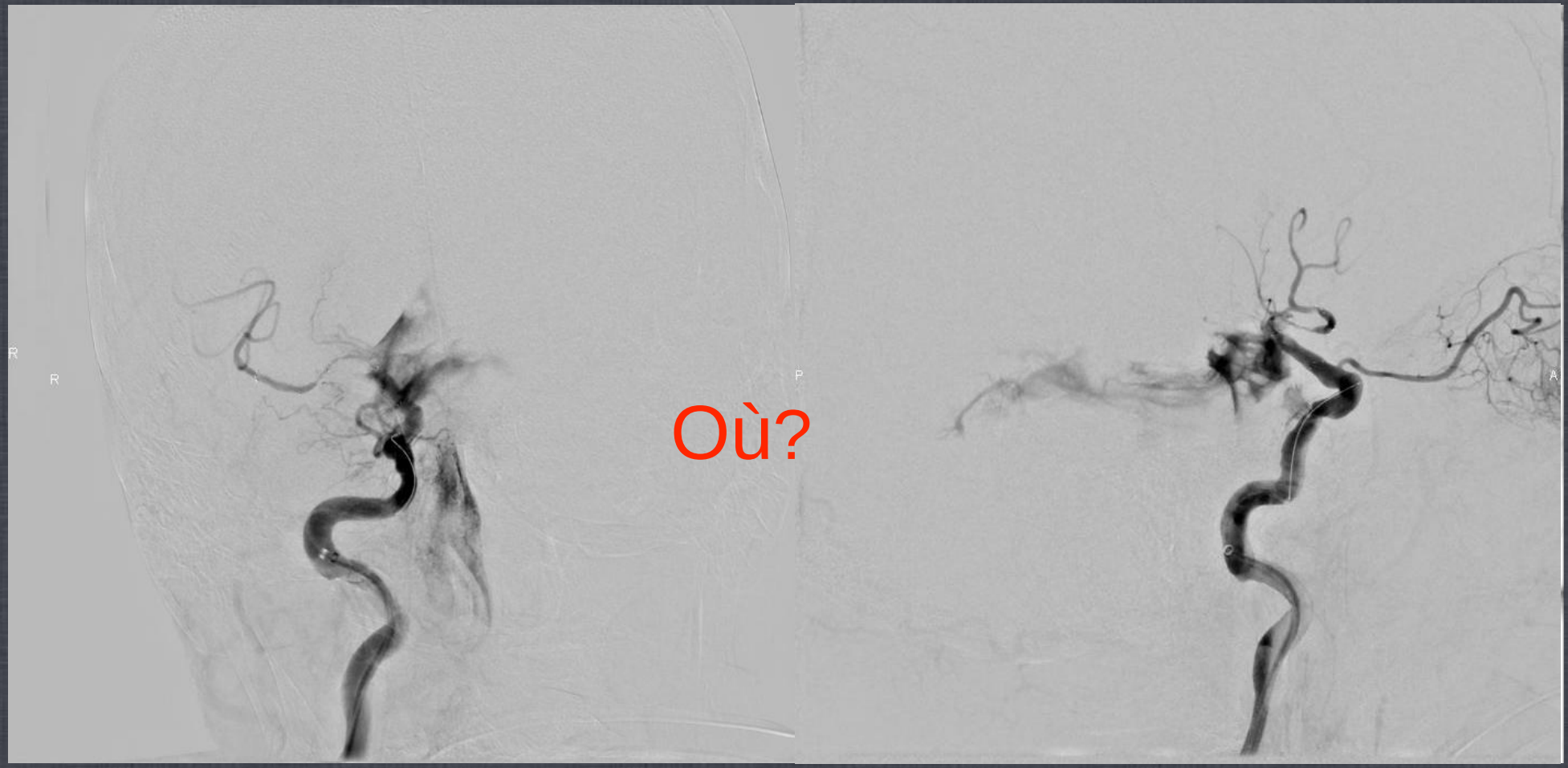
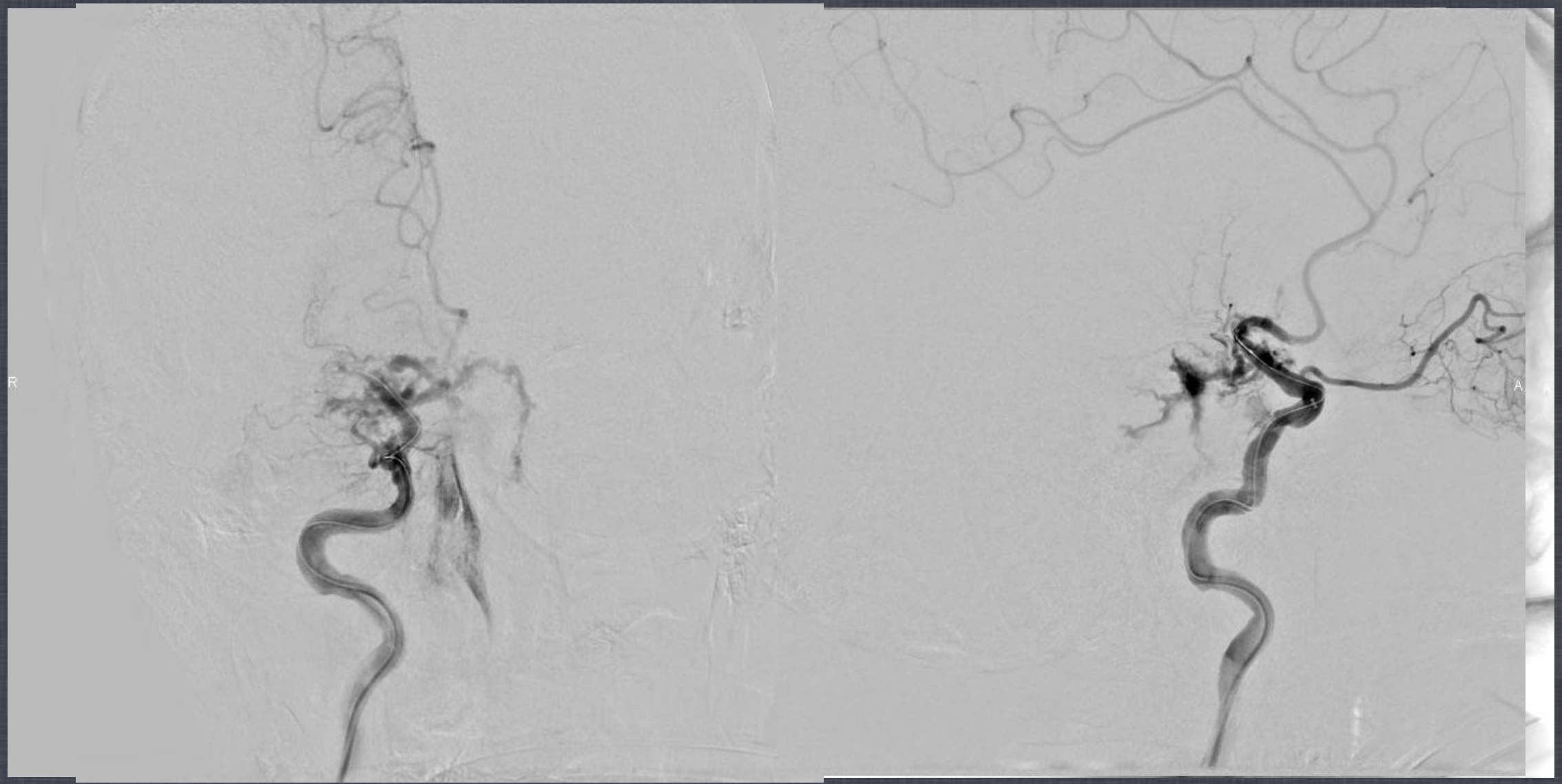
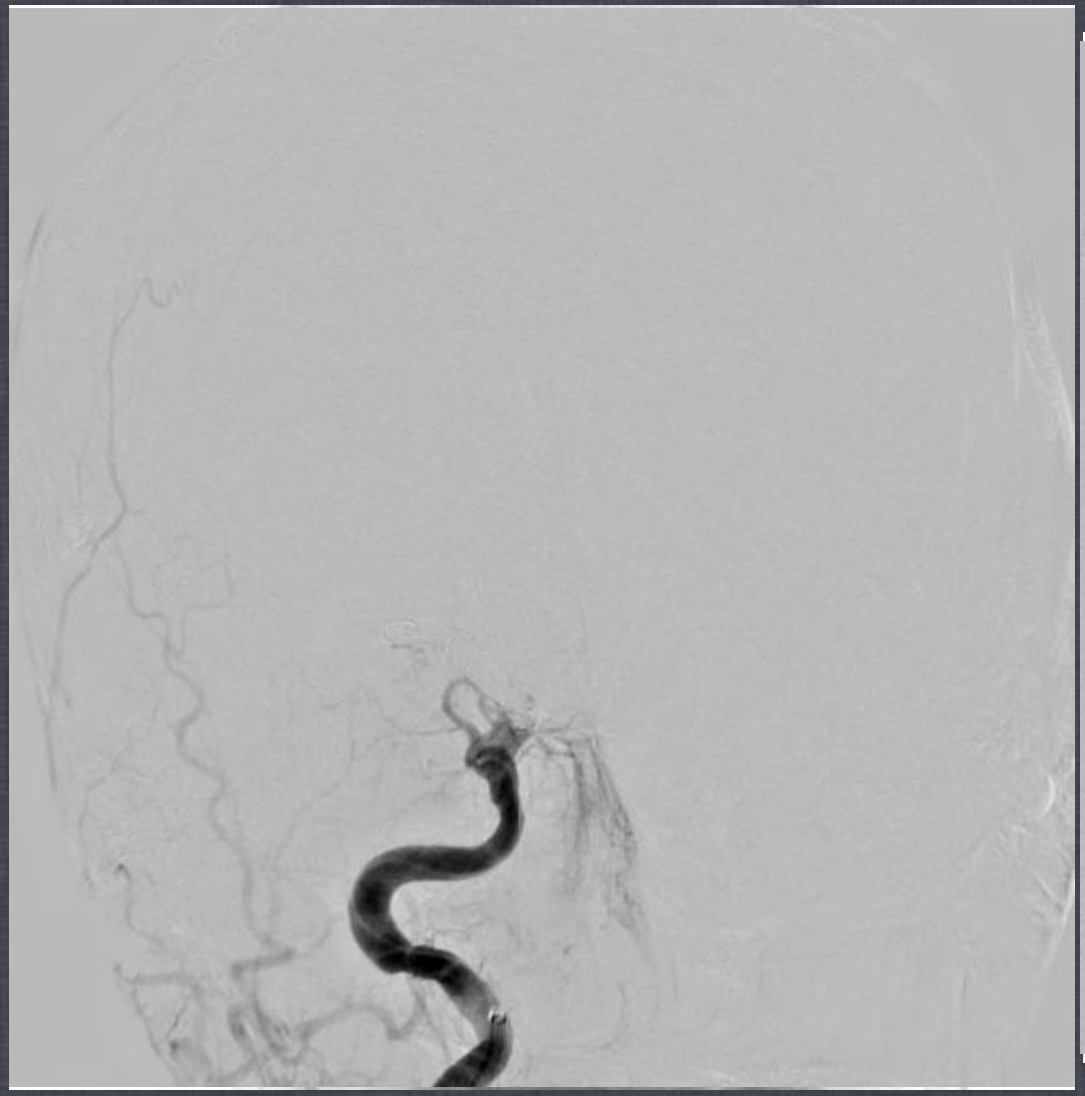


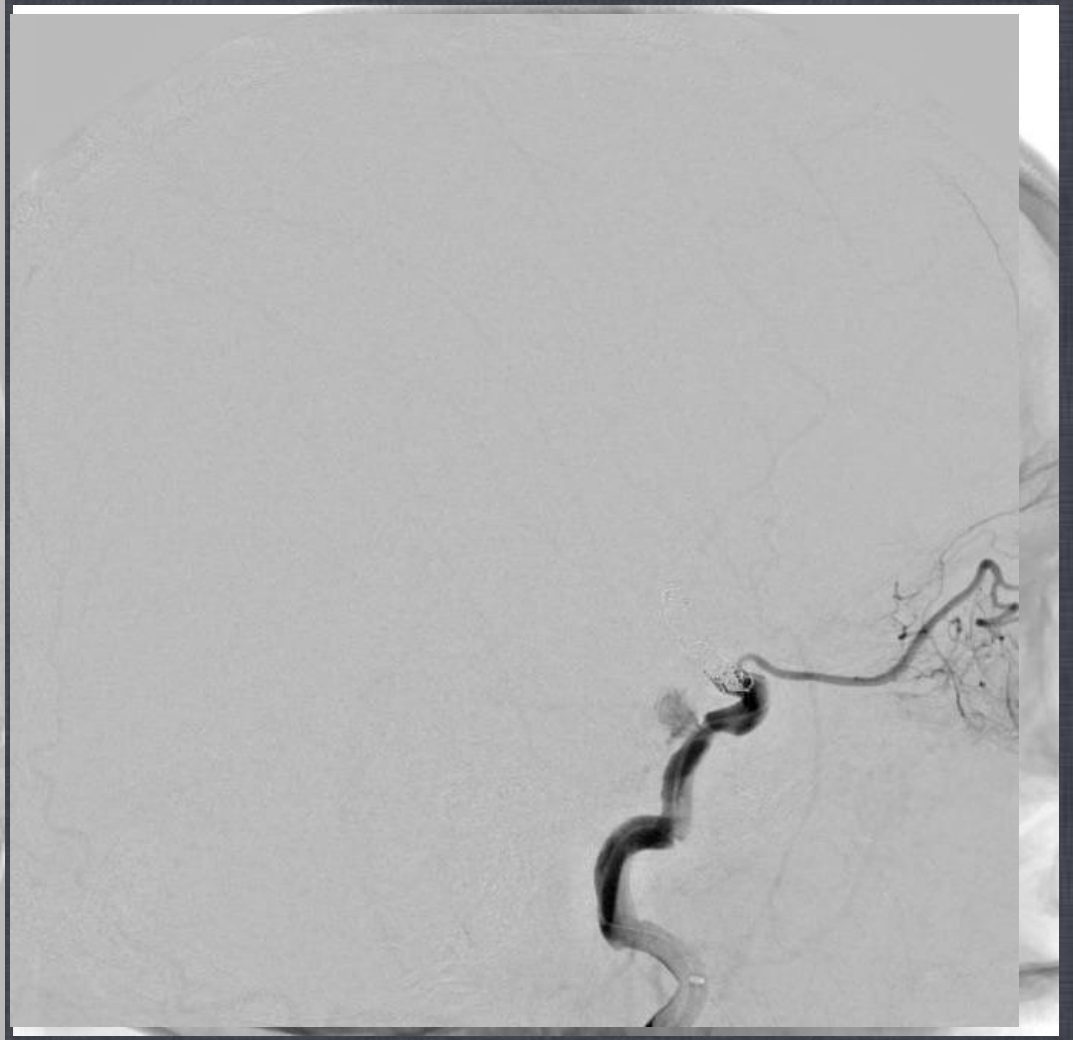


Où?

3 Min







TECHNIQUE: En discussion

- Anesthésie générale x Sédation consciente

Ischemic Stroke

ORIGINAL RESEARCH

Safety and quality of endovascular therapy under general anesthesia and conscious sedation are comparable: results from the GOLIATH trial

Leif H Sørensen,[1] Lasse Speiser,[1] Sanja Karabegovic,[1] Albert J Yoo,[2] Mads Rasmussen,[3] Kristina E Sørensen,[4] Claus Z Simonsen[4]

J Neurointerv Surg. 2019 Mar 29. pii: neurintsurg-2019-014712.

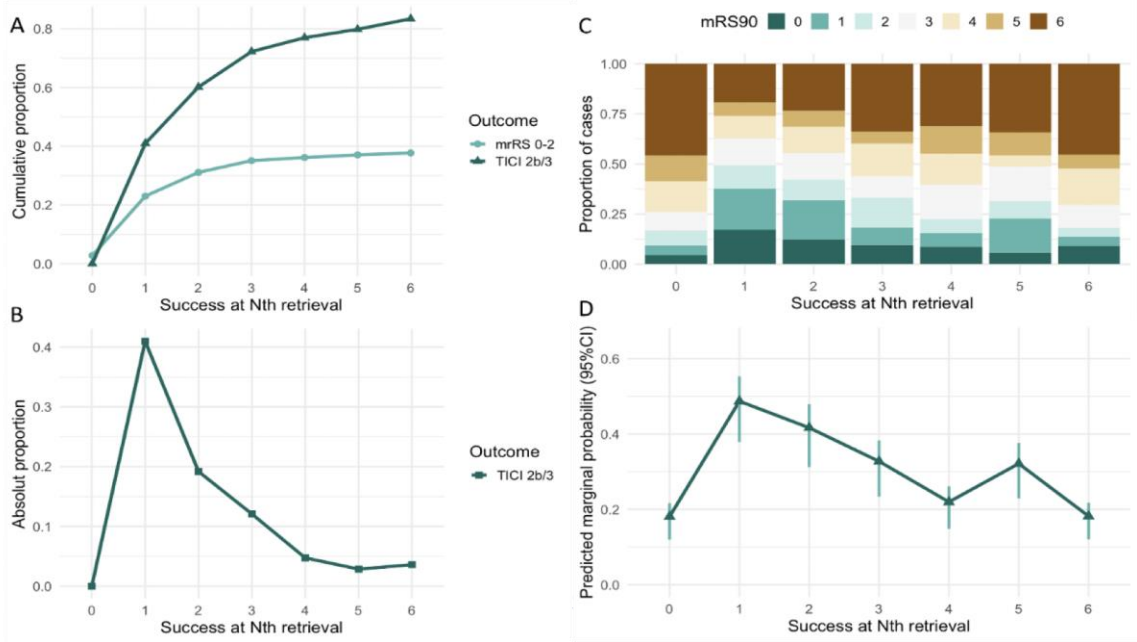
TECHNIQUE: En discussion

- Quand s'arrêter?

Good Clinical Outcome Decreases With Number of Retrieval Attempts in Stroke Thrombectomy

Beyond the First-Pass Effect

Fabian Flottmann, MD; Caspar Brekenfeld, MD; Gabriel Broocks, MD; Hannes Leischner, MD, PhD; Rosalie McDonough, MD; Tobias D. Faizy, MD; Milani Deb-Chatterji, MD; Anna Alegiani, MD; Götz Thomalla, MD; Anastasios Mpotsaris, MD; Christian H. Nolte, MD; Jens Fiehler, MD; Máté E. Maros, MD, MSc; for the GSR investigators*



Stroke. 2021 Jan;52(2):482-490

TECHNIQUE: En discussion

- Composition du thrombus?

In situ Clot Features and Vessel Wall Pathology impact the Mechanical Thrombectomy procedure

Length

Shorter length → **better functional outcome, faster procedure** (Dutra *et al.*, Stroke, 2019)

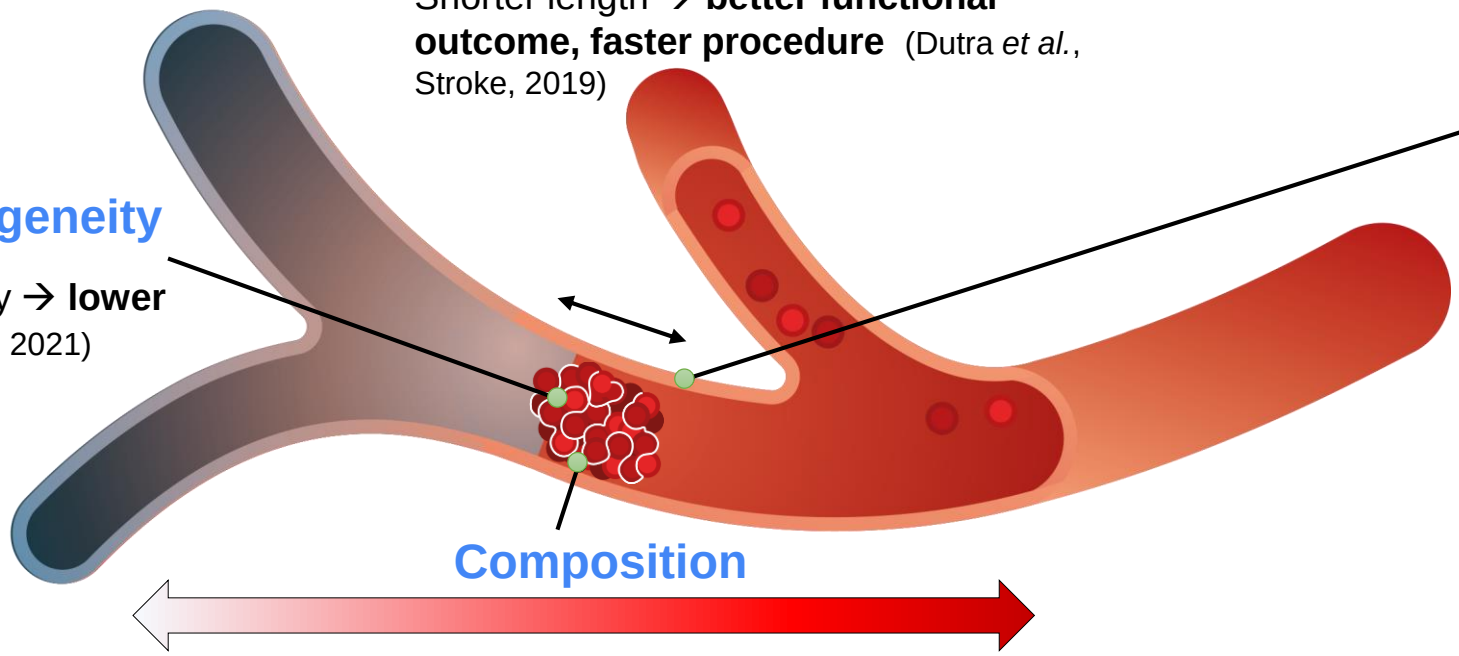
Hetereogeneity

More heterogeneity → **lower FPE** (Liu *et al.*, JNIS, 2021)

Vessel wall pathology

ICAD → **longer procedure times, poorer outcomes**

Park *et al.*, Front Neurol, 2019
Tsang *et al.*, Stroke, 2019
Lee *et al.*, J Stroke, 2022

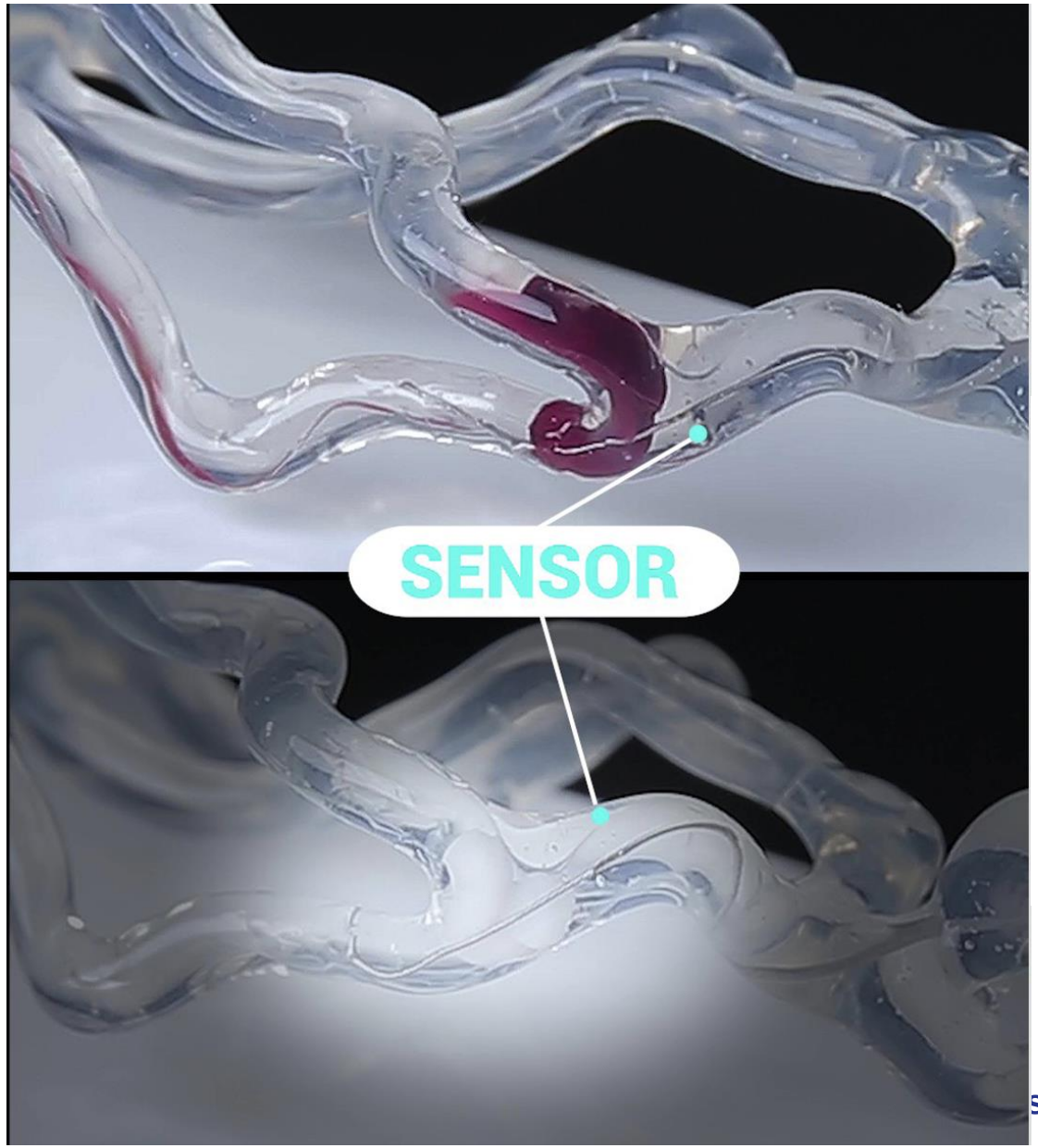


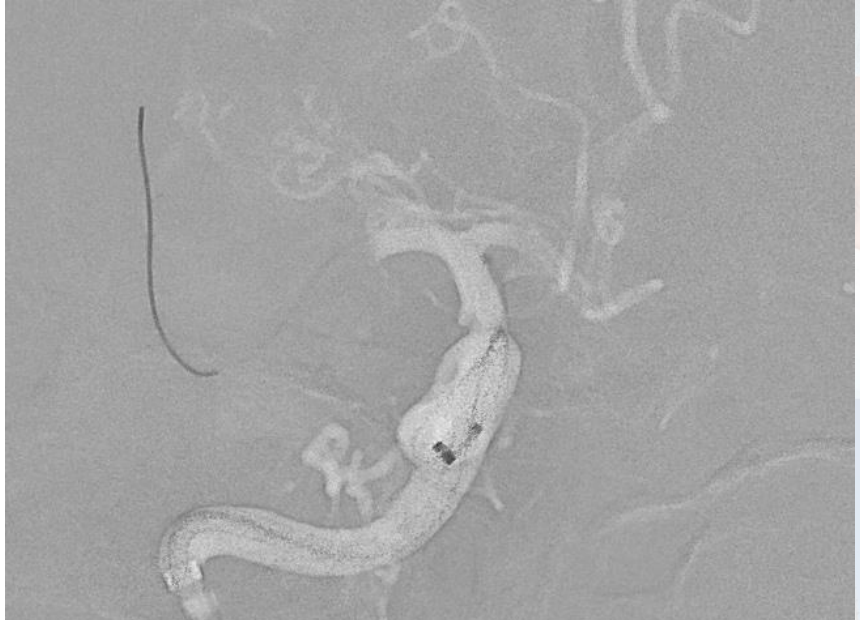
- **More difficult to retrieve**
- **Worse recanalization**
- **Lower proportion of TICI 3**
- **Increased number of passes**

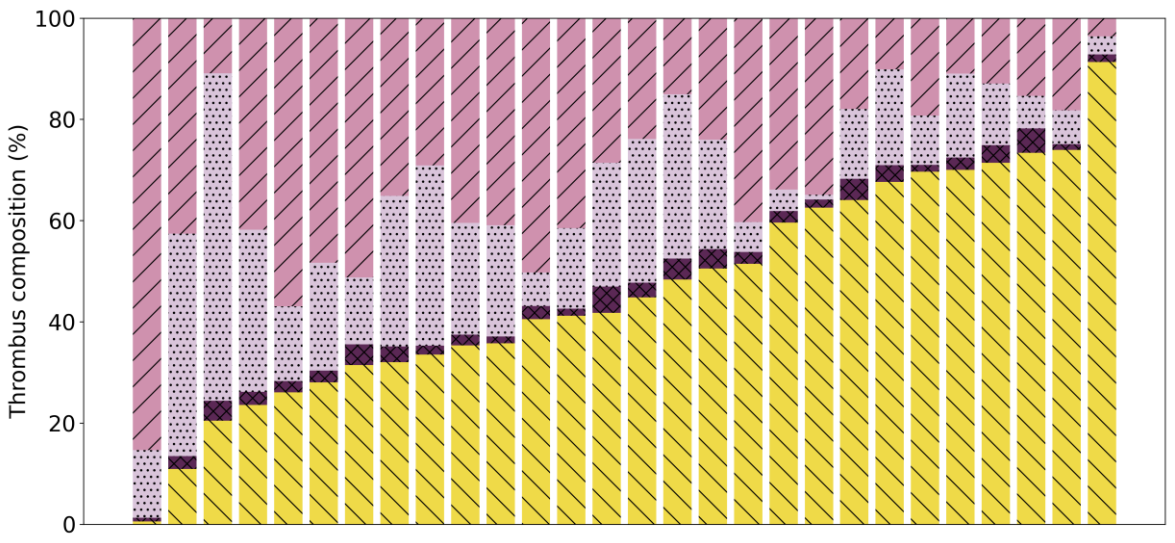
- **Easier clot retrieval**
- **Better recanalization outcome**
- **Less recanalization manoeuvres**
- **Shorter procedure times**
- **Prone to fragmentation**

Sporns *et al.*, Cerebrovasc. Dis., 2017; Maekawa *et al.*, Cerebrovasc. Dis. Extra, 2018; Huang *et al.*, Int J Mol Sci, 2022; Chueh *et al.*, JNIS, 2016; Staessens *et al.*, Haem, 2020; Douglas *et al.*, JNIS, 2020; Shimizu *et al.*, Thromb. Res., 2022; Ye *et al.*, Clin Neurol Neurosurg, 2020

SENSOME
Sensitive Medical Devices







Conclusion

- Stent-retriever + Aspiration : résultats cliniques et recanalisation équivalents
- À présent, aucune étude ne prouve la supériorité d'un stent-retriever par rapport à un autre
- Le développement de stent retrievers et de cathéter d'aspiration de plus en plus petit nous permet d'accéder à des artères les plus distales
- Recanalisation au Premier Passage : meilleur résultat clinique

Merci pour votre attention

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