MONTER ET ÊTRE STABLE EN INTRA-CRÂNIEN

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École de la Thrombectomie

23/09/2021

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NRI PSL

SORBONNE UNIVERSITÉ
CRÉATEURS DE FUTURS DEPUIS 1257

École de la thrombectomie

OBJECTIFS

- Connaître les stratégies pour obtenir un **micro-cathétérisme stable en intra-crânien**
- Connaître les stratégies pour **franchir le caillot**
- Connaître les stratégies pour les **recanalisations distales**

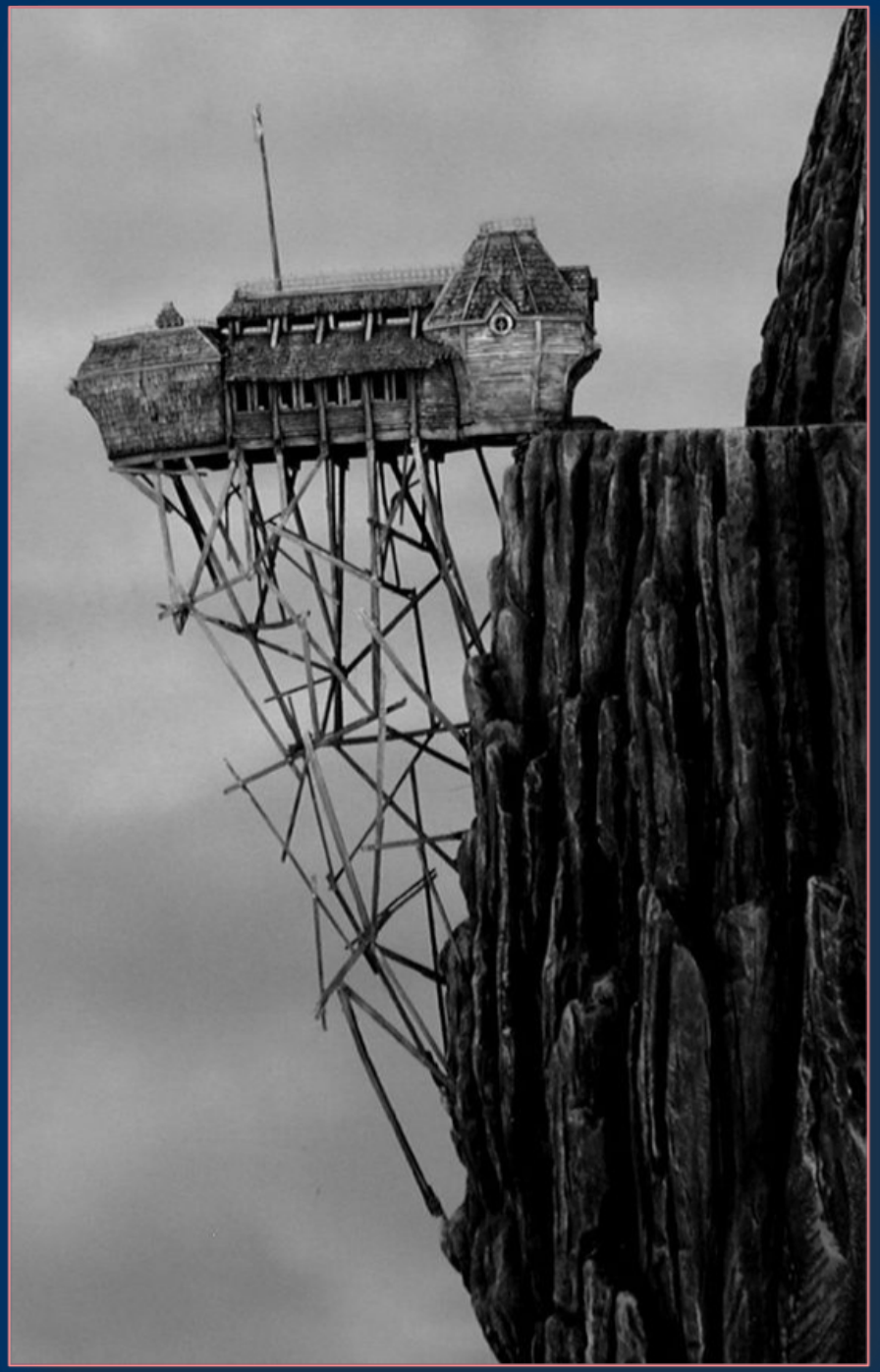
ACCÈS

Tout commence par les fondations de l'édifice …

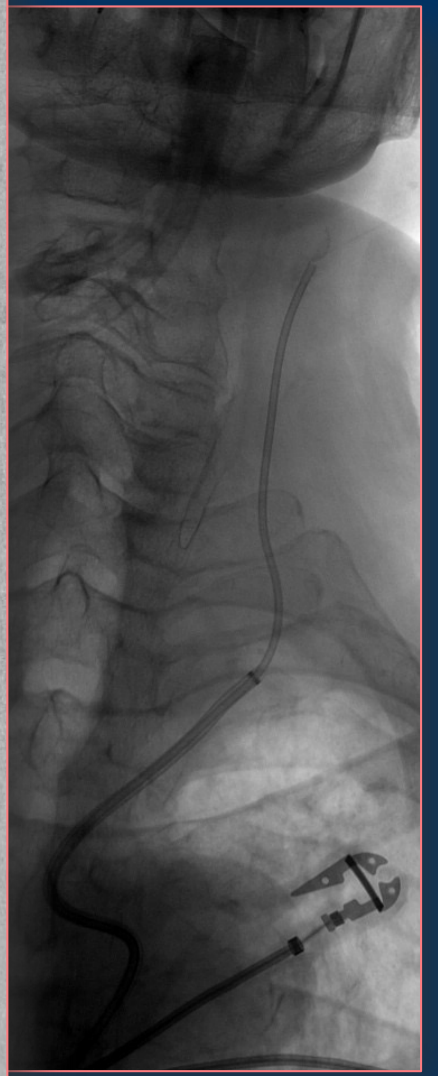
- Un leitmotiv : la **stabilité**
- Plus le cathéter porteur est distal, plus il est stable
- Cathétérisme **triaxial** +++

Stabilité

- *Introducteur Arrow 9F 24 cm*
- *NeuronMax 6F sur sonde Simmons 2 5F*
- *Cathéter aspiration*




ME PASSAGE



STRATÉGIE

- **Aviation civile :**
  - **Plan the flight**
  - **Flight the plan**

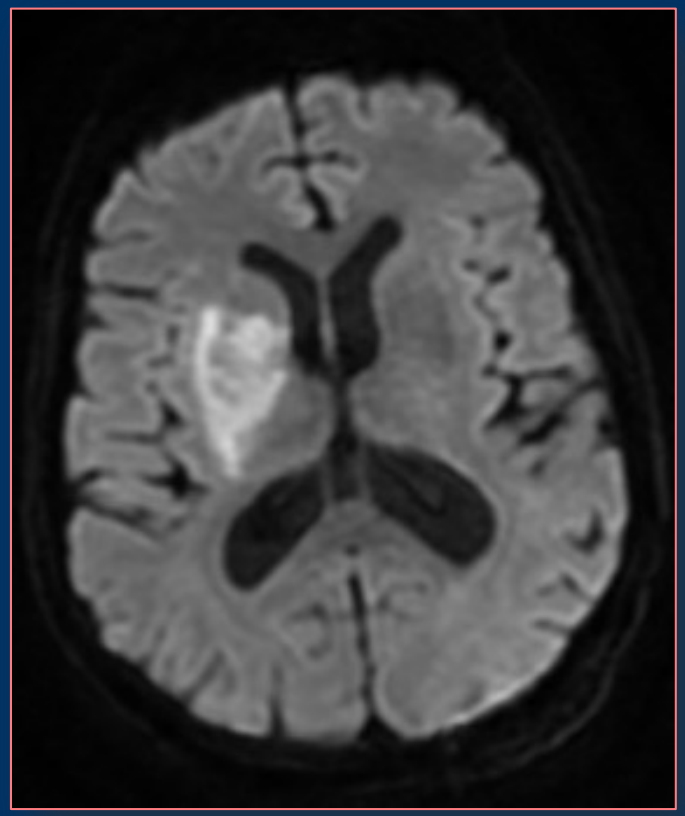
- **Mais savoir changer de stratégie en cours d'intervention**

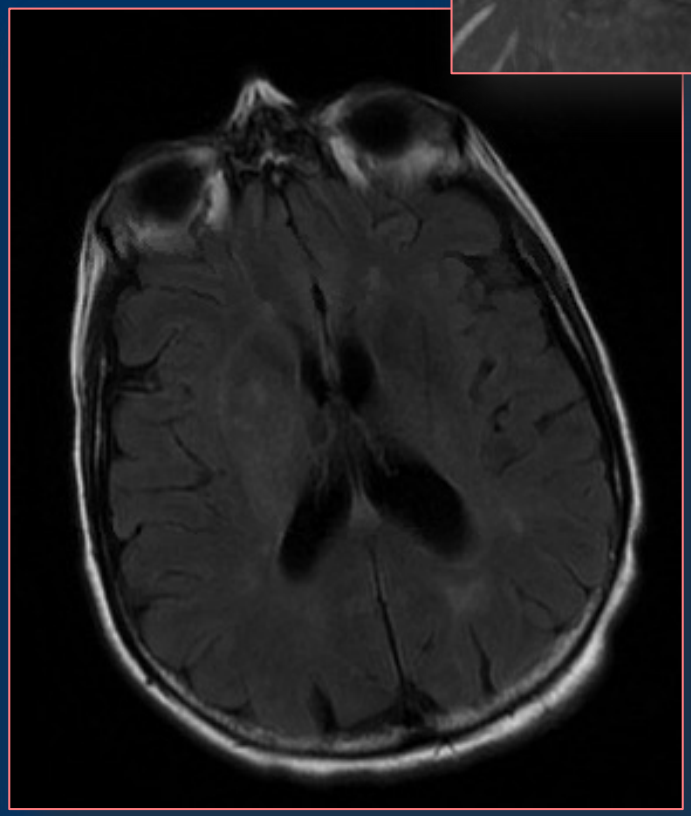
STRATÉGIE

- **Dès le bilan diagnostique :**

  Patient de plus de 70 ans et/ou absence de visualisation de l'ACI ou de l'a. vertébrale dominante en intra-crânien : imagerie des TSA
- Introducteur long fémoral 9F (24 cm)
- Introducteur long 6F souple (80 ou 90 cm)
- Cathéter d'apiration 6F

- Patiente de 63 ans
- Déficit brutal hémi-corps G
- NIHSS = 14





École de la thrombectomie

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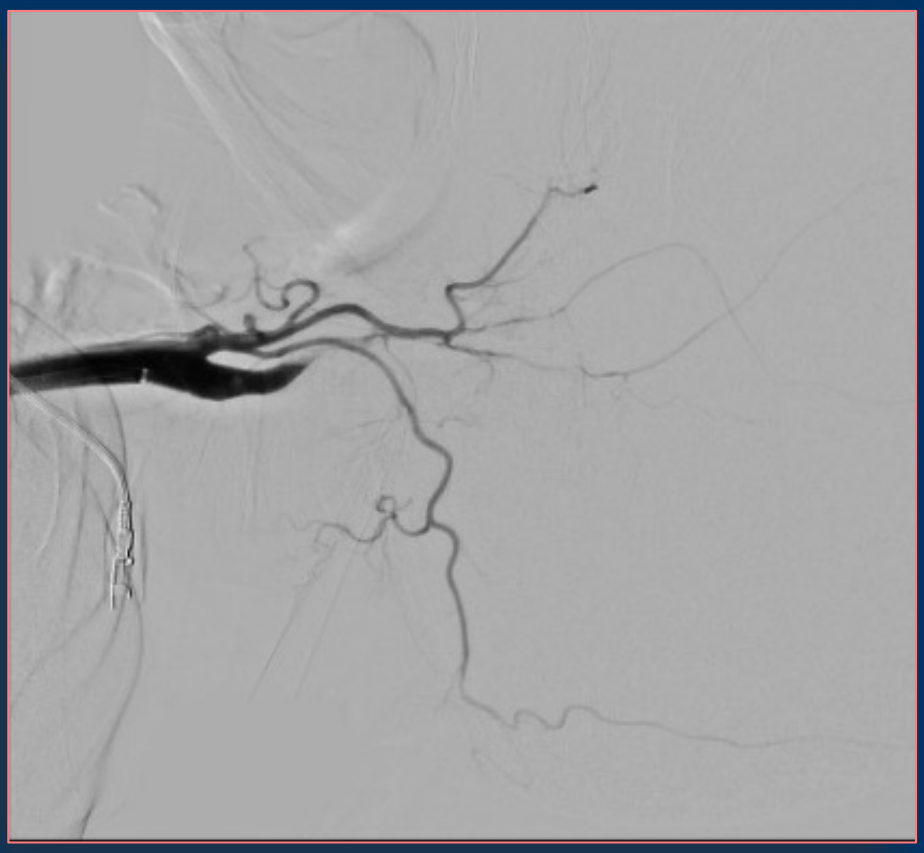
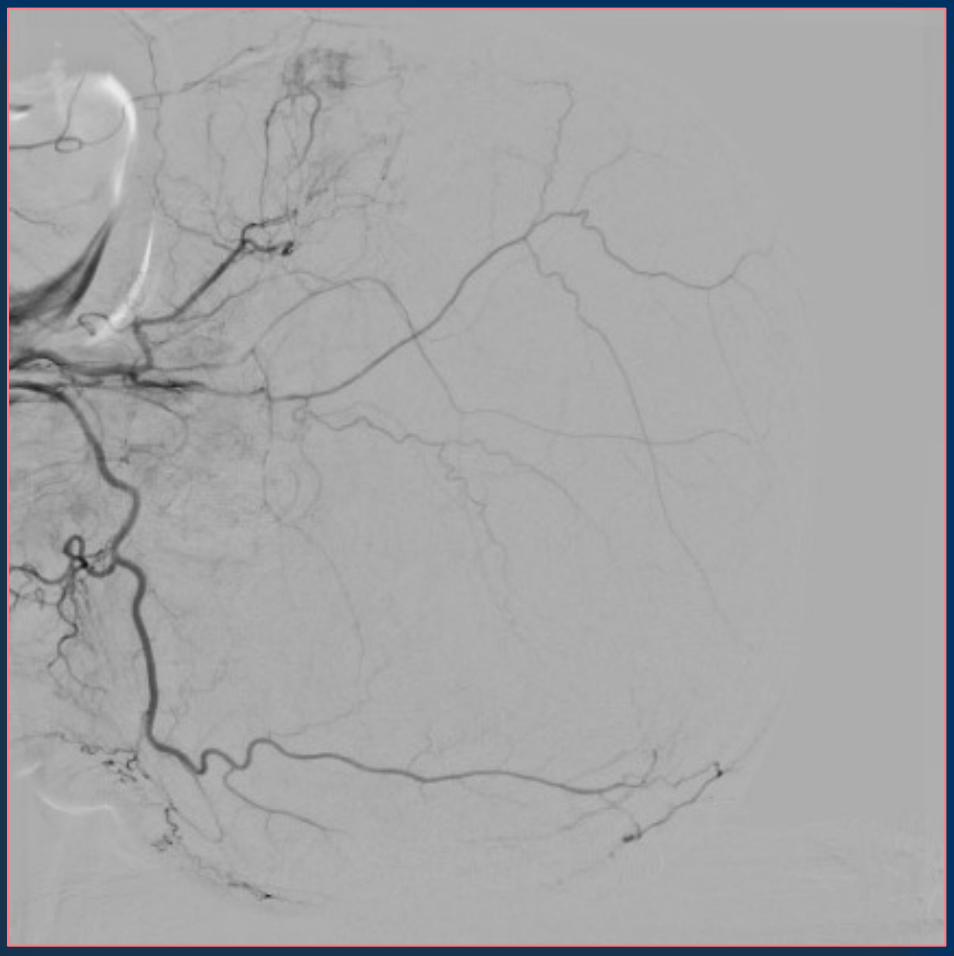
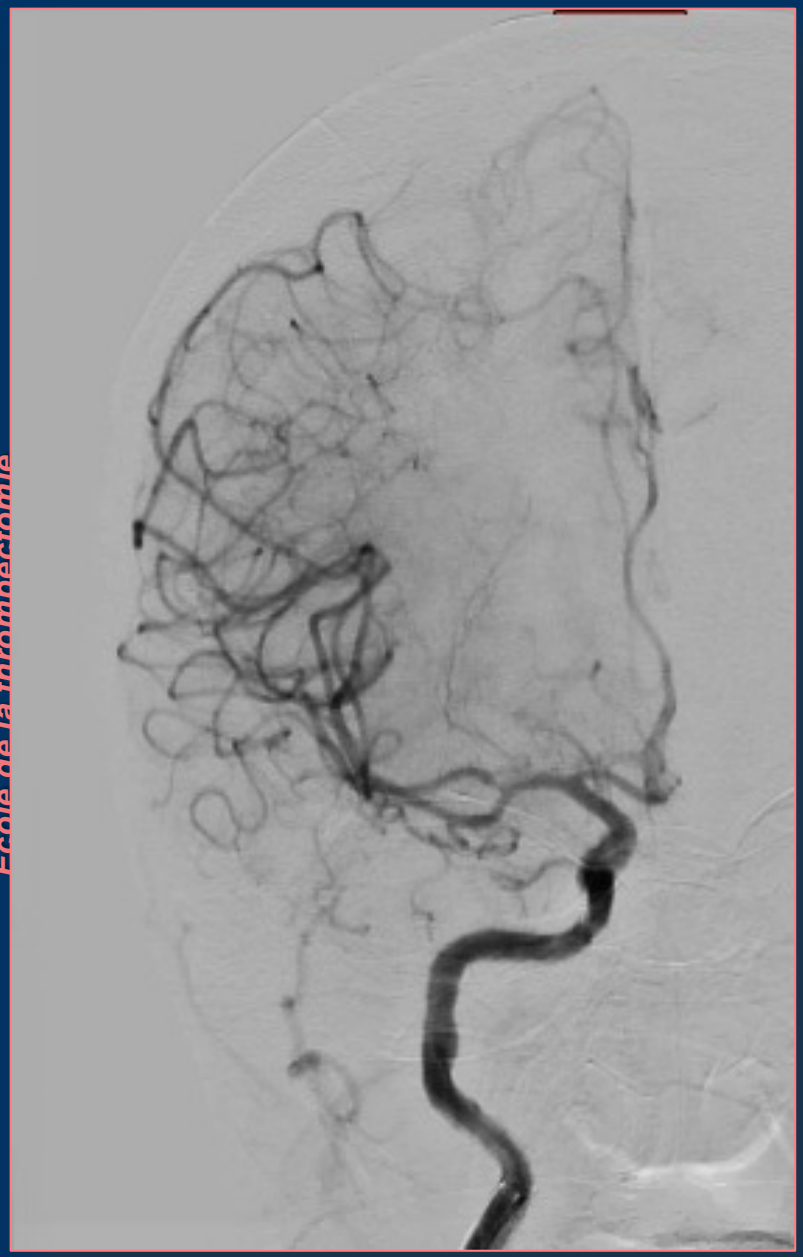
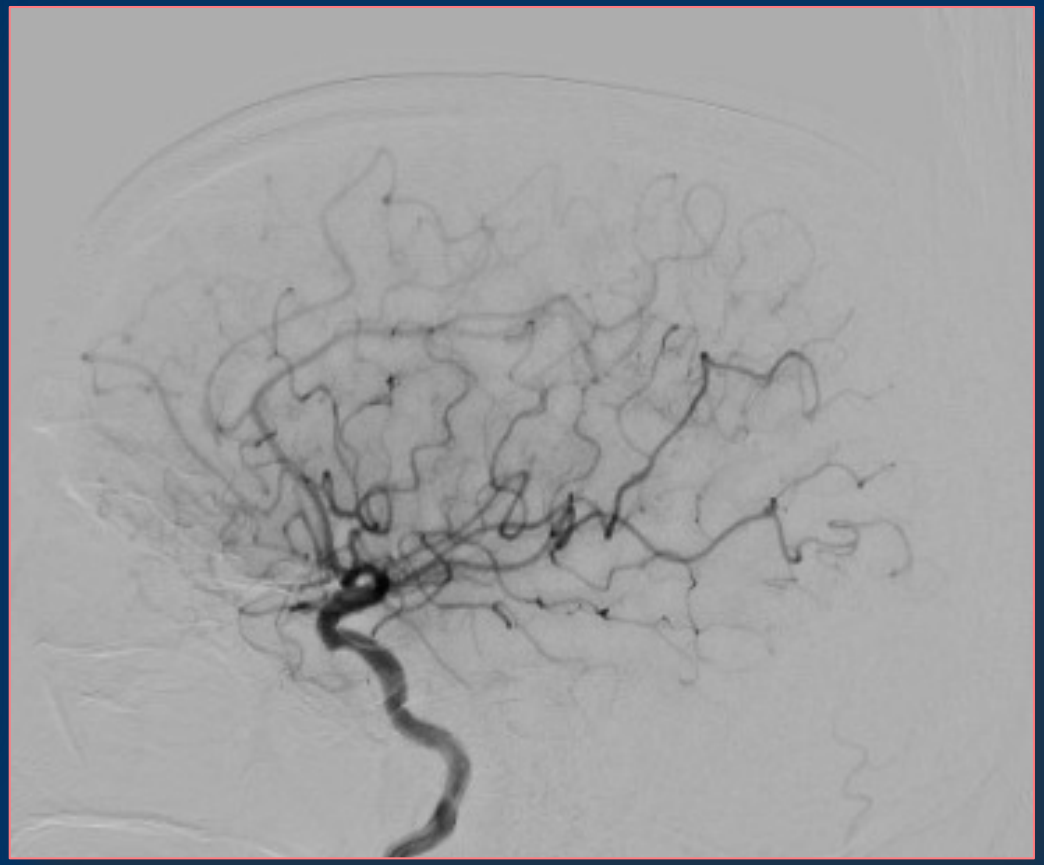




École de la thrombectomie



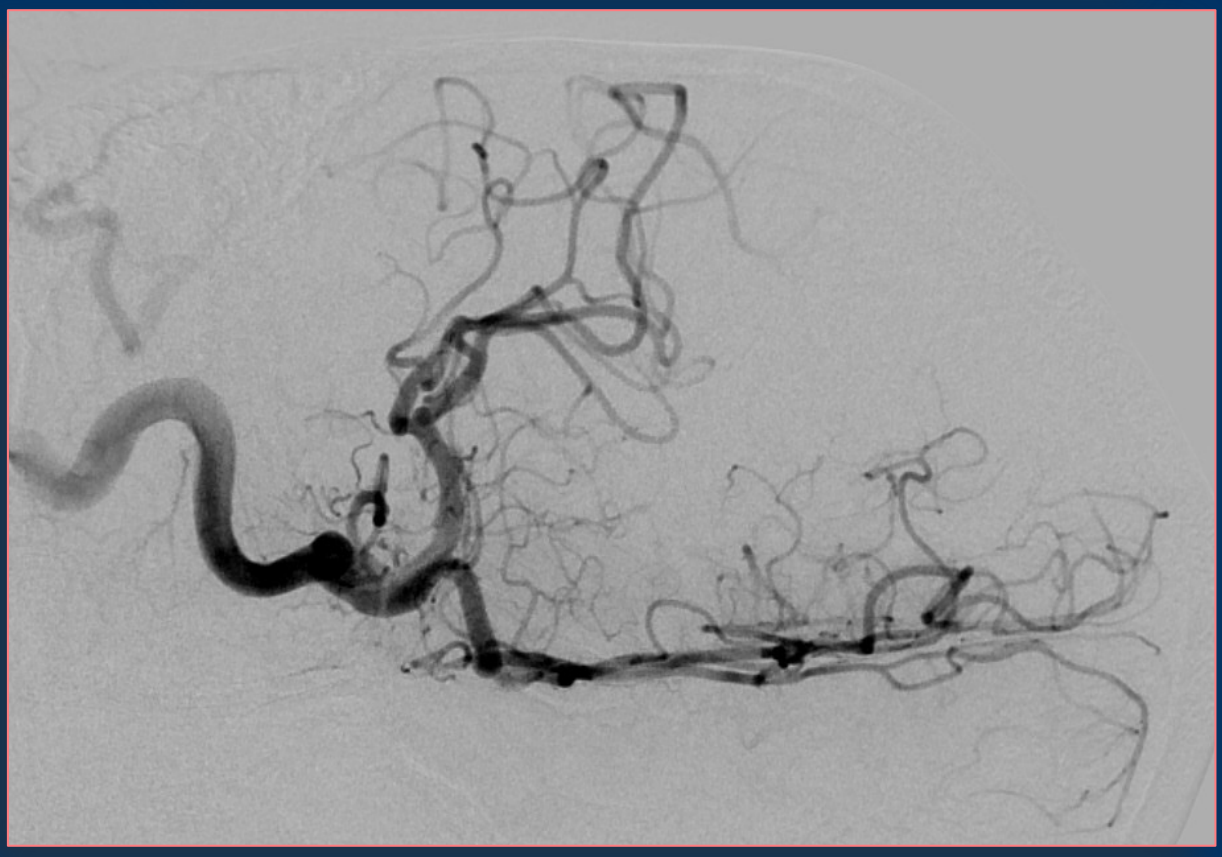


Écol

STRATÉGIE

- Savoir changer de stratégie :

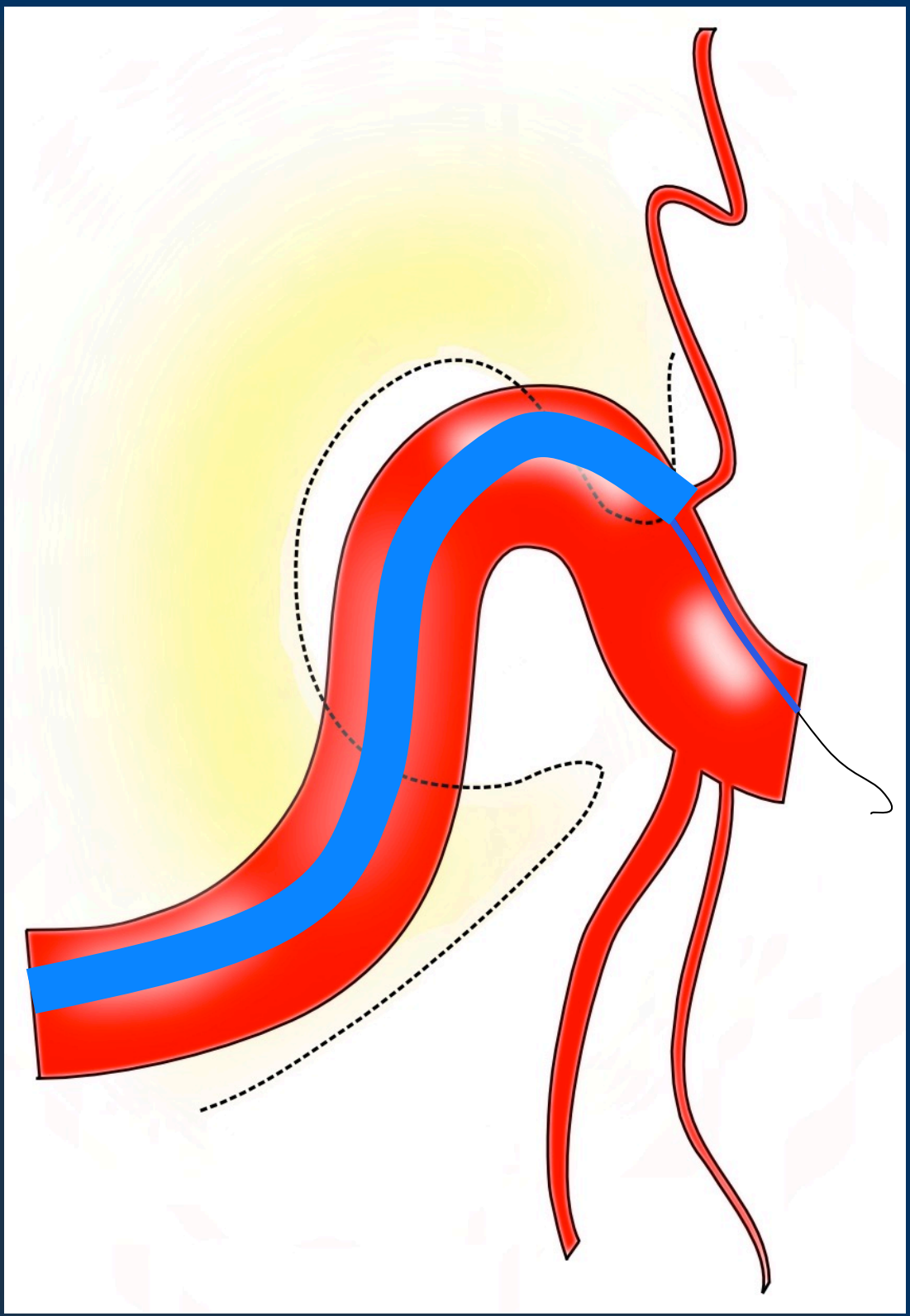
École de la thrombectomie

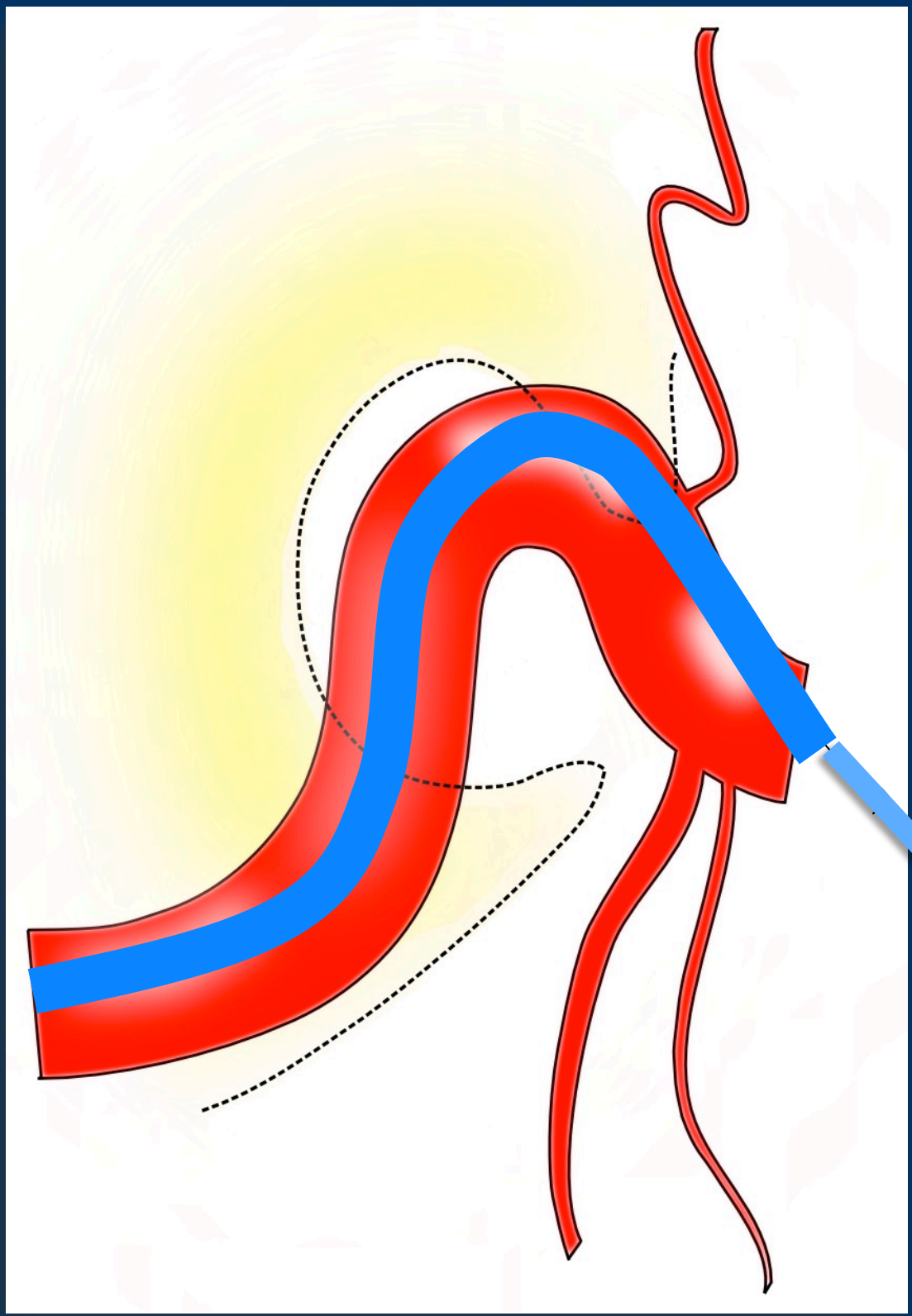


ASPIRATION DIRECTE (ADAPT) OU « SOLUMBRA »

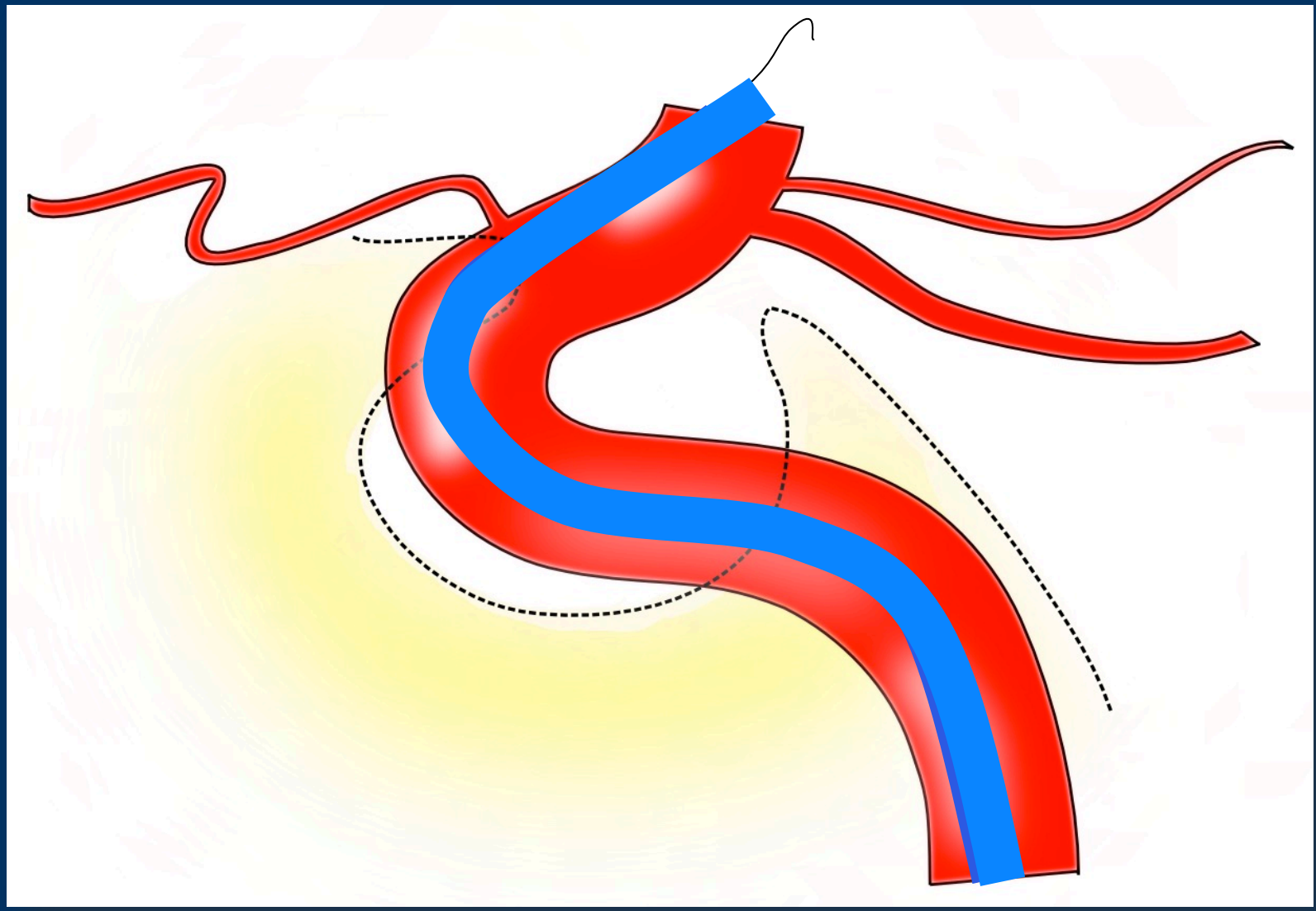
- Mon cathéter ne monte pas dans le siphon

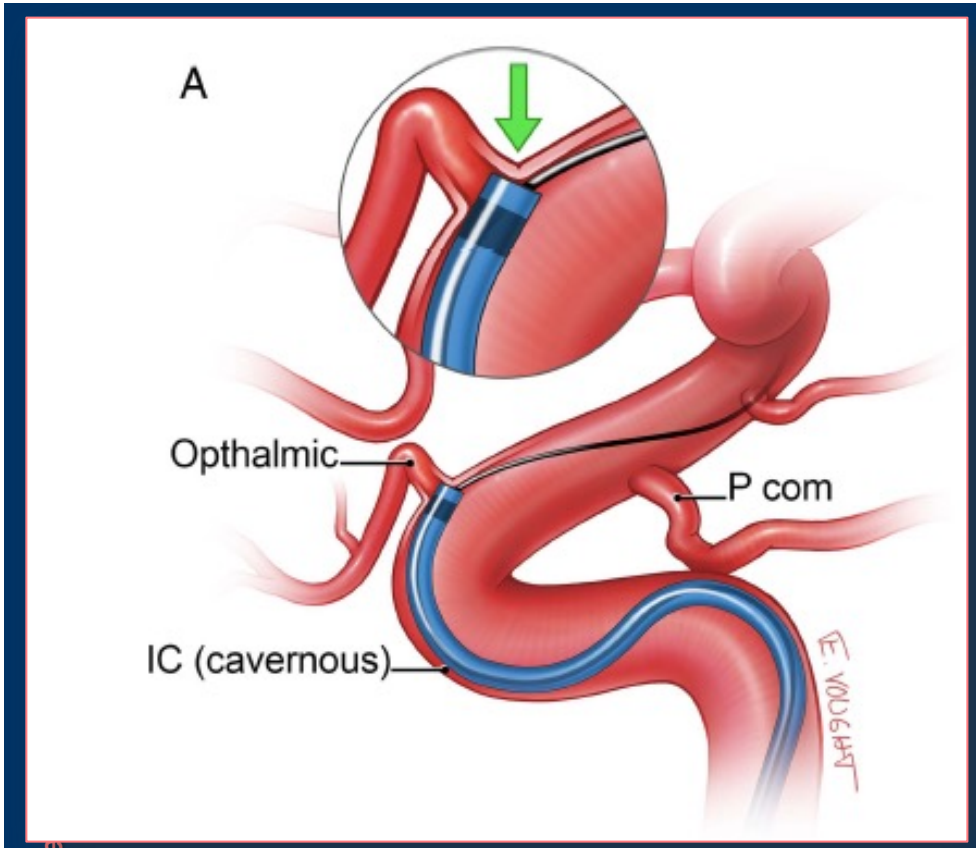
  Que faire ?

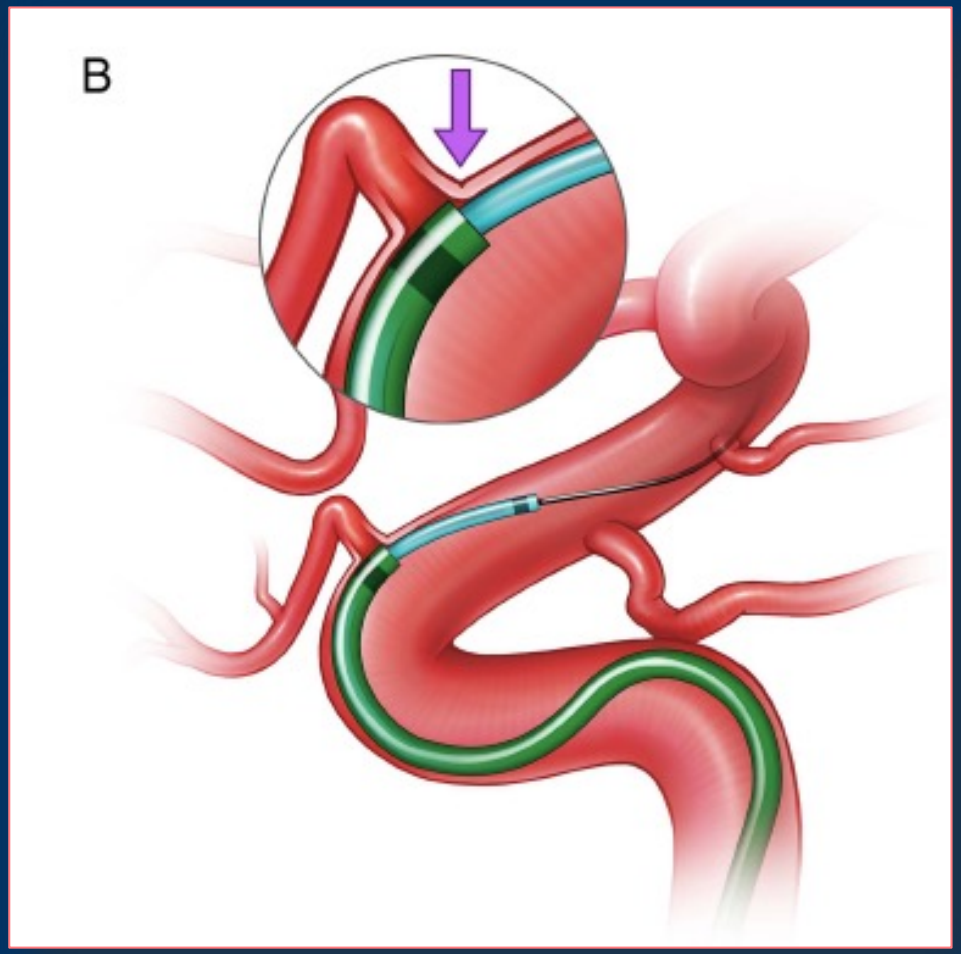




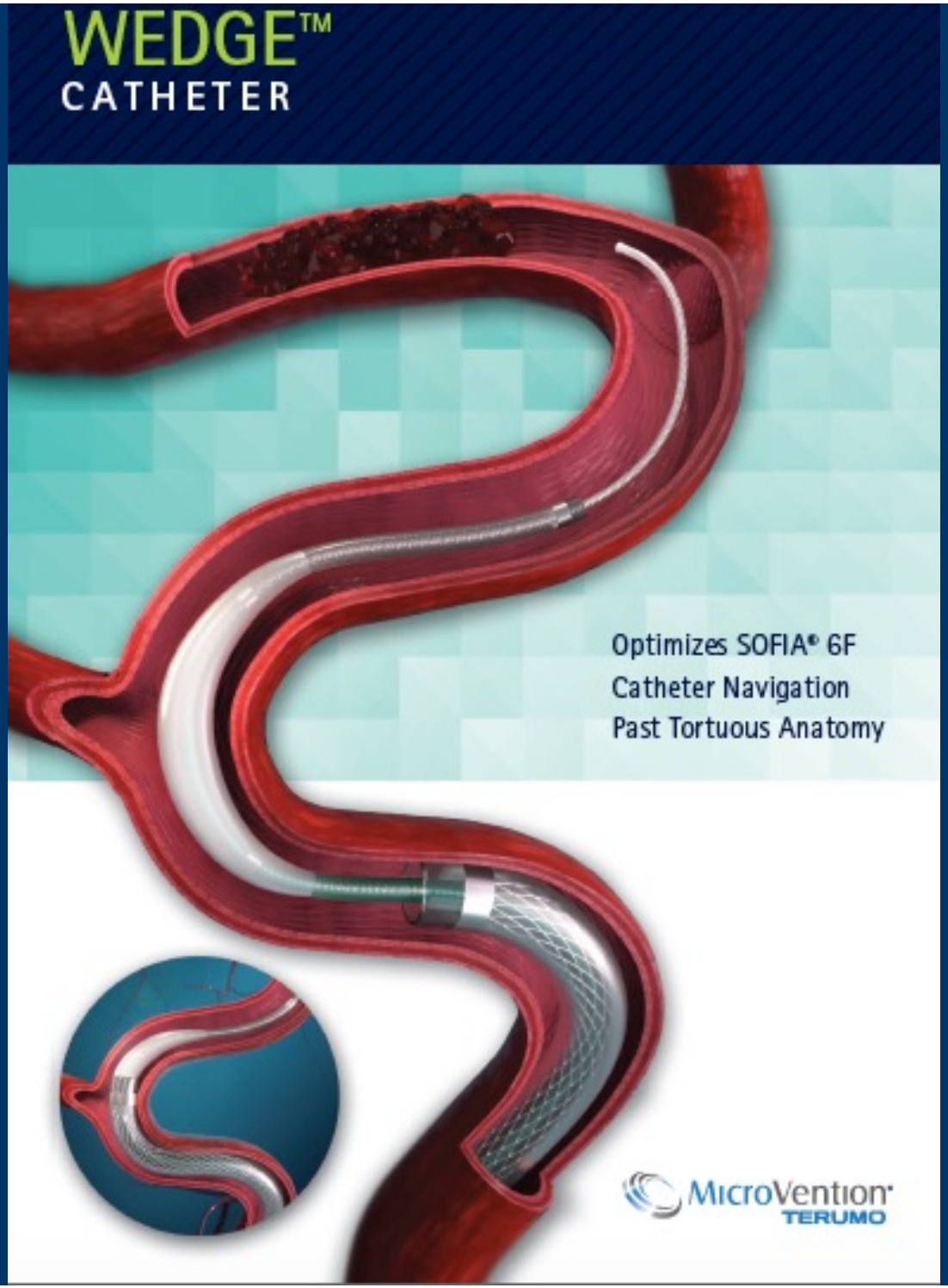
Cathéter 3Max







Spiotta AM. JNIS. 2015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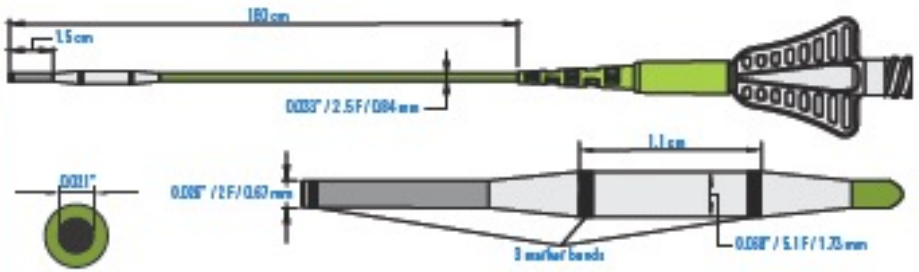
WEDGE™ CATHETER

Optimizes SOFIA® 6F Catheter Navigation Past Tortuous Anatomy

PRODUCT CODE	ID	TIP SHAPE	CATHETER LENGTH	TIP LENGTH	OD DISTAL	OD PROXIMAL	BULB WORKING LENGTH	BULB MAX OD	TIP MARKERS
MCWED21160	0.021"	Straight	160 cm	1.5 cm	0.026" 2.0 F 0.67 mm	0.033" 2.5F 0.84 mm	1.1 cm	0.068" 5.1 F 1.73 mm	3

One unit per box; includes shaping mandrel and introducer sheath



The Wedge™ Microcatheter is intended for general intravascular use, including the peripheral, coronary and neurovasculature for the infusion of diagnostic agents, such as contrast media, and therapeutic agents. For complete indications, potential complications, warnings and instructions, see Instructions for use (IFU PDT1730EC).

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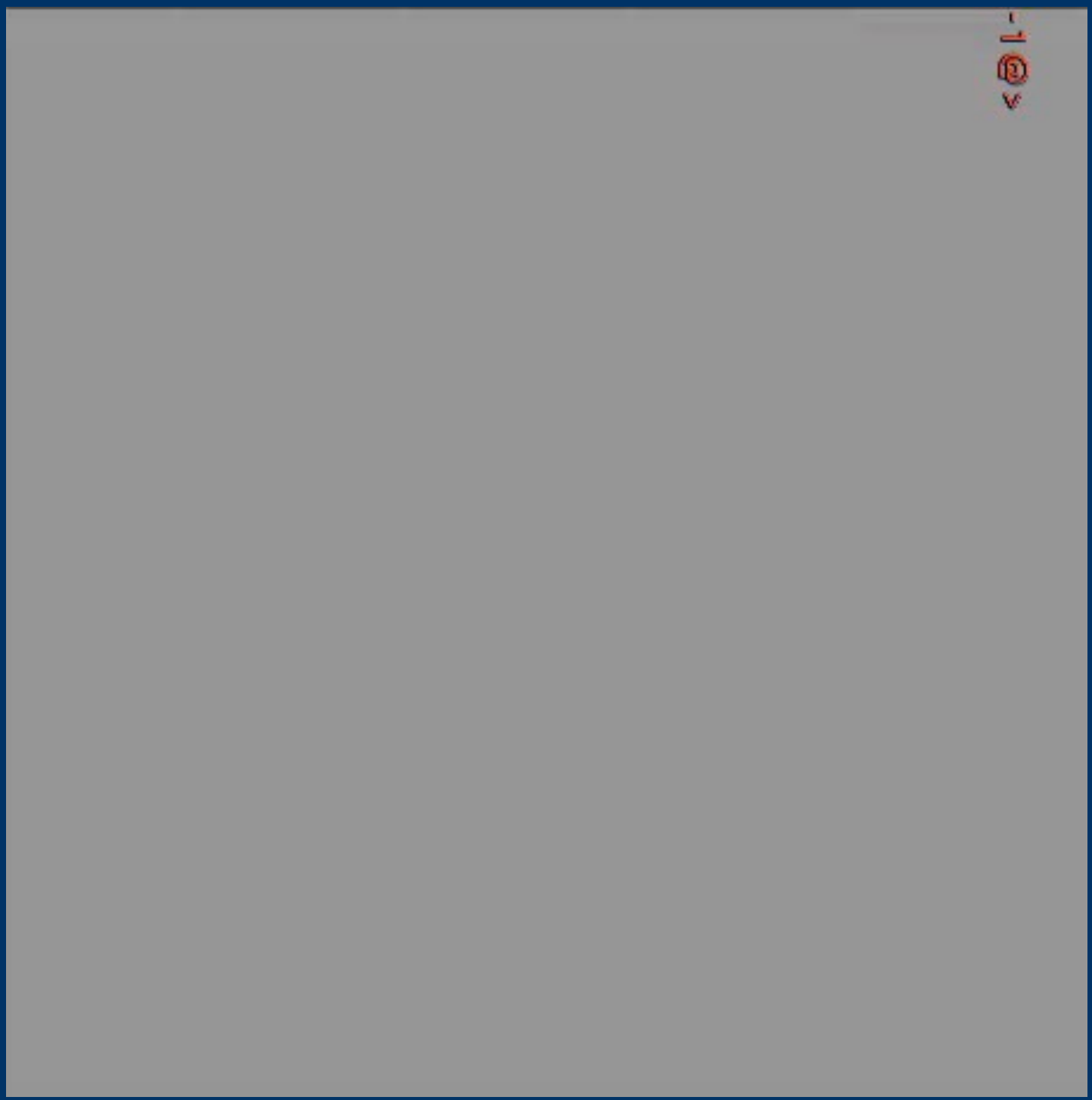
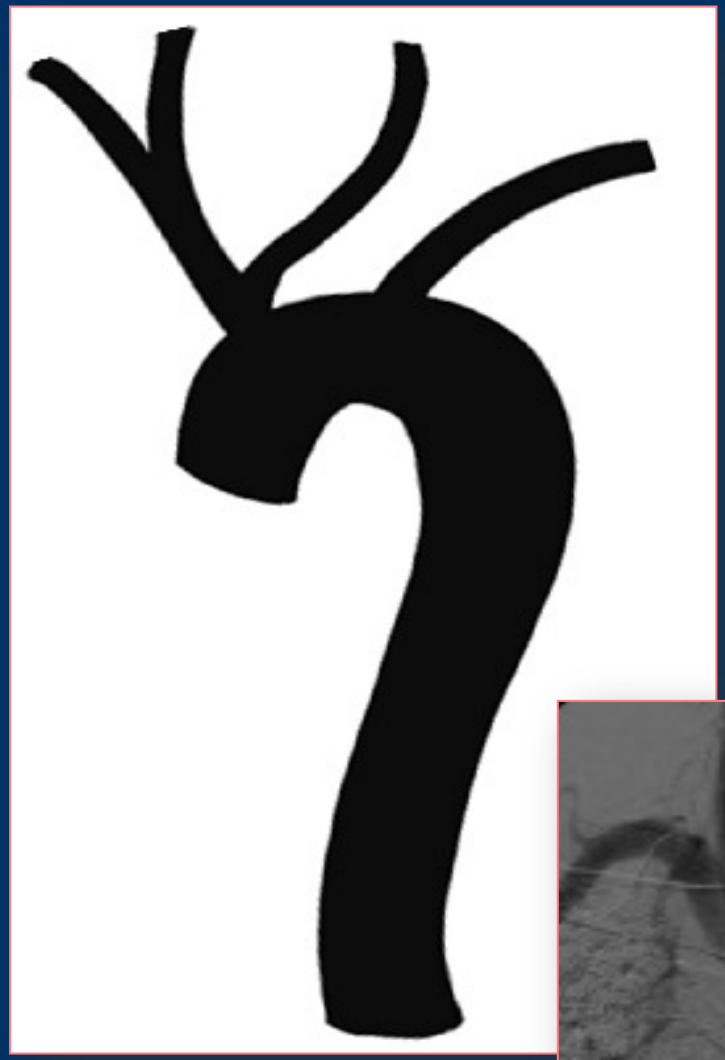
École de la thrombectomie



TSA DIFFICILES



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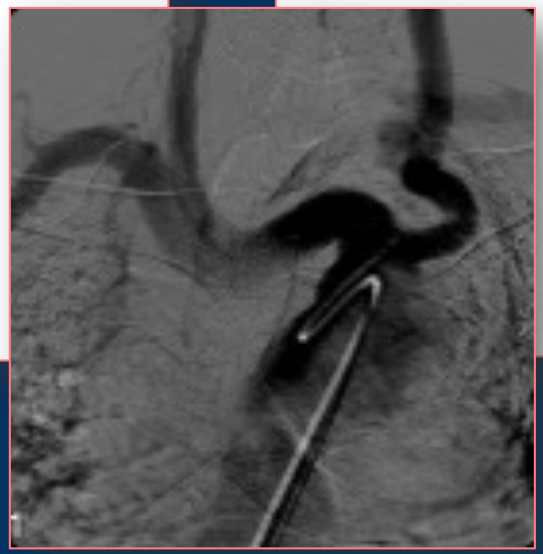

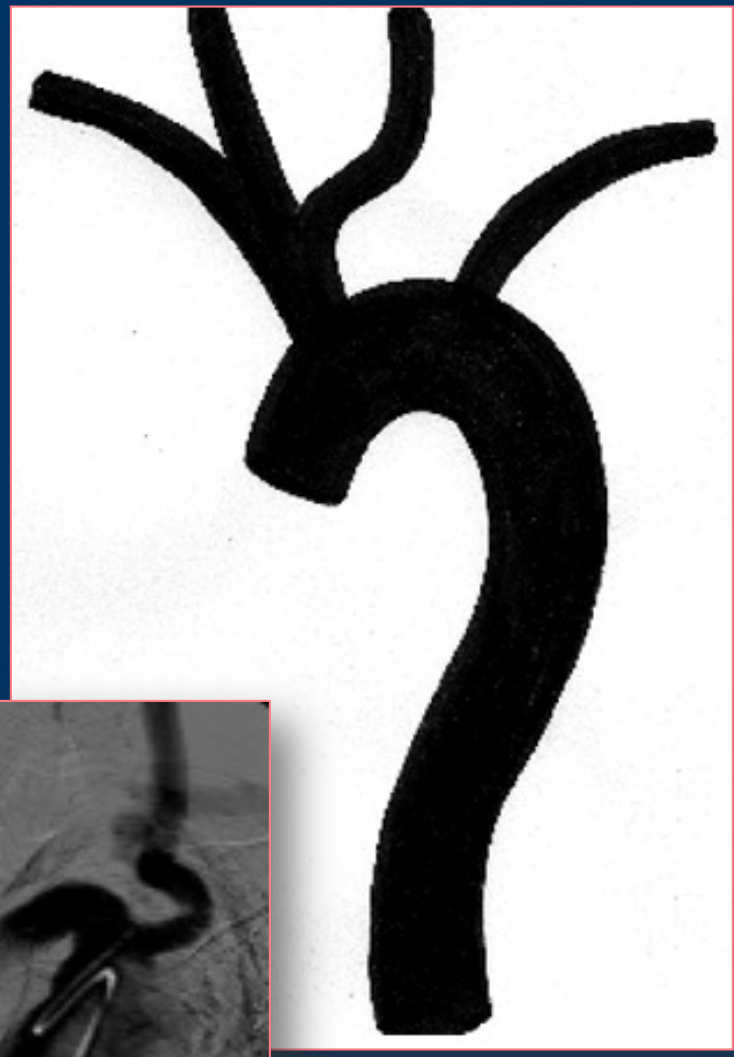

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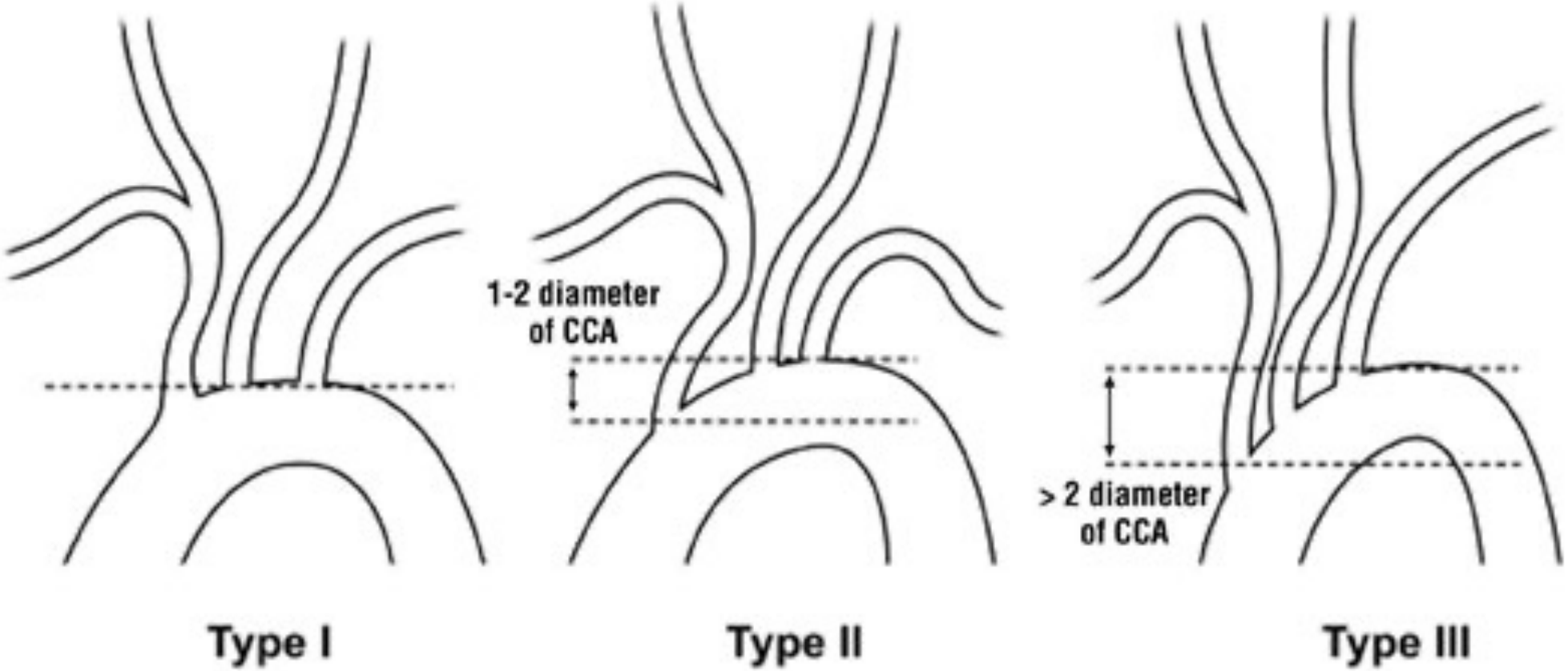
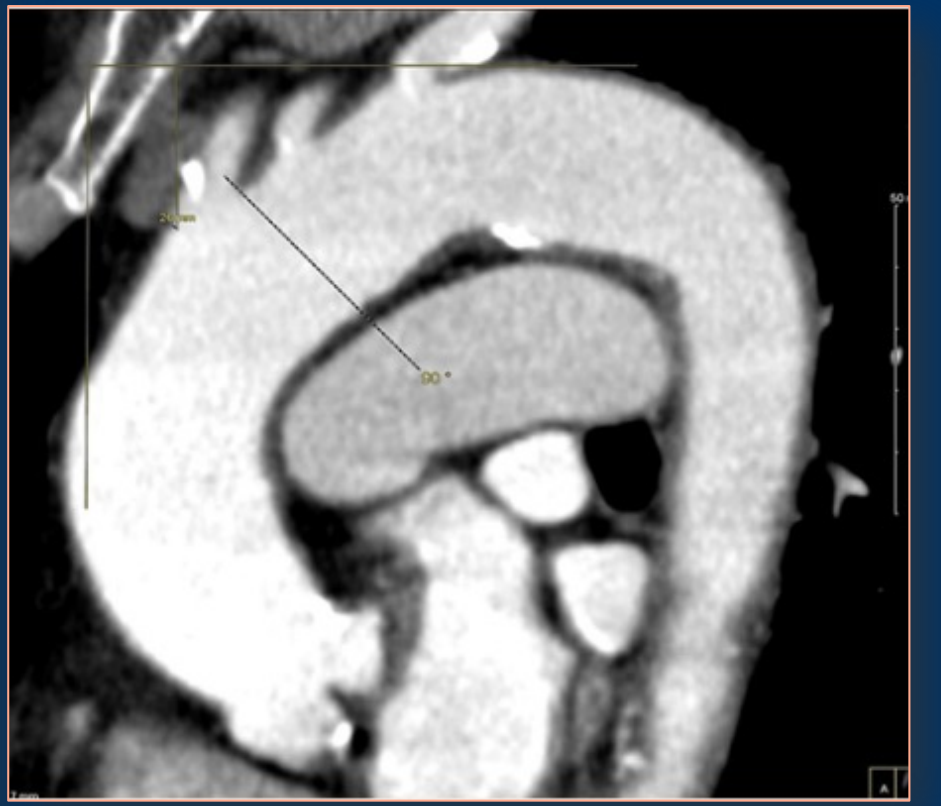
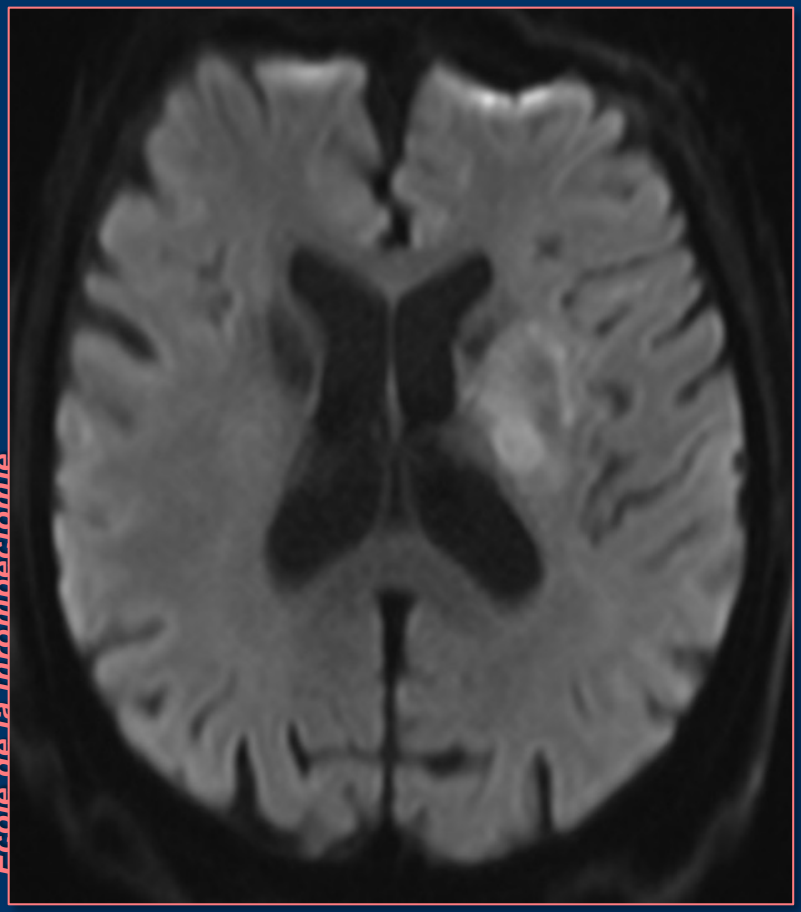
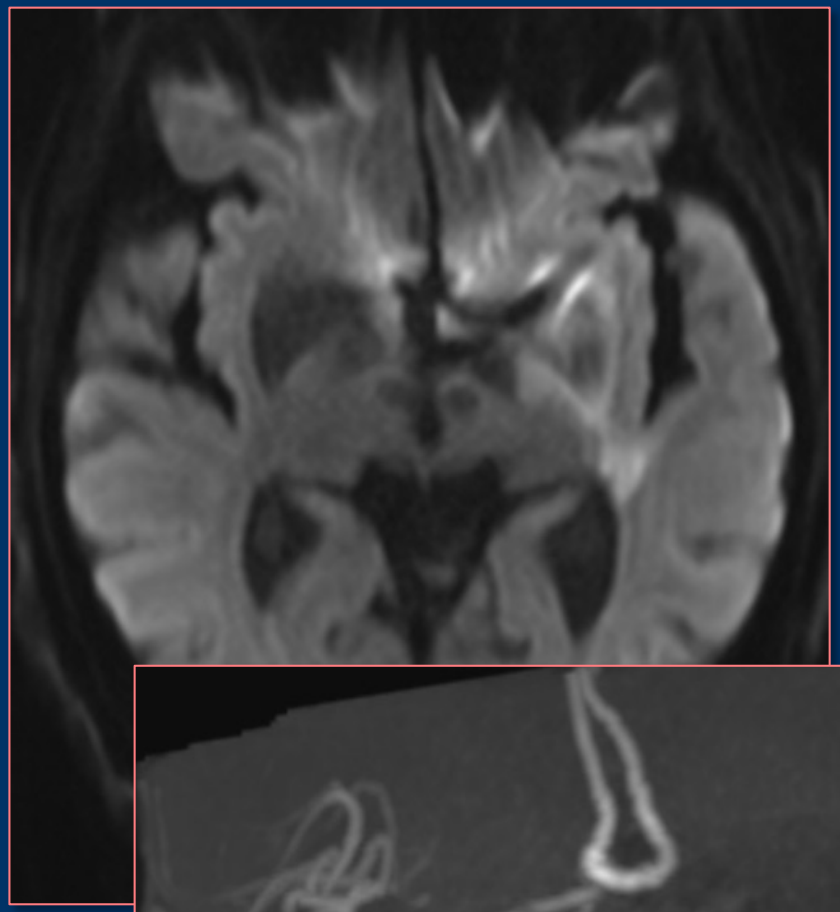
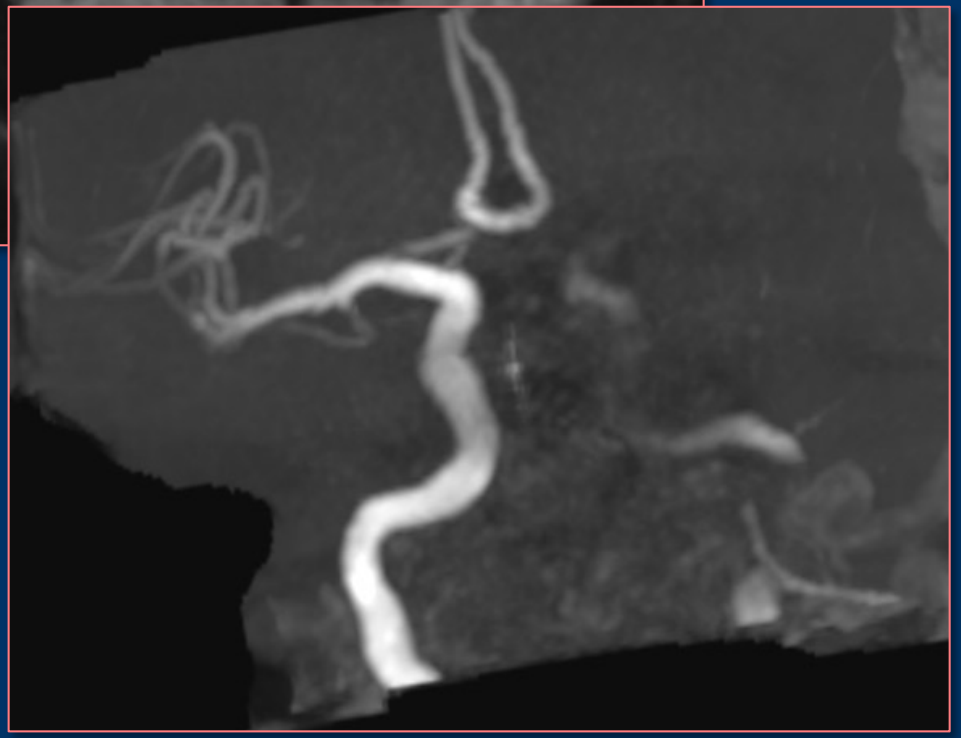

1-2 diameter
of CCA
> 2 diameter
of CCA
Type I
Type II
Type III


90 °





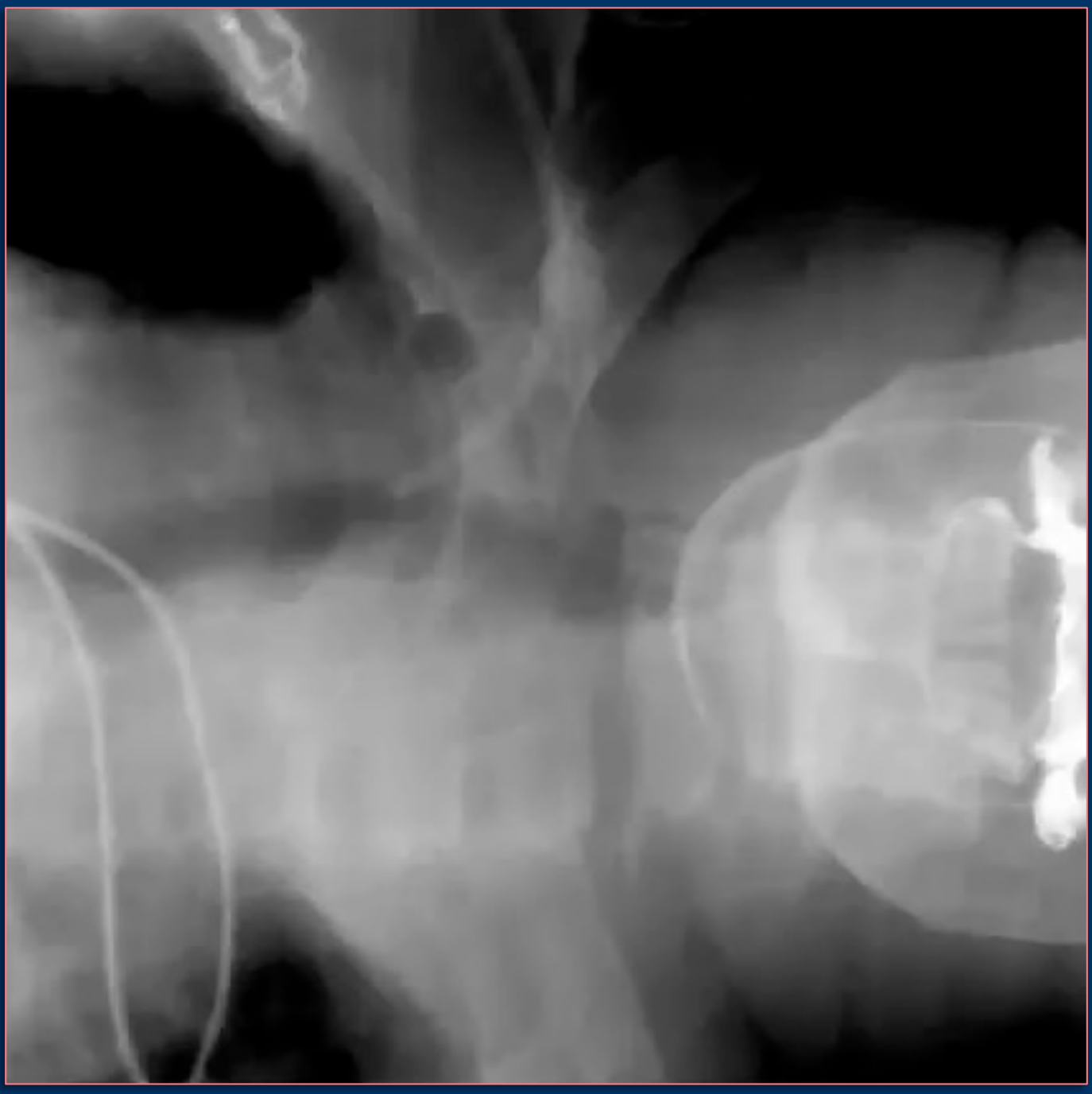


Femme de 80 ans

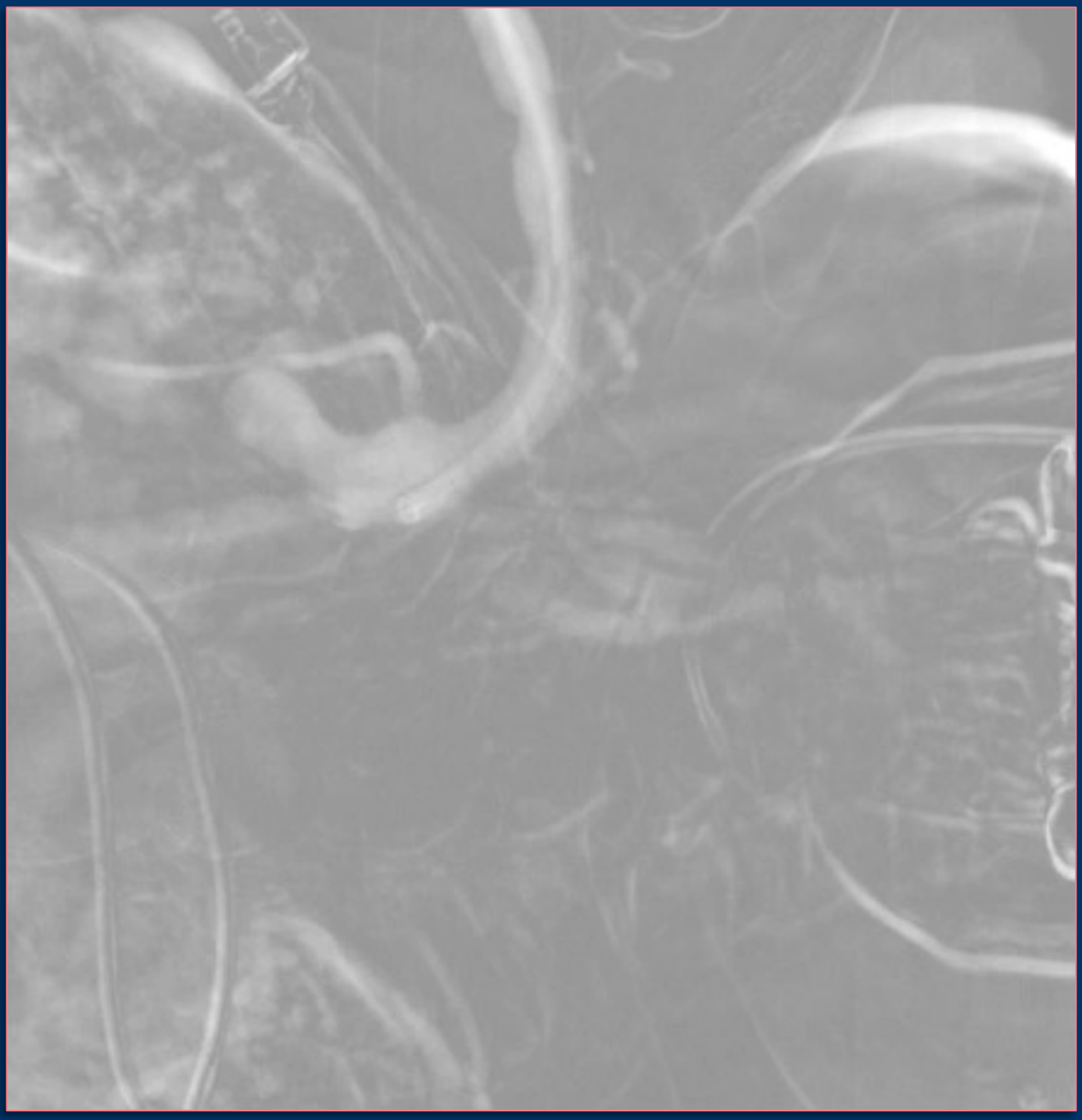
Hémiplégie Dte, aphasie

NIHSS = 27

École de la thrombectomie



École de la thrombectomie



École de la thrombectomie

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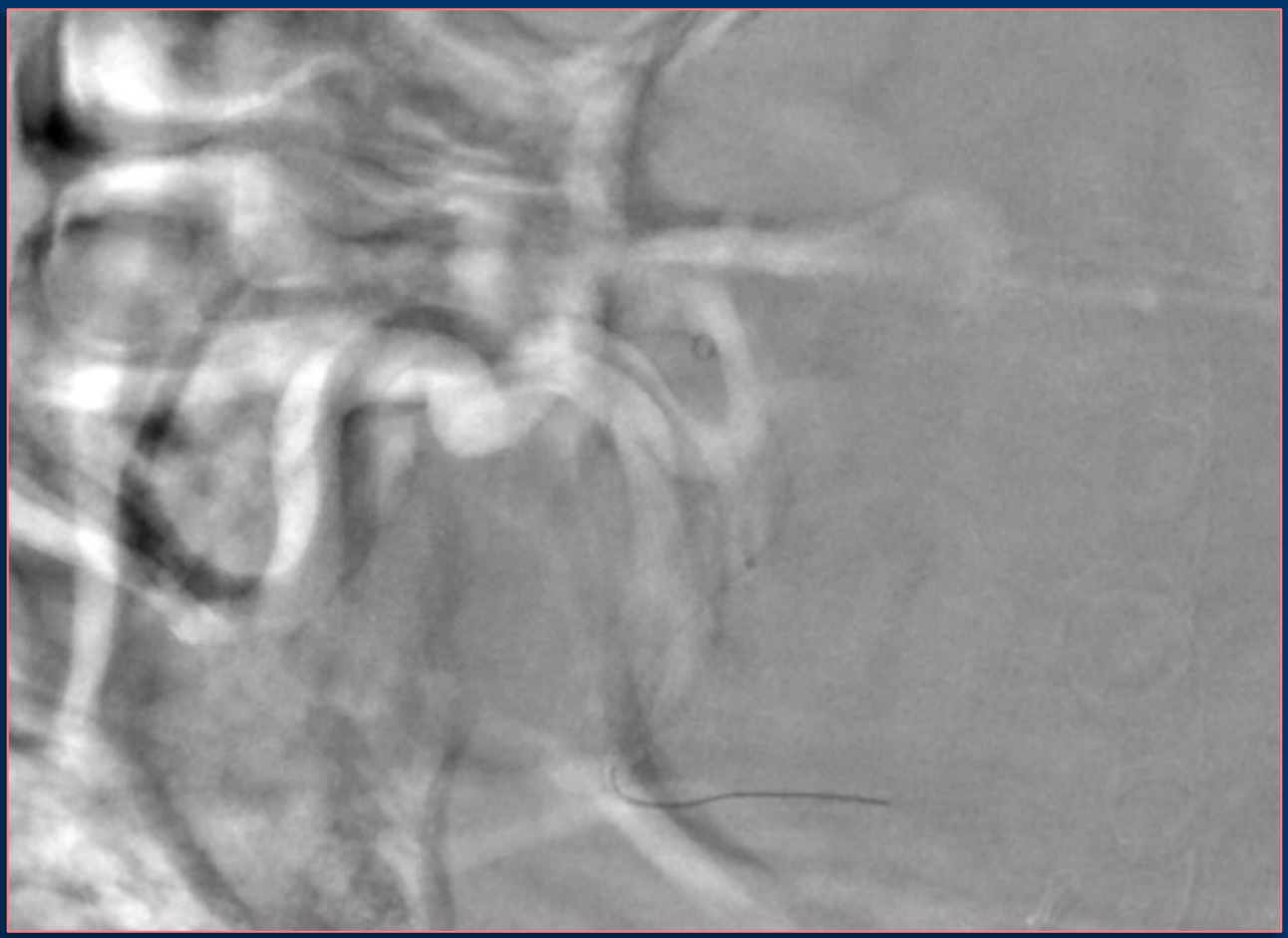


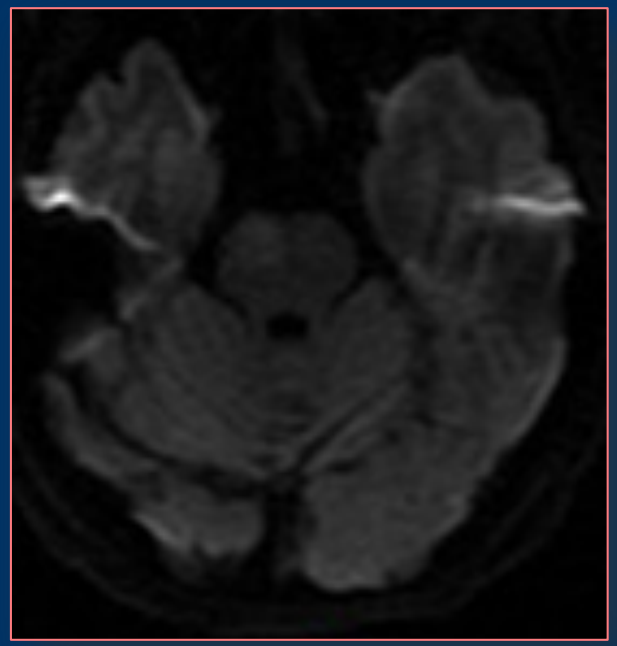
École de la thrombectomie

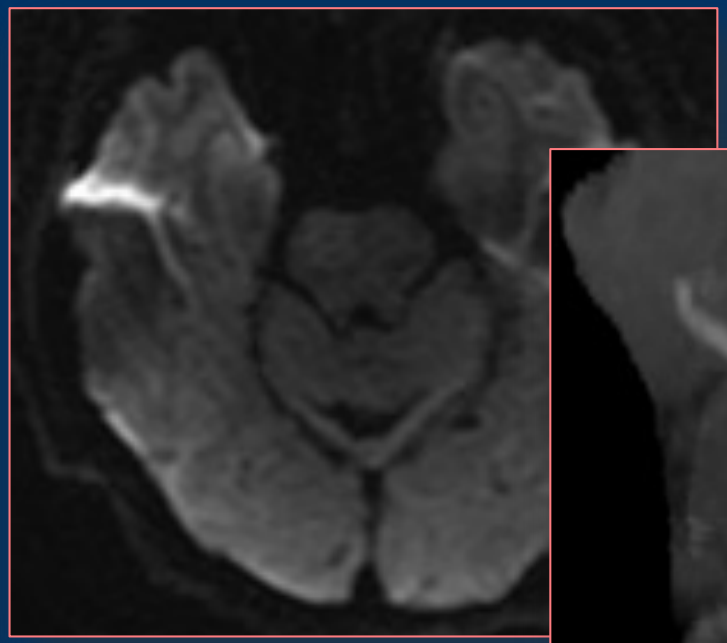

3Max
Traxcess 14”

FRANCHIR LE CAILLOT

- Le moyen **le plus sûr** de franchir le caillot, c'est de ne pas le franchir …
- Intérêt de l'aspiration : cathéter à large lumière au contact du caillot
- Pas de nécessité de franchir le caillot

- *Patiente de 63 ans*
- *Hémiplégie G*
- *NIHSS = 12*
- *Patiente en salle d'angio à H7*





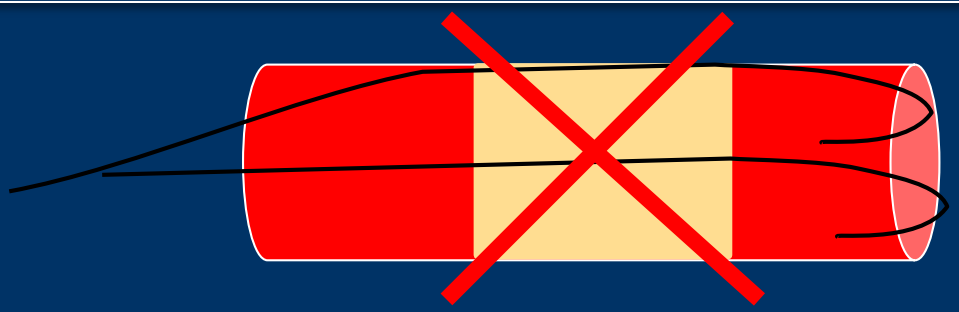
École de la thrombectomie

École de la thrombectomie

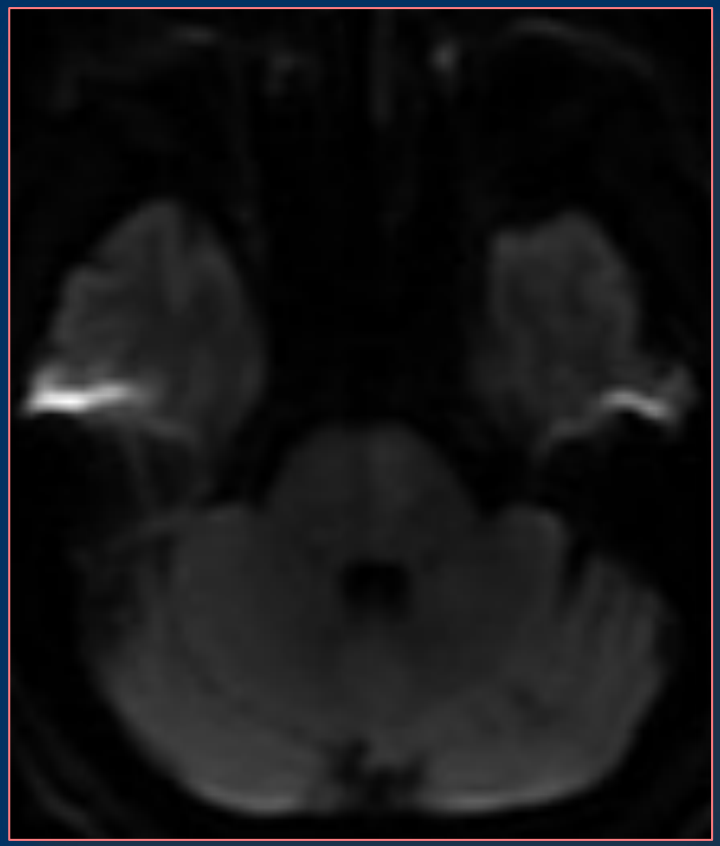

POST THROMBOASPIRATION

FRANCHIR LE CAILLOT

- Quand est-il nécessaire de franchir le caillot ?



Patient de 52 ans. Coma brutal



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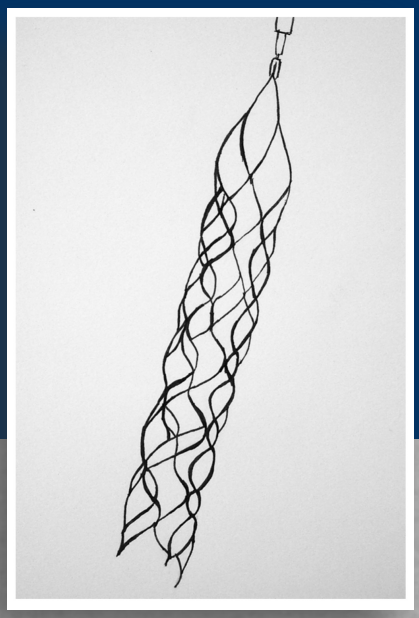
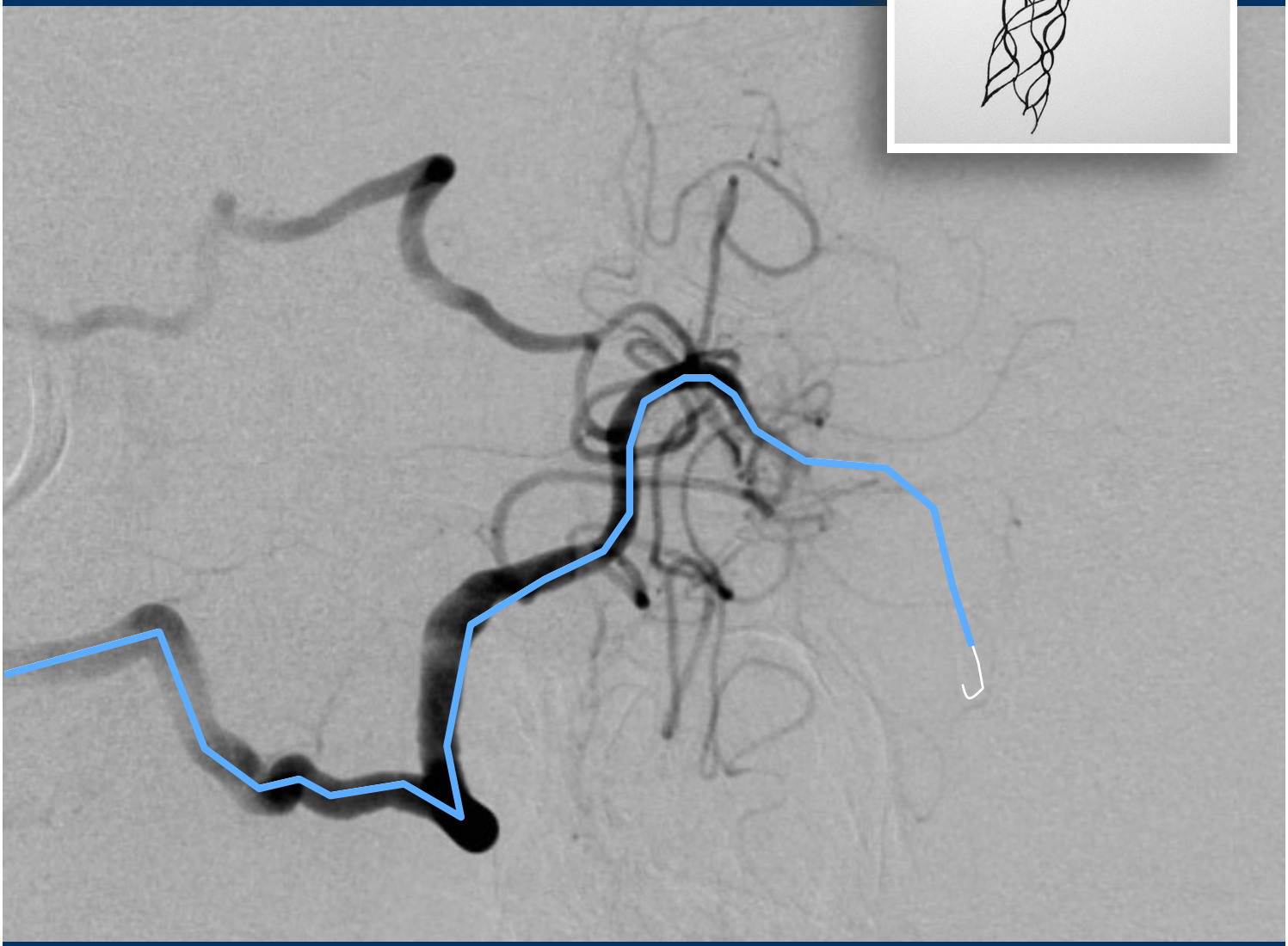
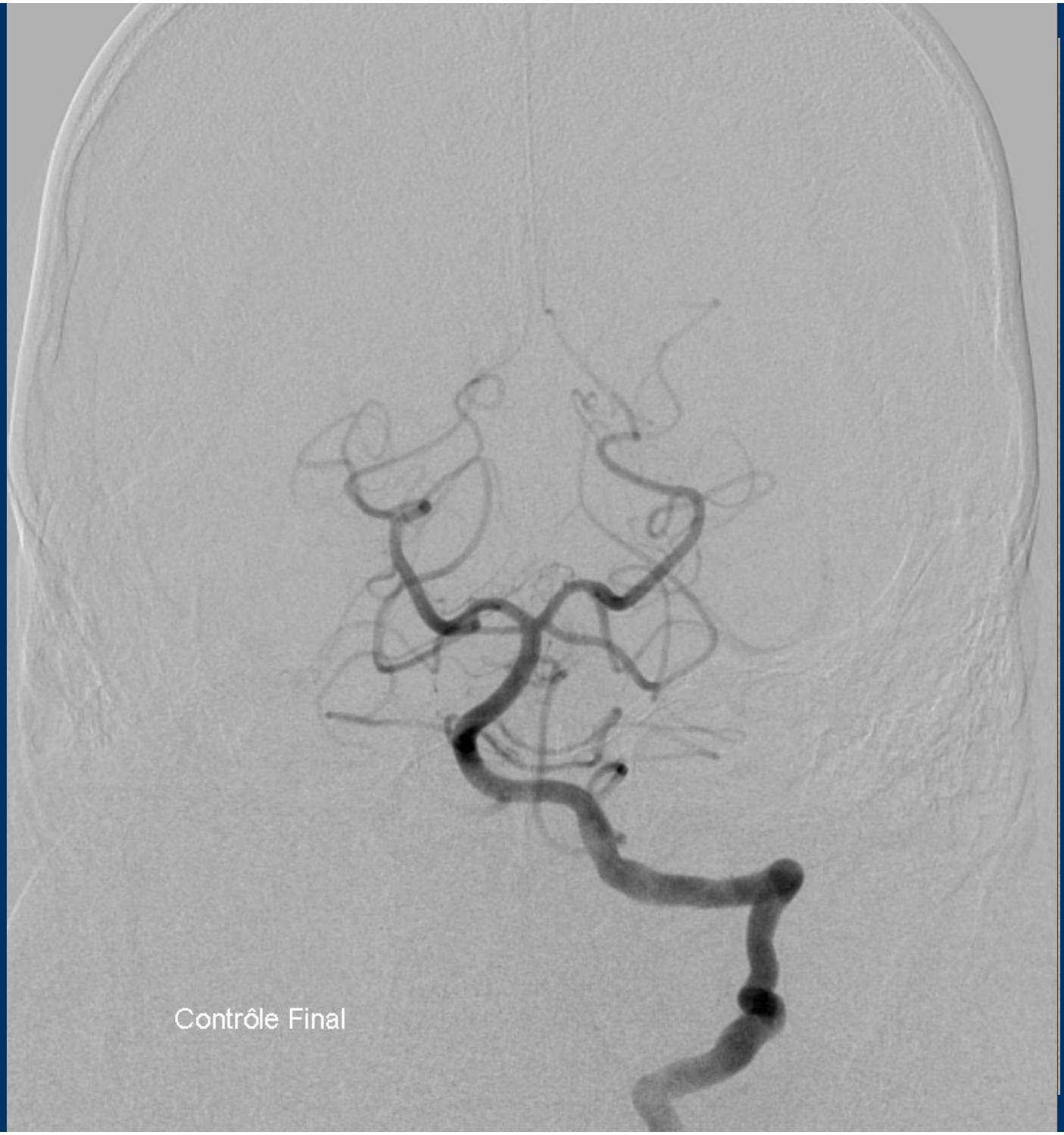
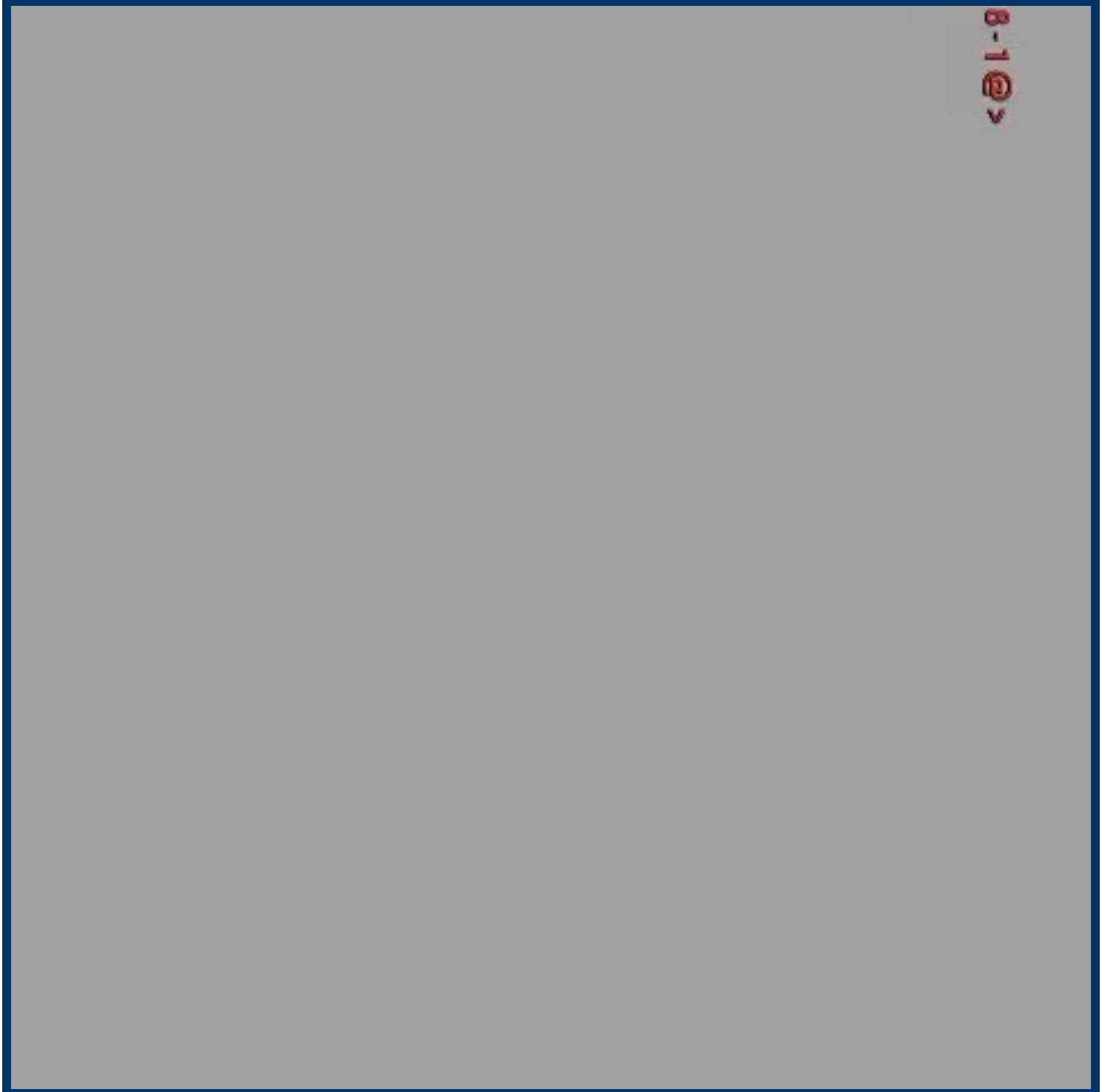





Contrôle Final


AVC

FRANCHIR LE CAILLOT

- *Quels sont les risques à franchir le caillot ?*

Comment franchir le caillot de façon sûre ?

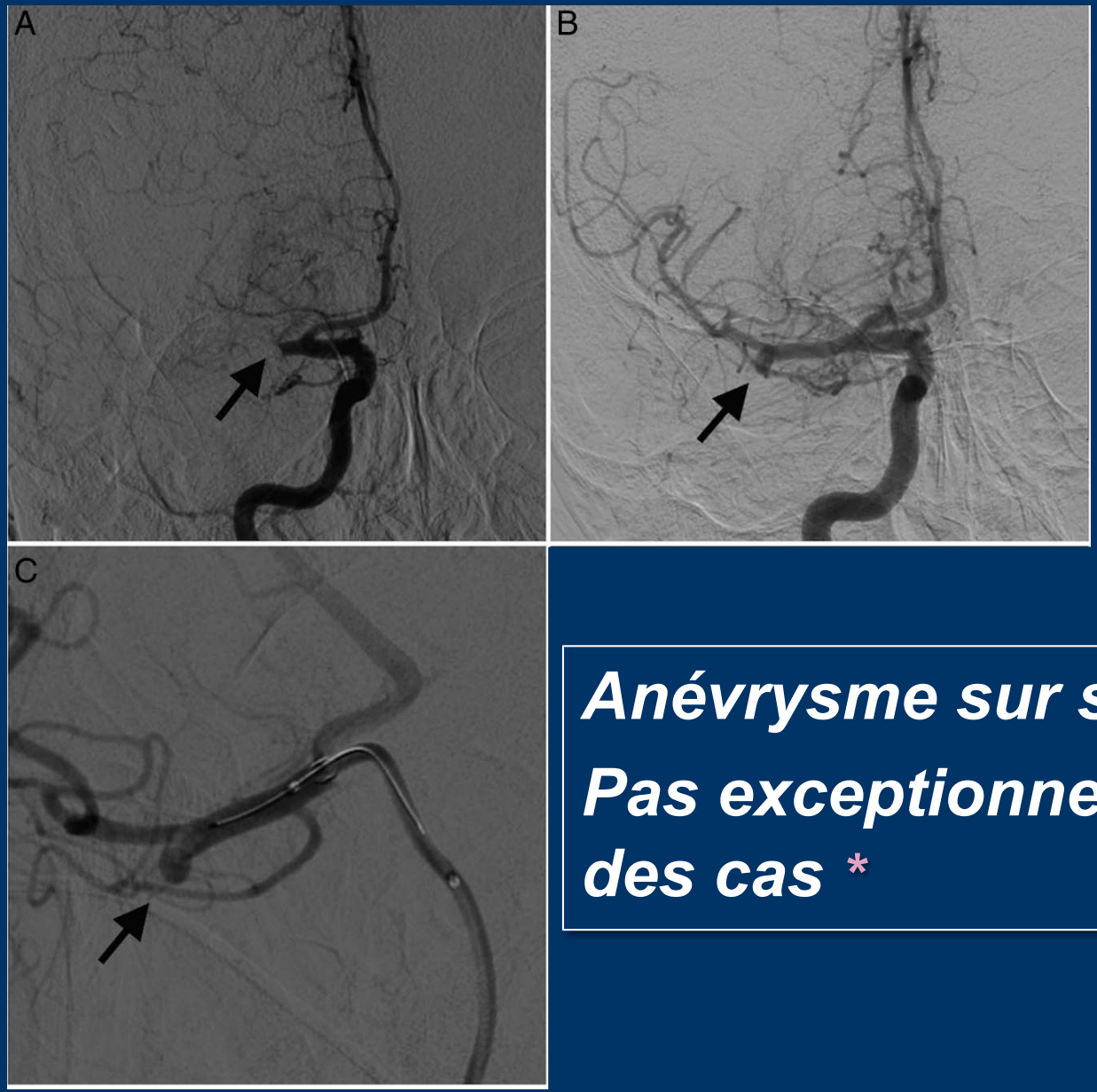
- toujours avec le microguide

- microguide en « J »

- torquer le microguide en l'avançant

FRANCHIR LE CAILLOT

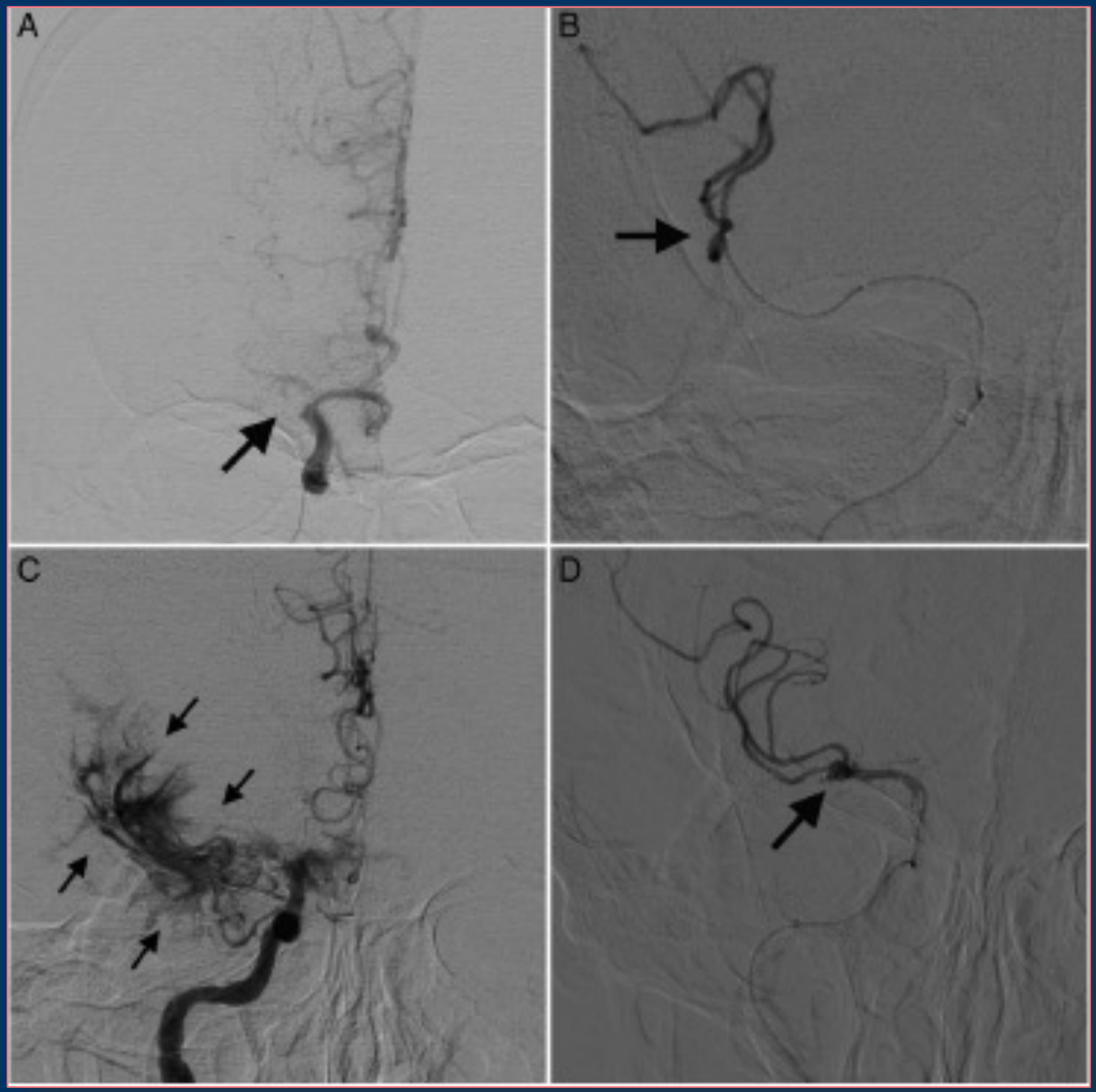
Quelle courbure pour franchir le caillot ?



Anévrysme sur site occlusion

Pas exceptionnel ; jusqu'à 3,7% des cas *

*** Zibold F. JNIS. 2016***

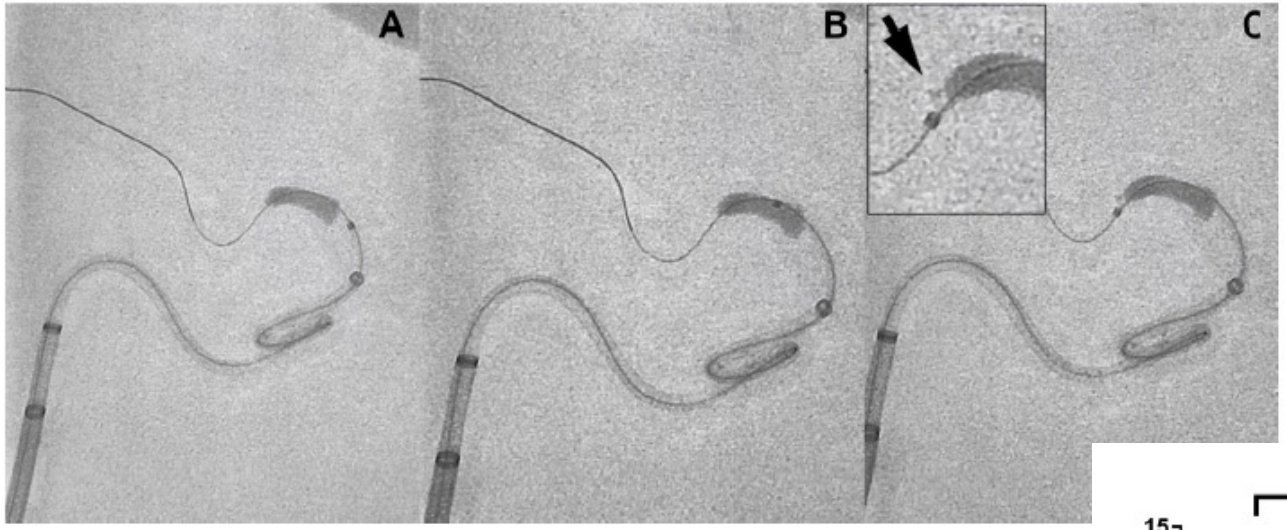


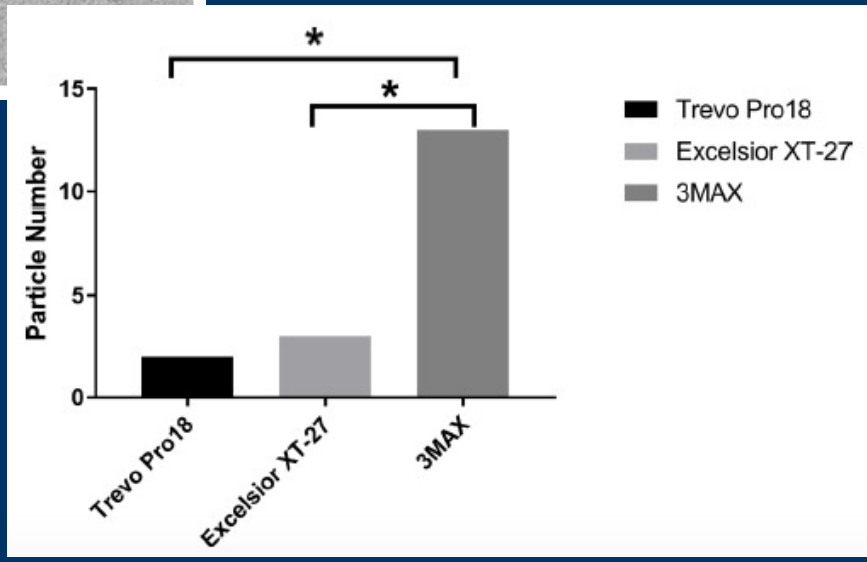
Zibold F. JNIS. 2016

Microcatheter navigation through the clot: does size matter?

Jildaz Caroff,[1,2] Robert M King,[1] Rose Arslanian,[1] Miklos Marosfoi,[1] Erin T Langan,[1] Matthew J Gounis,[1] Ju-Yu Chueh[1]

JNIS. 2018

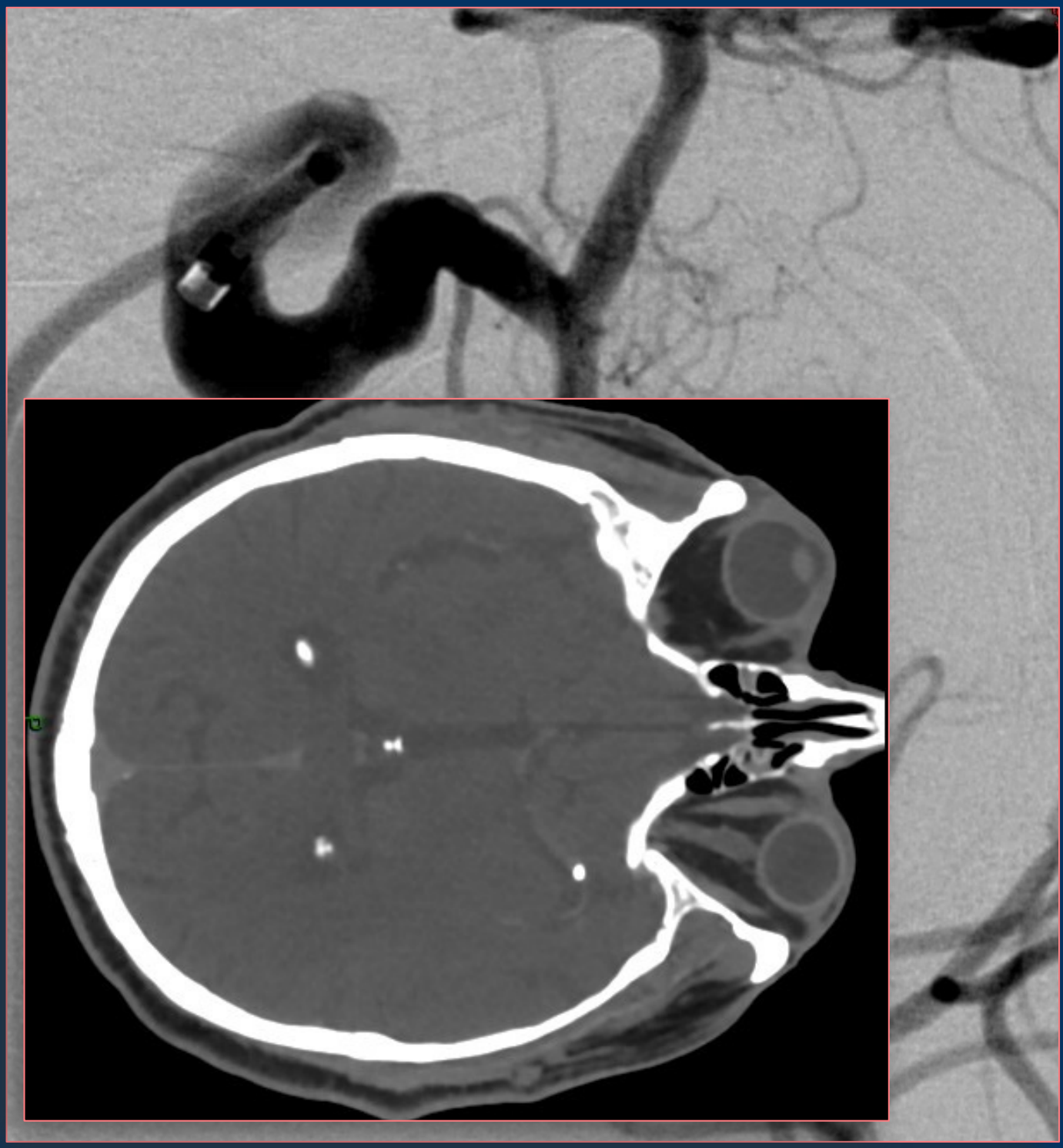


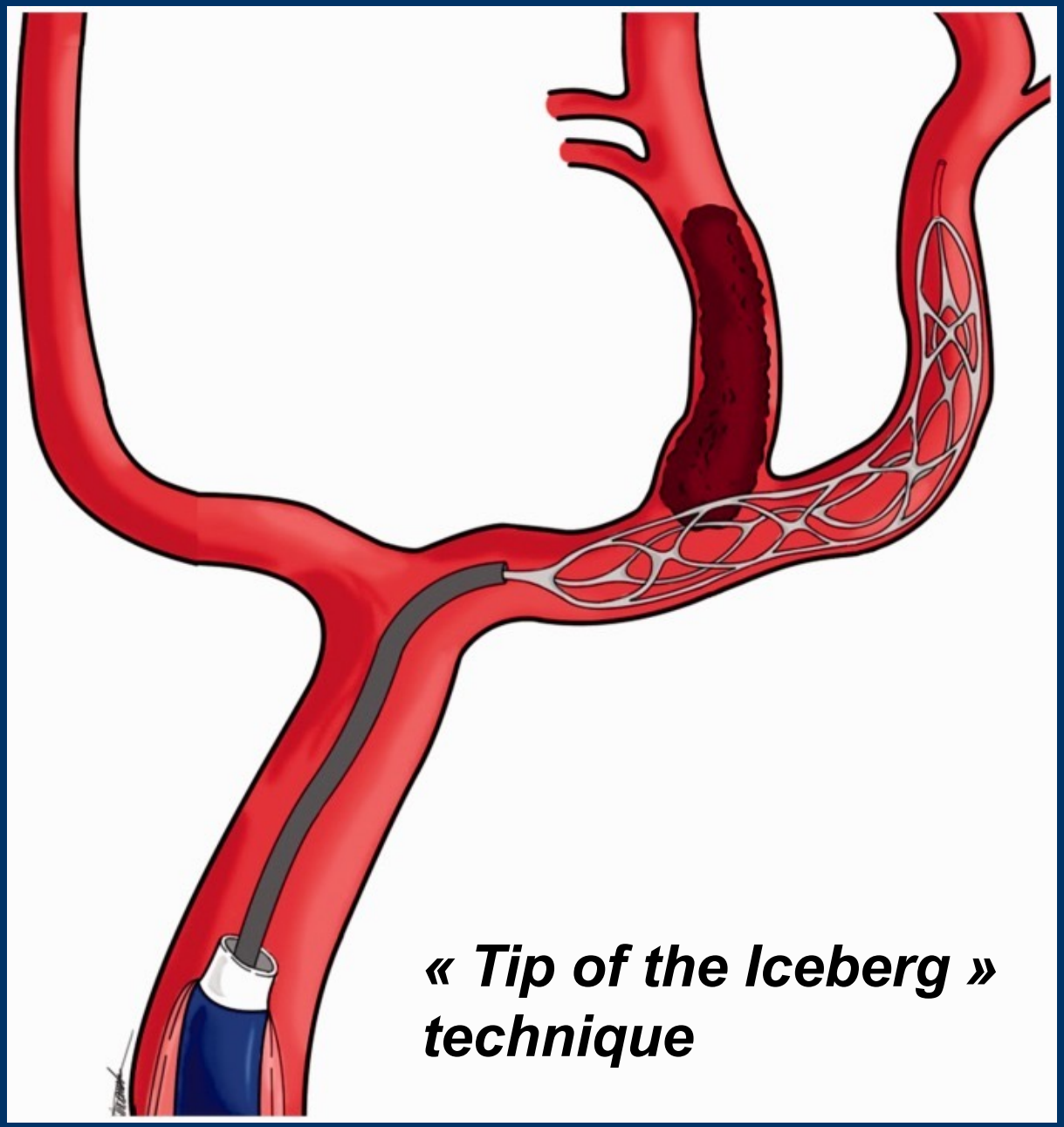


FRANCHIR LE CAILLOT

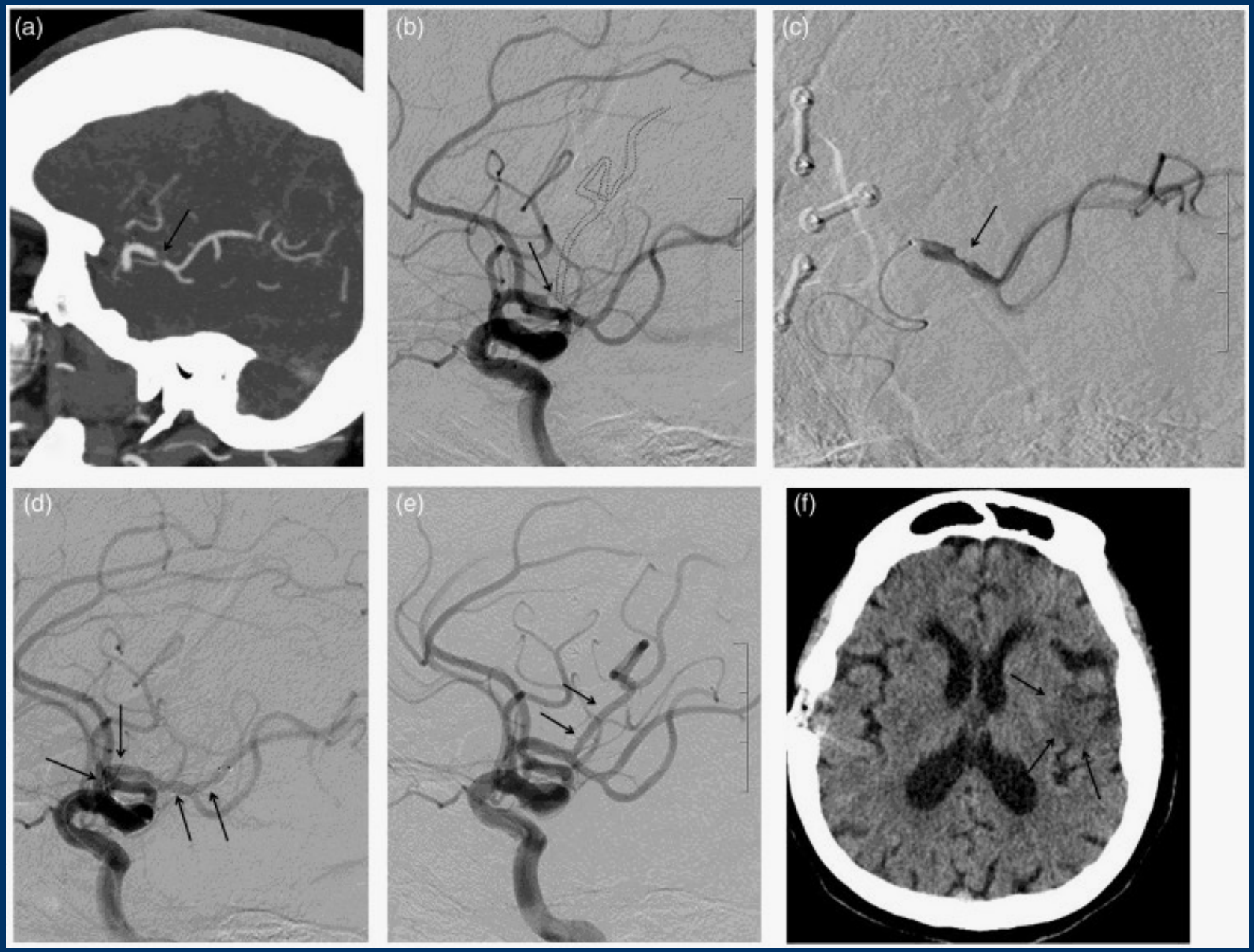
- *Je n'arrive pas à franchir le caillot. Que faire ?*

- *Savoir changer de stratégie/ s'arrêter*
- *« Tip of the Iceberg » technique*





Agit R. Interv Neuroradiol. 2015

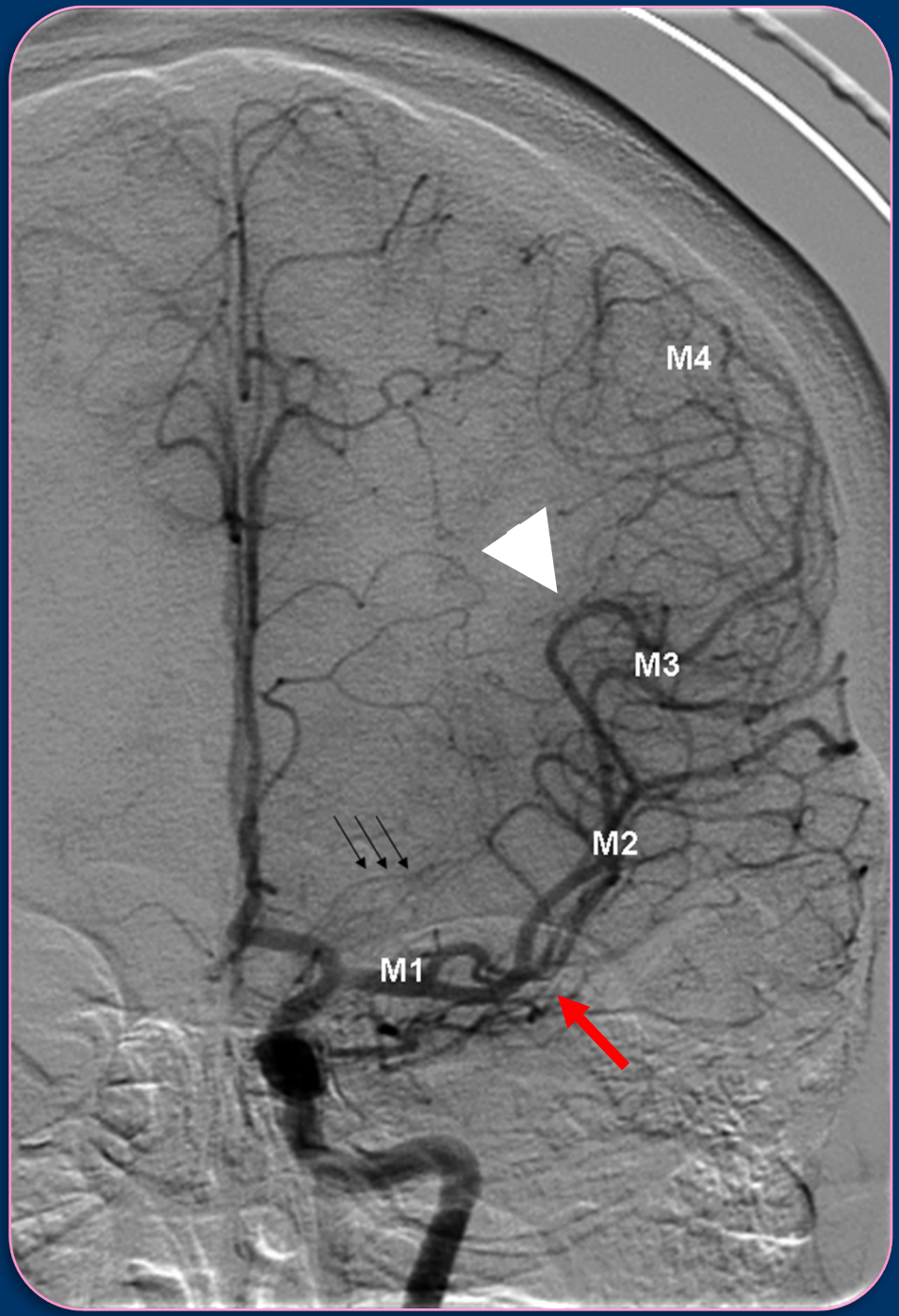


Agit R. Interv Neuroradiol. 2015

Occlusions distales

Occlusion M2

- MR CLEAN : 39 patients (7,8%)
- SWIFT PRIME : 19 patients (10%)
- REVASCAT : 18 patients (9%)
- EXTEND-IA : 10 patients (14,3%)
- ESCAPE : 9 patients (2,9%)
- THRACE : 2 patients (1%)



M1 (basal): Horizontal

Bifurcation (78 %)/trifurcation (12 %)

M2 (insulaire) : le long insula; ascendante

M3 (operculaire) : concavité crâniale

M4 (cortical) : longe le cortex

Genou de la sylvienne

Point sylvien angio.

a. lenticulo-striées

Die Lageabweichungen der vorderen Hirnarterie im Gefäßbild [1]

Von Dr. Erich Fischer, Assistent der Klinik

Der Verlauf der A. cerebri media zerfällt in folgende Unterabschnitte:

1) den horizontalen Anfangsteil (M_1), von der Teilungsstelle der Carotis int. bis zu dem etwa rechtwinkligen Knie der A. cerebri media reichend,

2) den nach hinten zu ansteigenden Inselabschnitt (M_2), welcher mit 2—3 Hauptästen dem Inselgebiet dicht aufliegt, im Seitenbild in der arteriellen Gefäßachse (Moniz) des Gehirns verläuft und im Vorderbild nahezu vertikal ansteigt,

3) Gefäßverzweigungen (M_3) der vorgenannten Hauptäste der Fossa Sylvii mit dem Kandelaber (Foix) und charakteristischen Schleifenbildungen der Aa. frontales asc. im Seitenbild. Auf der Vorderaufnahme bilden diese zusammen mit der folgenden Gruppe ein charakteristisches, nach oben zu scharf begrenztes Fächerbild (M_{3-4}), das bei Tumoren der Zentral- oder Parietalregion eine typische Kompression nach unten erfährt,

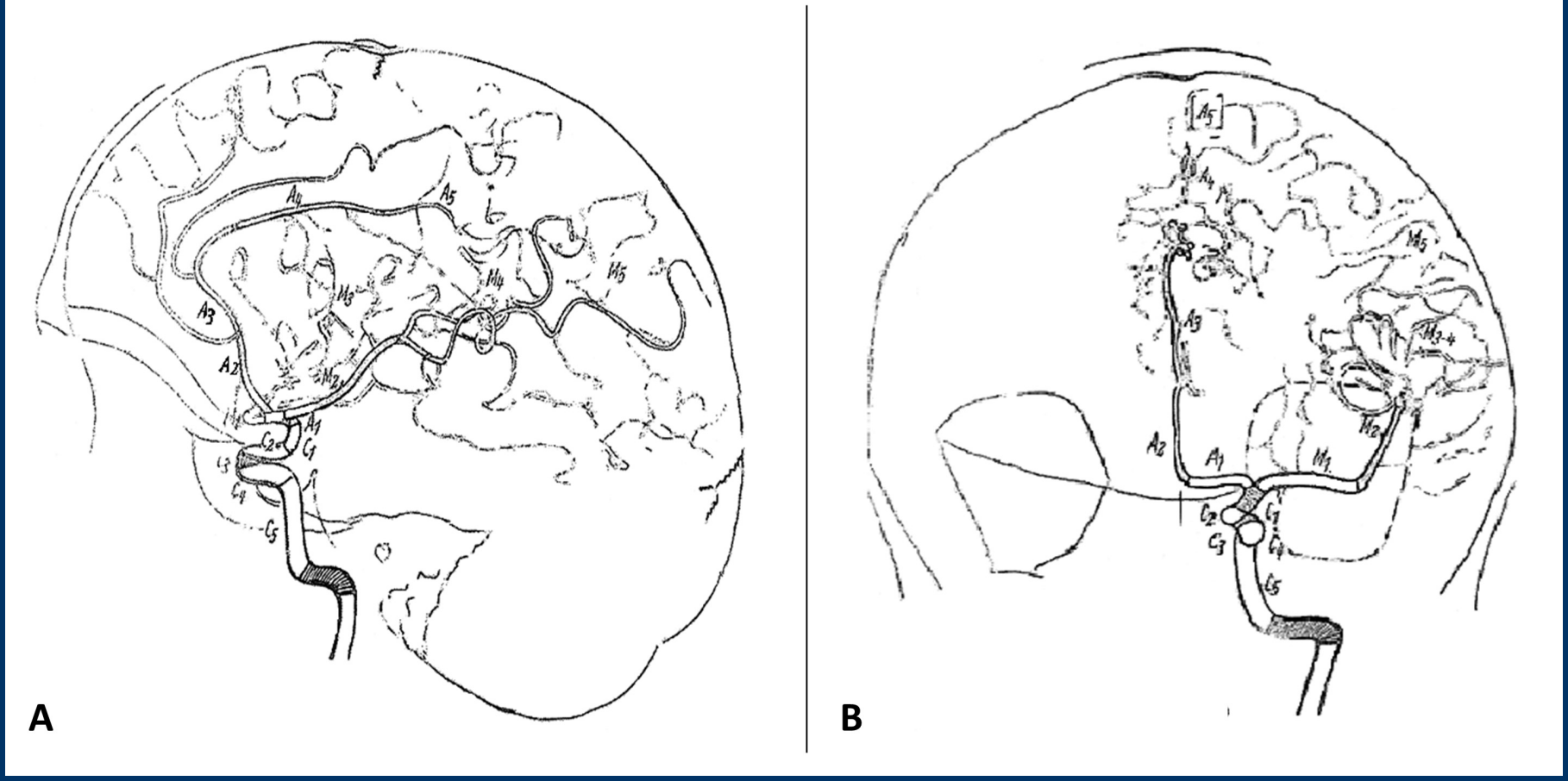
4) Gefäßverzweigungen (M_4) im hintersten Teil der Fissura Sylvii (Gyrus angularis-Gebiet), die im Seitenbild deutlich hervortreten, dagegen auf der Vorderaufnahme mit dem Fächer (M_{3-4}) zusammenfallen,

5) Endausbreitungen (M_5) der mittleren Hirnarterie. Sie sind zum Teil auf der Vorderaufnahme als feinere und mehr lockere Gefäßmaschen unmittelbar über dem dichteren und etwas gröber gezeichneten Fächerbild sichtbar, besonders klar jedoch im Seitenbild als divergierende Endäste (M_5) zu erkennen (Aa. parietalis post., angularis und temporalis post.). Bei Tumoren des Hinterhauptlappens können diese Äste von unten her eine Zusammendrängung und Parallelverlagerung nach oben oder aber, bei Entwicklung des Tumors mehr von dorsal her, eine stärkere Auseinanderdrängung in rechtwinkliger bis gerader Form erfahren.

Fischer, E. Zentralblatt Für Neurochir. 300–313 (1938)

Classification de Fischer, 1938

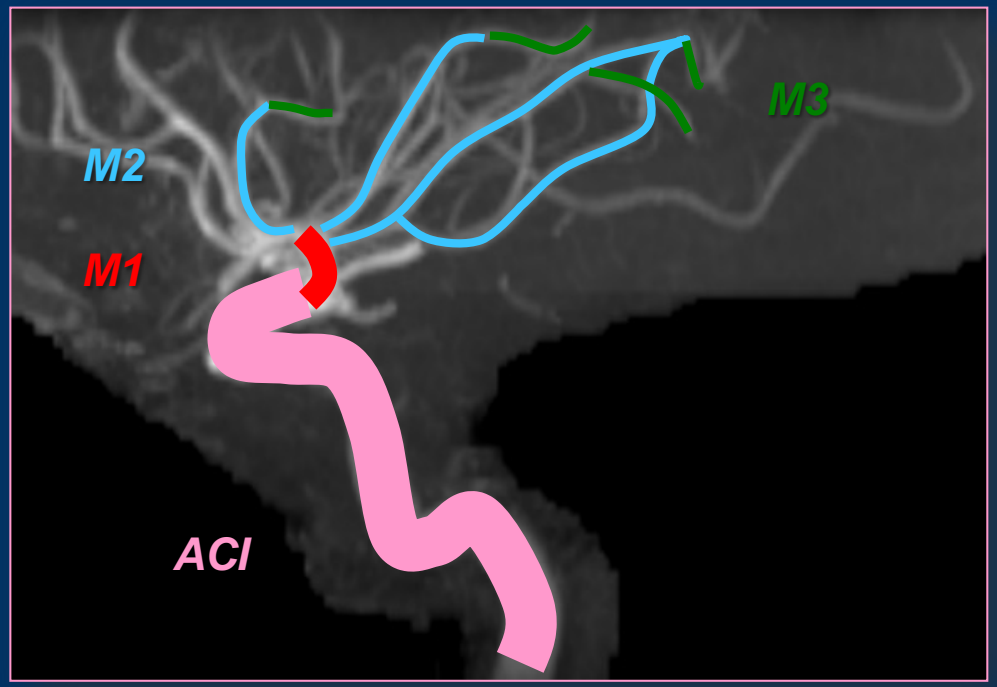
Original drawings of the intracranial arteries, by Fisher [21]. **A**. Lateral view; **B.** Frontal view



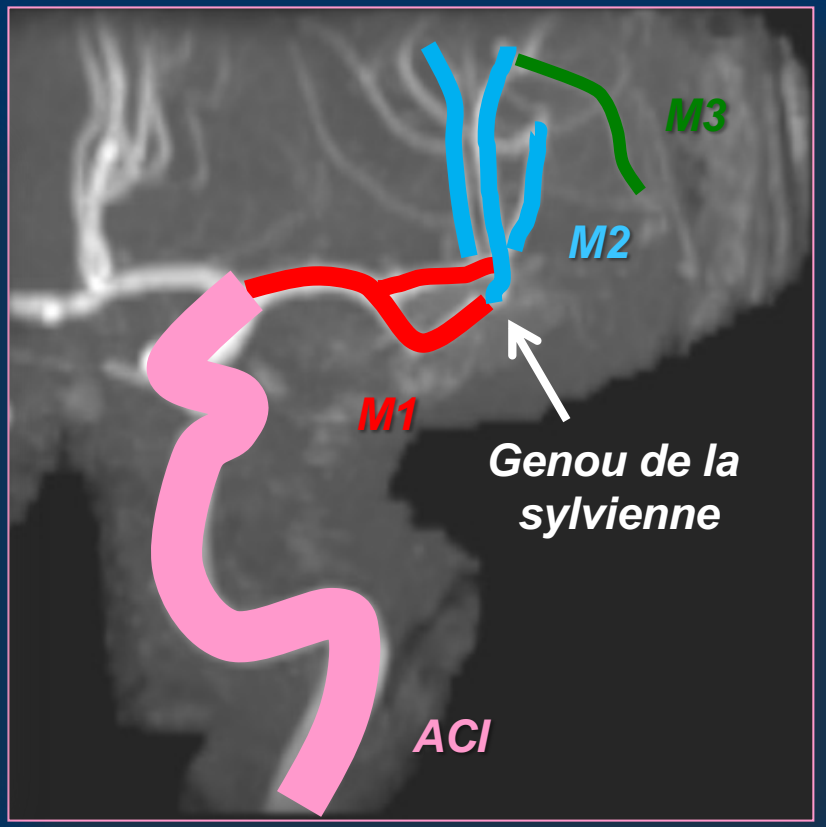
Fischer, E. Zentralblatt Für Neurochir. 300–313 (1938)

ARM cérébrale

Reconstructions MIP

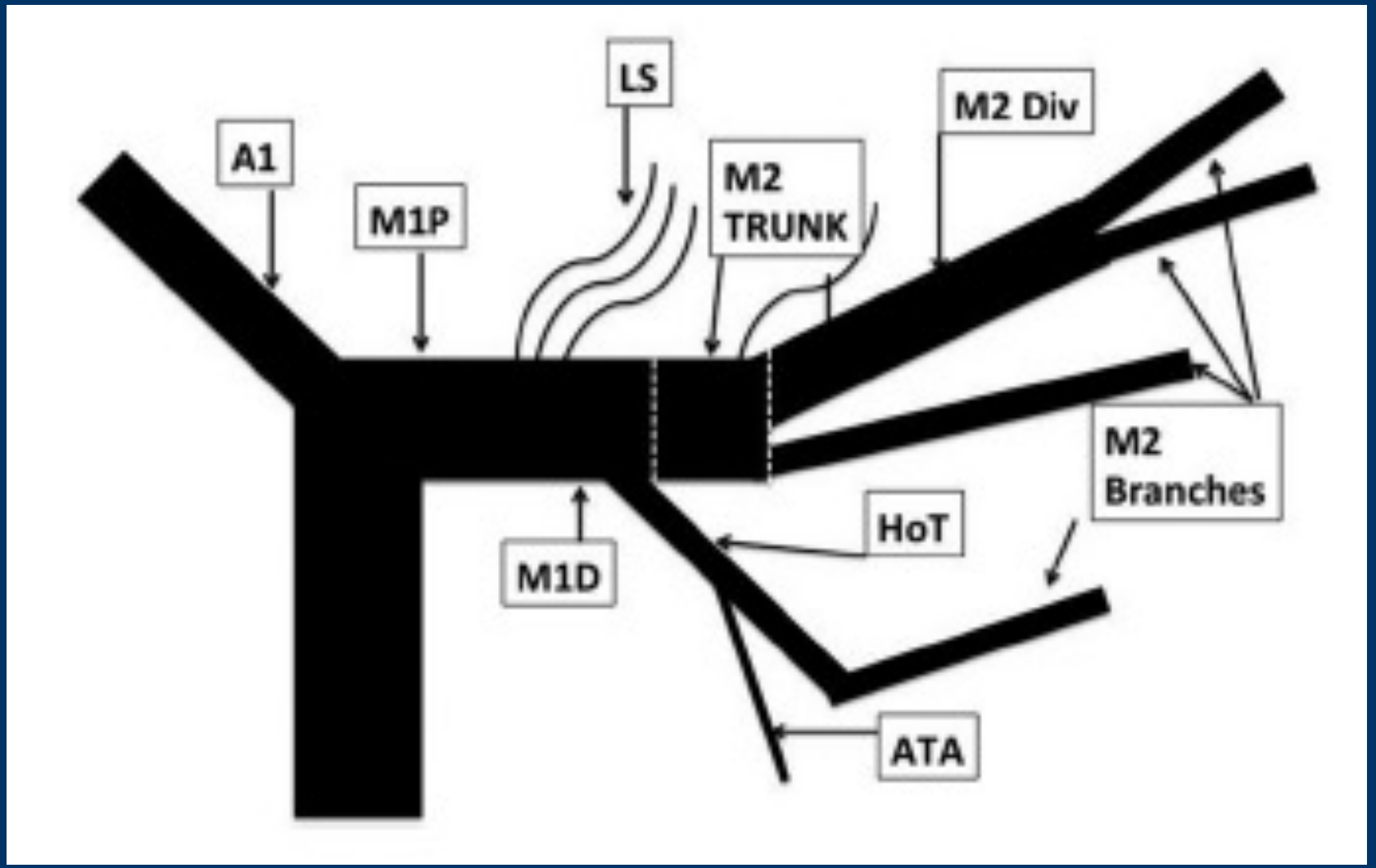


Vue latérale

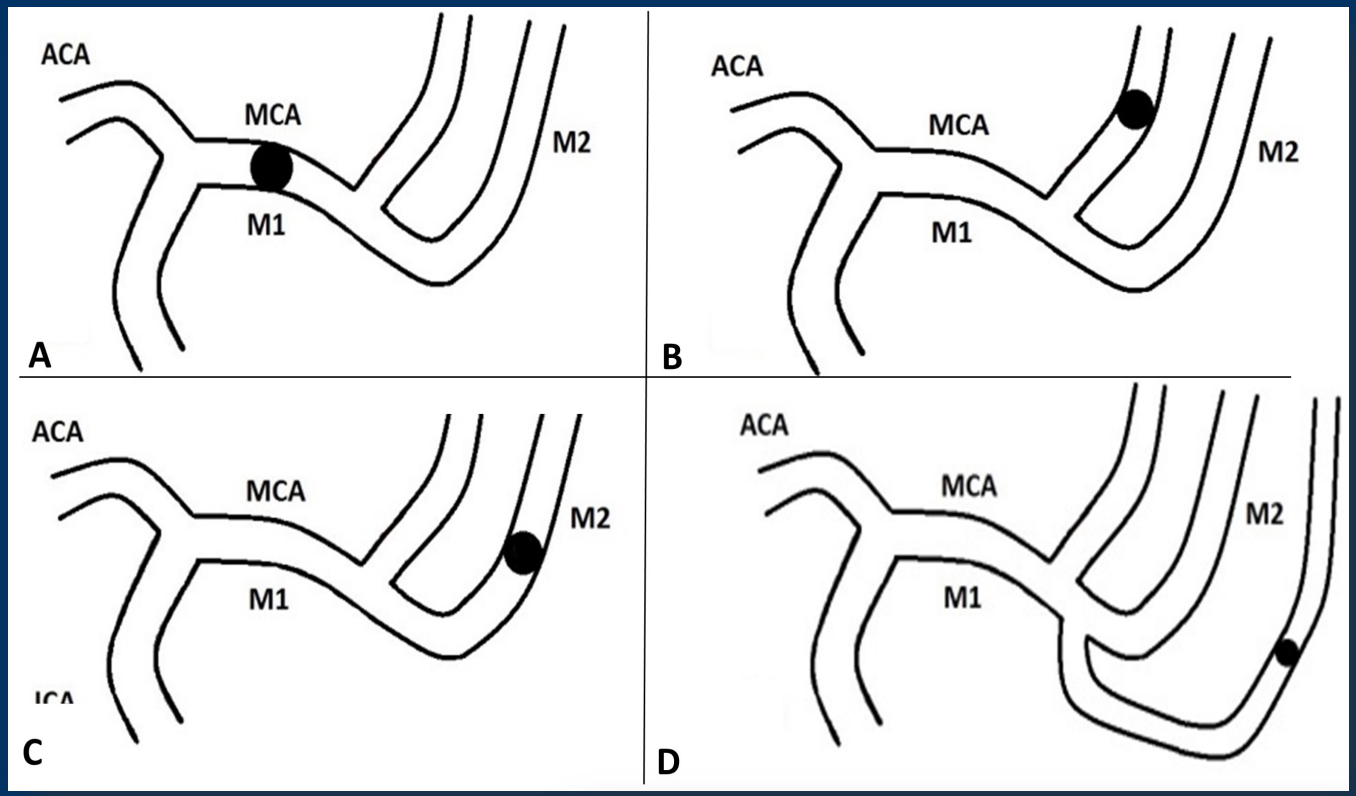


Vue de face

Endovascular Therapy of M2 Occlusion in IMS III

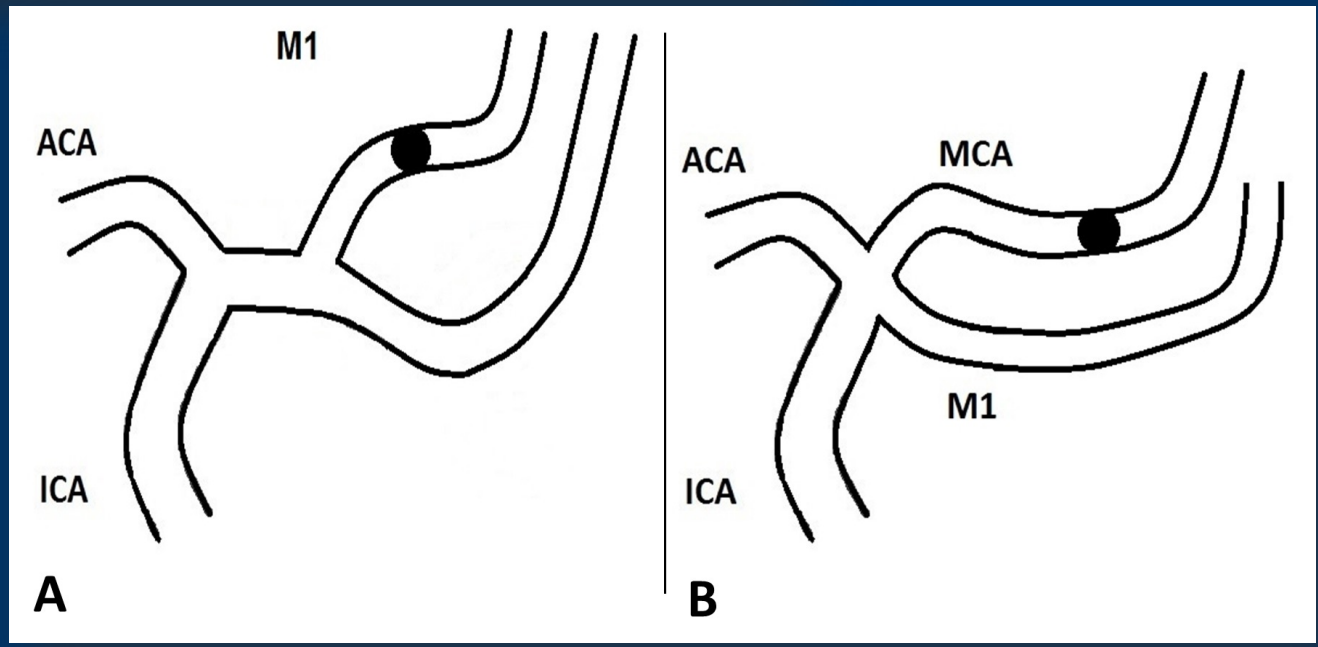


Tomsick et al. AJNR Am. J. Neuroradiol. 38, 84–89 (2017)



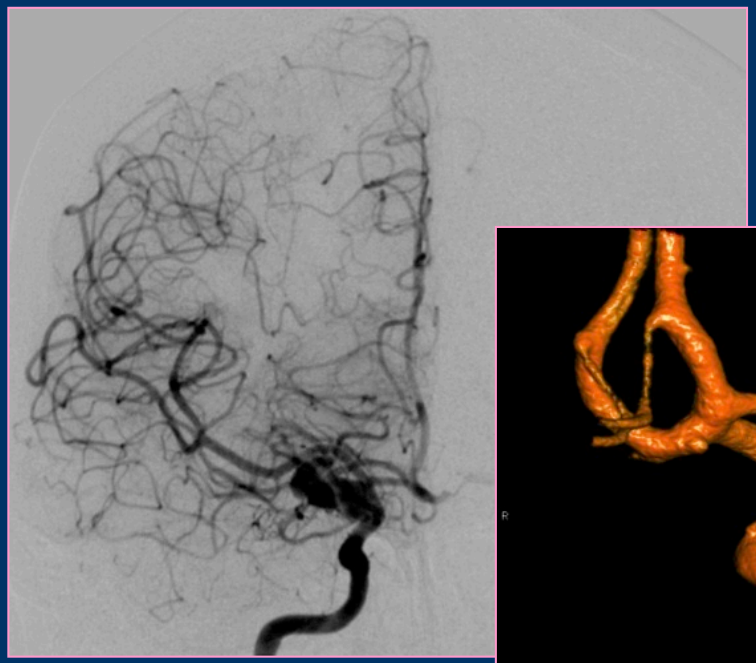
LETTERS

Caution; Confusion Ahead...

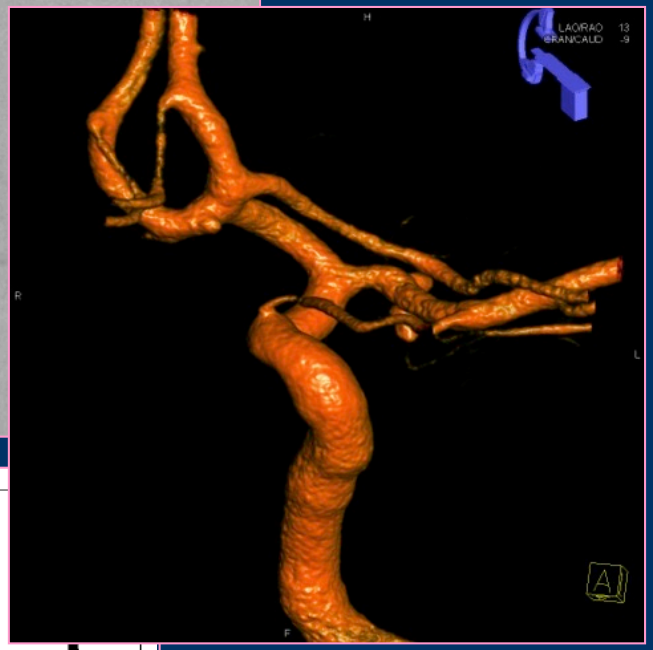


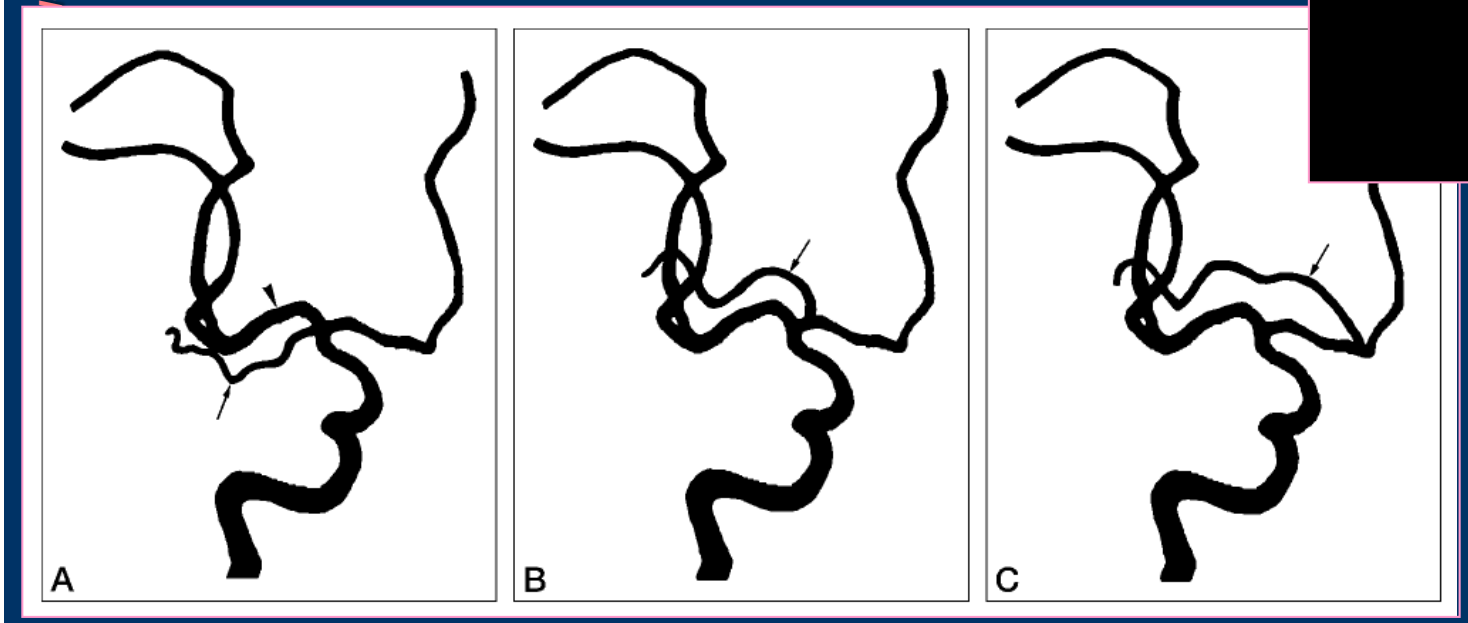
Capocci R. AJNR. 2017

VARIATIONS ACM



ACM accessoire





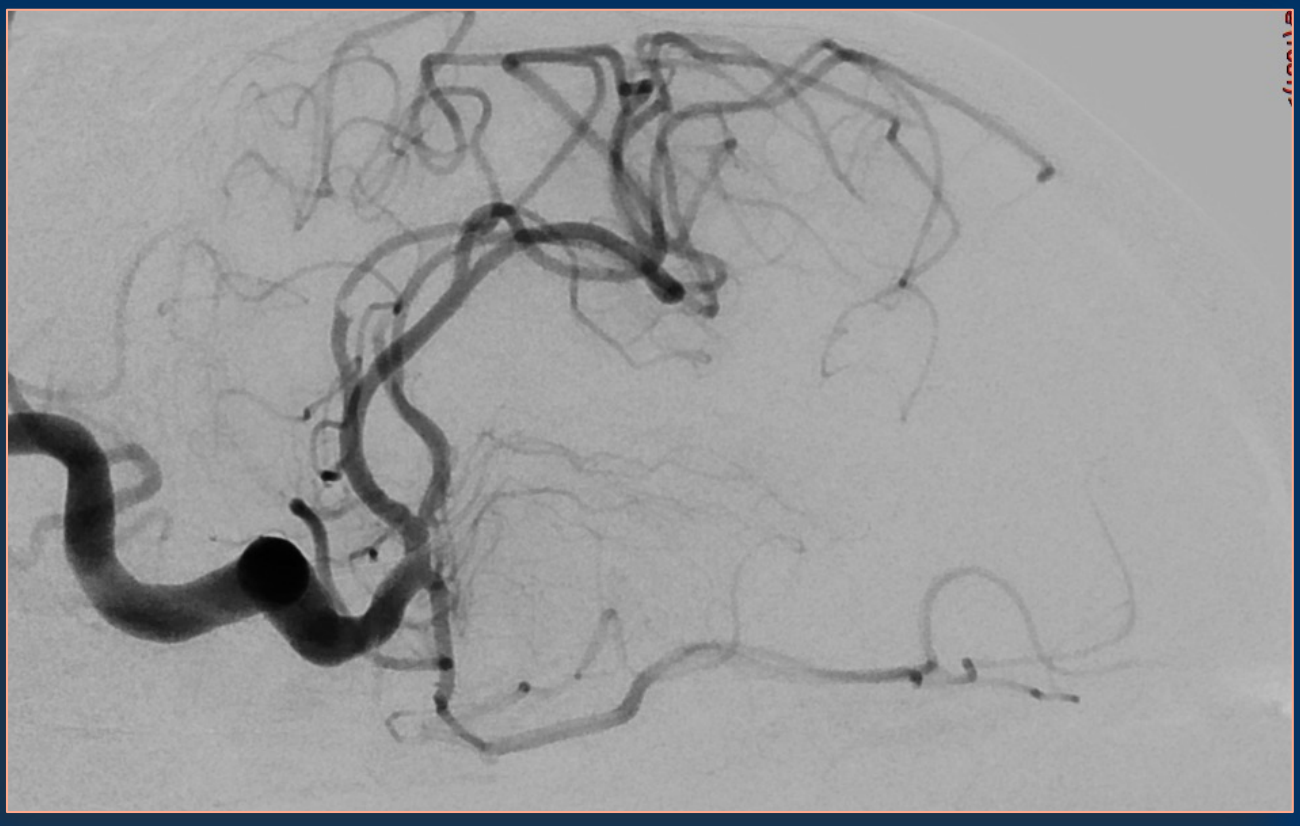
0,2 à 4 %

Komiyama M. AJNR. 1998

ACM Dte dupliquée

94 ans. Hémiplégie Dte. NIHSS = 17

École de la thrombectomie



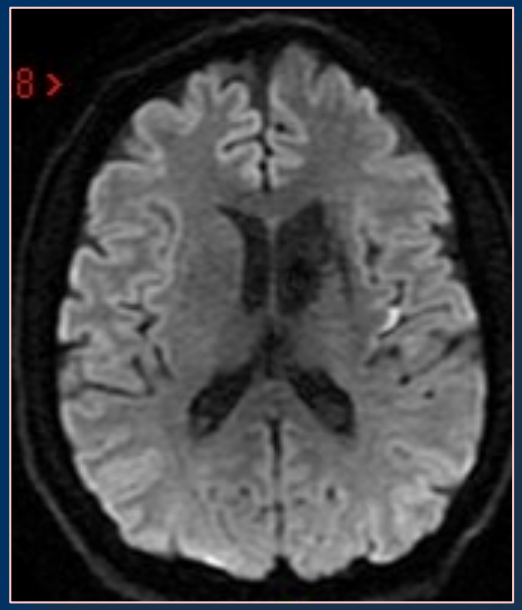
Mechanical Thrombectomy for Isolated M2 Occlusions: A Post Hoc Analysis of the STAR, SWIFT, and SWIFT PRIME Studies

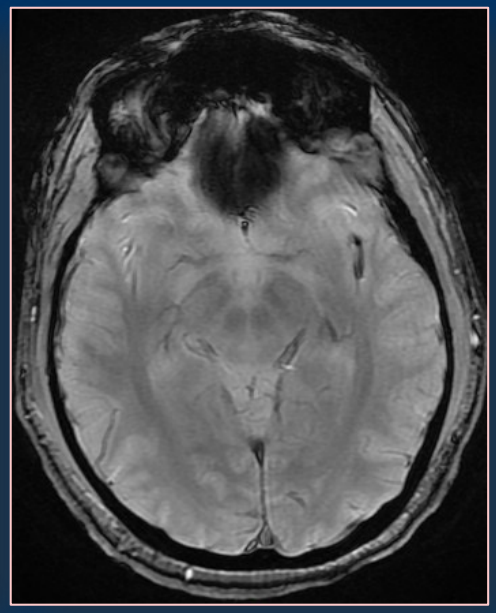
- *50 patients occlusion M2*
- *Taux de recanalisation : 85%*
- *mRS ≤ 2 : 60%*

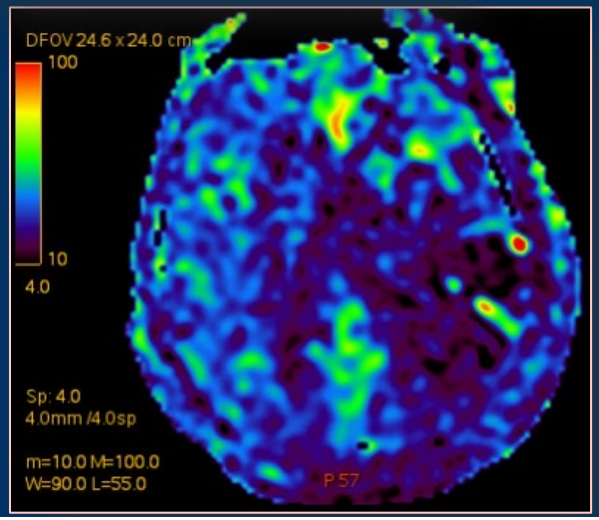
	M2 Occlusion (*N* = 50)	M1 Occlusion (*N* = 249)	*P* Value
Time from groin puncture to recanalization (min) (median) (IQR)	29 (22–45)	35 (25–52)	.41
No. of passes with stent retriever (mean)	1.4 ± 0.8	1.7 ± 1.0	.07
≥3 Passes with stent retriever	13% (5/38)	23% (52/227)	.21
mTICI 2b or 3 reperfusion	85% (34/40)	82% (193/235)	.82
Rescue therapy	6% (3/50)	8% (19/249)	1.000
Complications			
Device-related serious adverse events	6% (3/50)	4% (10/249)	.46
Symptomatic ICH	2% (1/50)	2% (5/249)	1.000
Outcome at 90-day follow-up			
mRS 0–1	50% (25/50)	41% (100/243)	.27
mRS 0–2	60% (30/50)	56% (136/243)	.64
Mortality	12% (6/50)	10% (25/249)	.62

Coutinho JM. AJNR. 2016

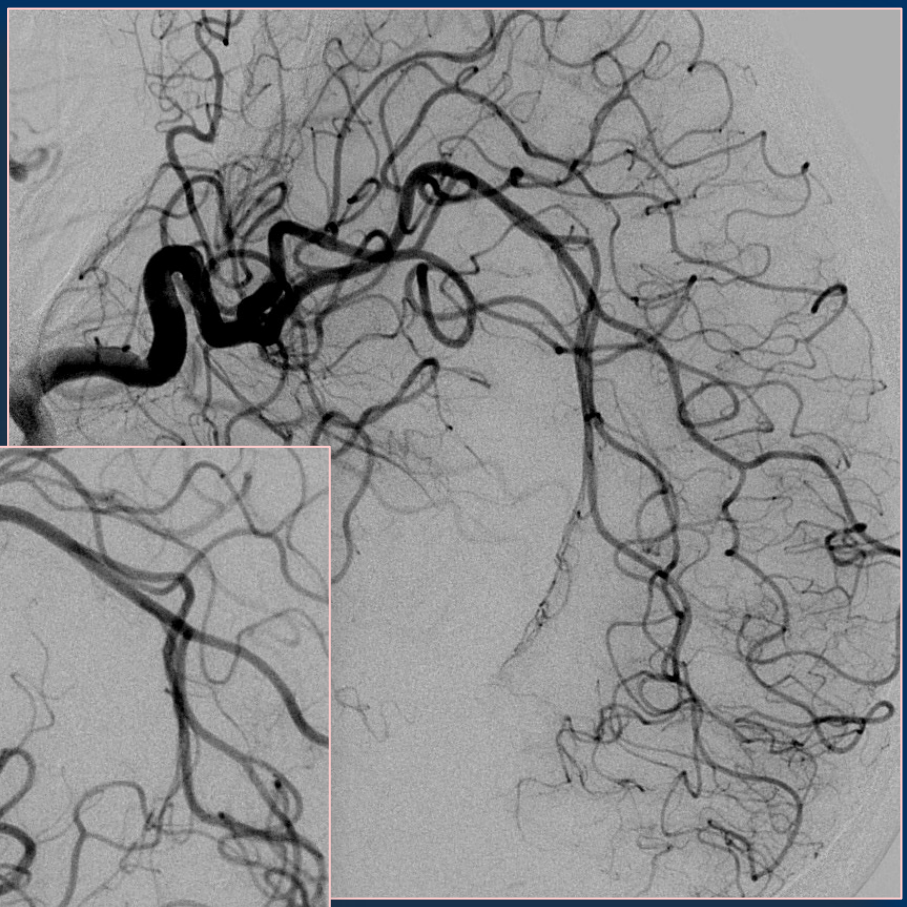
- Patient de 36 ans
- Aphasie brutale

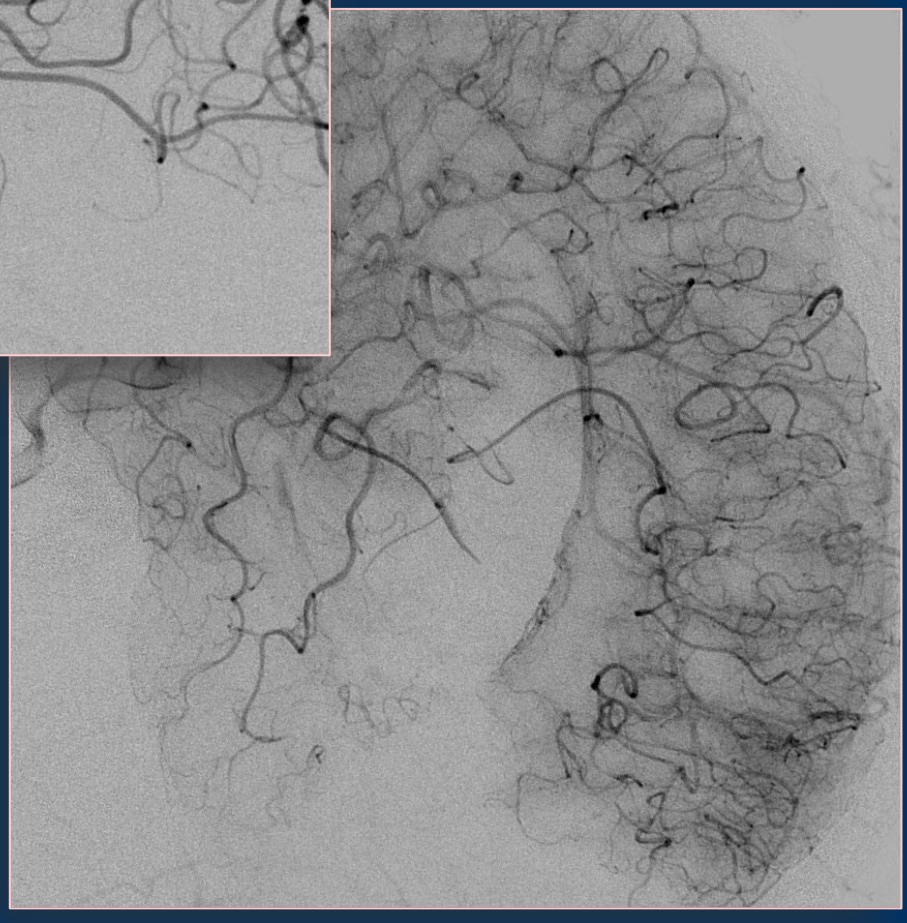






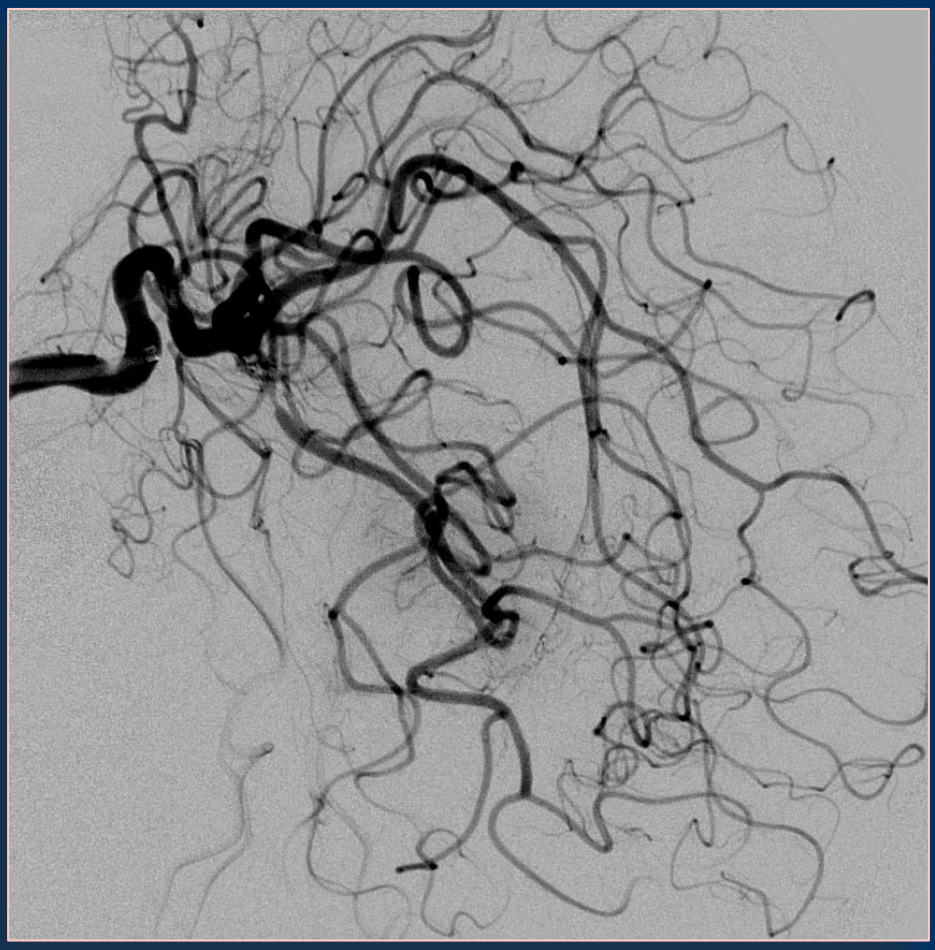
École de la thrombectomie



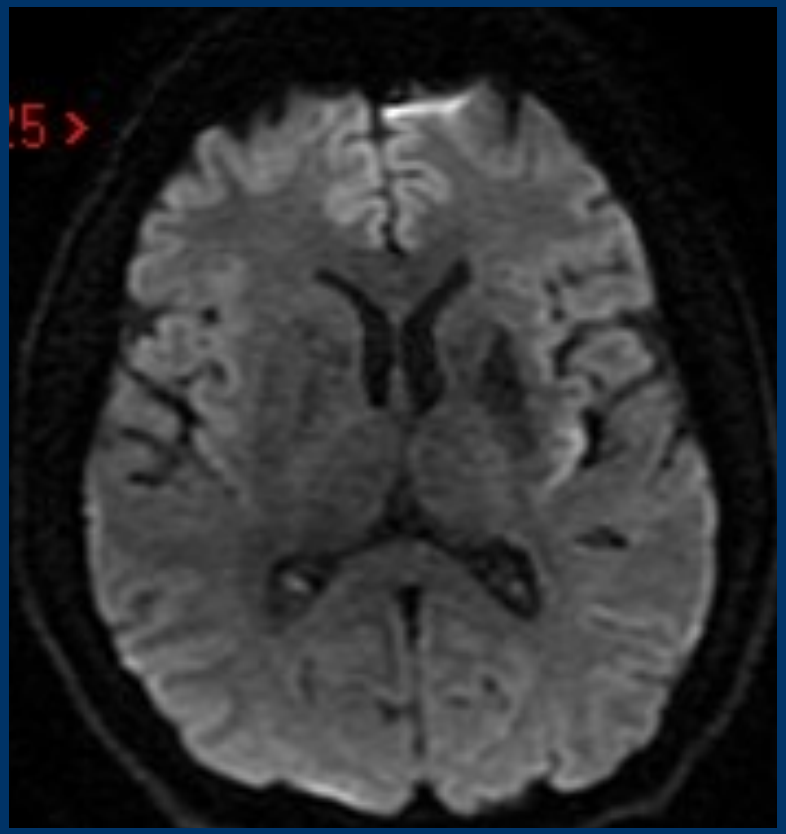


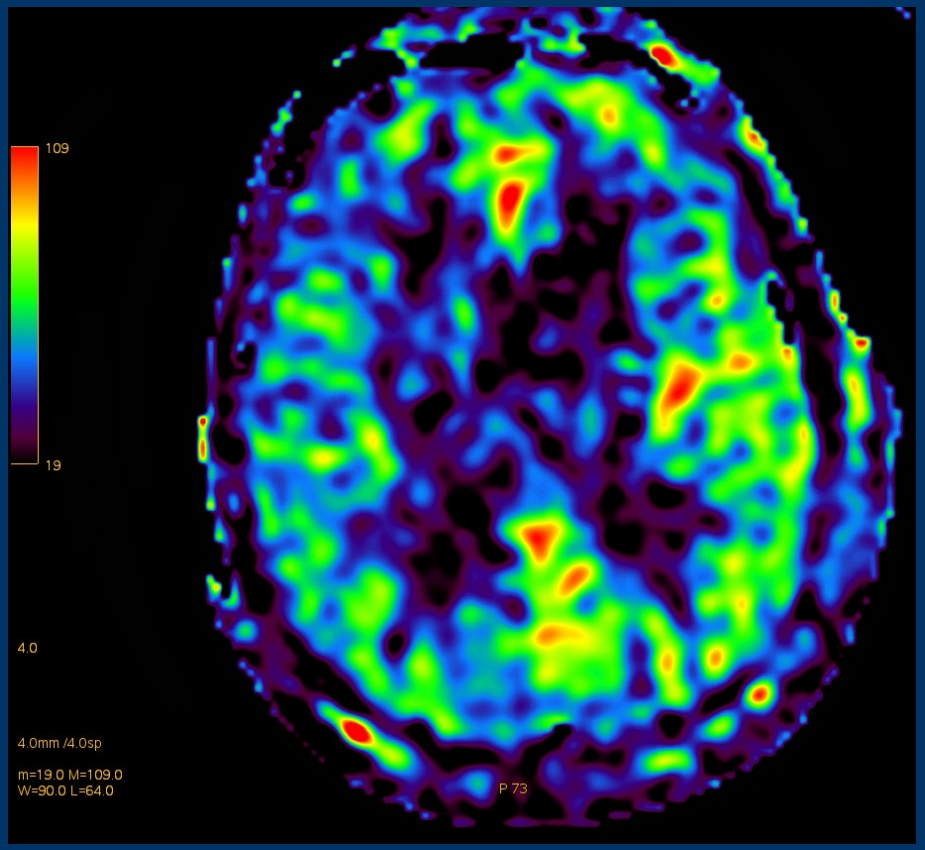
École de la thrombectomie

École de la thrombectomie



IRM de contrôle à H24





Occlusions distales : Aspiration ou stent retriever ?

Series	Population	Pre-treatment NIHSS	Device/Technique	TICI 2b/3 recanalization rate	Embolization to new territory	Procedure-related death	0-2 mRS at follow-up
Humphries W. et al. (2015) [9]	105 patients	17	Stent retriever (Solitaire FR or TREVO)	88%	5.7%	2.9%	44% at 90 days
Pfaff J. et al. (2015) [19]	30 occlusions of the distal ACA	18	Stent retriever	88%	0%	0%	36.2% at 90 days
Navia P. et al. (2015) [17]	6 patients	12	ADAPT (3MAX)	100%	0%	0%	83% at discharge
Kurre W. et al. (2016) [15]	76 patients for 90 occlusions	14	Stent retriever (pREset LITE)	70.0%	13.3%	0%	~34% at 90 days.
Haussen DC. et al. (2016) [8]	8 patients for 10 occlusions	19	Stent retriever (Baby TREVO)	75%	0%	0%	25% at 3 months
Coutinho JM. et al. (2016) [4]	50 M2 occlusions	13	Stent retriever	85%	NA	NA	60% at 90 days
Park JS. et al. (2016) [18]	32 M2 occlusions	10.9	Manual aspiration (4MAX)	84%	0%	0%	78% at 3 months
Vargas J. et al. (2016) [28]	35 patients	14	ADAPT (5/4/3MAX)	77.1%	NA	0%	59.4% at 90 days
Presented study	32 patients for 37 occlusions	14	ADAPT (3MAX)	Overall: 76.3% 3MAX alone : 59.5%	6.3%	3.1%	40% at 3 months

- *Stent retriever : préférer petite taille (3 mm)*
- *Pas d'étude randomisée comparant aspi. et stent retriever*

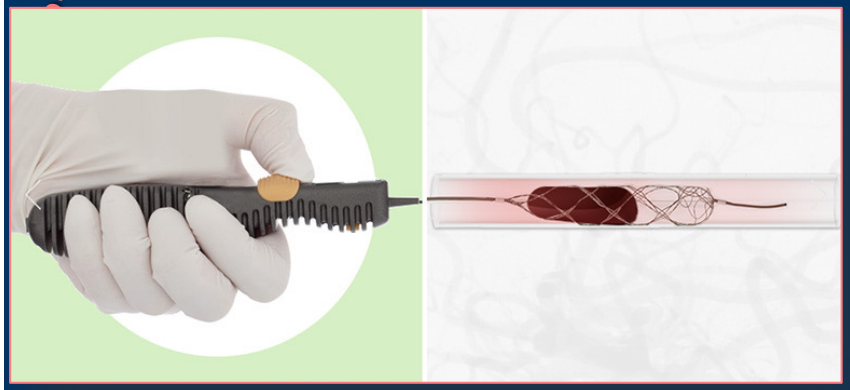
Premat K. Clinical Neuroradiol. 2017

pREset LITE 3-20
(Phenox)

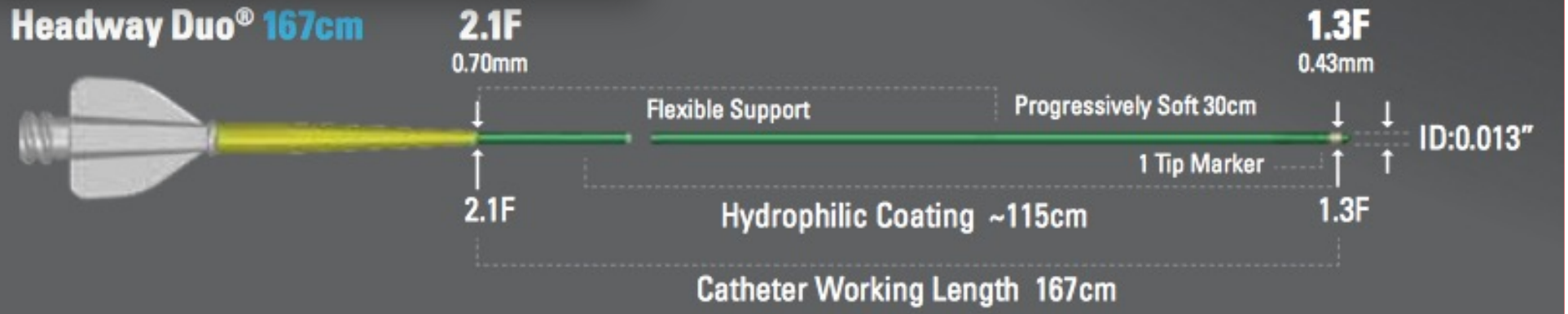
Catch mini
(Balt)

Compatibles avec microcathéters 0.017”

Penumbra



Tiger 13 (Rapid Medical)
compatible avec microcathéter 1.3F



God sees everything

but the neurologists miss no complication

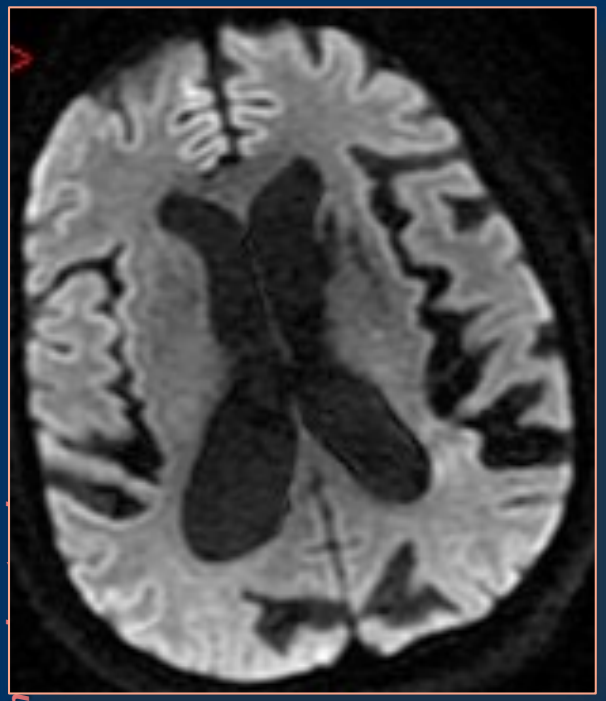
ORIGINAL RESEARCH

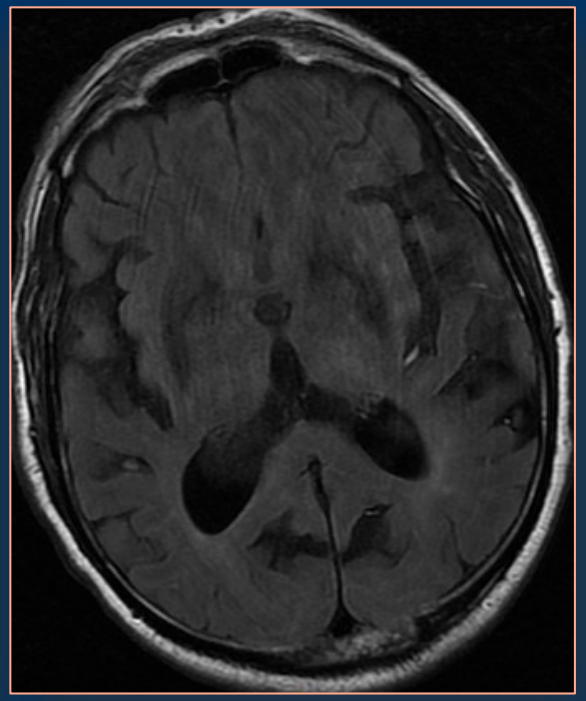
Vessel perforation during stent retriever thrombectomy for acute ischemic stroke: technical details and clinical outcomes

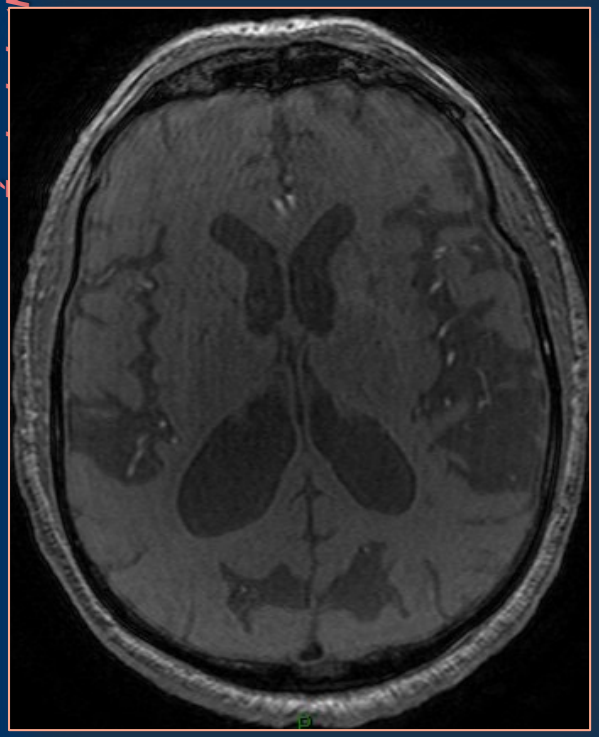
Maxim Mokin,[1] Kyle M Fargen,[2] Christopher T Primiani,[1] Zeguang Ren,[1] Travis M Dumont,[3] Leonardo B C Brasiliense,[3] Guilherme Dabus,[4] Italo Linfante,[4] Peter Kan,[5] Visish M Srinivasan,[5] Mandy J Binning,[6] Rishi Gupta,[7] Aquilla S Turk,[8] Lucas Elijovich,[9] Adam Arthur,[9] Hussain Shallwani,[10] Elad I Levy,[10] Adnan H Siddiqui[10]

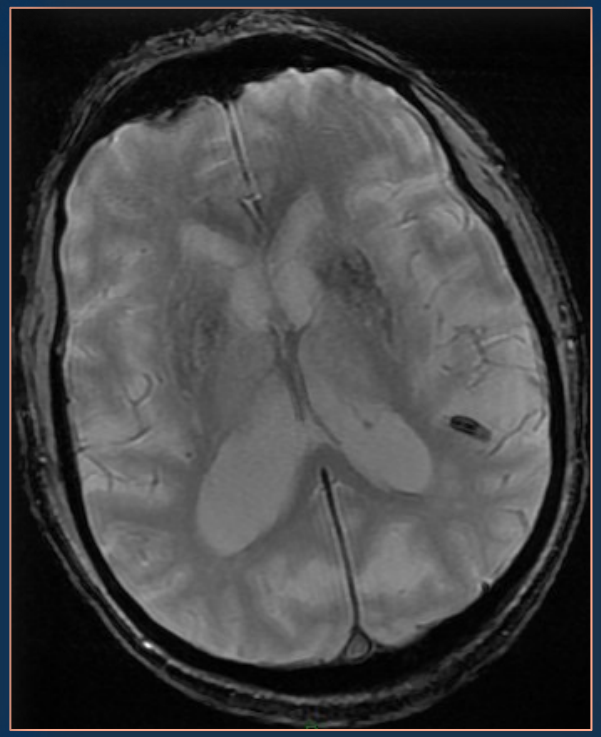
- ***1599 cas de TM***
- ***1% de perforations***
- ***63% des perforations survenues sur TM distales***

Mokin M. JNIS. 2016

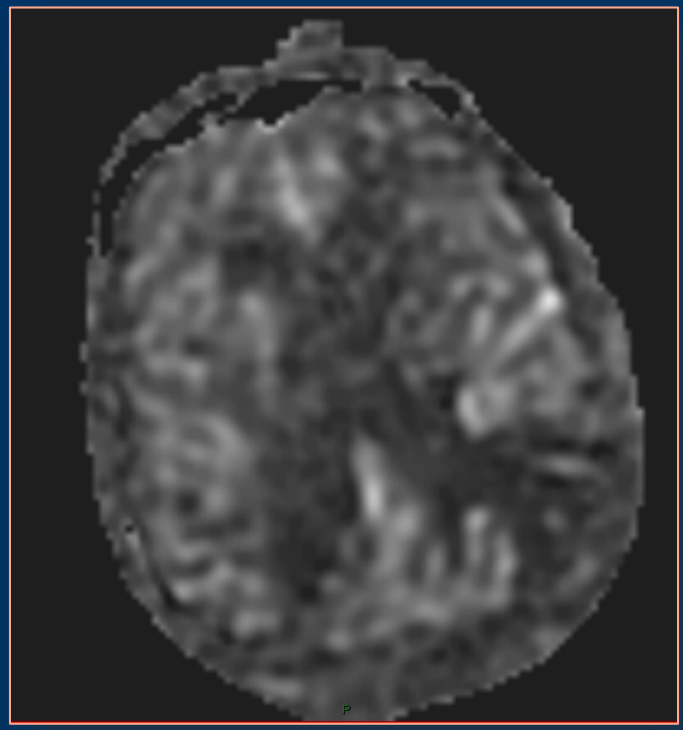




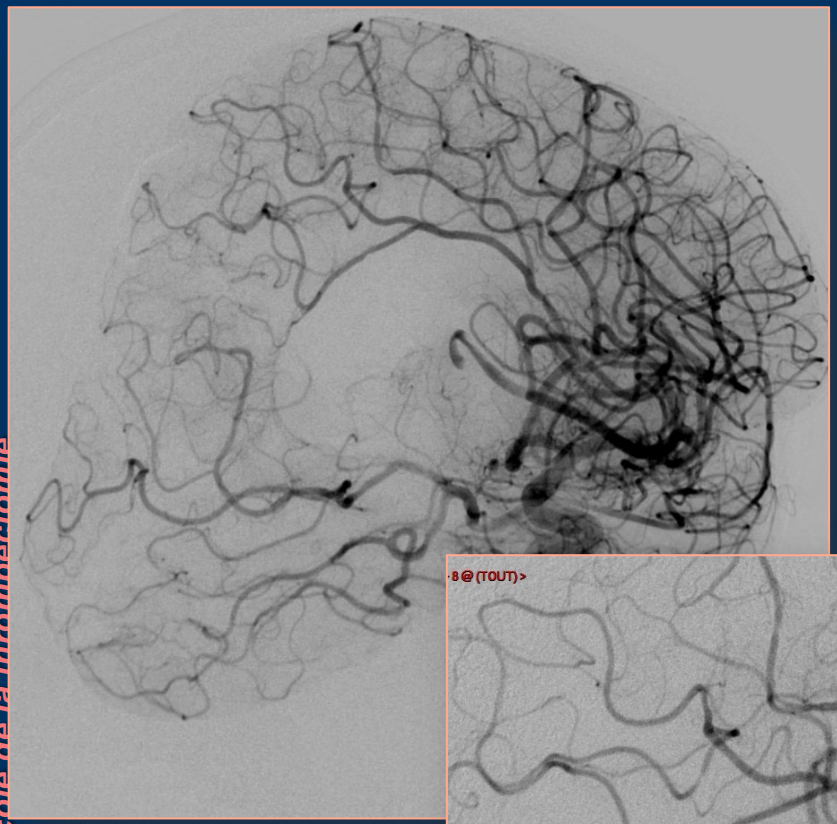


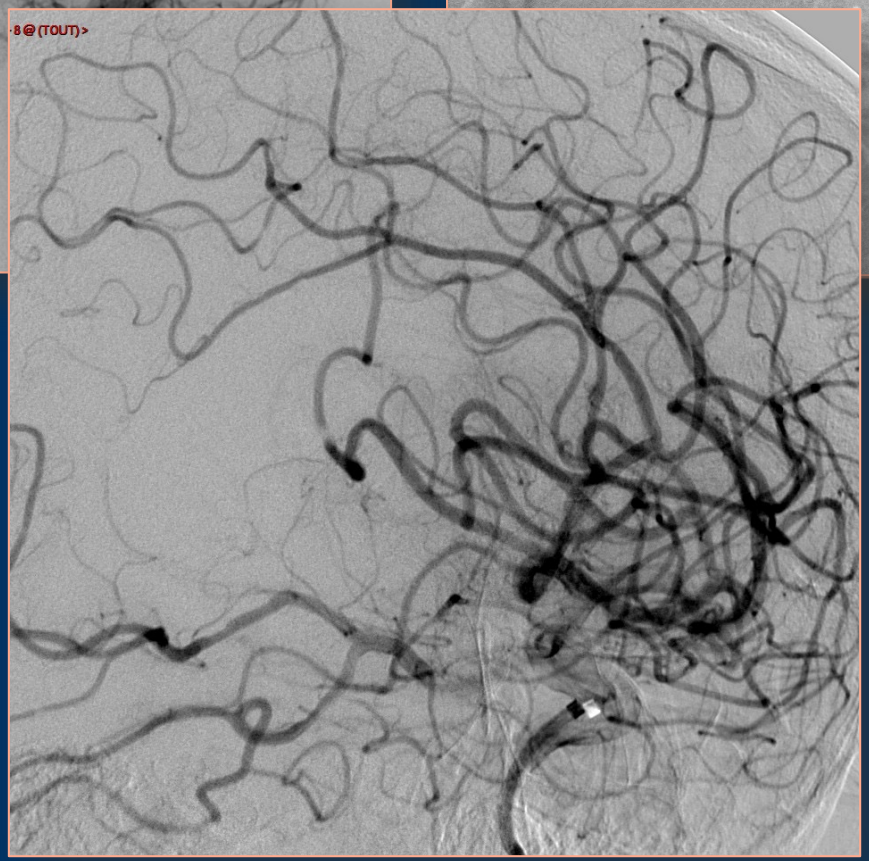


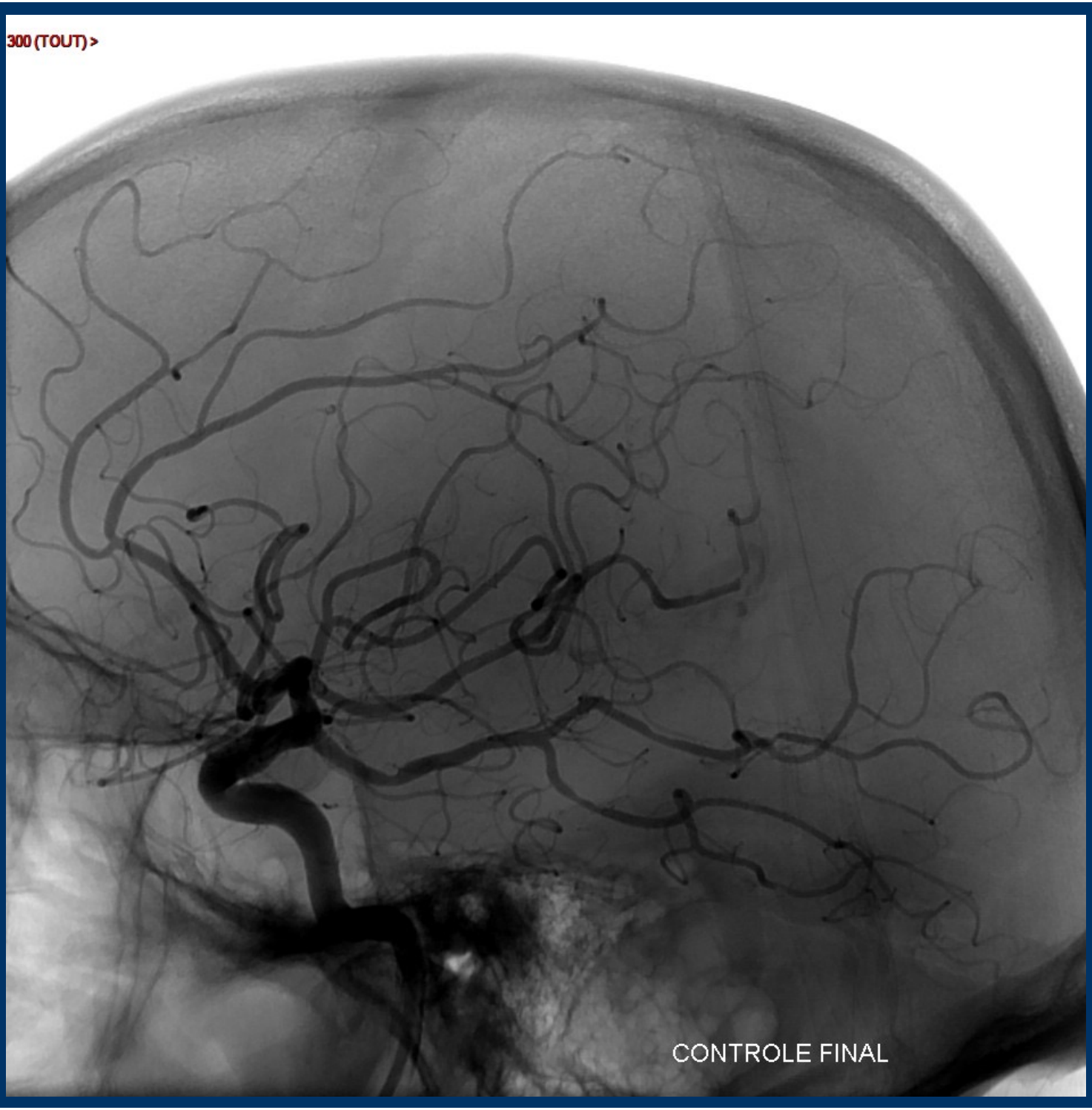
- *Patient de 65 ans*
- *Aphasie au décours d'une coronarographie*
- *Score NIHSS = 5*
- *Patient sous Aspégic/ Plavix*



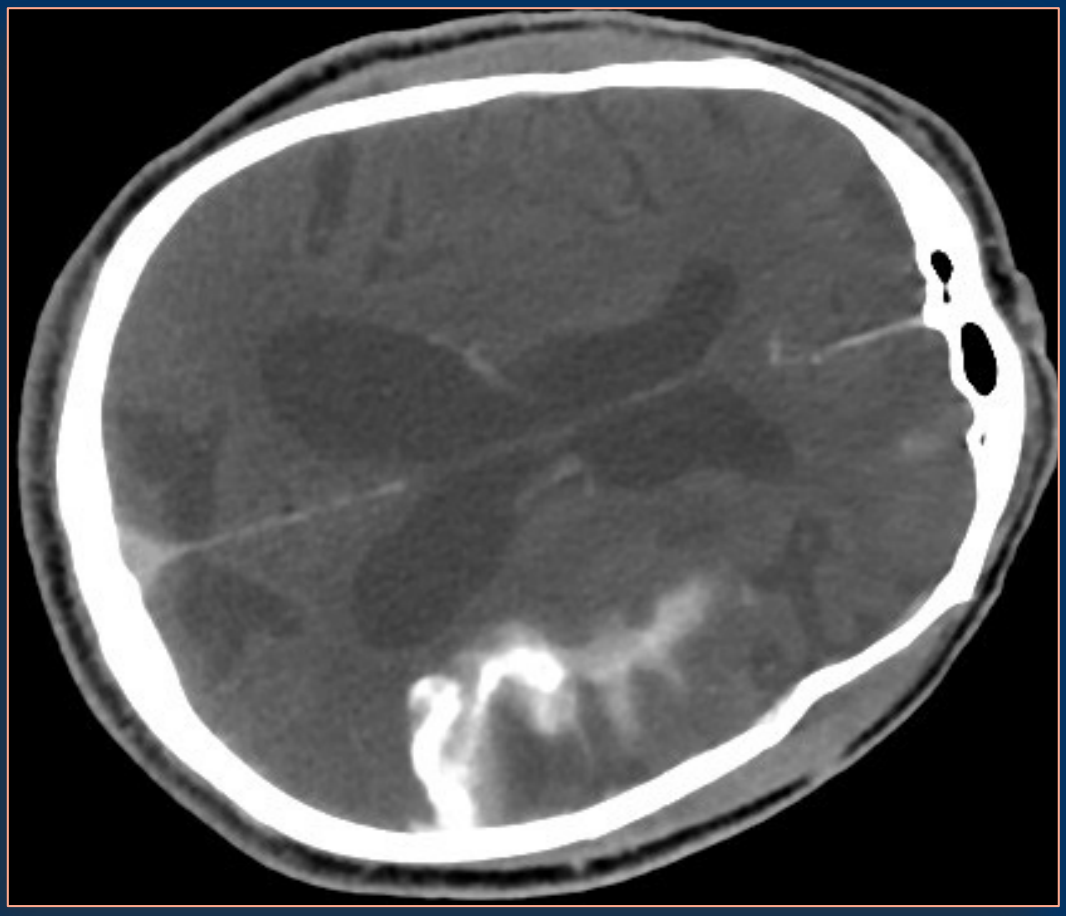
École de la thrombectomie






300 (TOUT) >
CONTROLE FINAL

École de la thrombectomie



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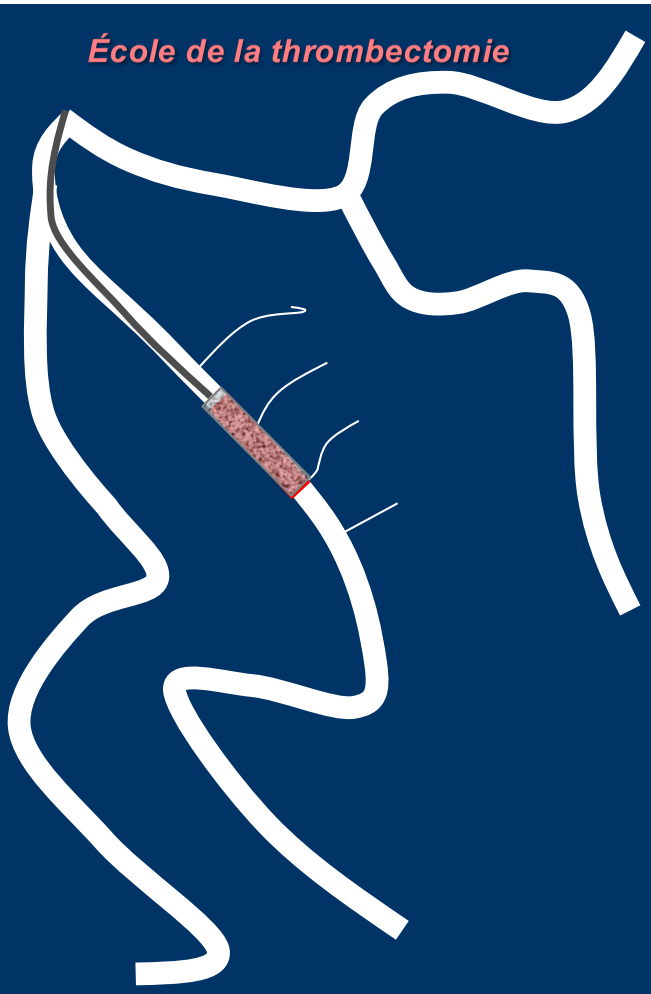
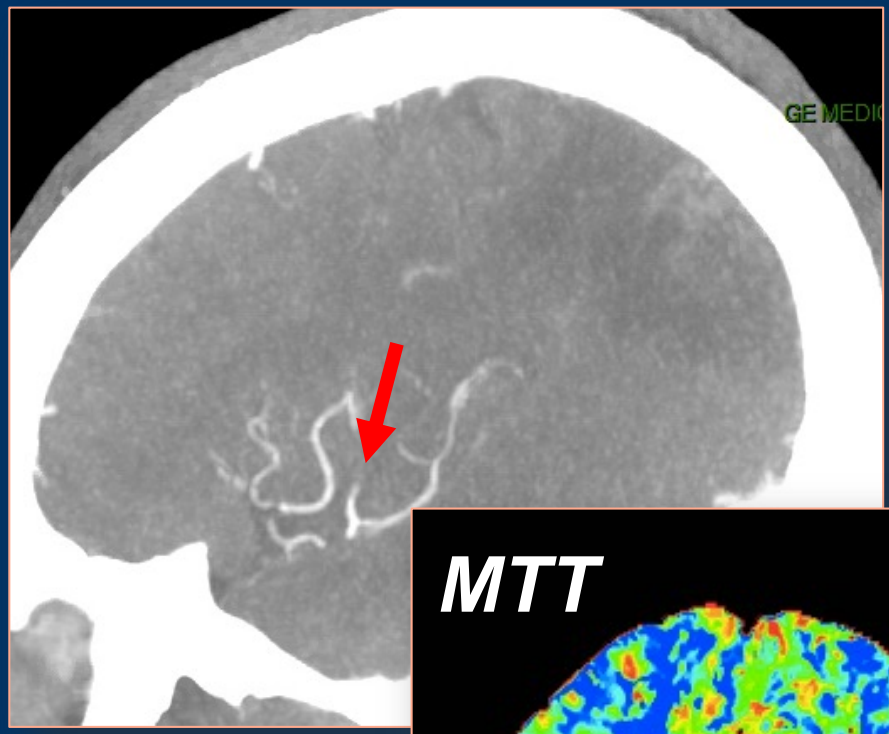
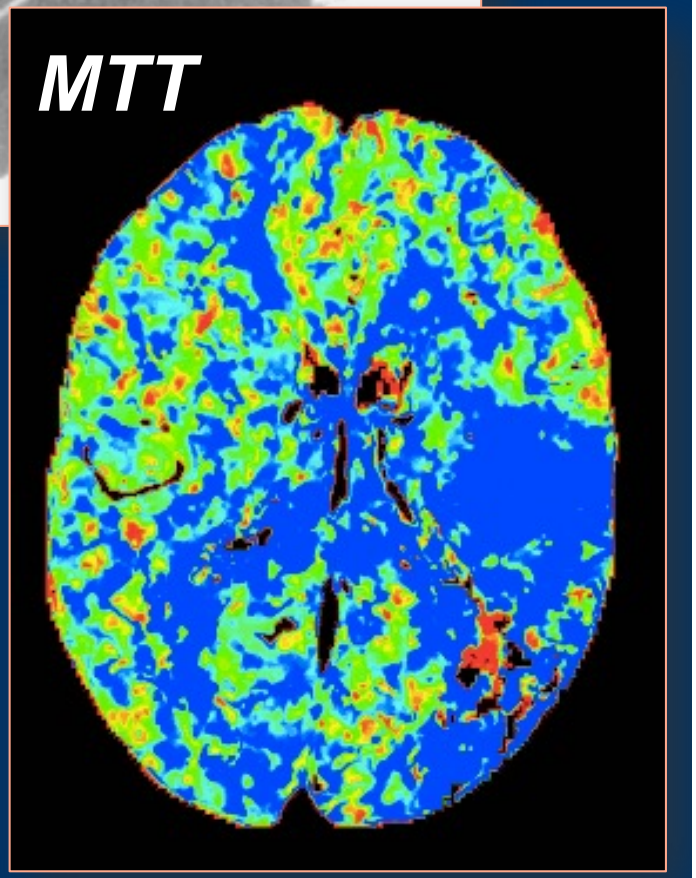
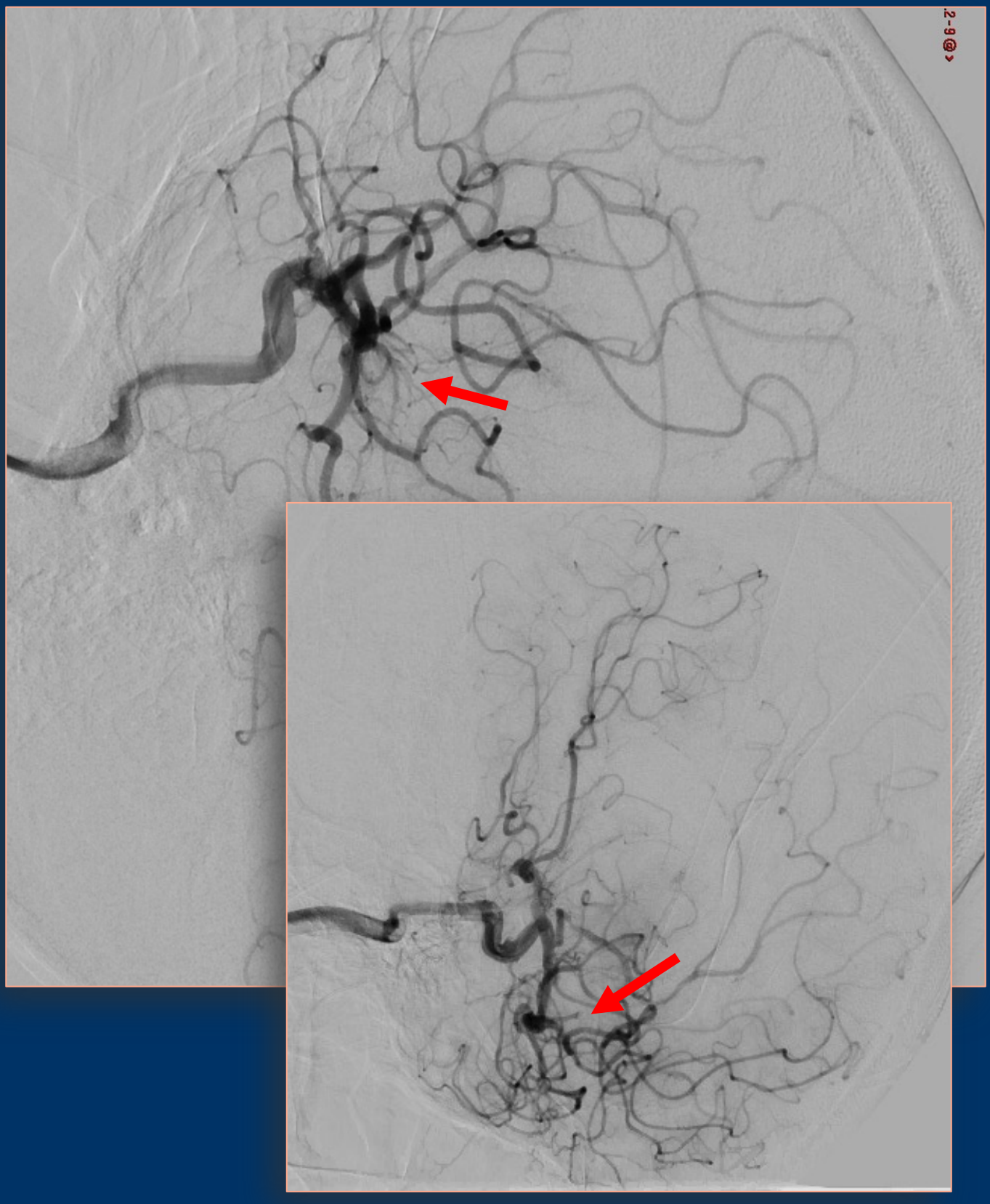


Homme de 53 ans
Aphasie. NIHSS = 4
ATCD AVCi sylvien G
Anticoag. pour arythmie
Pace-maker



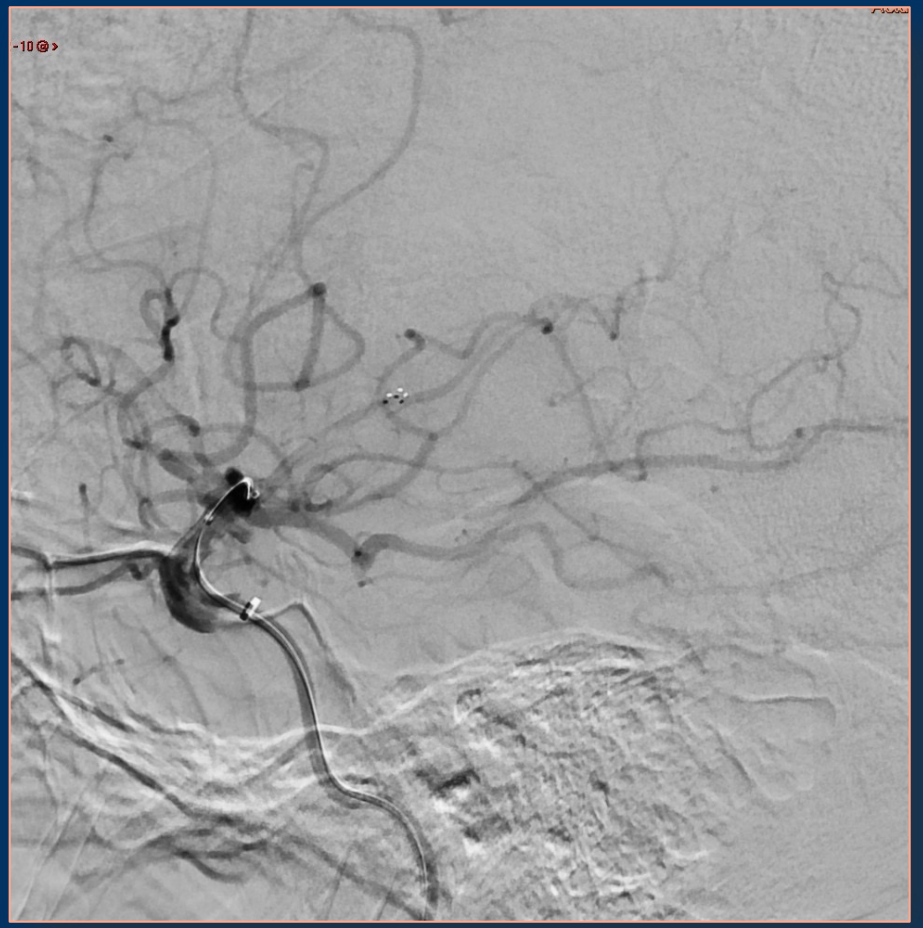


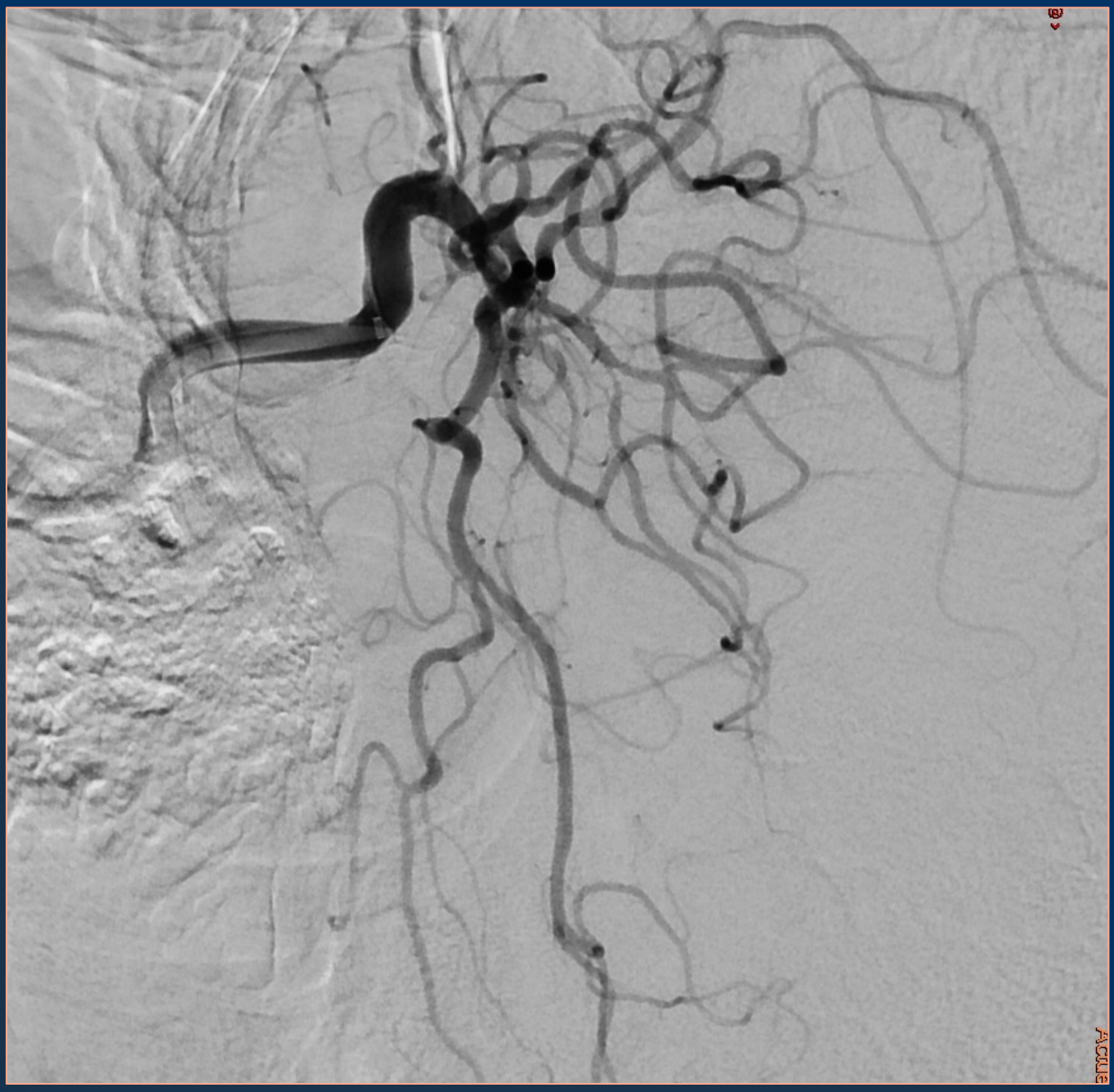
École de la thrombectomie

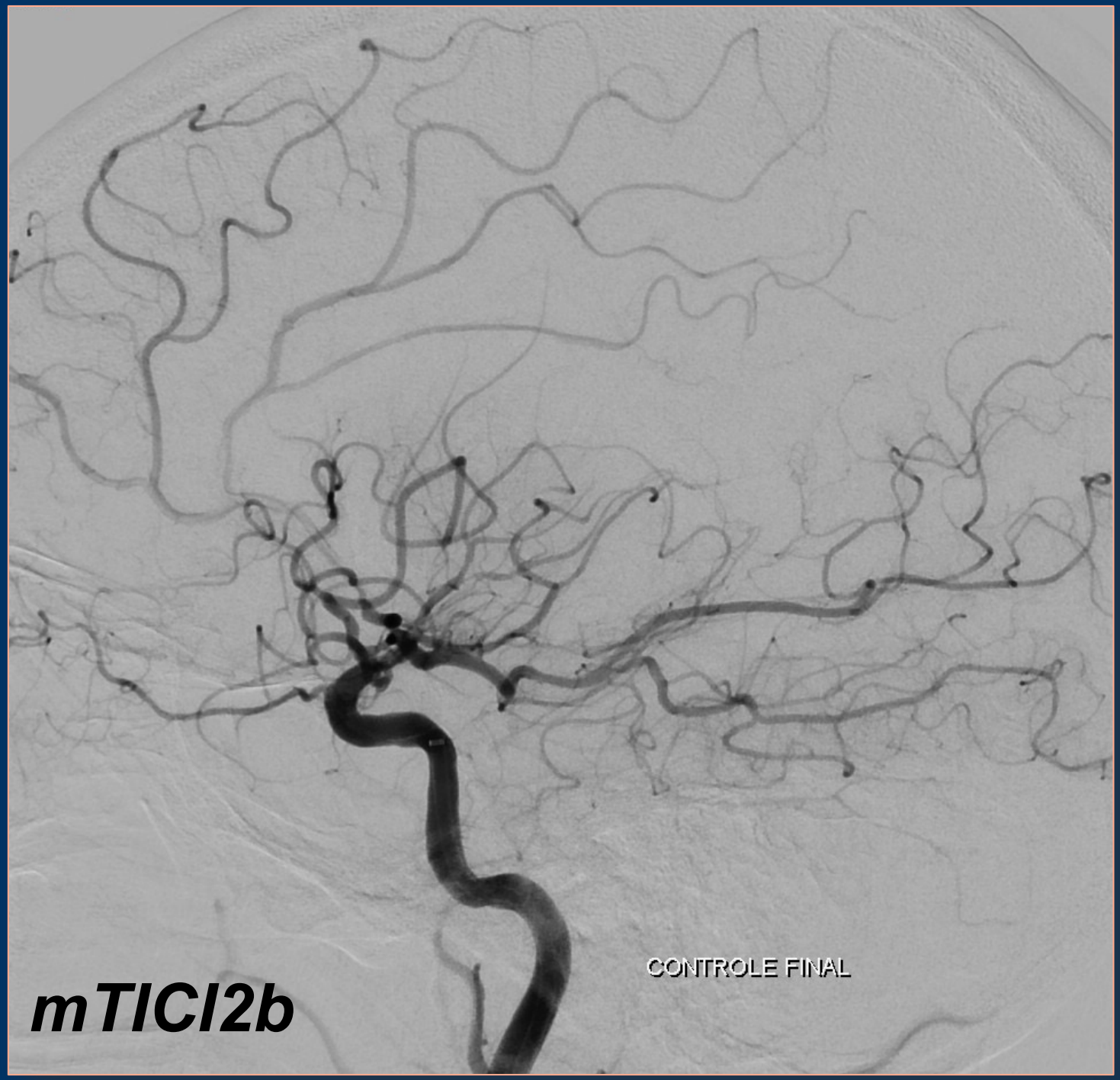


École de la thrombectomie

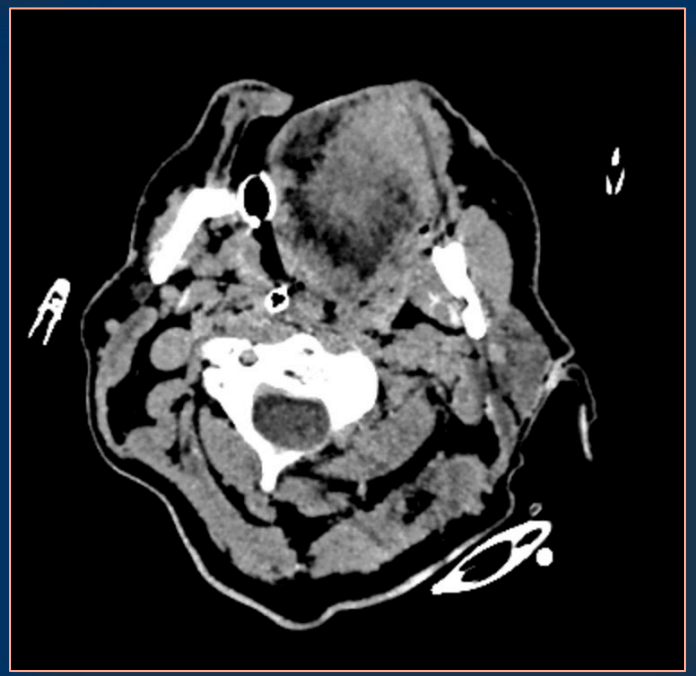
Rebar 18
Traxcess 14
Catch Mini






CONTROLE FINAL
mTICI2b

TDM post-procédure



TDM @ H5

« TAKE HOME » MESSAGE

- Importance de la **stabilité**
- **Tri-axial** +++
- Cathéters intermédiaires souples
- Franchissement du caillot avec **micro-guide**, de préférence en « **J** »
- Occlusions distales (M2) : stent retriever et aspiration efficaces. **Risque de complication hémorragique plus élevé**

Merci pour votre attention!

NRI PSL

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frederic.clarencon@aphp.fr