

DES - COURS de BASE NEURORADIOLOGIE

Année académique 2017-2018

Pathologie vasculaire cérébrale aiguë



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Professeur Clinique

Chef de Clinique

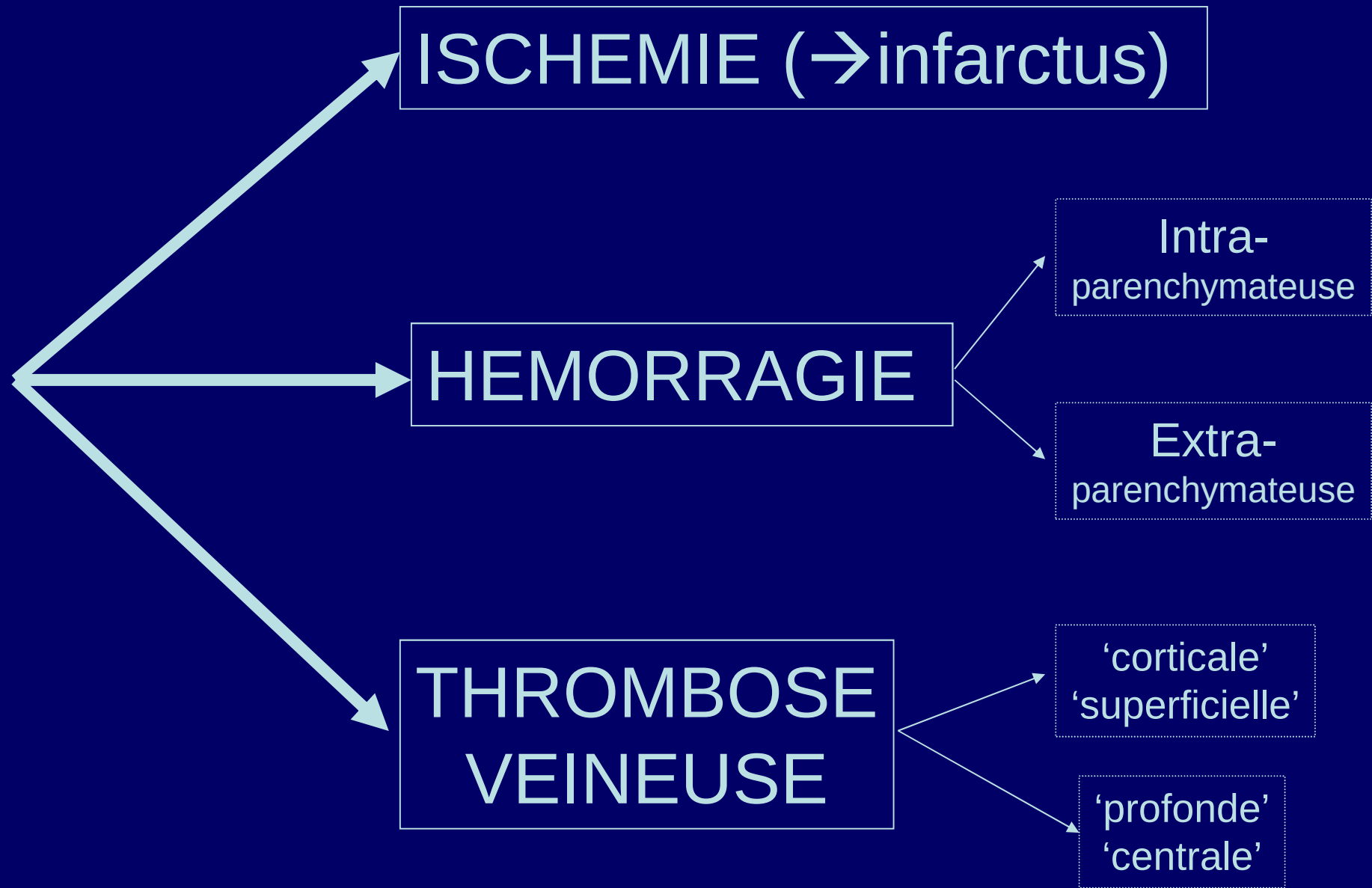
Université catholique de Louvain

Cliniques universitaires Saint-Luc

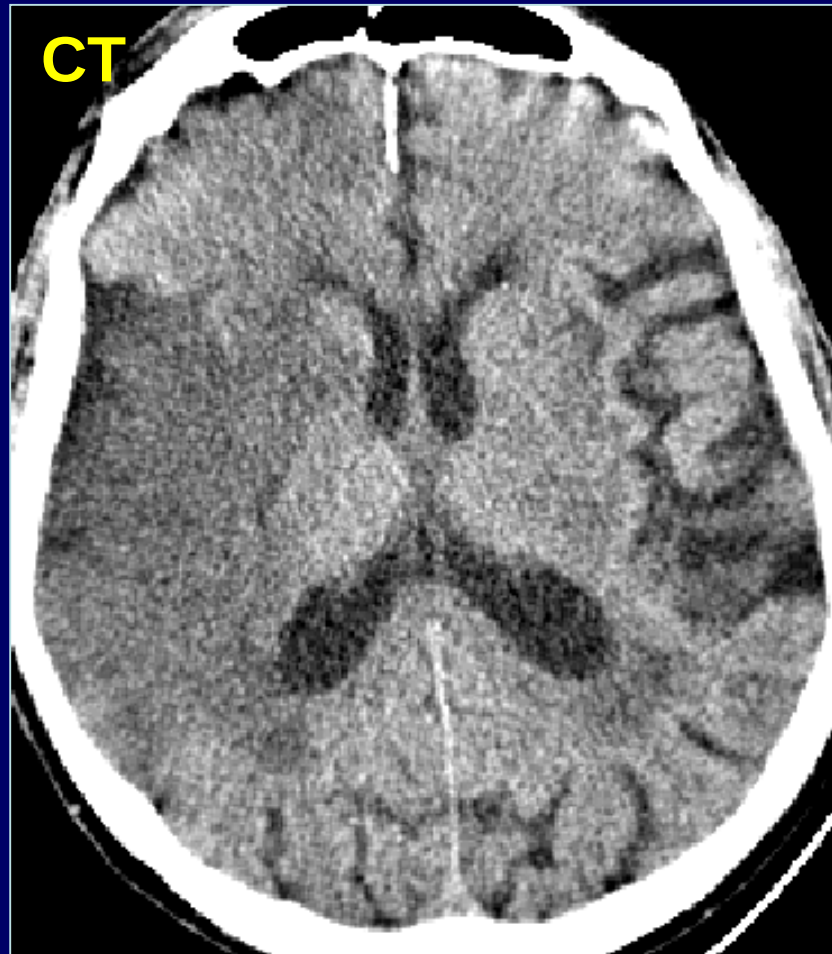
duprez@rdgn.ucl.ac.be

<http://www.saintluc.be>

26 janvier 2018



Ischémie cérébrale aiguë



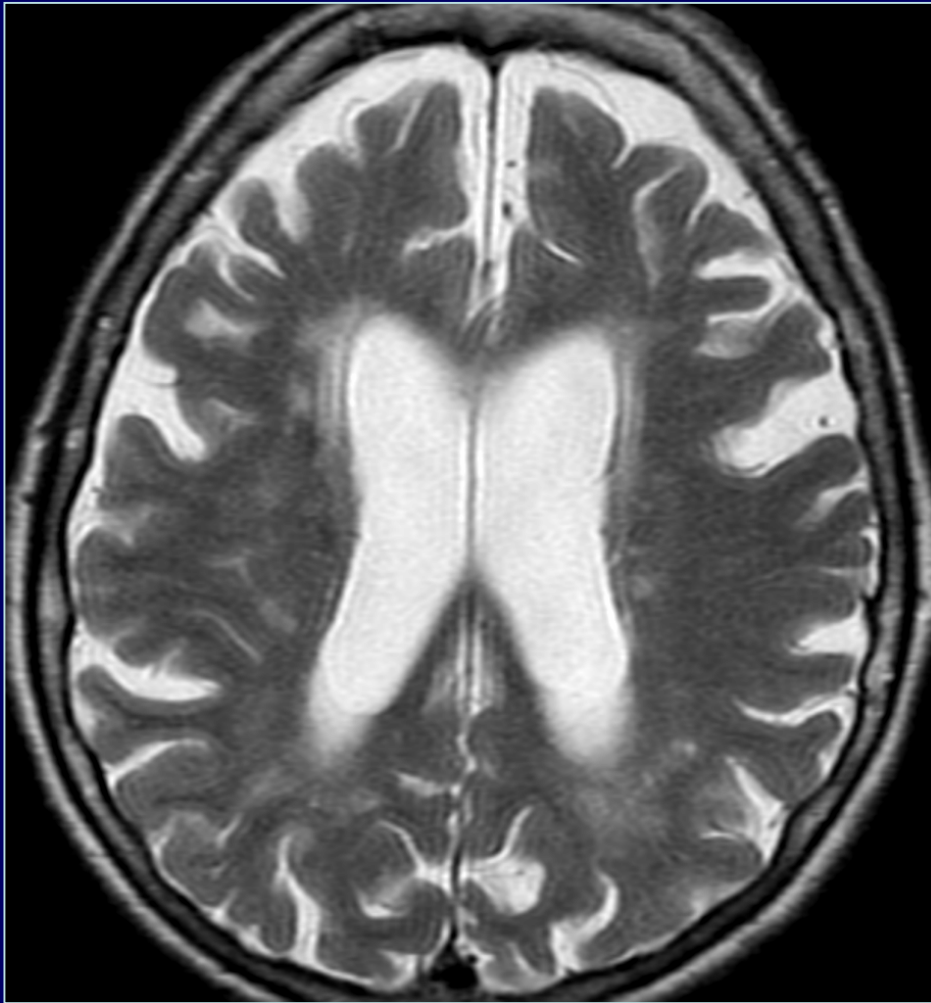
hypodensité



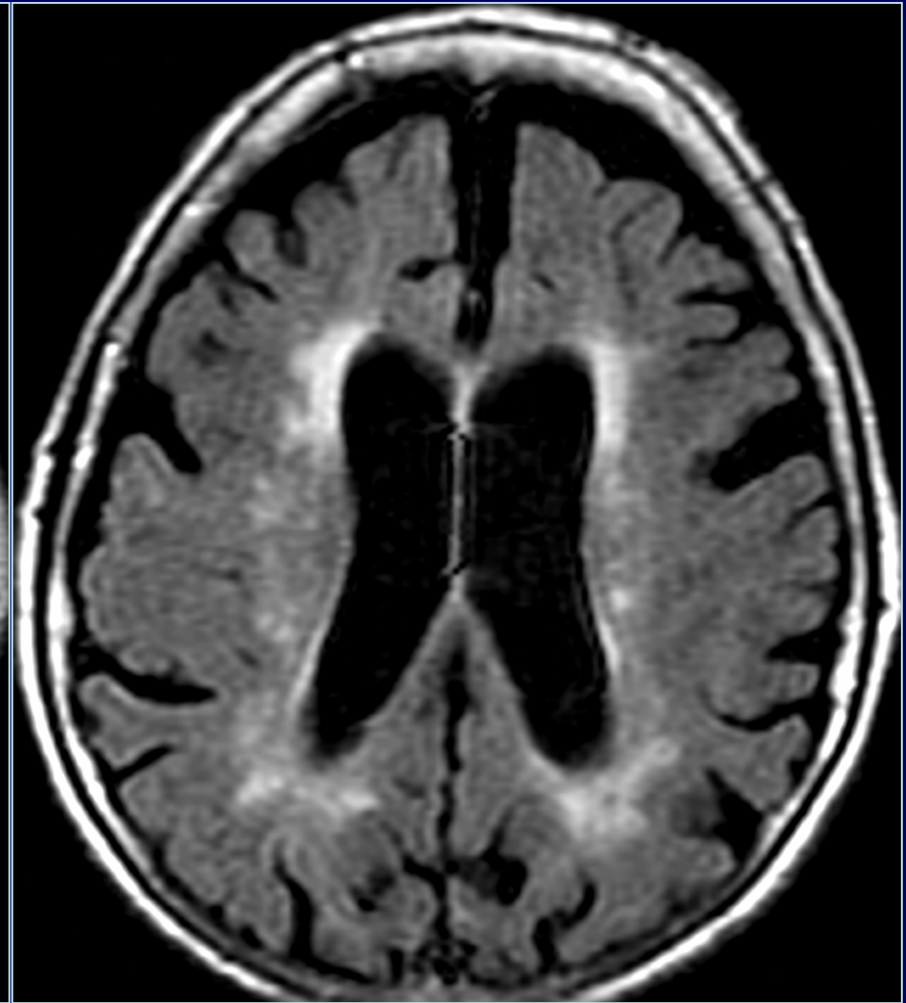
hypersignal FLAIR/T2

> 6 heures (« fenêtre thérapeutique » pour traitement thrombolytique)

<6 heures: imagerie de diffusion (Diffusion-Weighted Imaging)

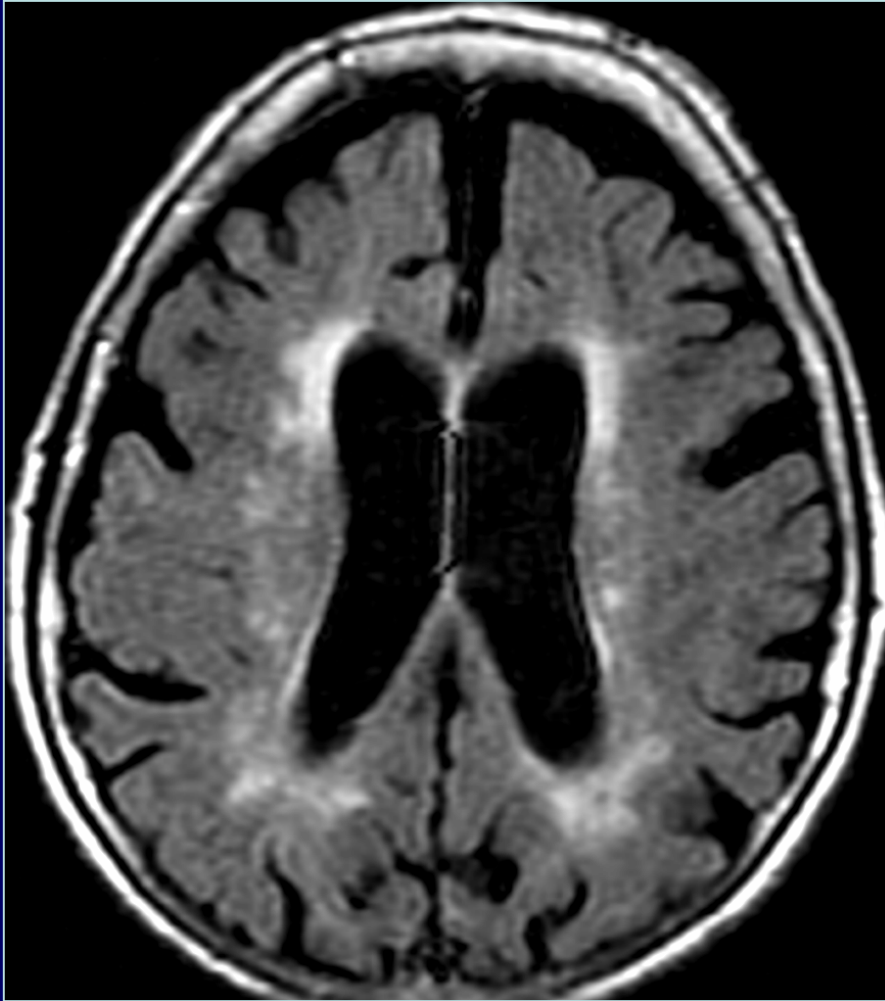


T2-FSE

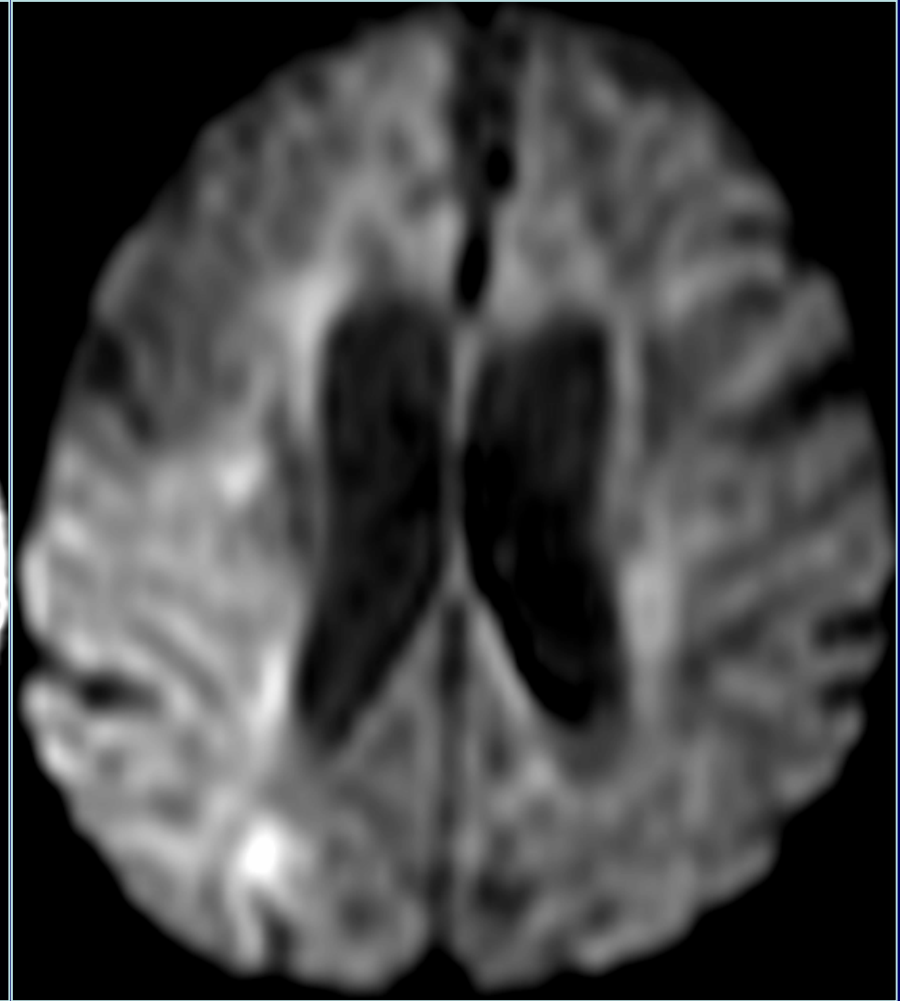


FLAIR

<6 heures: imagerie de diffusion

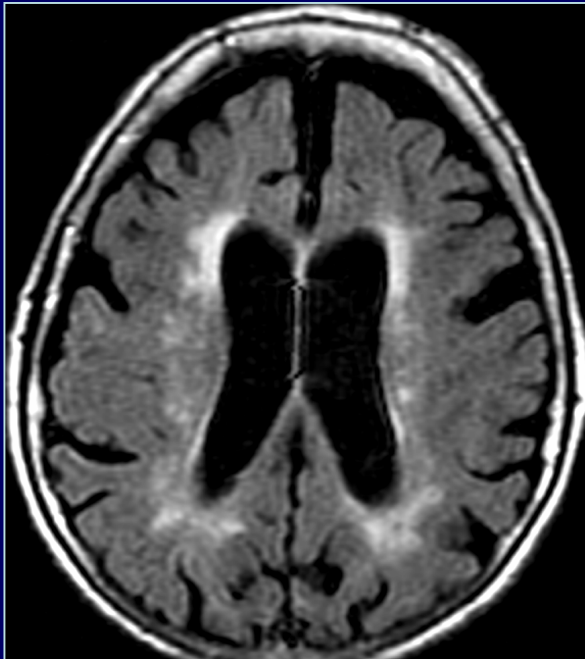


FLAIR

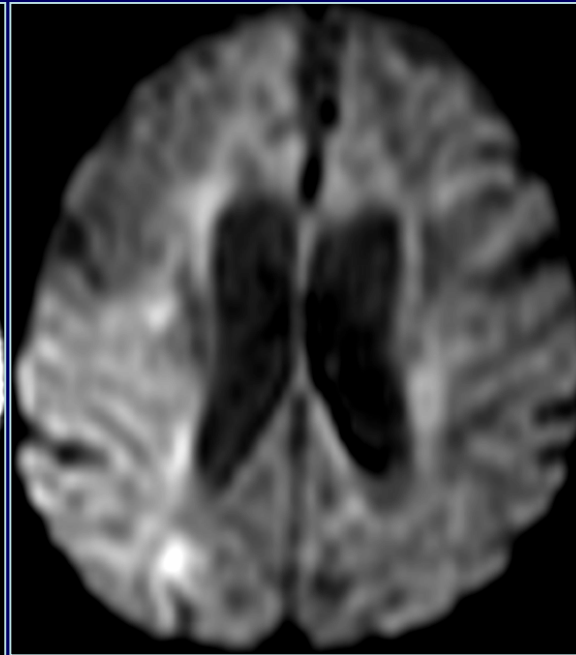


Imagerie de diffusion

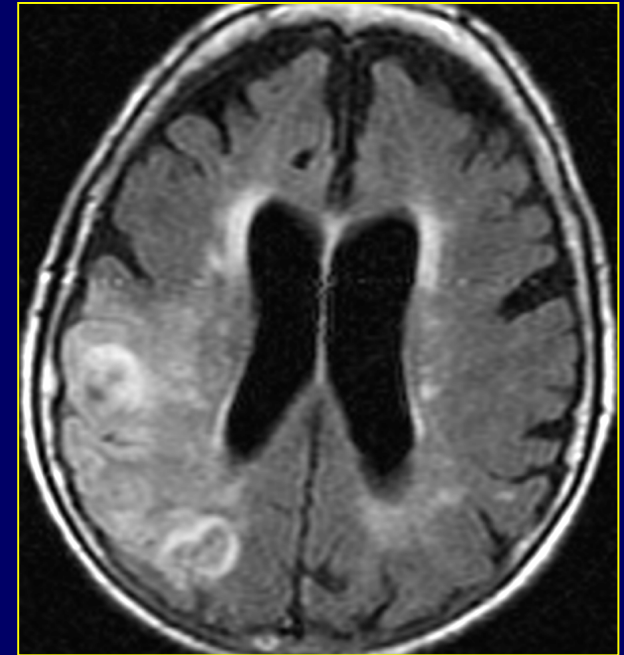
<6 heures: imagerie de diffusion



FLAIR 3 heures

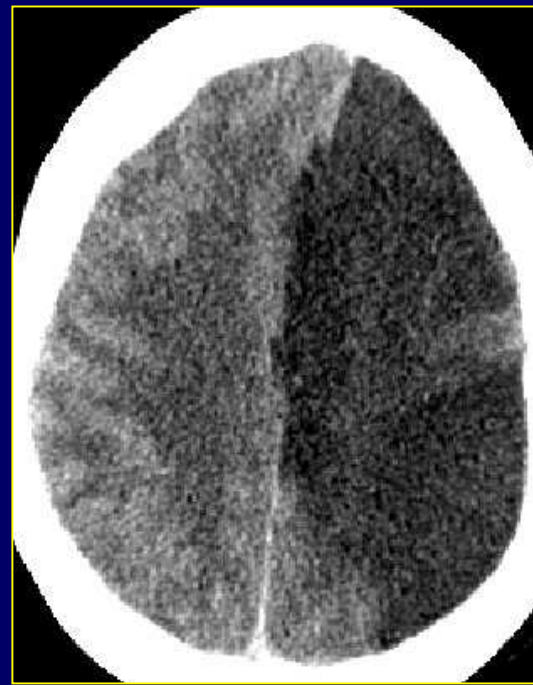
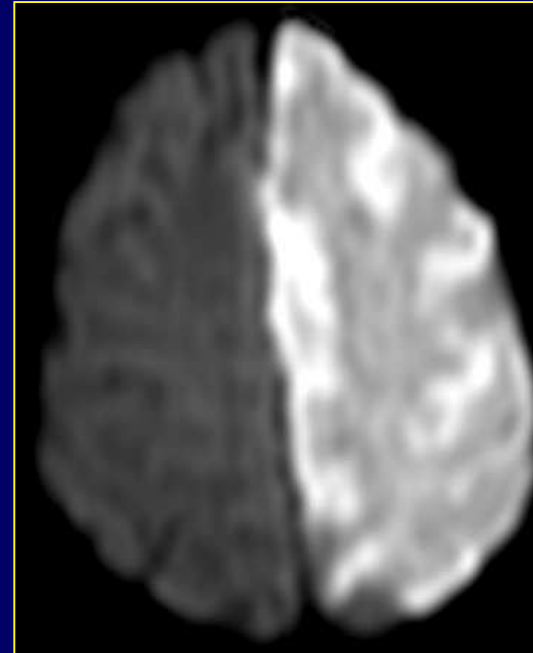
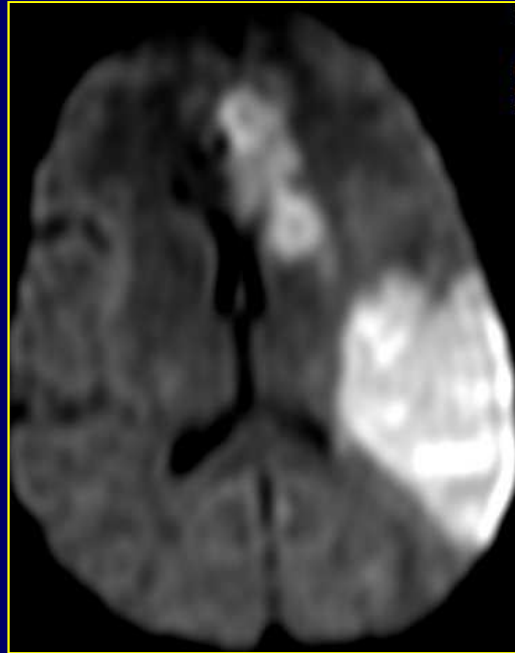


Diffusion 3 heures



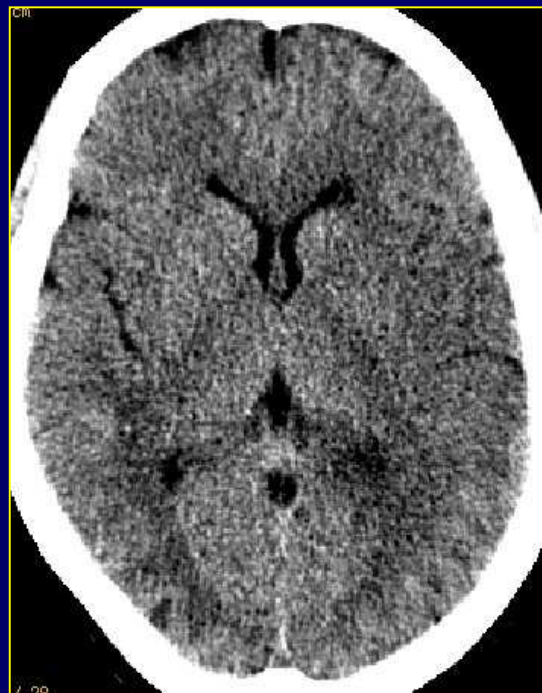
FLAIR 24 heures

72 heures

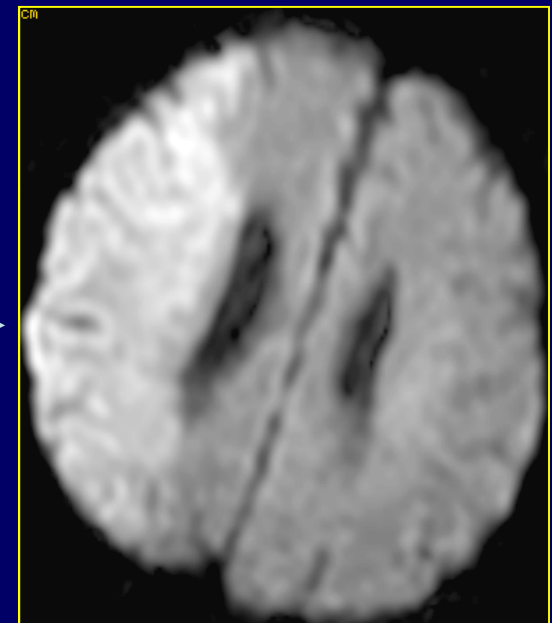
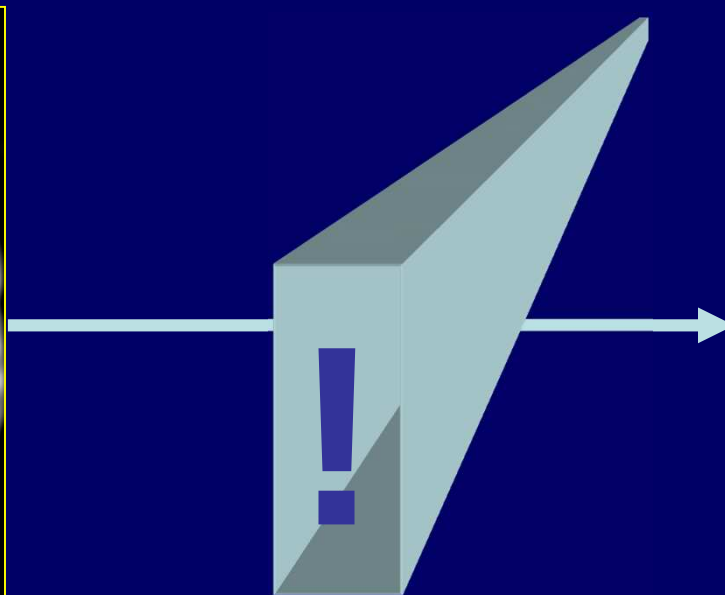
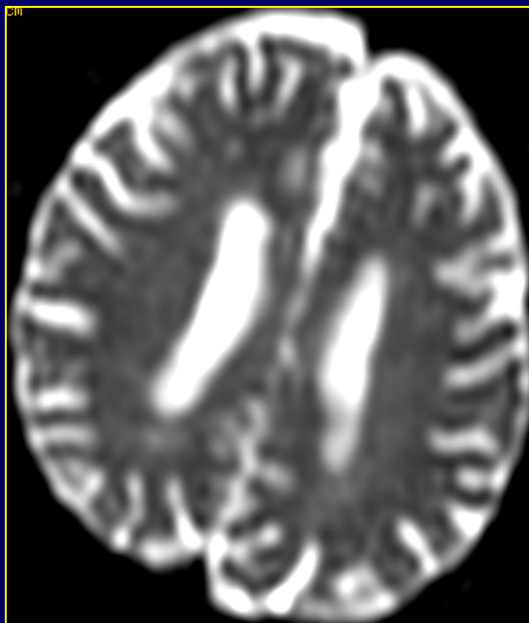


MR
=
CT

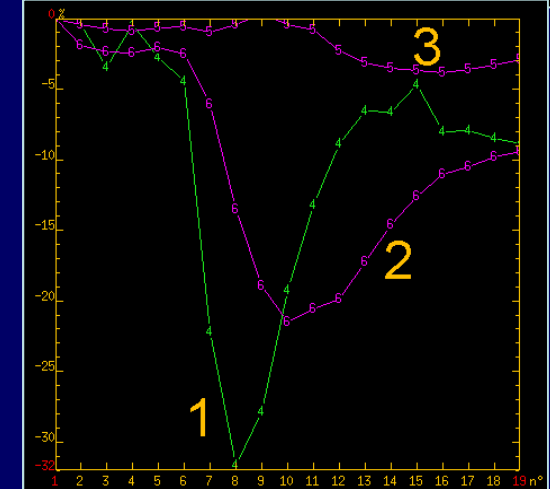
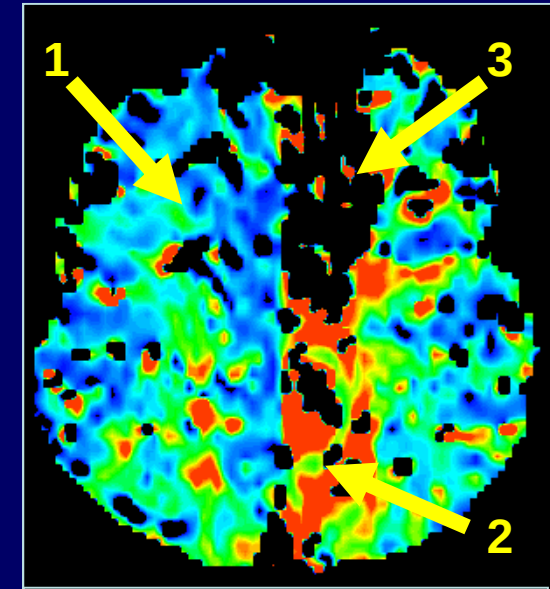
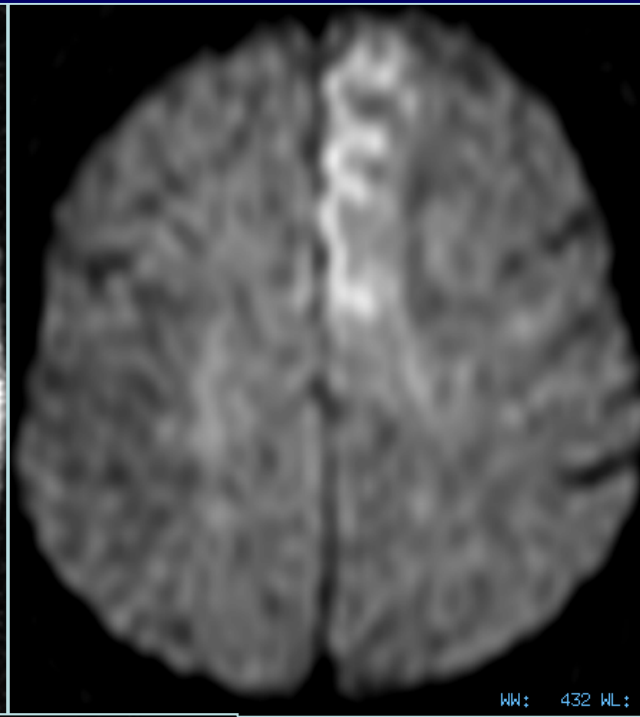
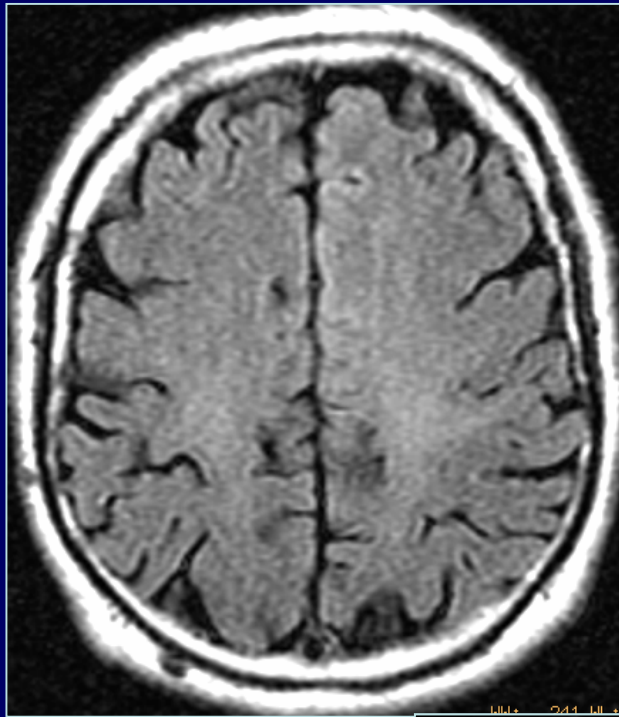
<6 heures



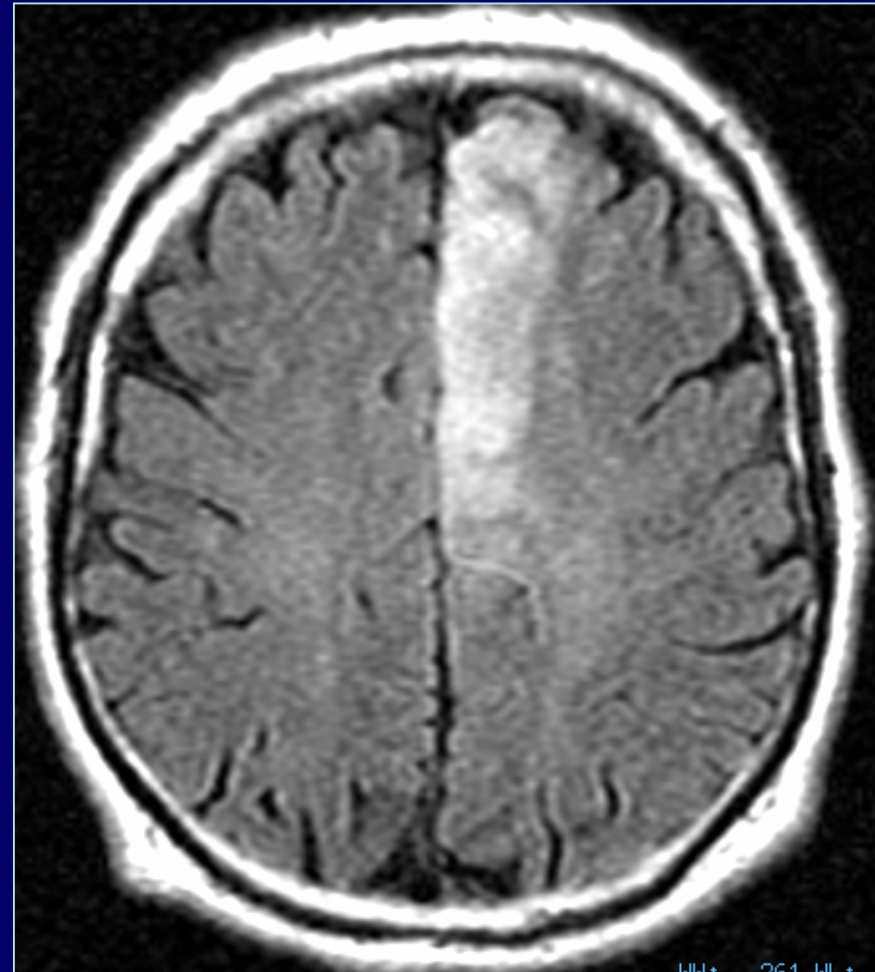
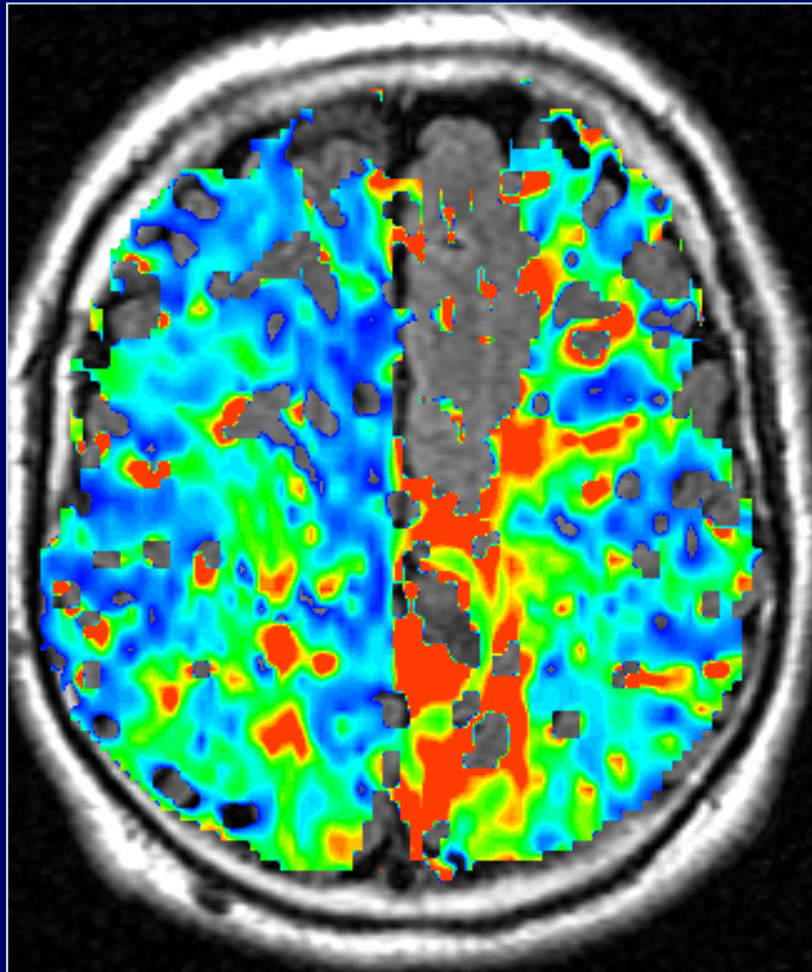
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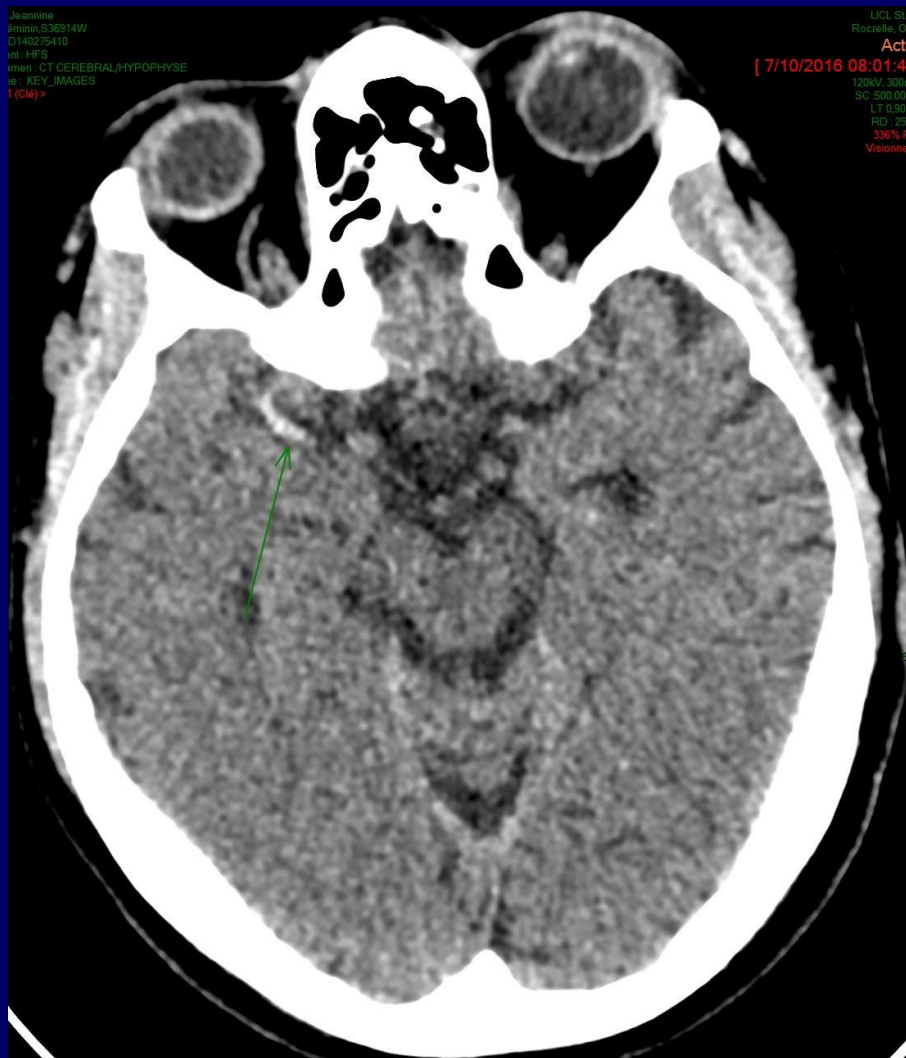
<6 heures: imagerie de perfusion (Perfusion-Weighted Imaging) (I)

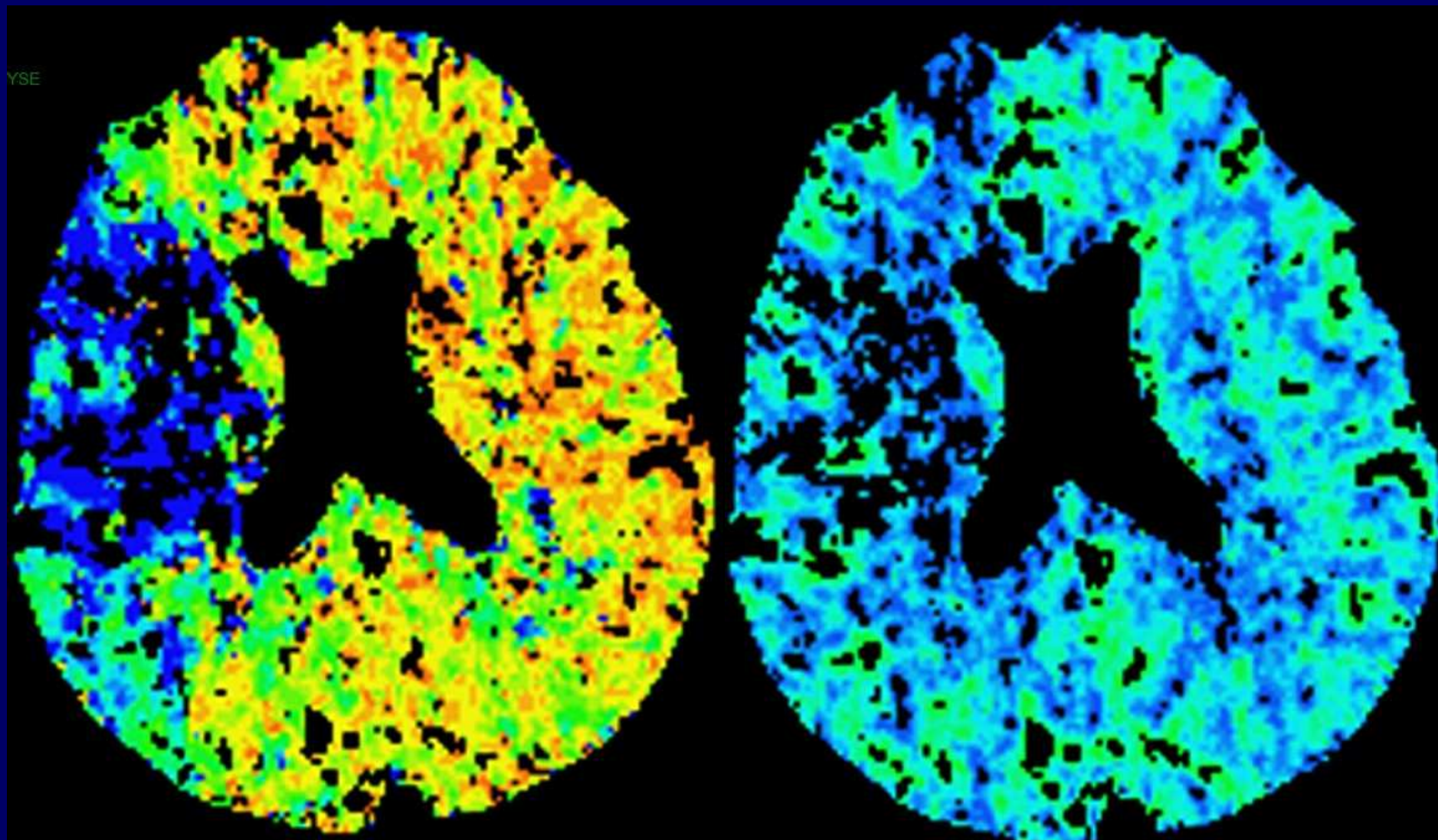


<6 heures: imagerie de perfusion (Ib)



PERFUSION CT (CTP)





MTT

CBV

Pos. coupe : 187.1 mm

Pos. patient : KFS

Desc. examen : CT CEREBRAL/HYPOPHYSE

Desc. série : résultats perfusion

< 2184 - 8 >

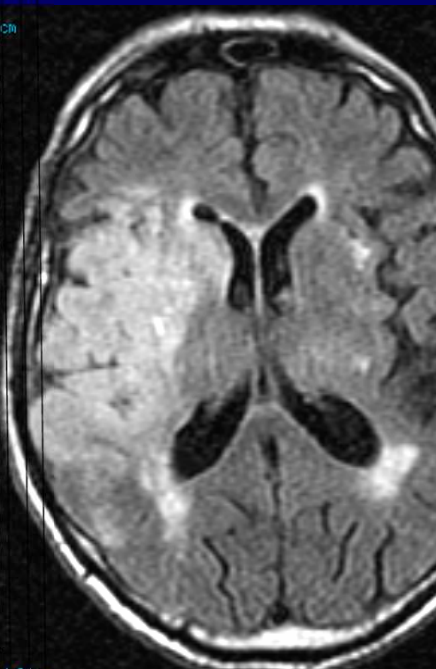
MTT aug. et
CBV norm.

MTT aug. et
CBV rouge.

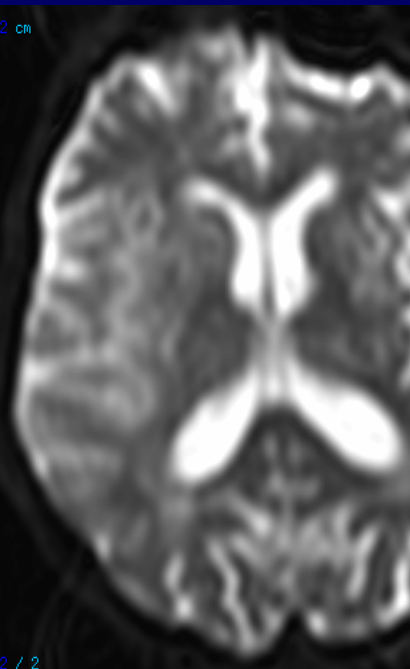




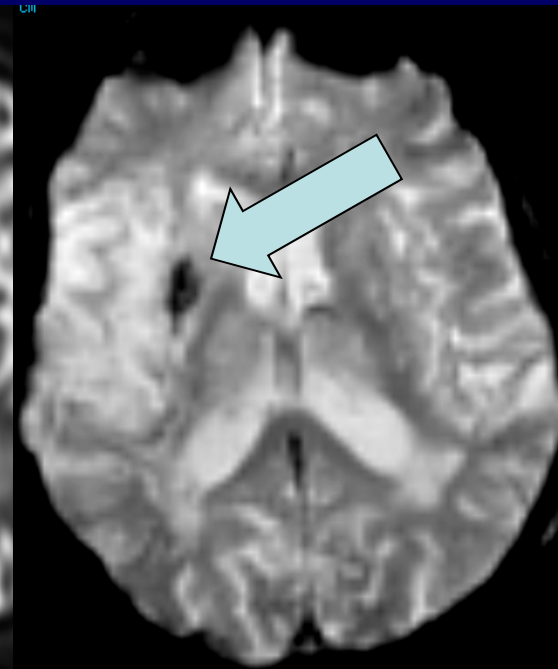
CT



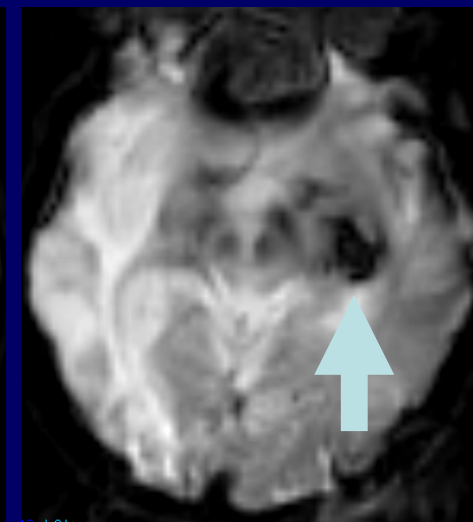
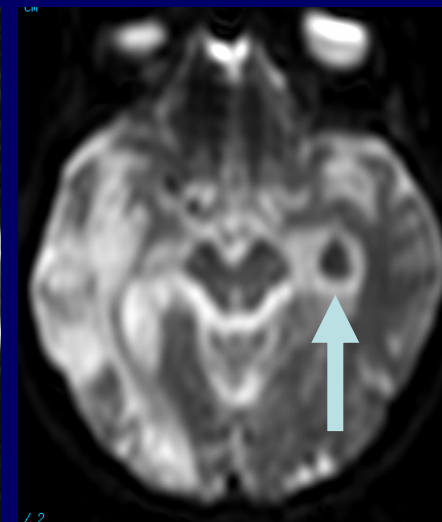
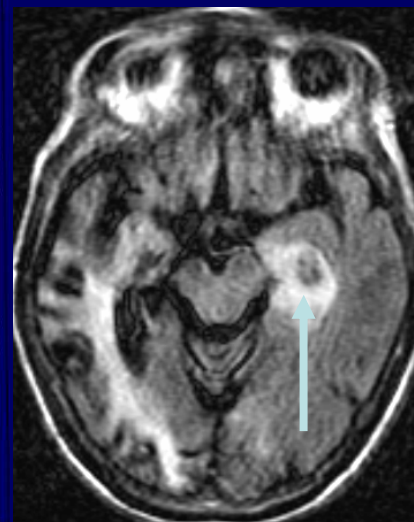
FLAIR



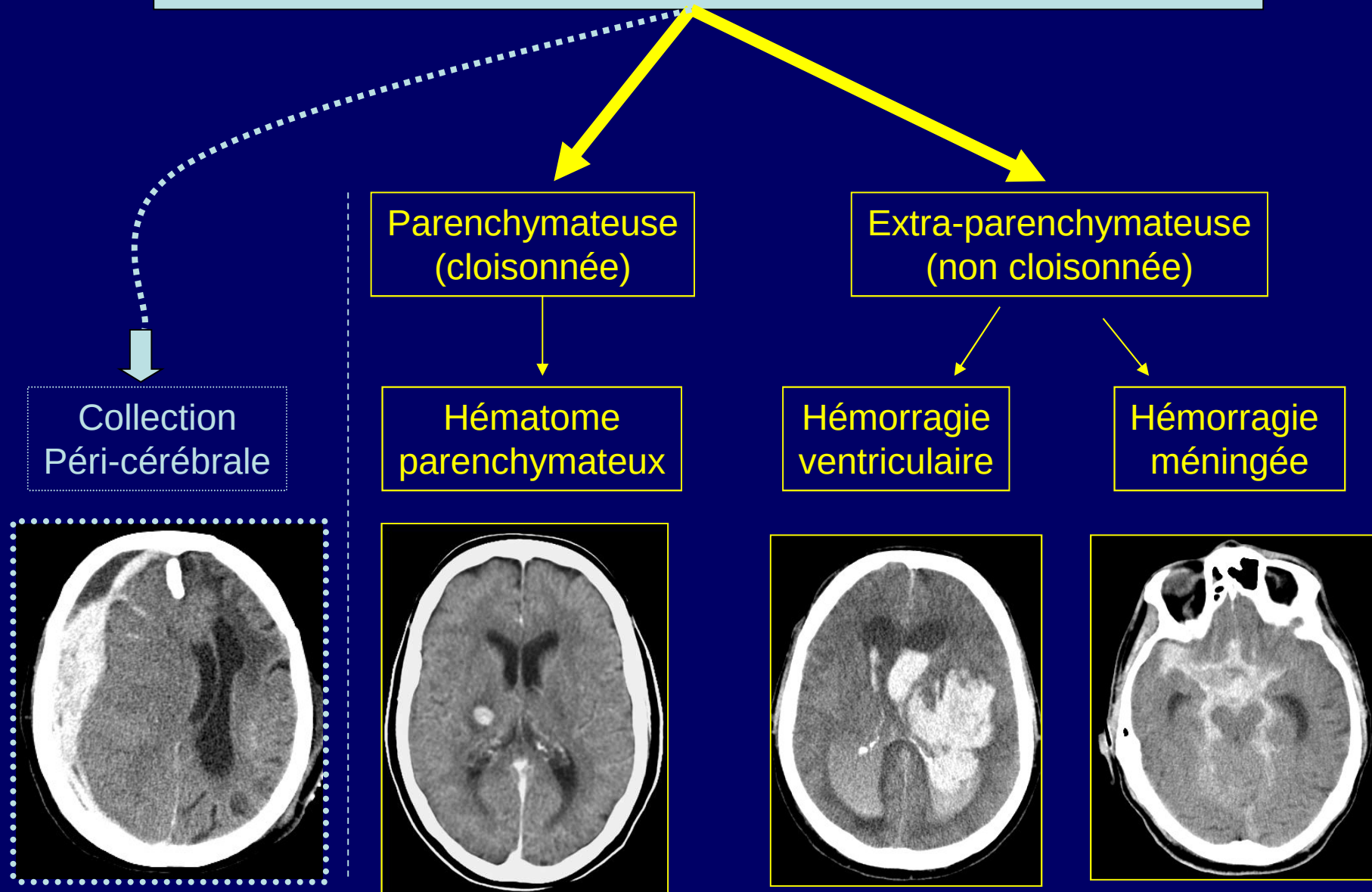
EPI-SE-T2



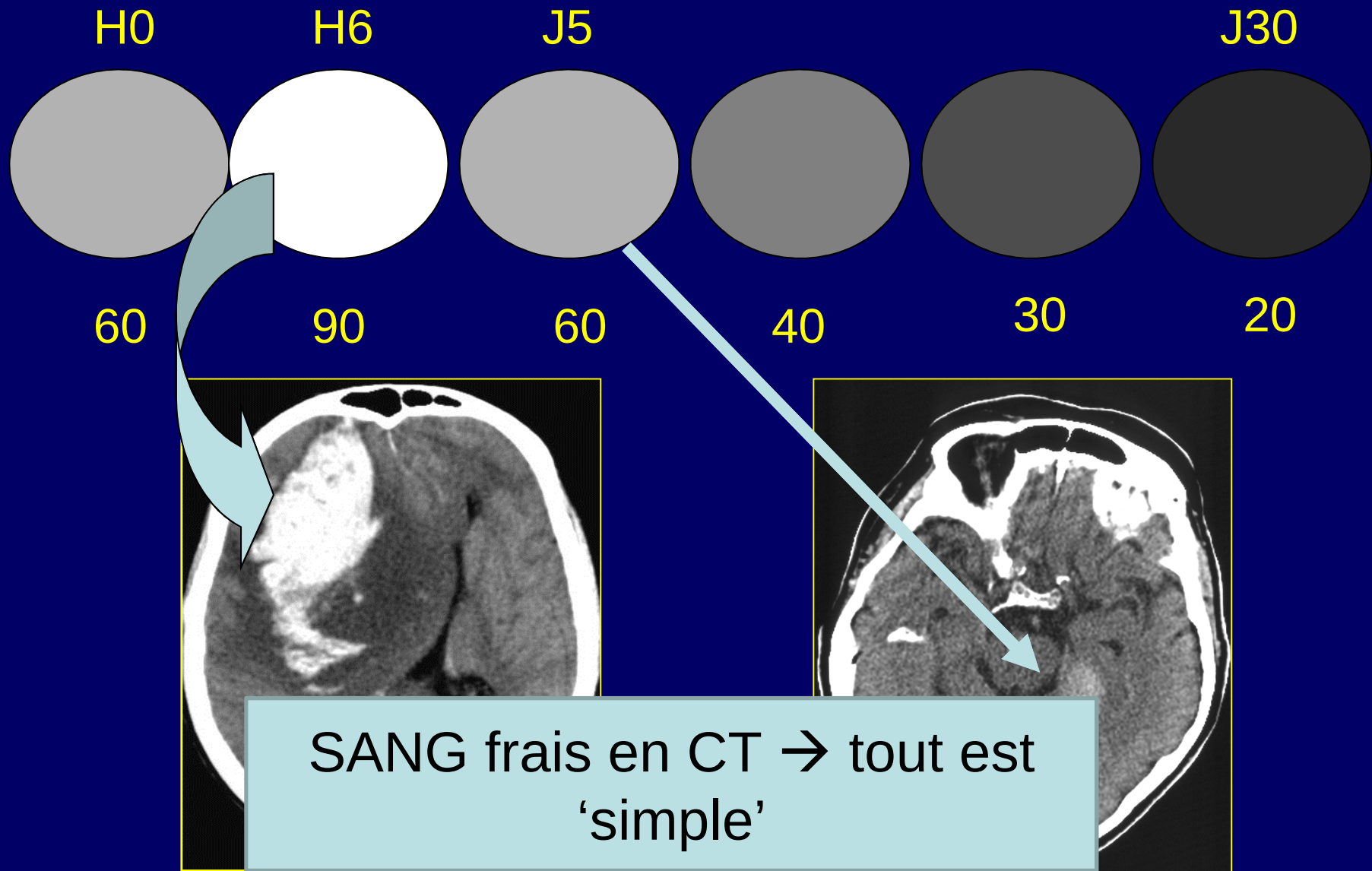
EPI-GRE-T2*



Hémorragie cérébrale

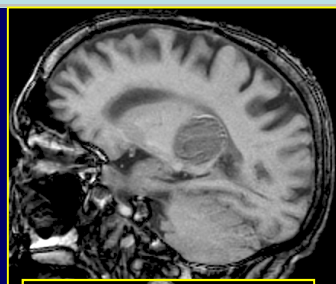


Hématome parenchymateux en TDM

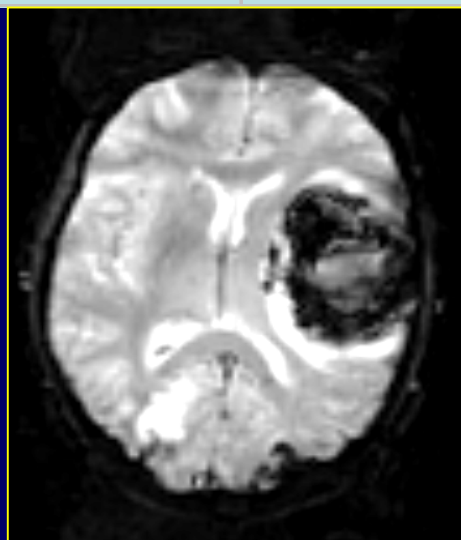


Hématome parenchymateux IRM

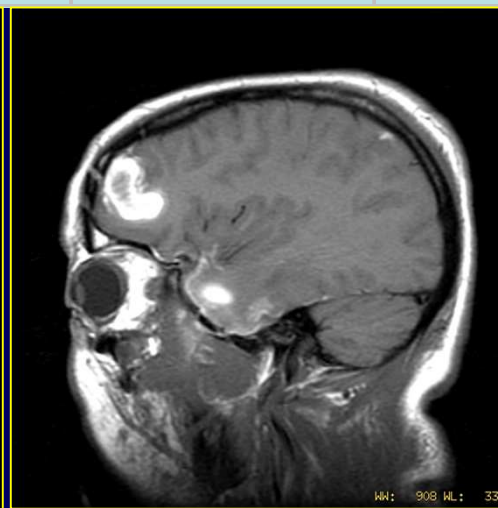
Délai	< 3 heures	4-24 heures	> 48 heures	1 semaine	1 mois
Pondération T1 substrat du signal	hypo/iso <i>oxyHb</i>	iso <i>oxyHb</i>	hyper <i>metHb IC</i>	hyper <i>metHb EC</i>	hypo <i>liquide EC</i>
Pondération T2 substrat du signal	hyper <i>serum</i>	hypo++* <i>déoxyHb</i>	hypo <i>déoxyHb</i>	hyper <i>metHb EC</i>	hyper <i>liquide EC</i>
					couronne hypo++* <i>hémossidérine</i>
* mieux mis en évidence par susceptibilité magnétique (séquence en écho de gradient)					
EC=extracellulaire / IC=intracellulaire					



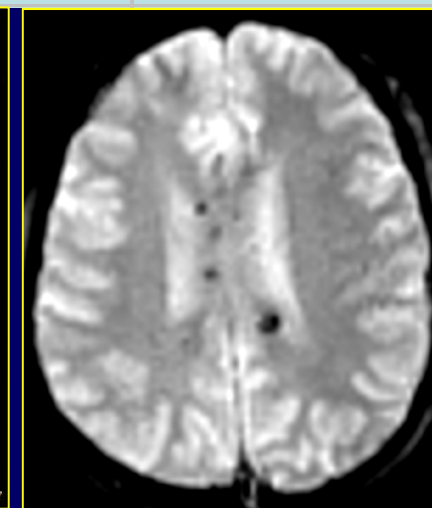
eau



déoxyHb → hypoT2



metHb → hyperT1



hémossidérine → hypoT2

SANG frais en IRM → tout est compliqué

Sang frais endocrânien

→ Rechercher une cause sous-jacente

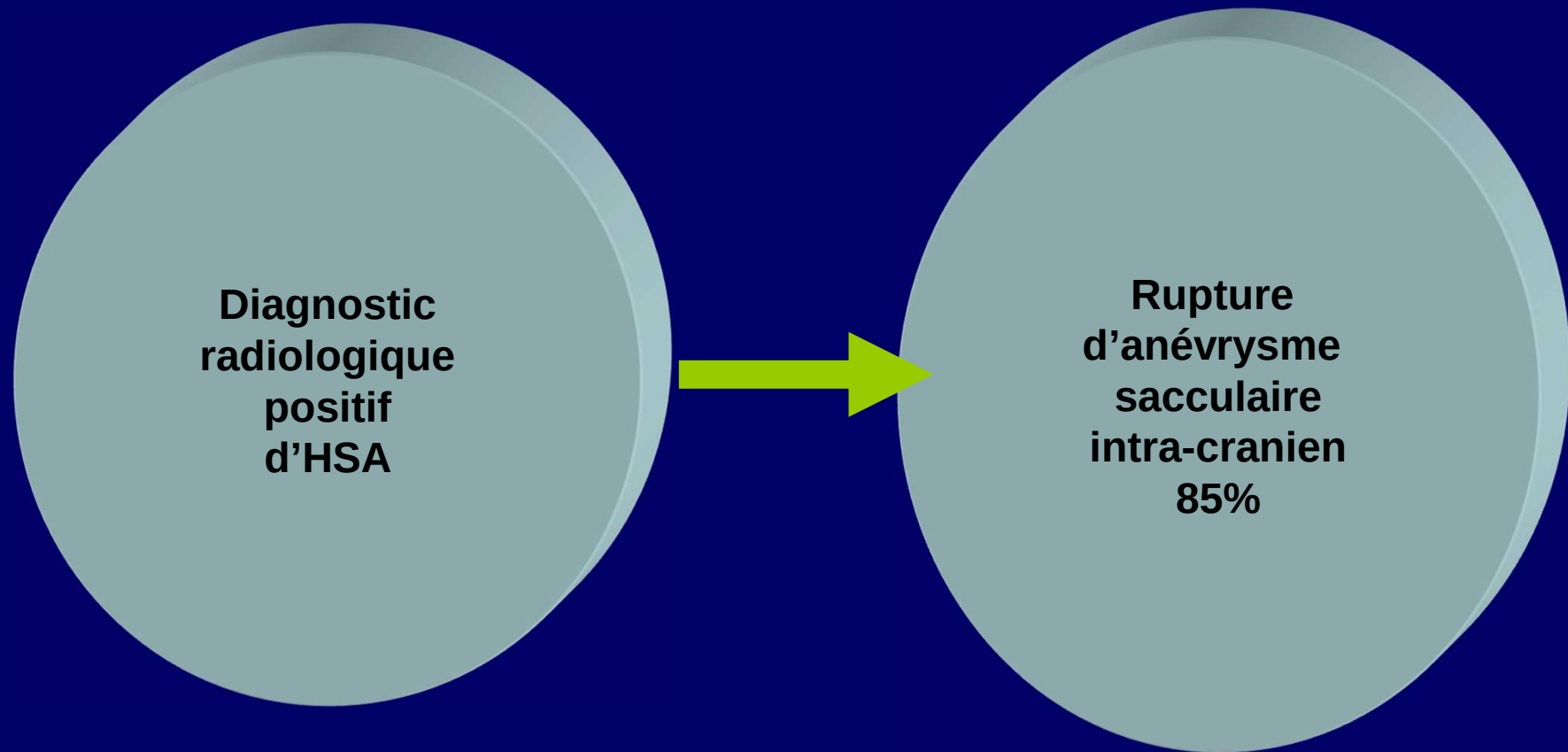
- Malformative vasculaire MAV/fistule >> cavernome
- Tumeur

→ Séquence de susceptibilité SWI, GRE-T2*, EPI-GRE-T2*

- non pas pour le foyer hémorragique
- pour trouver ailleurs un effet de susceptibilité d'origine sanguine pour cerner un contexte spécifique:
 - Cavernomatose
 - Hémosidérose méningée
 - Angiopathie amyloïde

→ Injecter le PdC en CT scanner (en garde !)

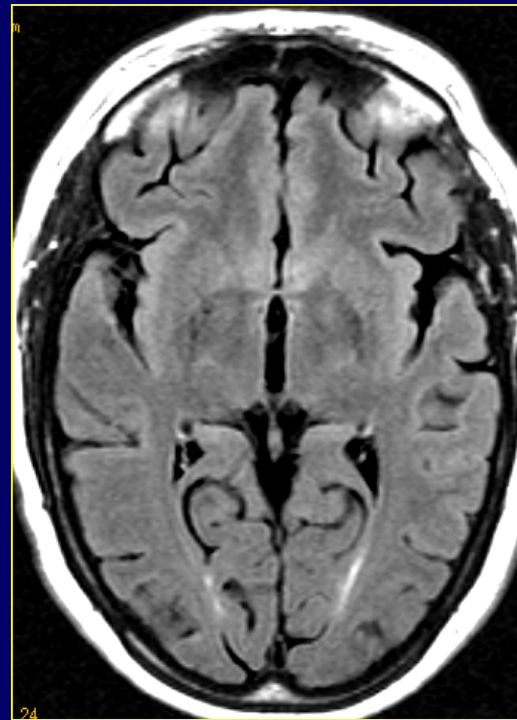
Hémorragie sous-arachnoïdienne



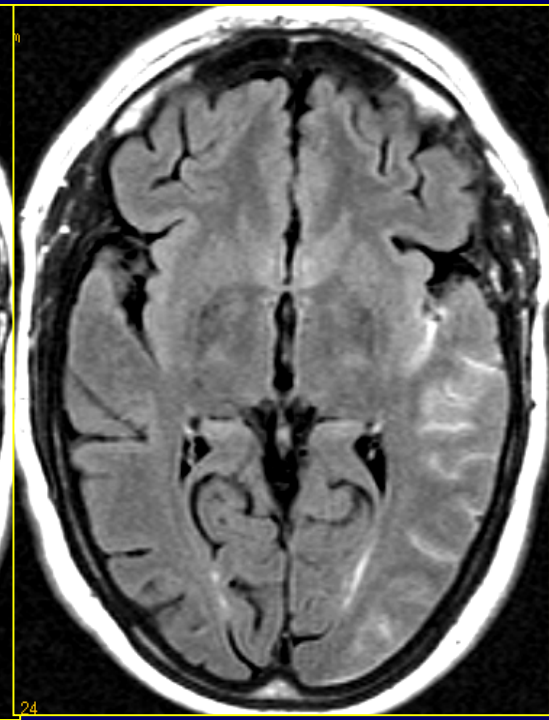
1. Diagnostic (+) d'HSA



CT scan



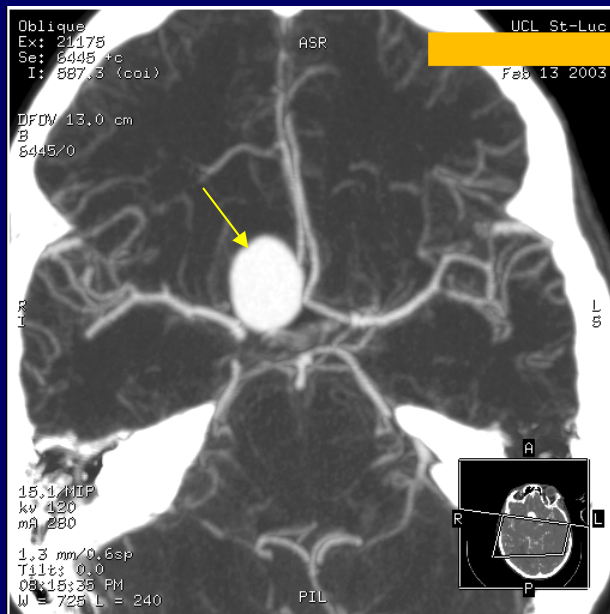
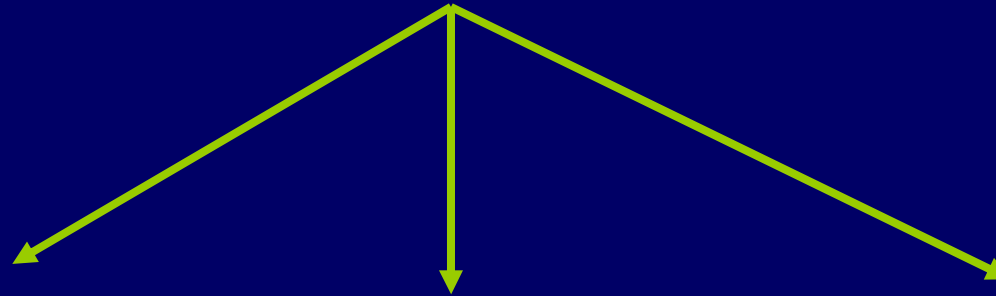
(-)



IRM

(+)

2. ➡ Localisation de l'anévrysme causal



Angio-CT

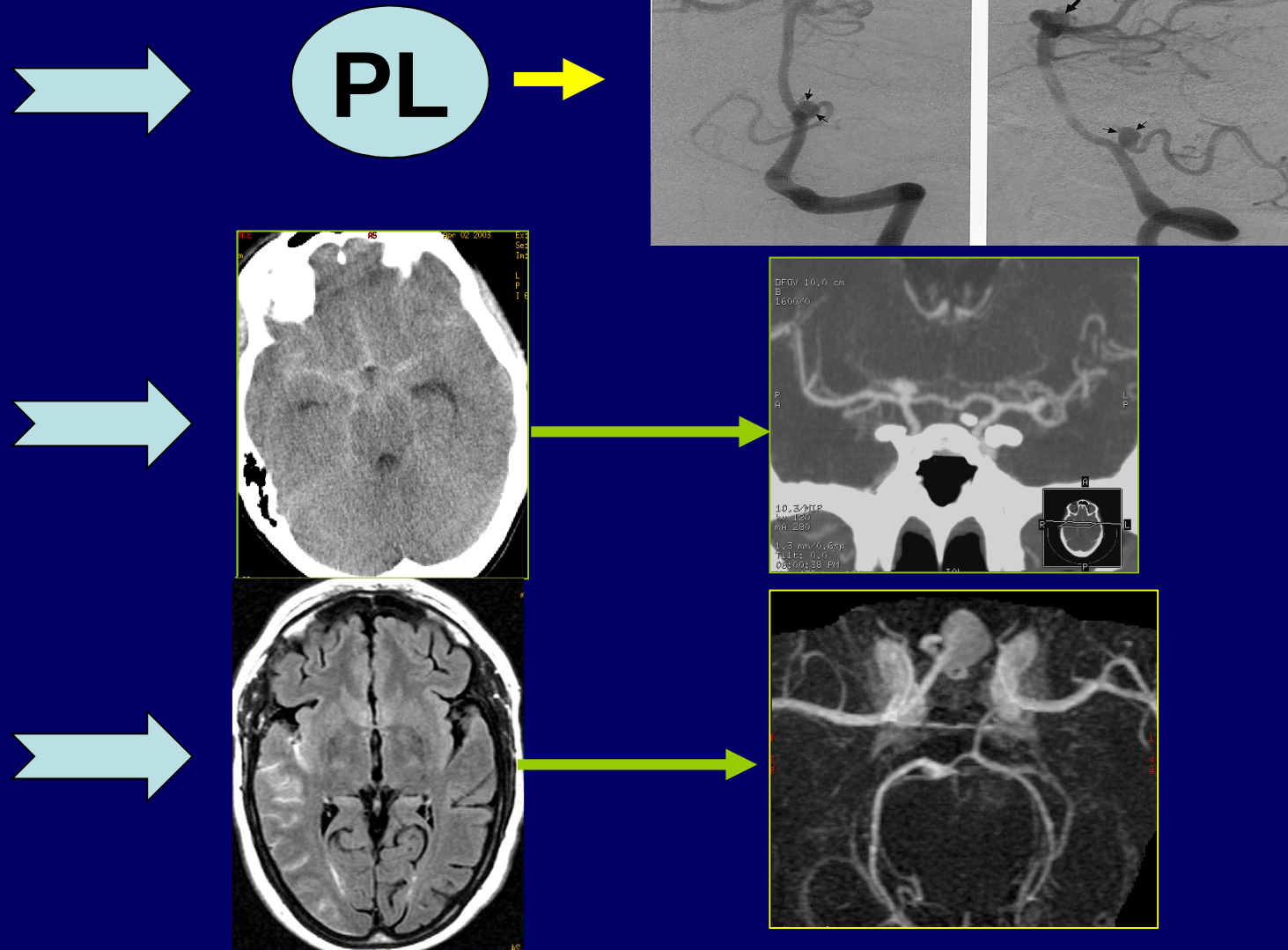


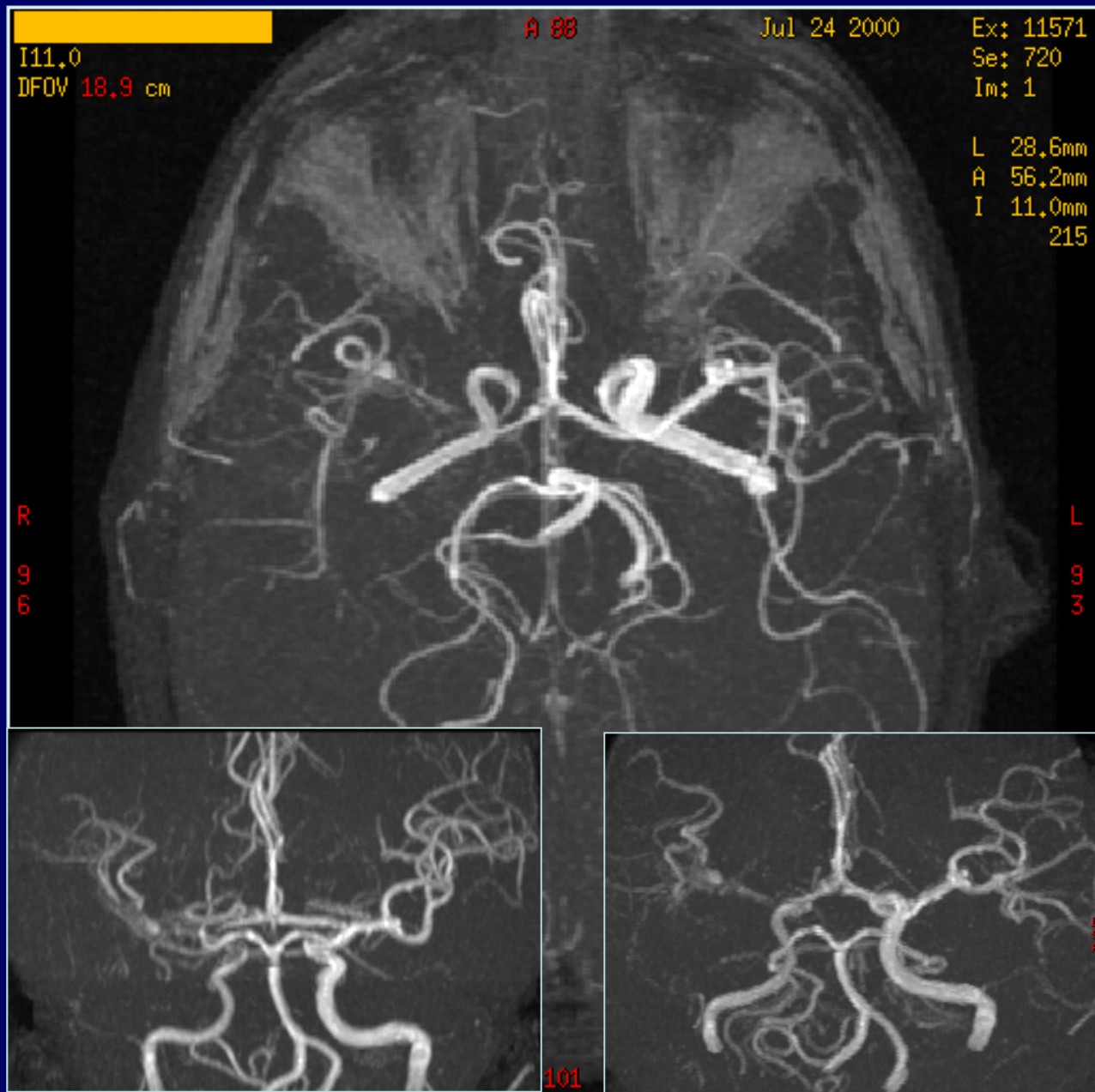
Angio-IRM



Angiographie

Diagnostic positif et étiologique d'HSA





Spasme artériel





Rare: < **1 case / 10.000/an**

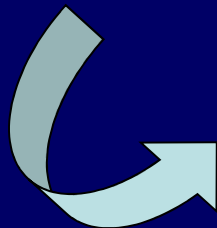


Facteurs de risque

hypercoagulabilité systémique

±

infections ou dommage tissulaire local



Facteurs de risque cumulatifs

10 - 20% SANS facteur de risque

Localisations de la thrombose veineuse



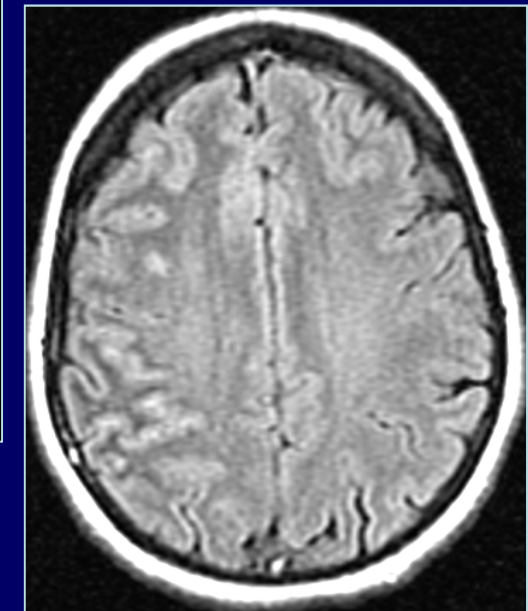
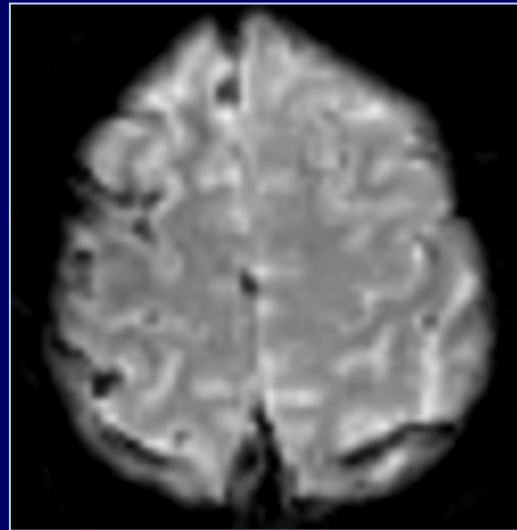
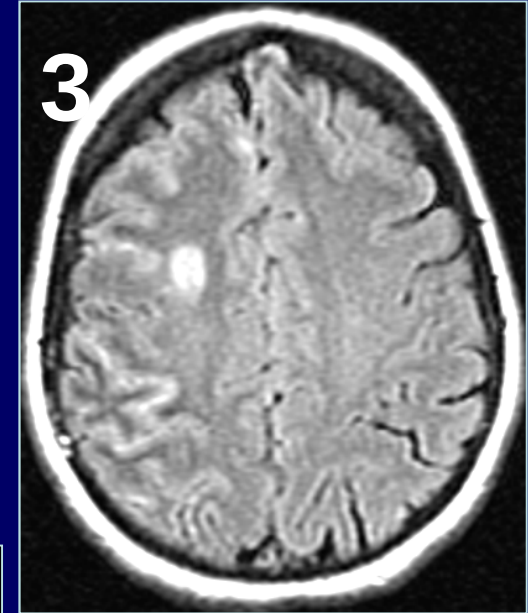
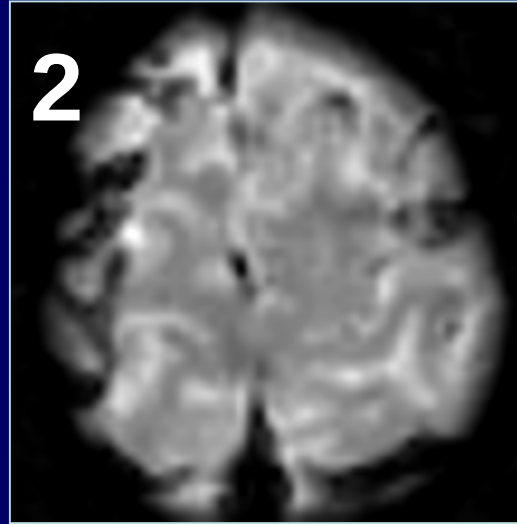
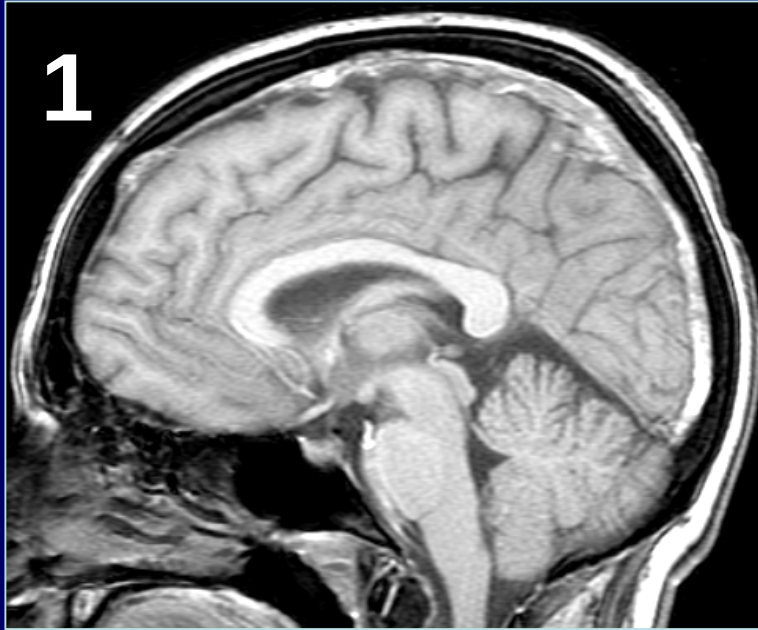
Dural sinus thrombosis
(‘deep’ CVT)



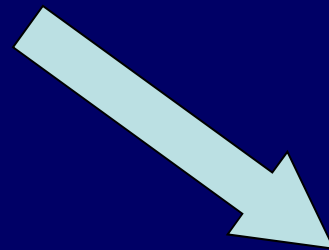
Cortical vein thrombosis
(‘superficial’ CVT)



Deep & superficial
Dural & cortical



**venous
occlusion**

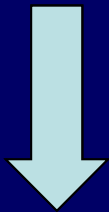


**draining veins
stasis**

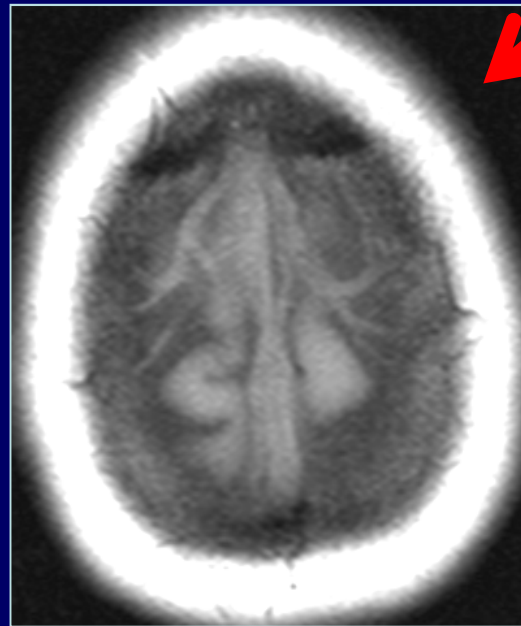
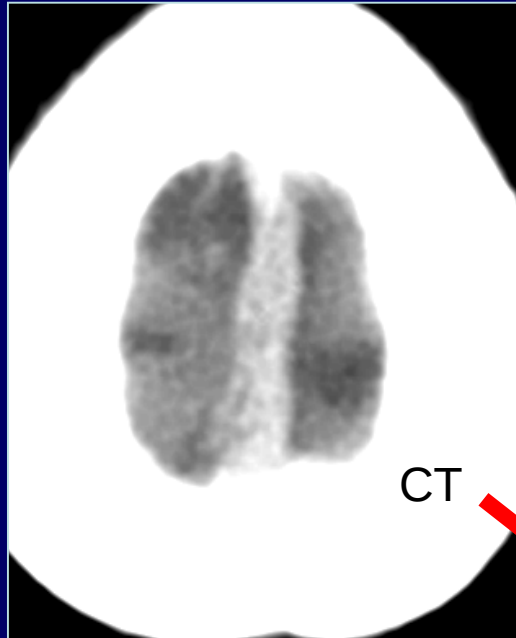


parenchymal damage

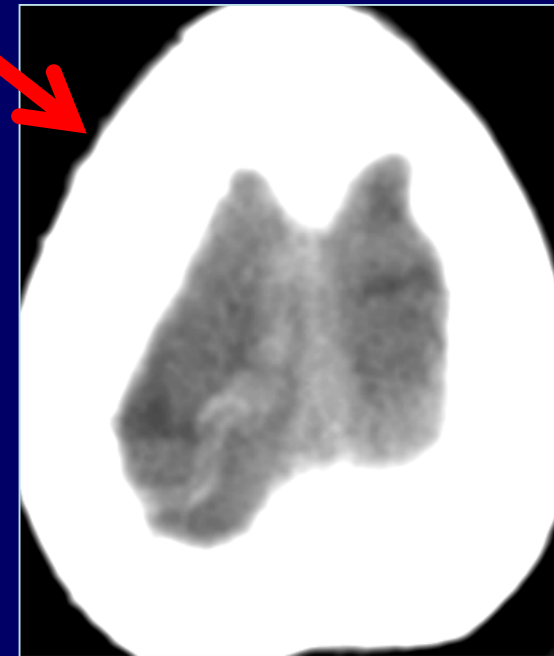
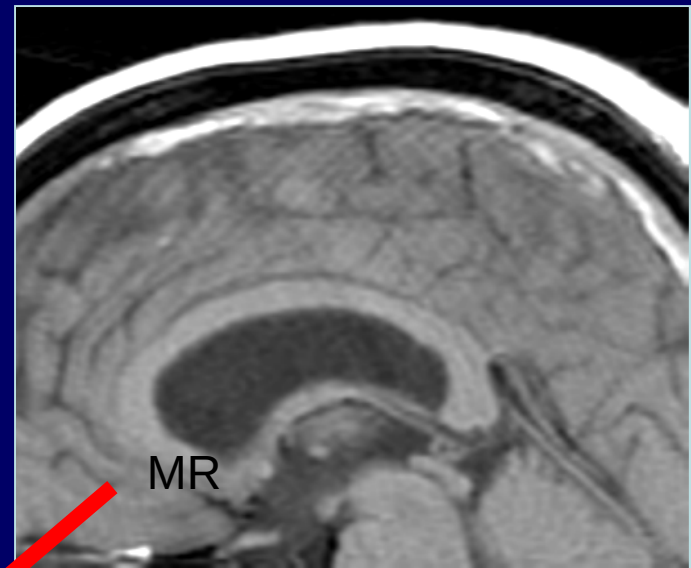
‘Signe
du
cordon’



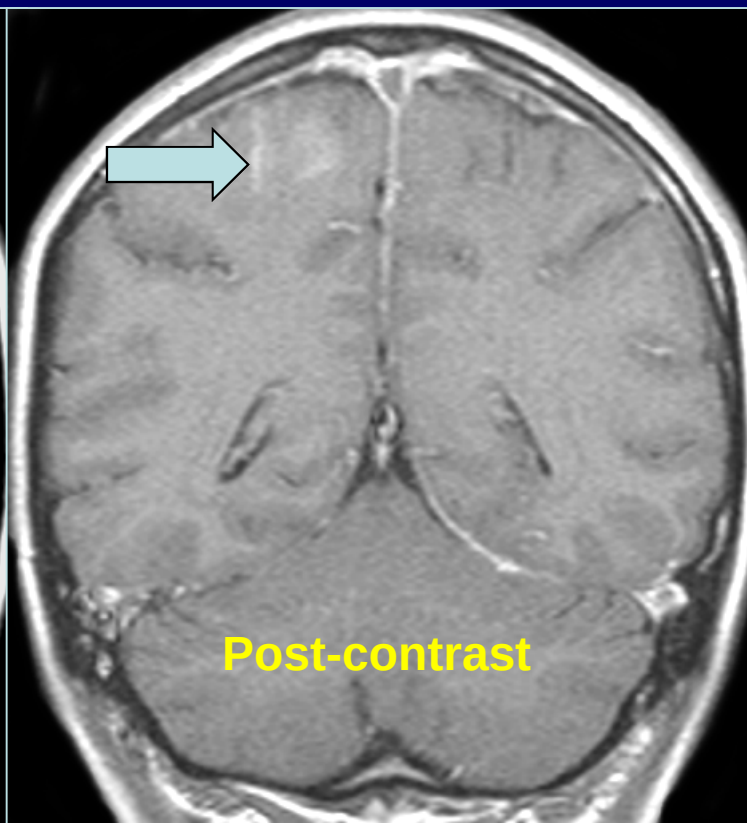
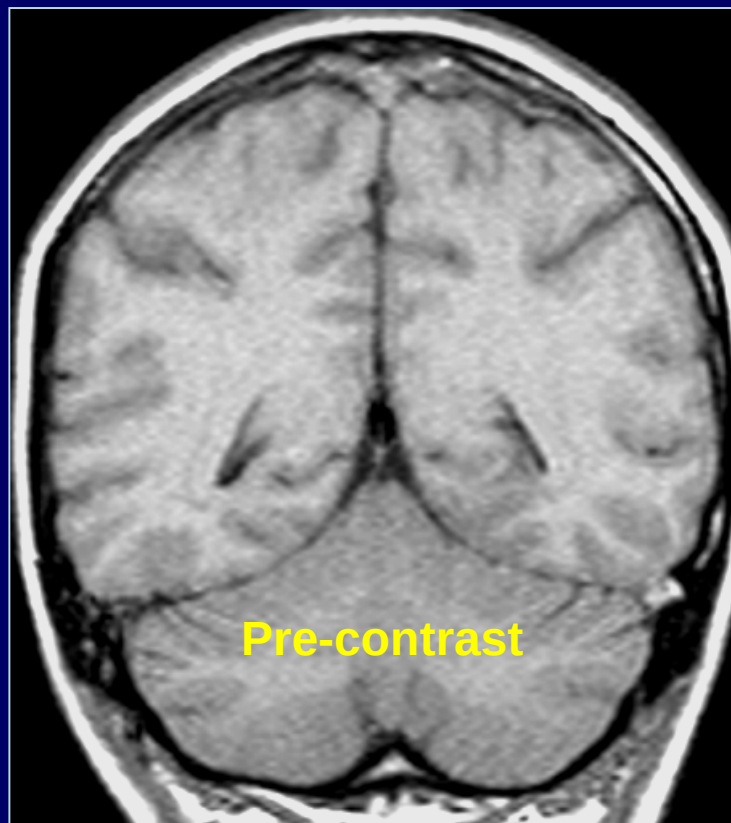
Dépendant du temps



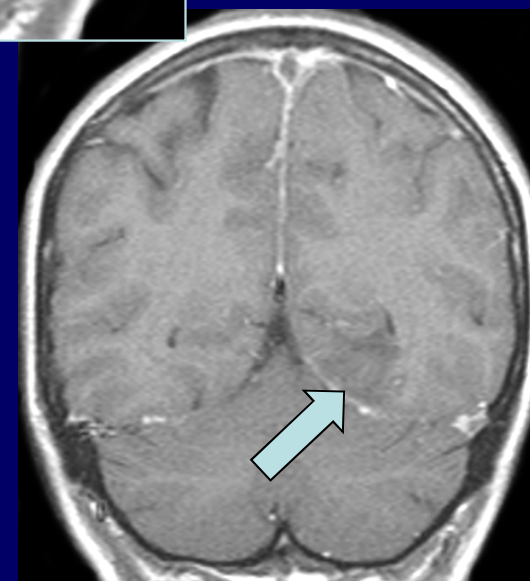
*few **hours***

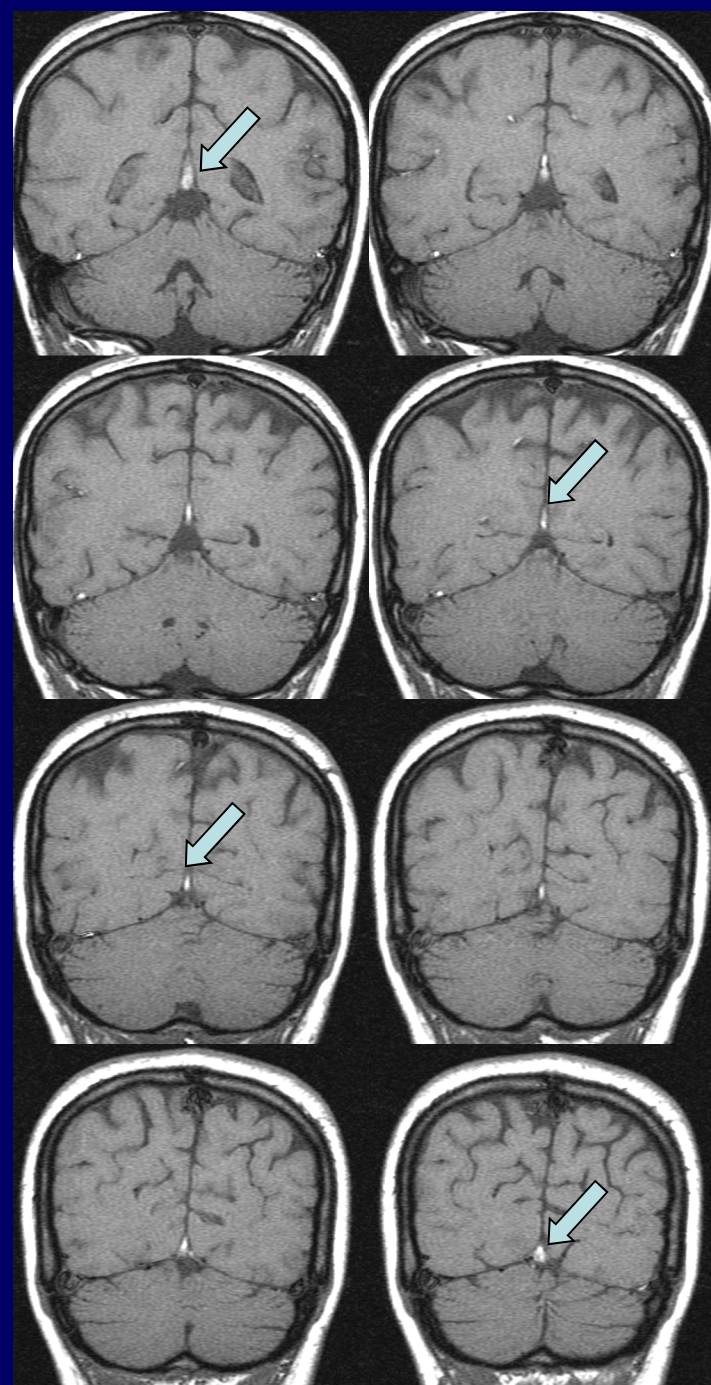


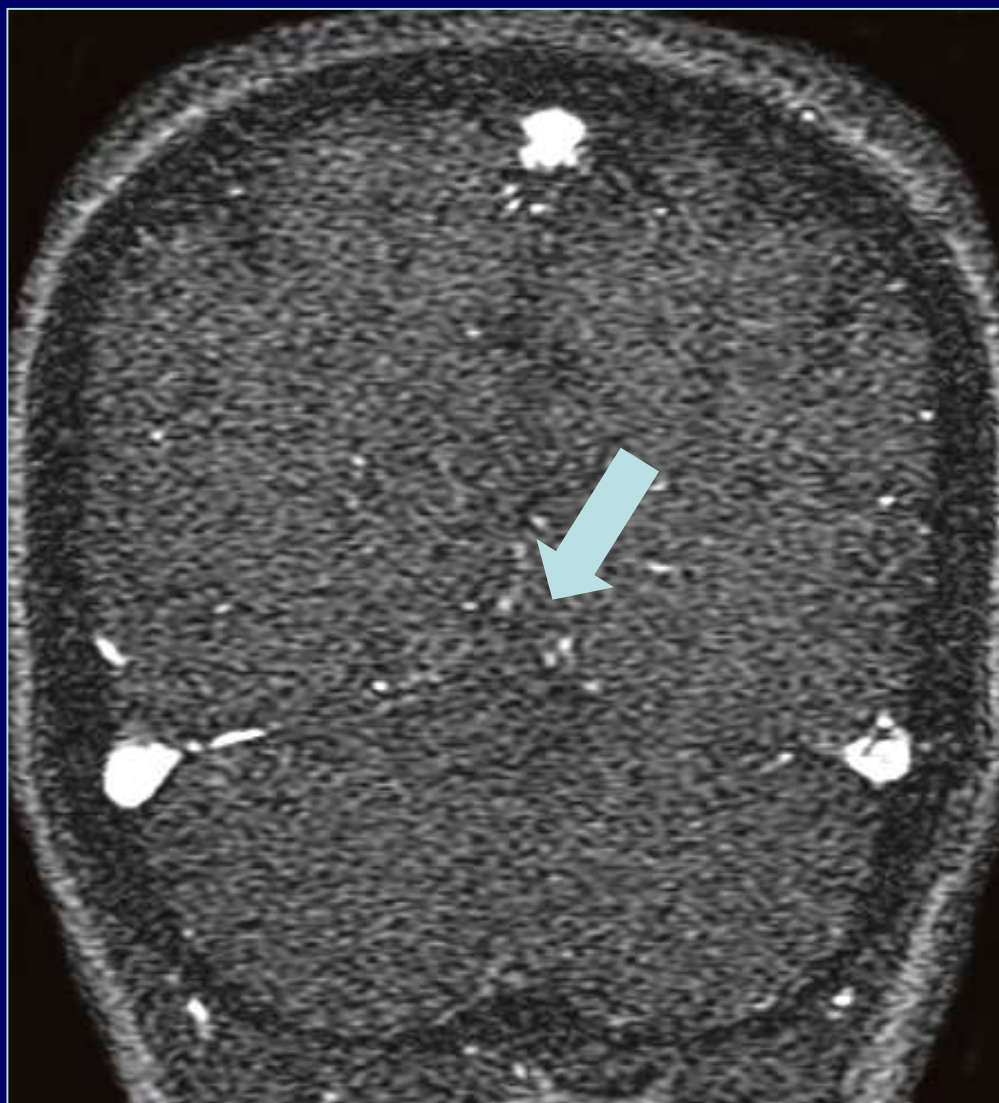
*few **days***



‘Signe du delta’







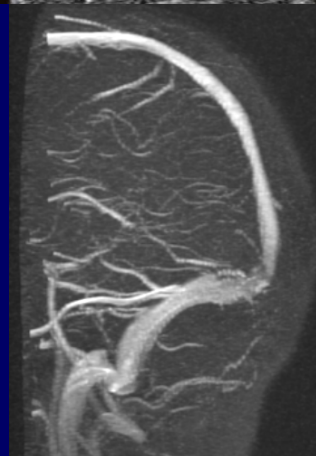
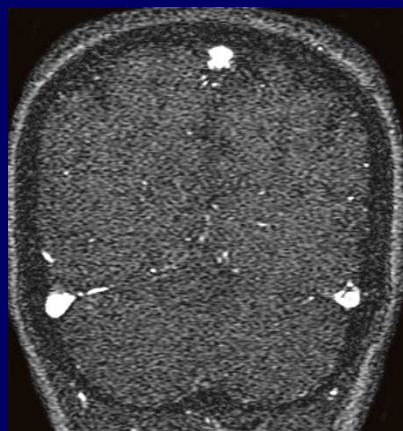
source image



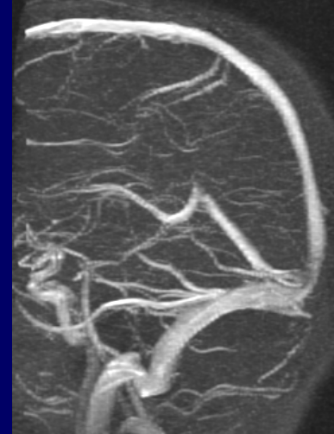
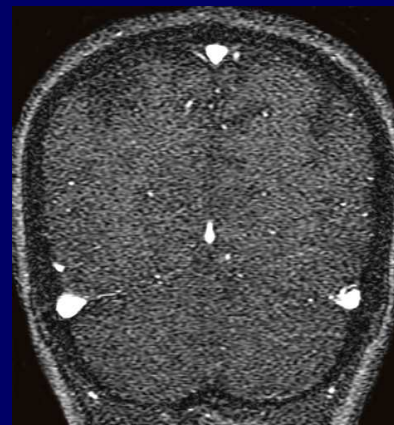
reconstruction



May 8th



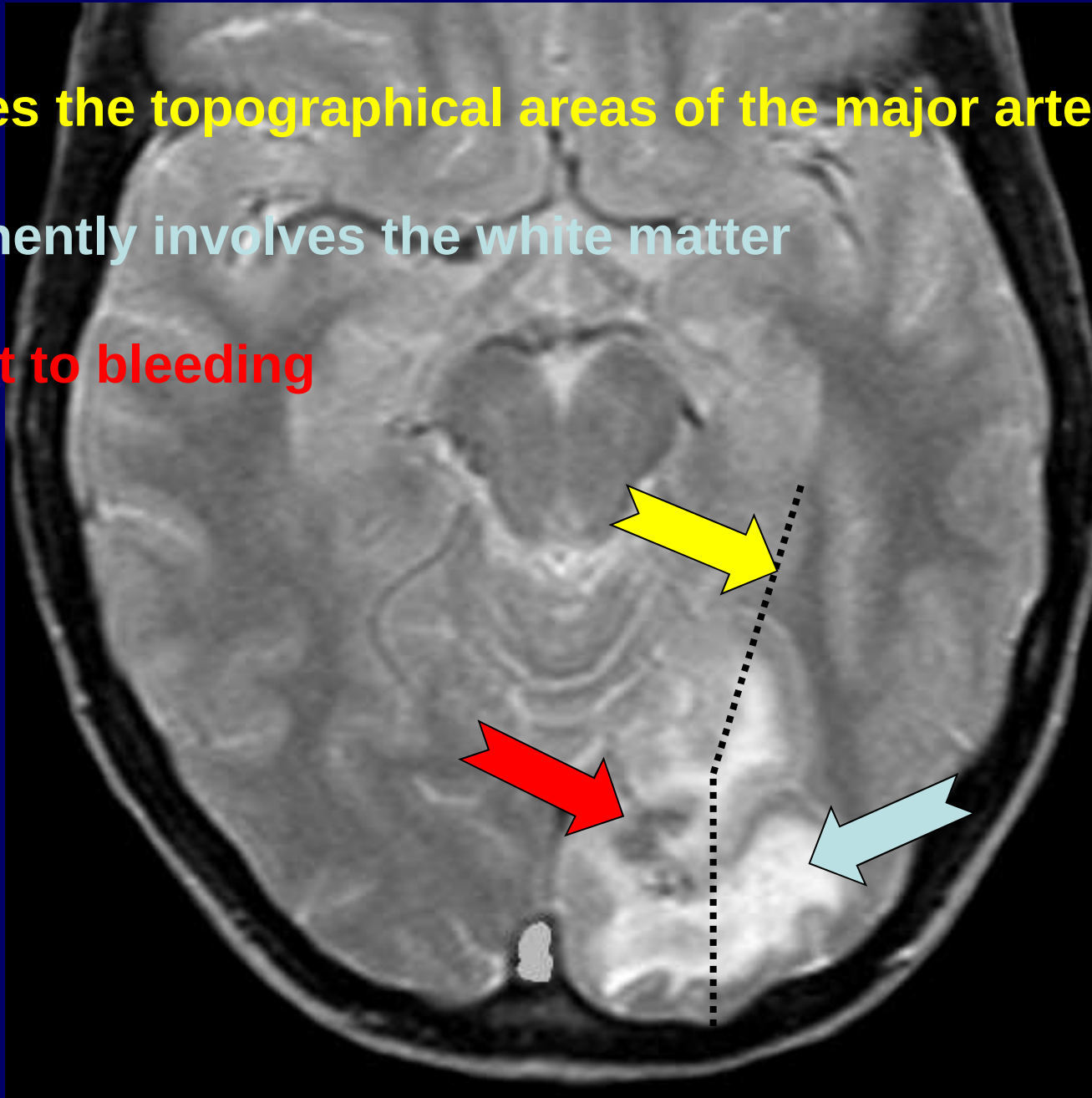
June 21th

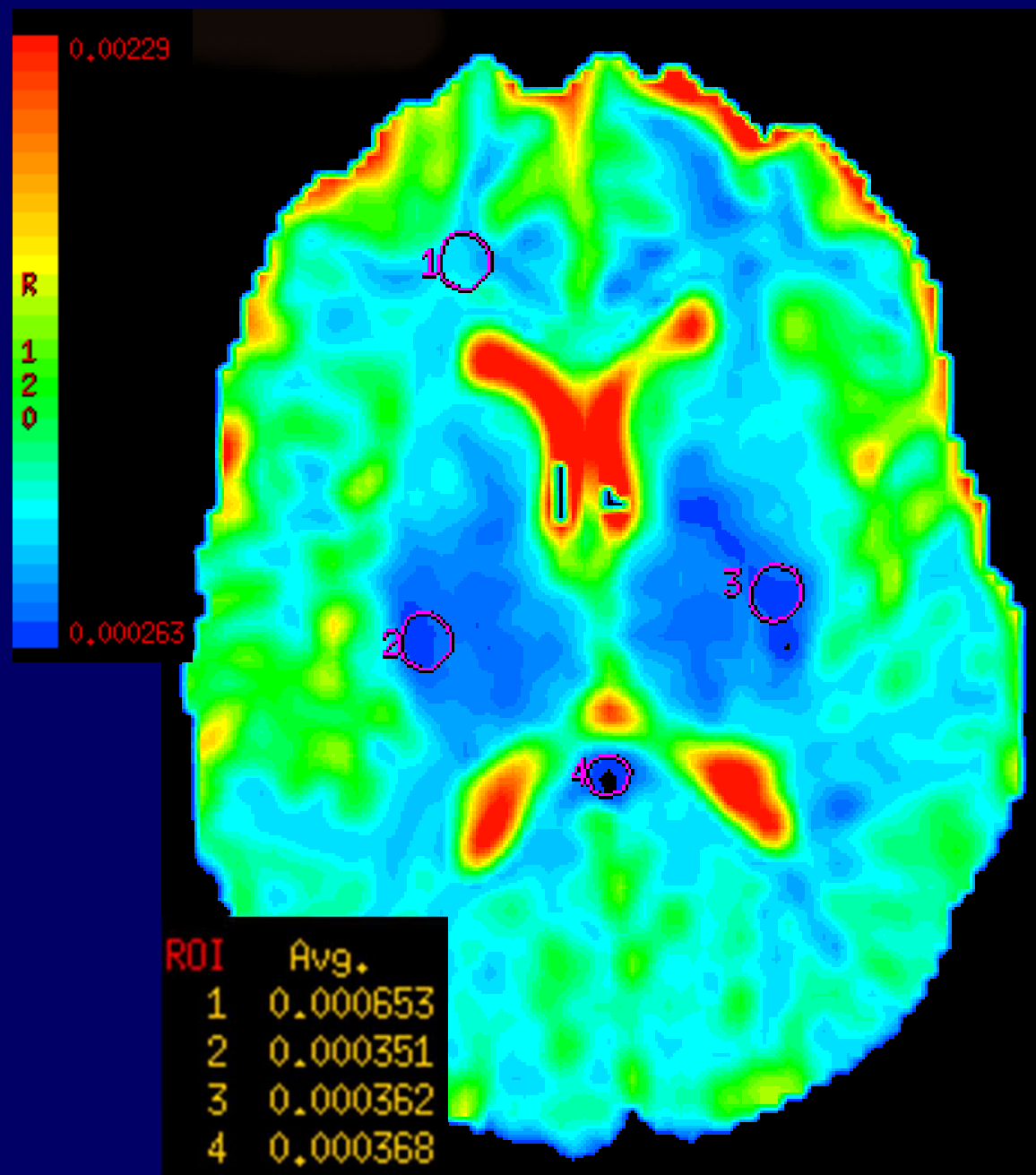
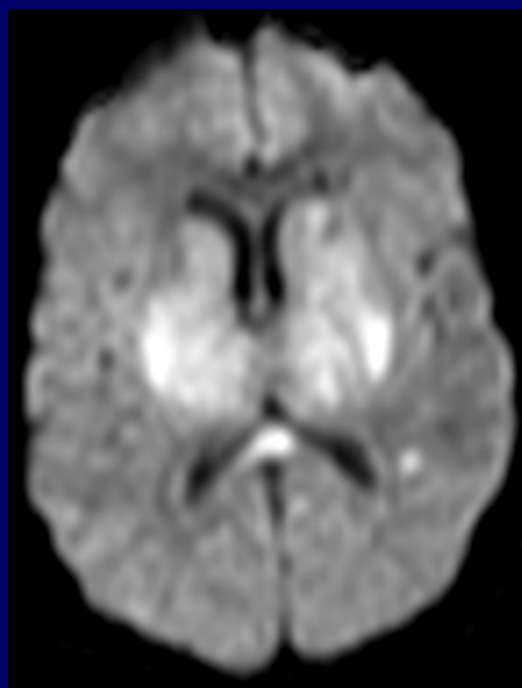
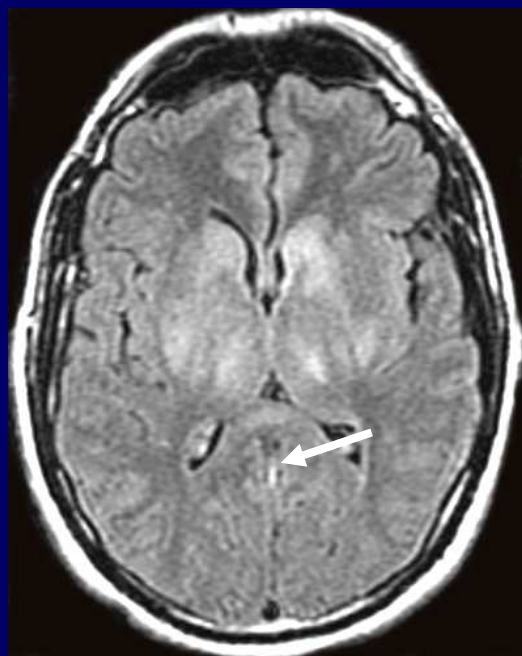


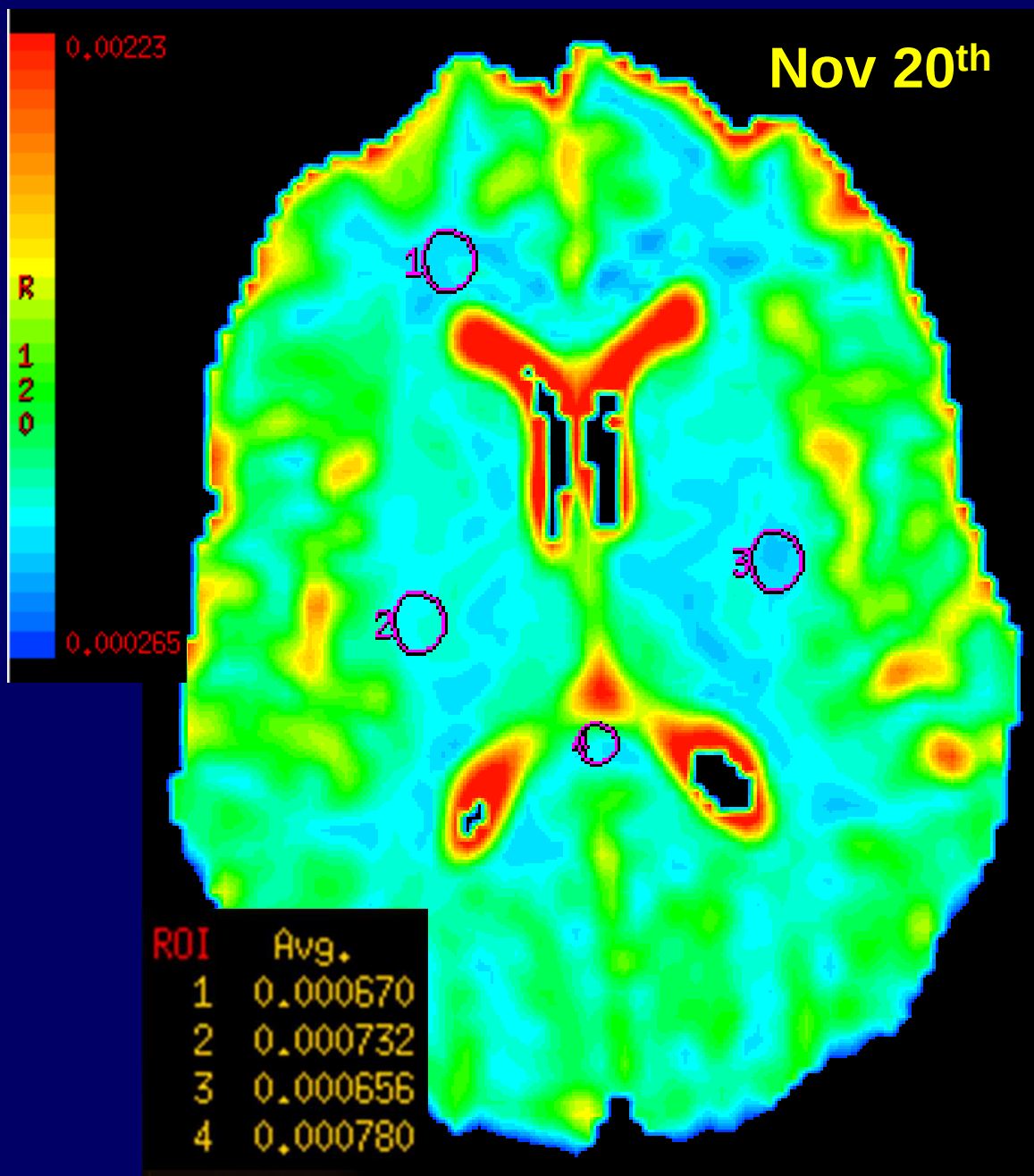
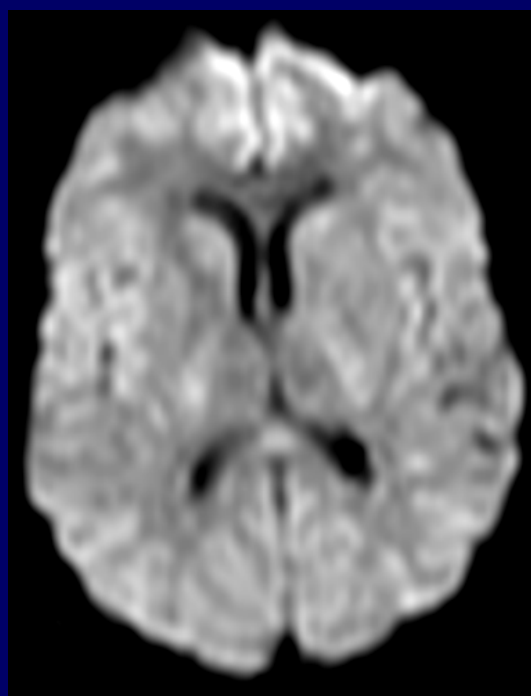
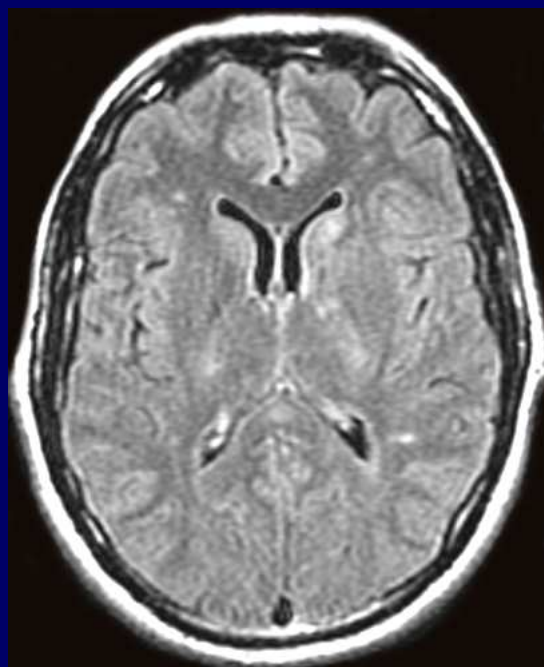
1. Crosses the topographical areas of the major arteries

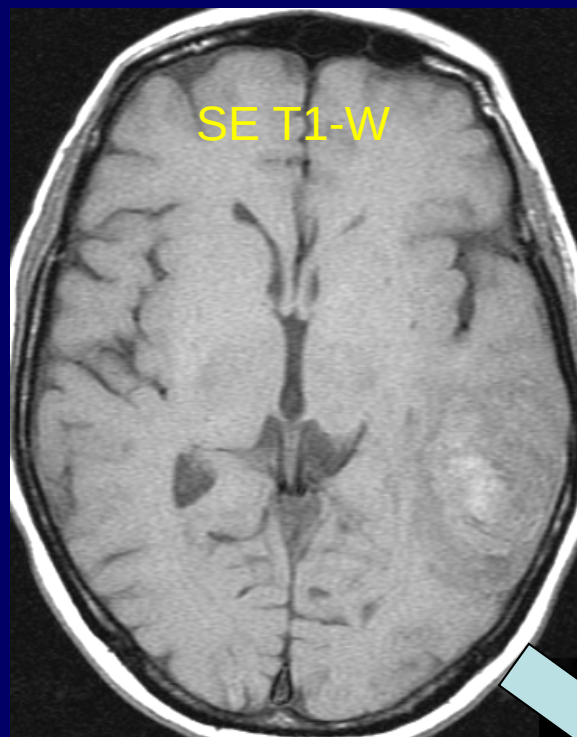
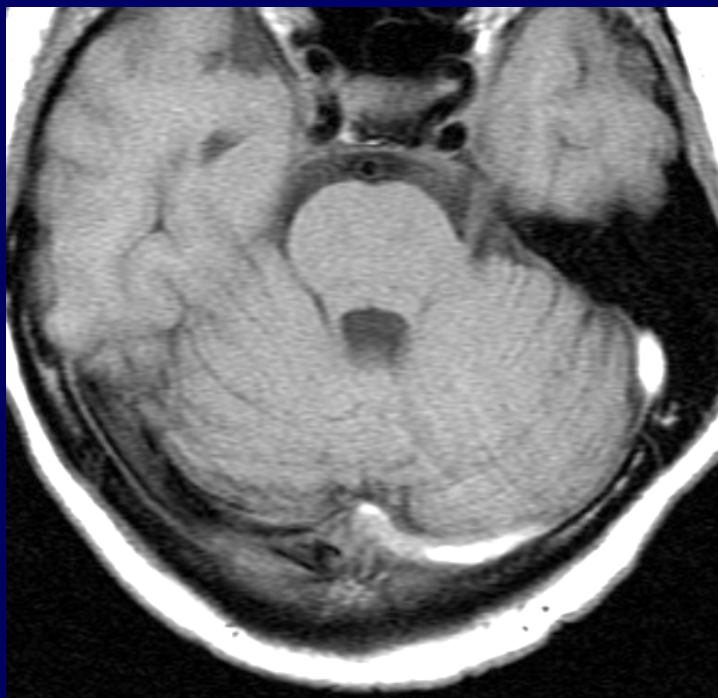
2. Prominently involves the white matter

3. Prompt to bleeding

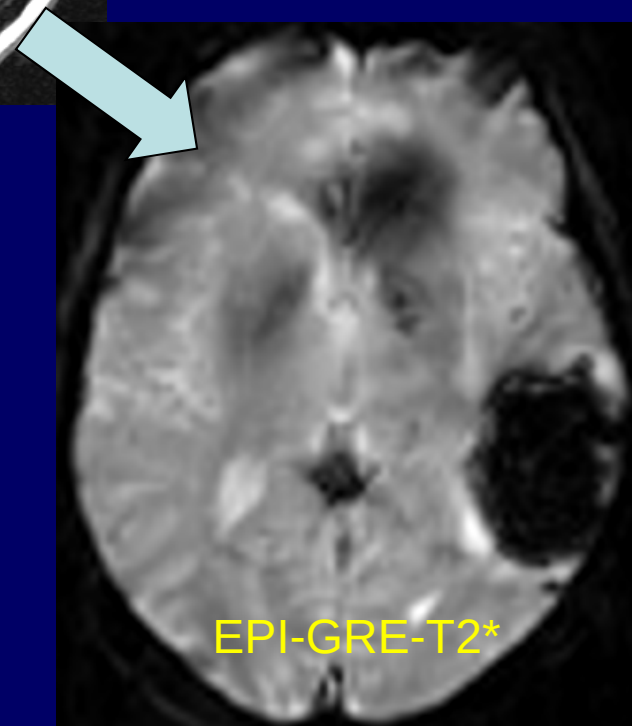




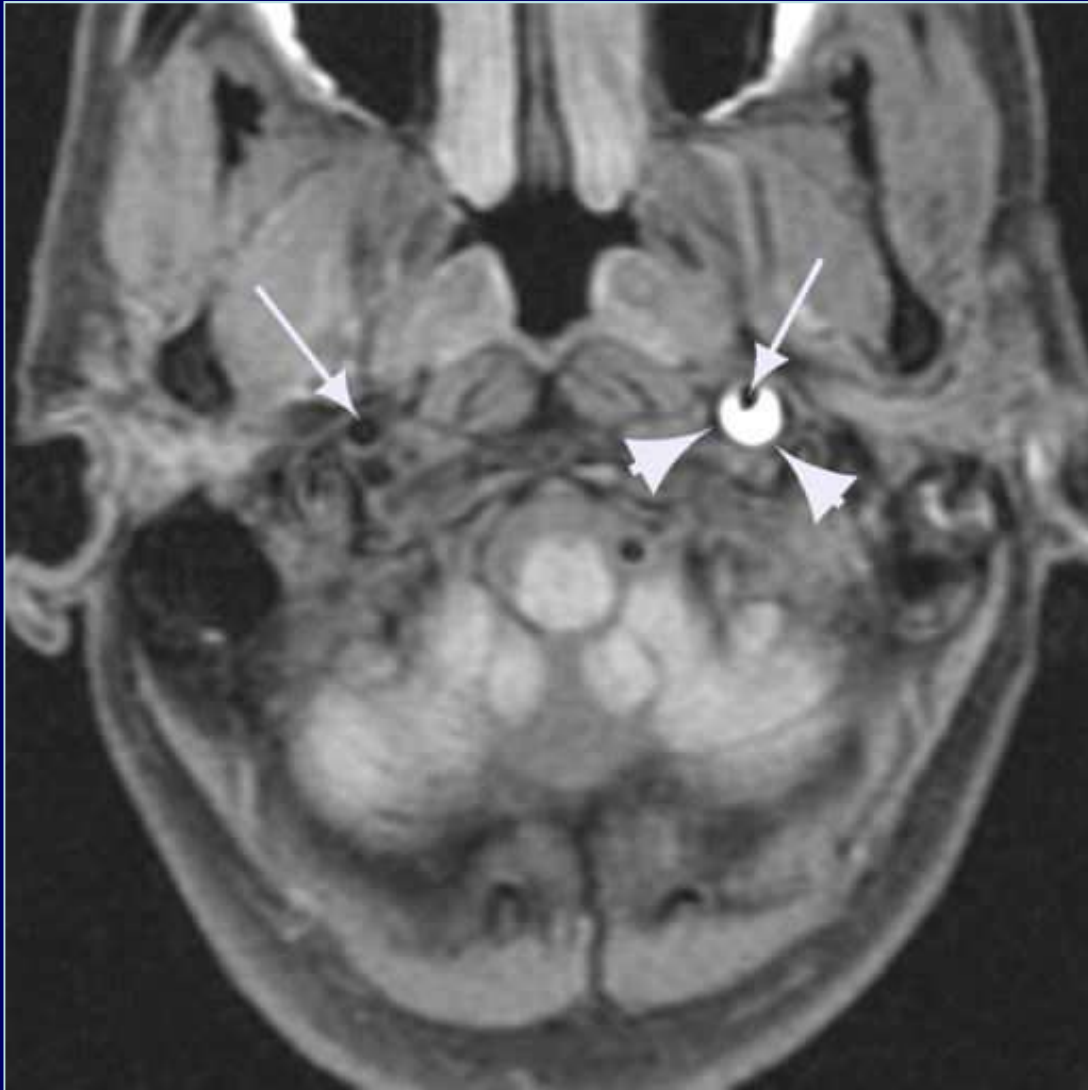




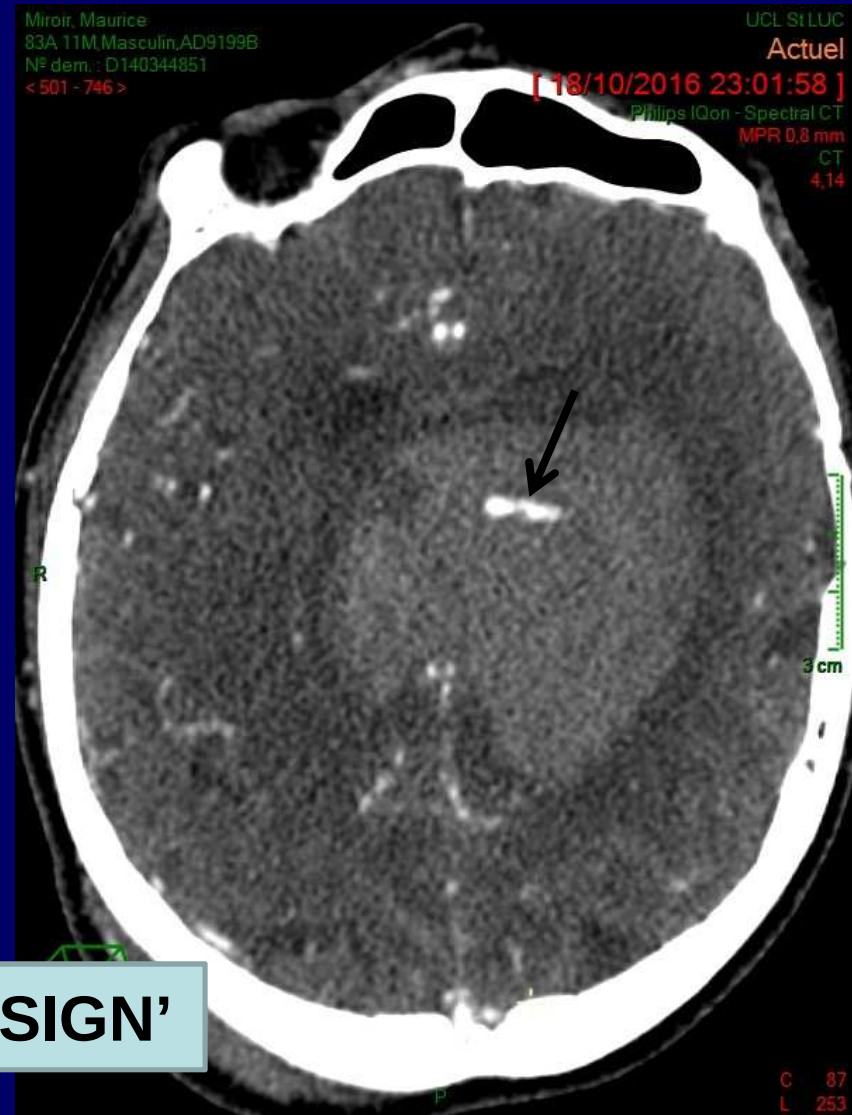
bleeding



Dissection artérielle

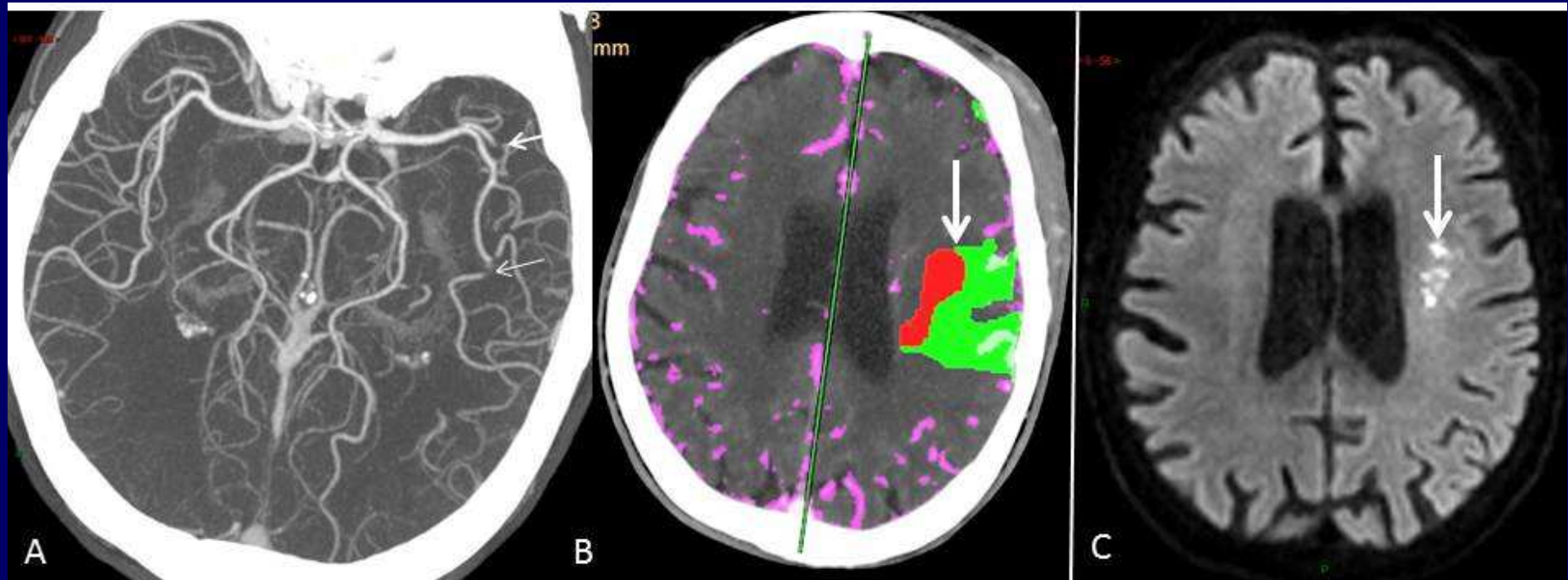


Case approach 1



'SWIRL-SIGN'

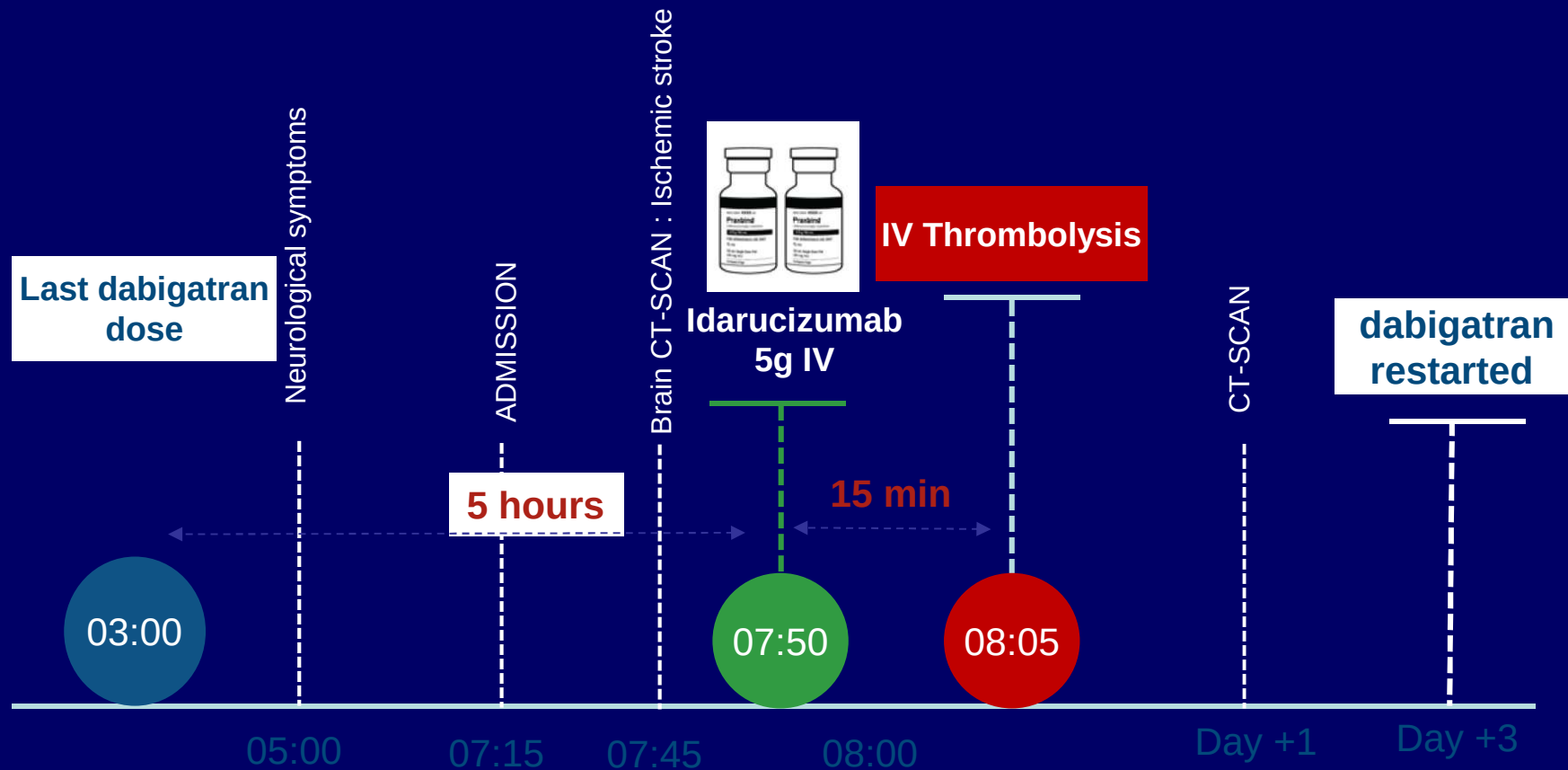
Case approach 2



85 ans – FA – HTA dyslipidémie

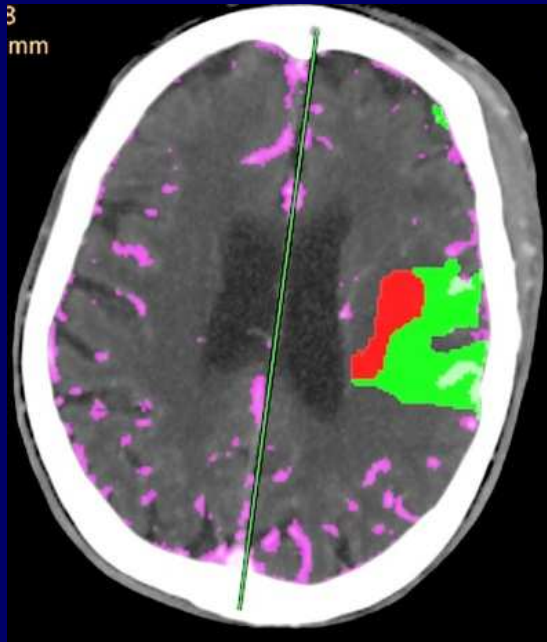
Aphasie et 1/2plégie droit → NHISS 17

Sous PRADAXA® → CI à la thrombolyse

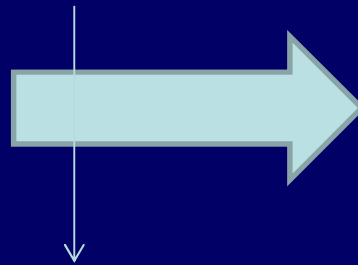


Case approach 2

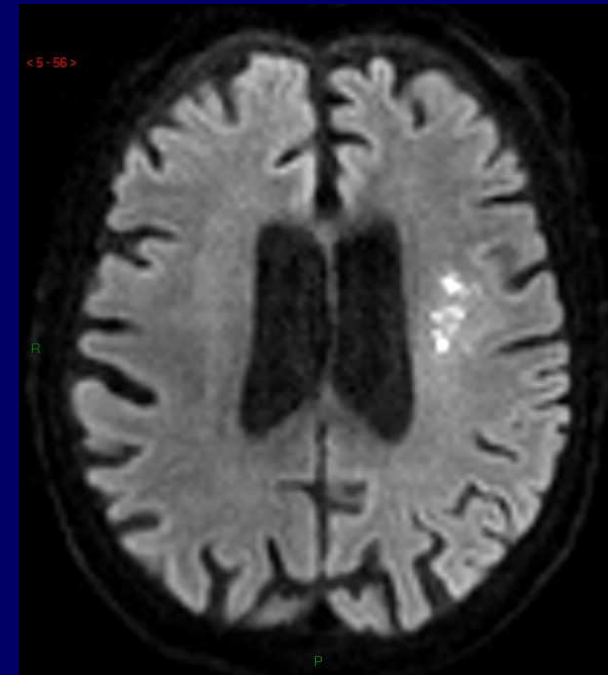
Case approach 2



Neutralisation du PRADAXA®
par PRAXBIND®



Thrombolyse !



R/ AC → CI à la thrombolyse IV (risque hémorragique)

Antivit K → INR >1.7 → exclu

Anti thrombine (Pradaxa®) → agent neutralisant disponible (Praxbind®)

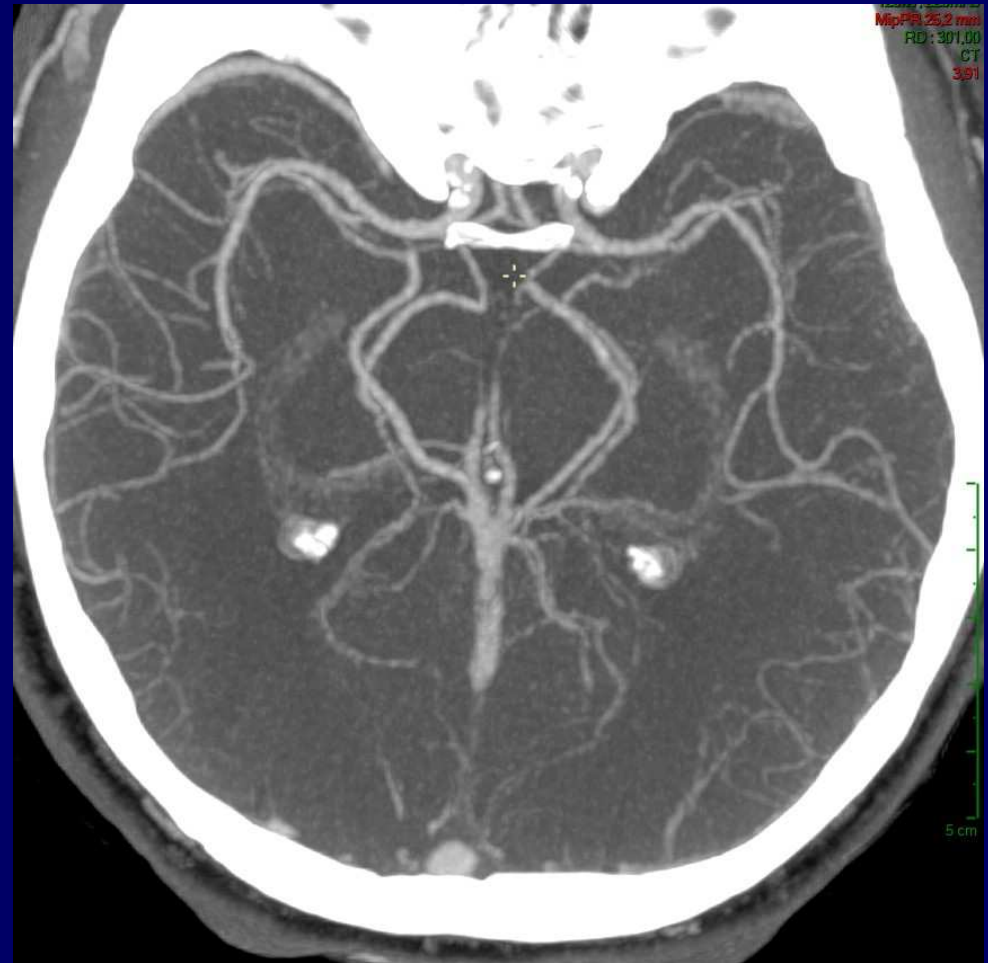
Anti facteur X (Xarelto®) → agent neutralisant dans le pipe-line

Case approach 3

Hémiplégie droite + aphasie



NCCT: normal



CTA: normal

Que faire ?

Case approach 3



Regarder plus bas !

... trouver un chirurgien vasculaire et une SO libres

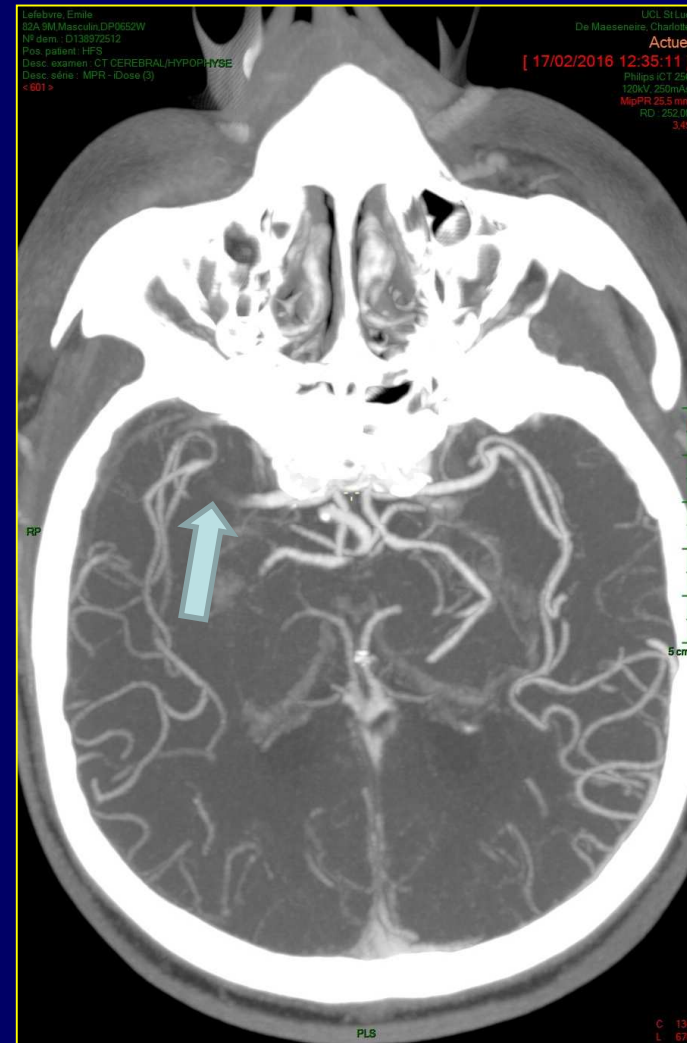
Case approach 4

Procédure interventionnelle: TAVI - ½ parésie gauche



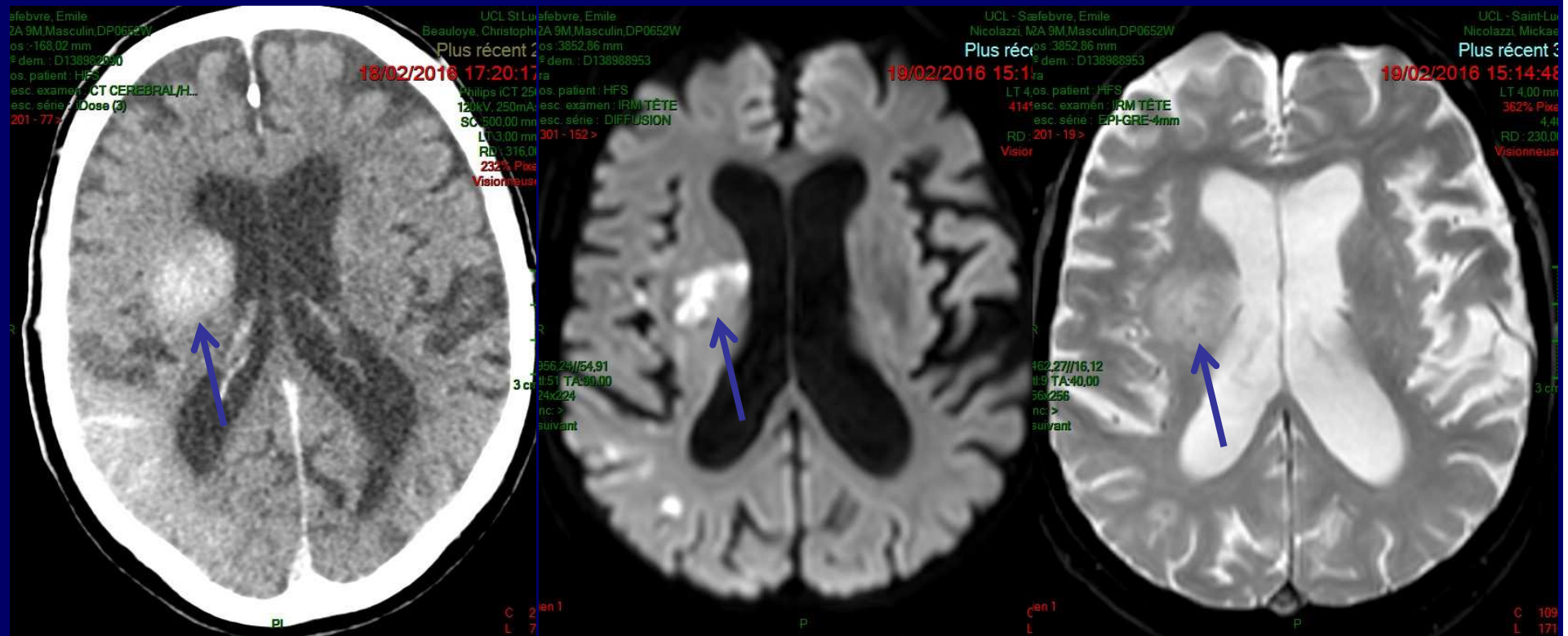
Examen 'à blanc'

Case approach 4



Angiogramme → thrombectomie

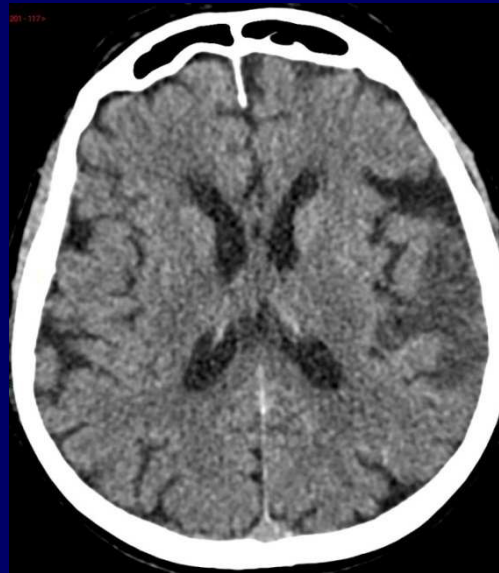
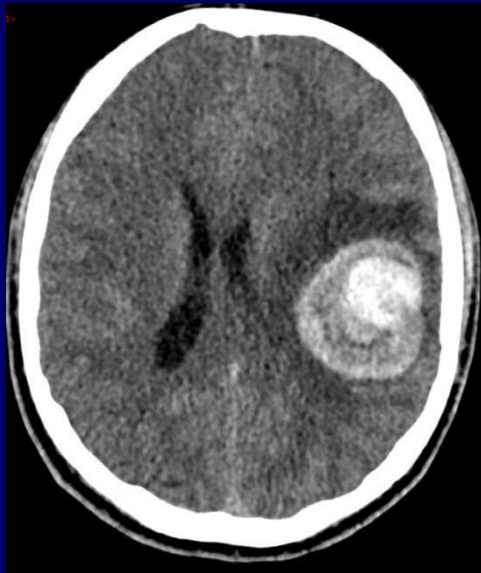
Case approach 4



Leakage de molécules de PdC par ischémie endothéliale

TAVI + CTA + THROMBECTOMIE !

NCCT



~~Thrombolyse
Thrombectomie~~



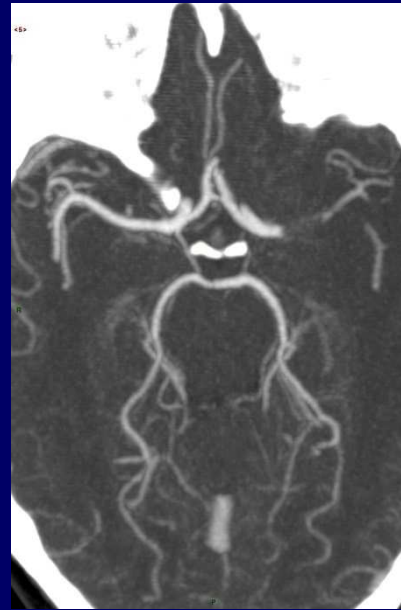
Thrombolyse
ssi <4h30



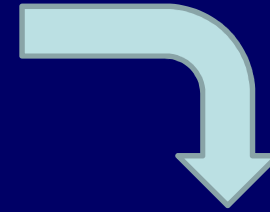
Thombectomie
ssi...

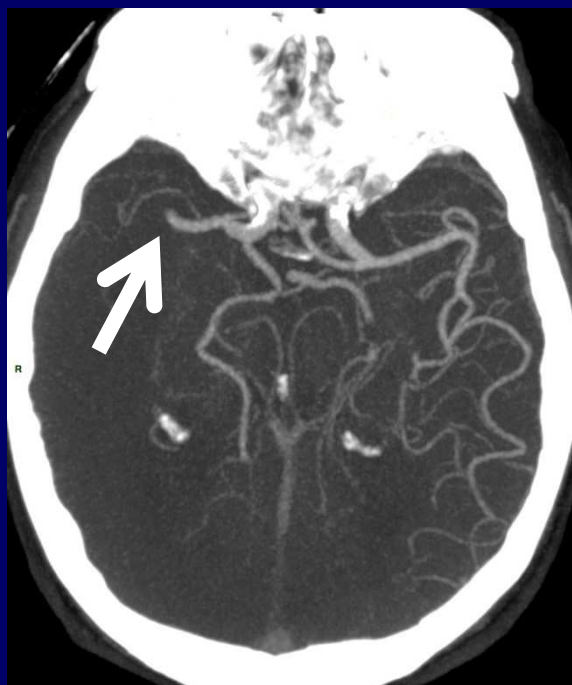


CTA

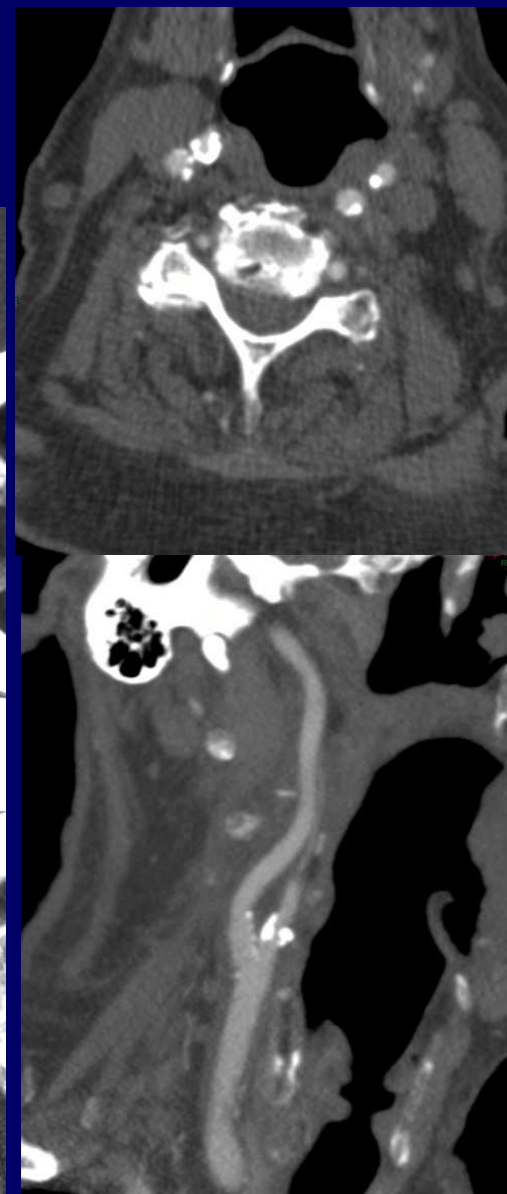


Caillot proximal
Caillot court





CTA



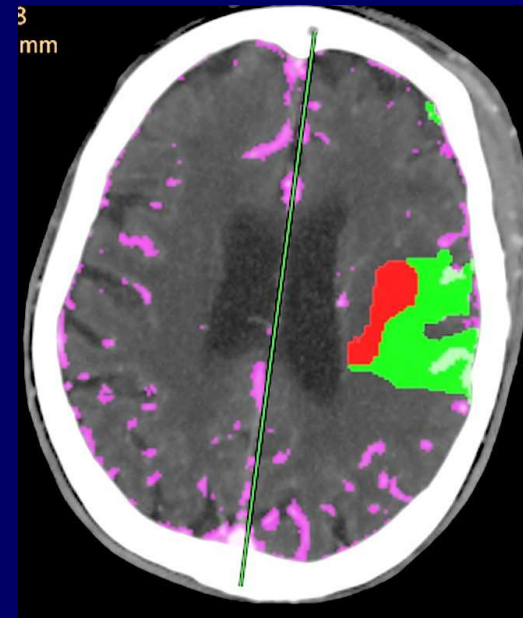
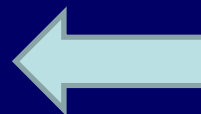
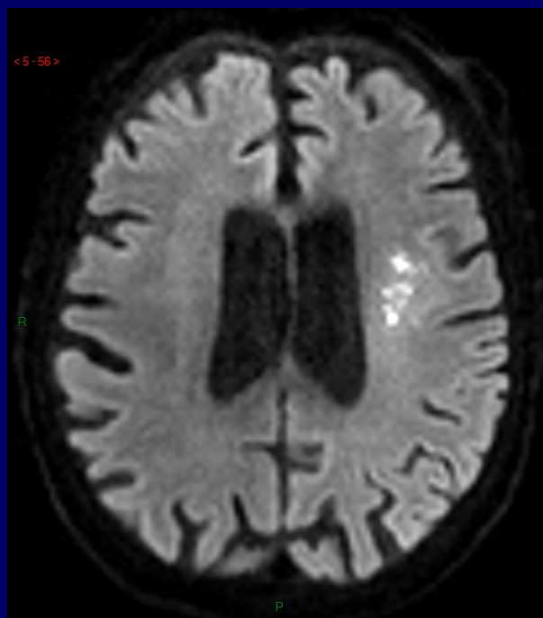
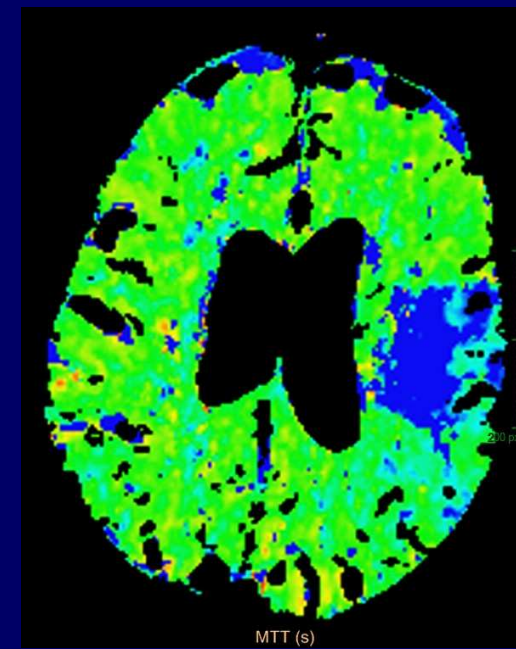
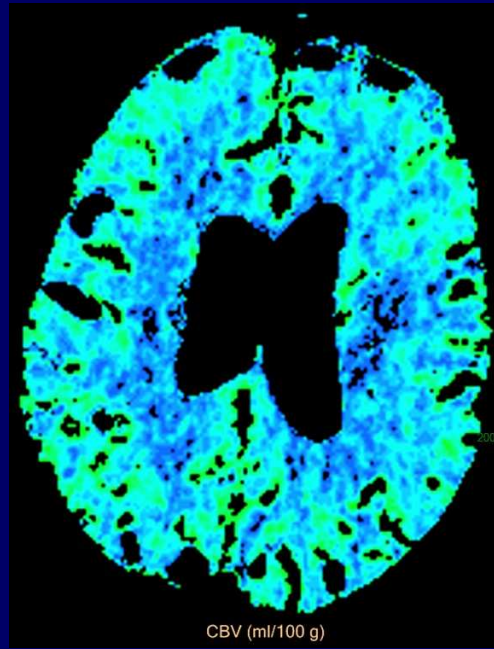
Montrer la perméabilité de la voie endo-vasculaire

CTA ... triphasique

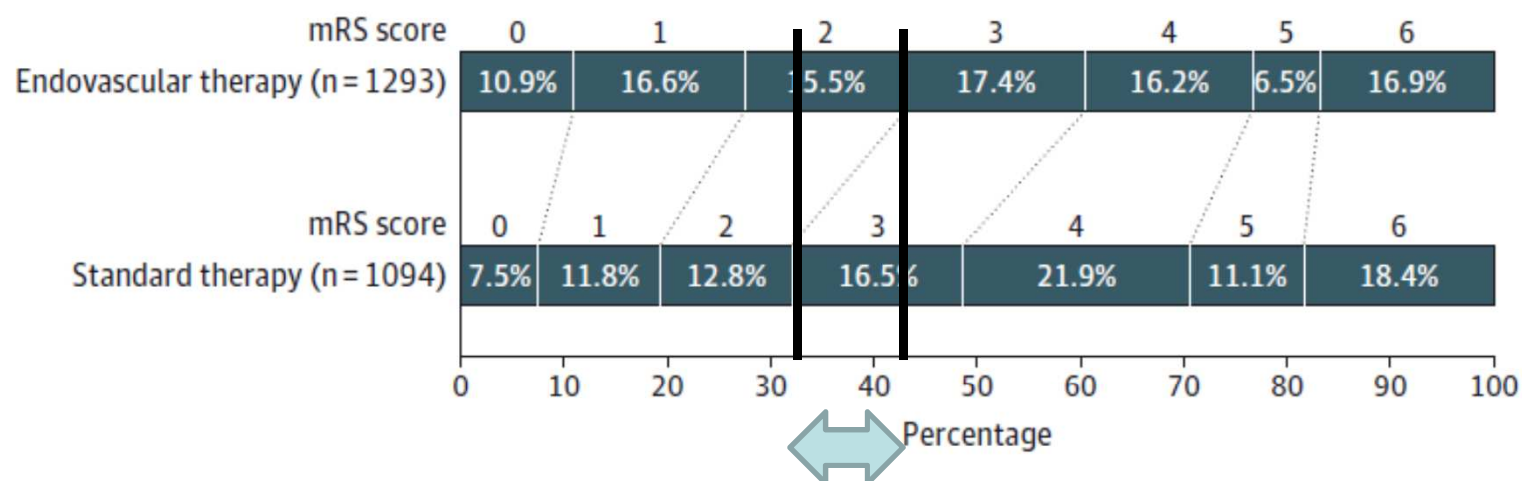


Monter la collatéralité → renforce l'indication de thrombectomie surtout '**hors**' délai

Peut-on concevoir le management de l'AVC hyperaigu sans IRM ?



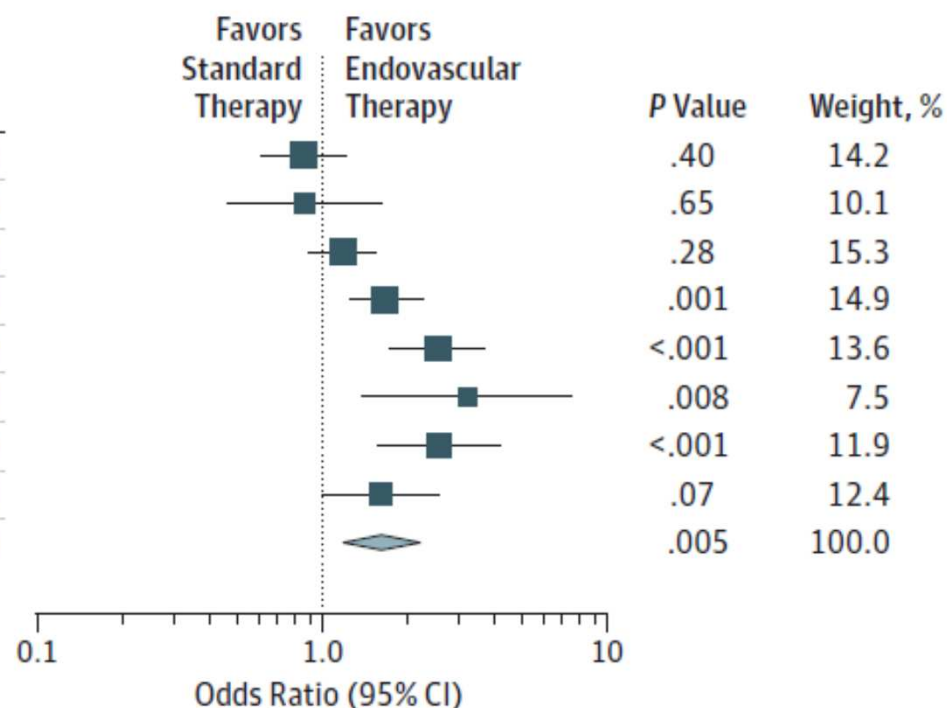
A Degree of disability at 90 d (modified Rankin Scale [mRS])



B Reduced disability at 90 d

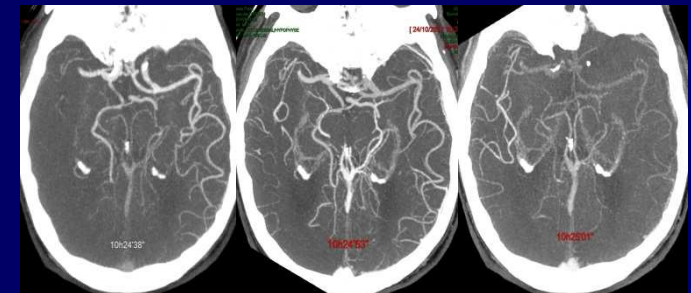
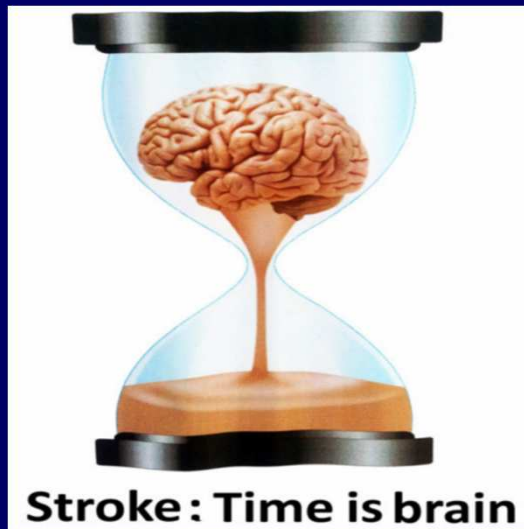
Source	Odds Ratio (95% CI)
SYNTHESIS, ²⁶ 2013	0.86 (0.60-1.23)
MR RESCUE, ²⁷ 2013	0.86 (0.45-1.63)
IMS III, ²⁸ 2013	1.17 (0.88-1.57)
MR CLEAN, ²⁹ 2015	1.66 (1.22-2.28)
ESCAPE, ³⁰ 2015	2.53 (1.70-3.79)
EXTEND-IA, ³¹ 2015	3.22 (1.36-7.61)
SWIFT-PRIME, ³² 2015	2.55 (1.53-4.26)
REVASCAT, ³³ 2015	1.57 (0.97-2.55)
Overall	1.56 (1.14-2.13)

$I^2 = 75.9\%$, $P < .01$



Que va-t-il encore se passer en AVC aigu ?

- better TRIAGE for thrombectomy
- mobile CTP
- full automated processing



Ultimate challenge

