

Dural AV Fistulas

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What is the proper name?

- Should it be Dural fistulas (Fistulae?)?
- Proper terminology maybe Dural Arteriovenous Fistulous Malformation (DAVFM) Borden et al
- Reflects the more complex nature of the disease where there is not a single hole fistula but a more complex weave of fistulous connections

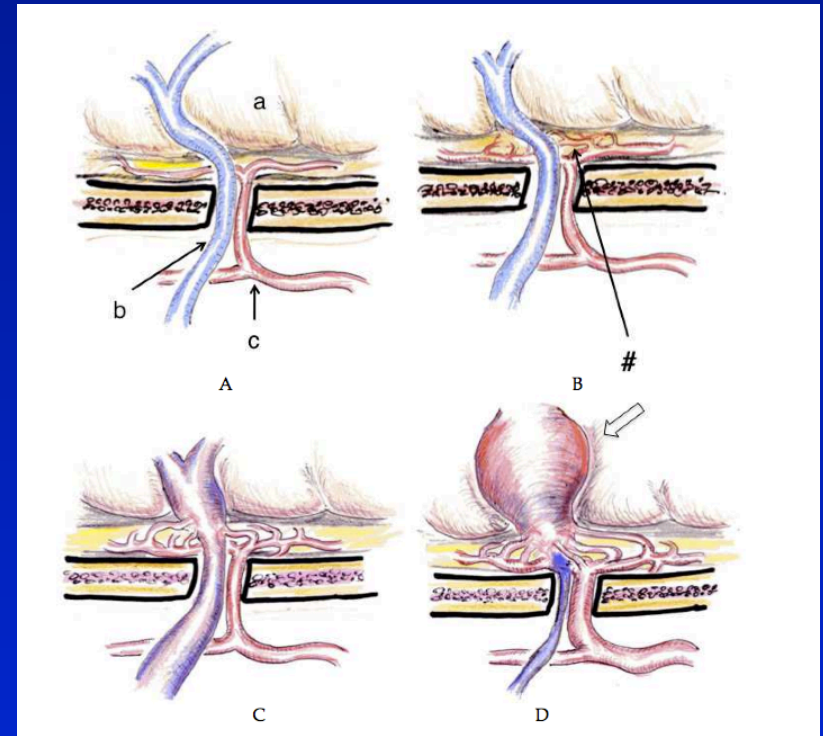
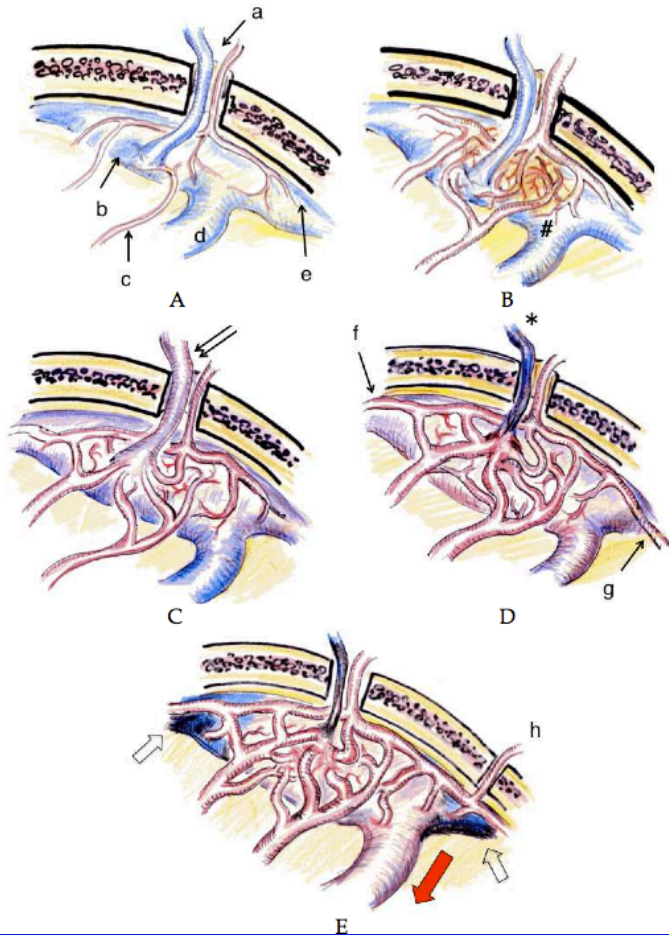
Hypothetical Mechanism of the Formation of Dural Arteriovenous Fistula – The Role and Course of Thrombosis of Emissary Vein and Sinuses

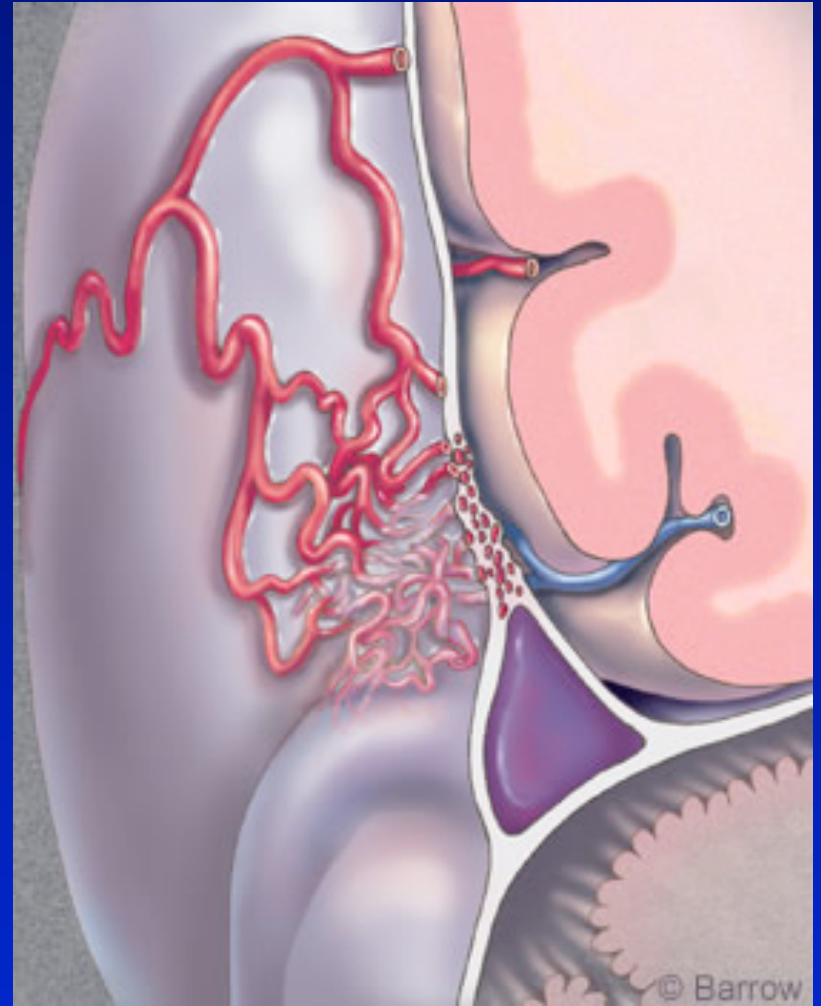
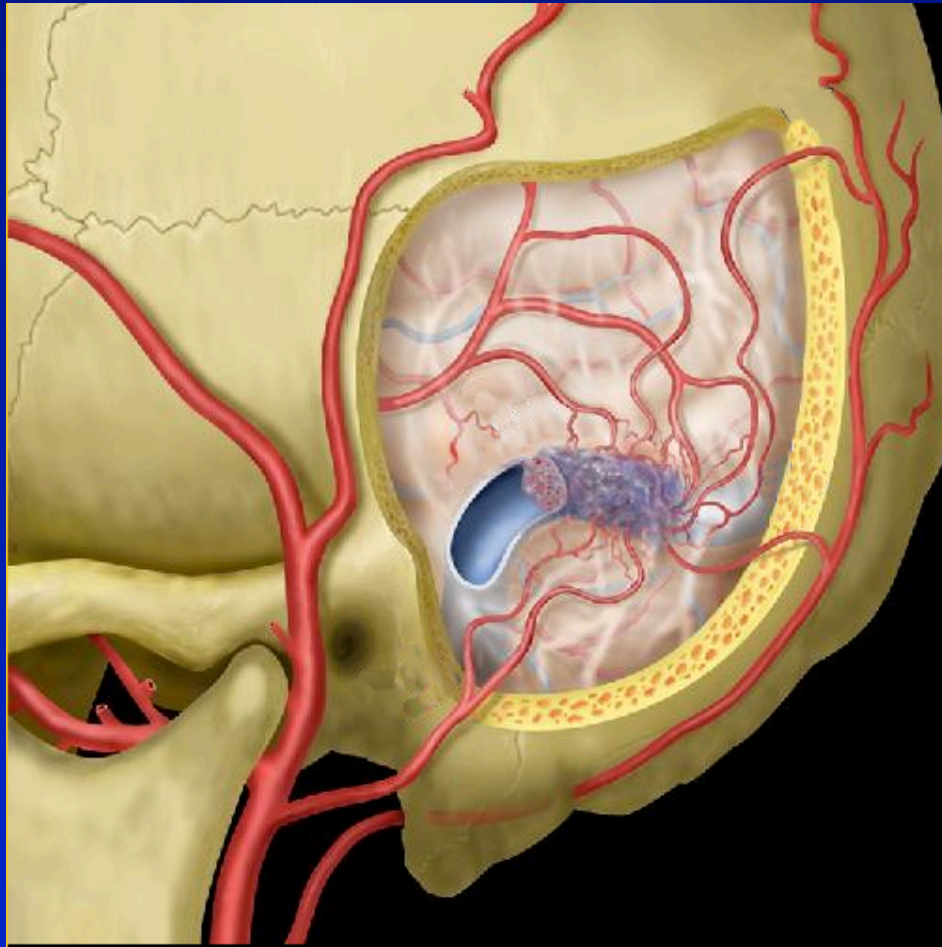
2012

Shigeru Miyachi
 Department of Neurosurgery, Nagoya
 University Graduate School of Medicine, Nagoya
 Japan

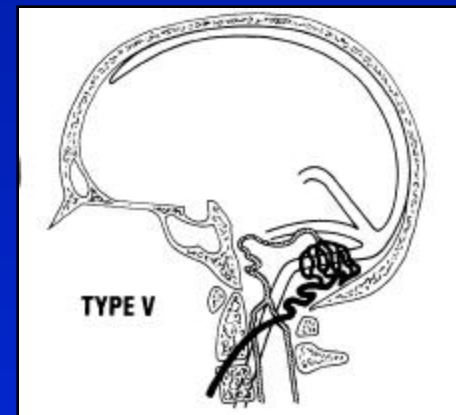
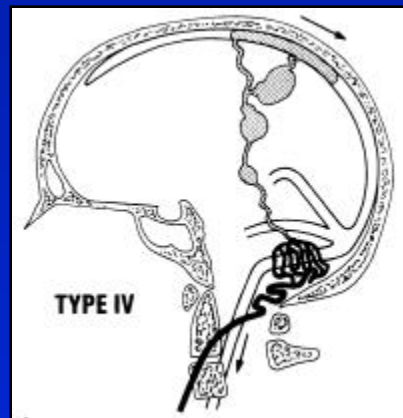
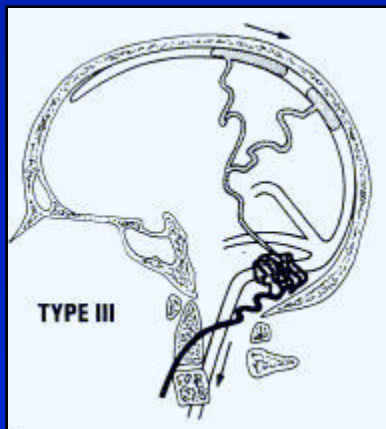
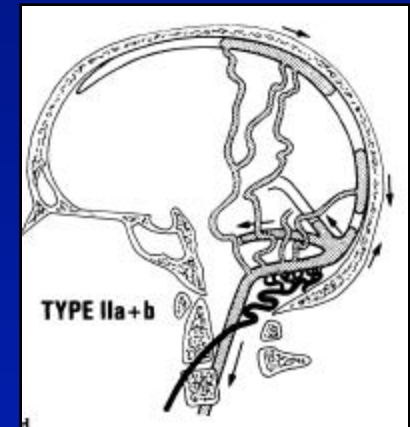
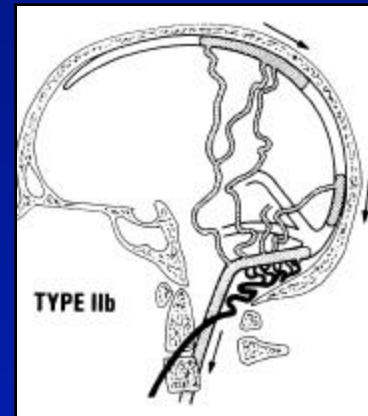
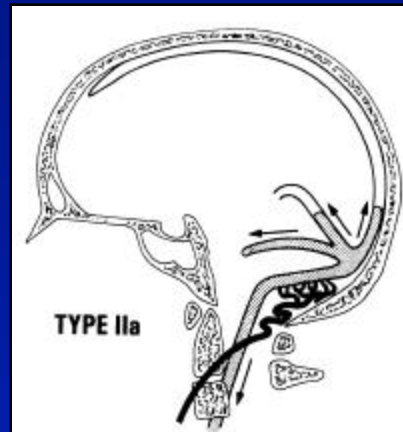
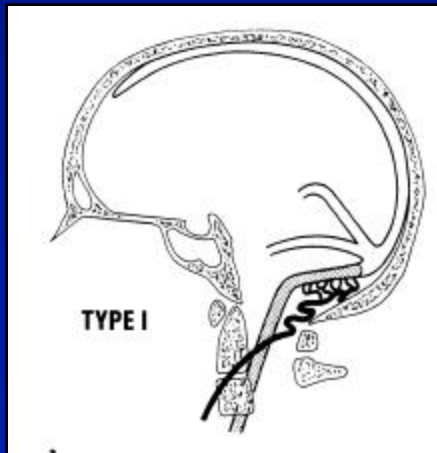
Hypothetical Mechanism of the Formation of Dural Arteriovenous
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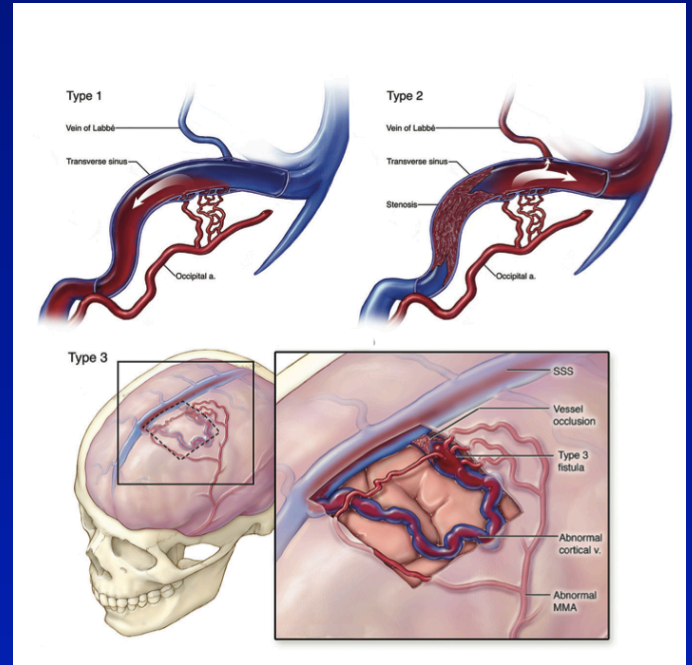
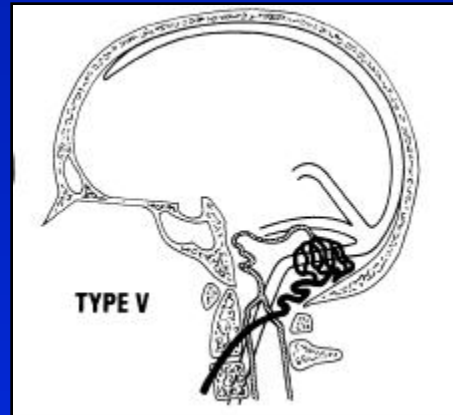
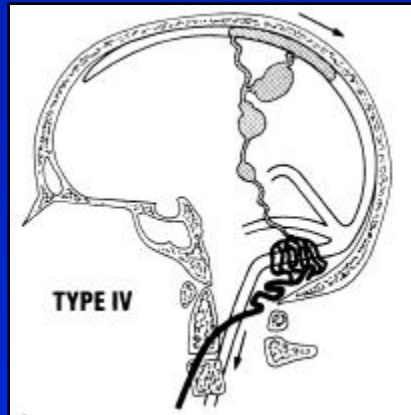
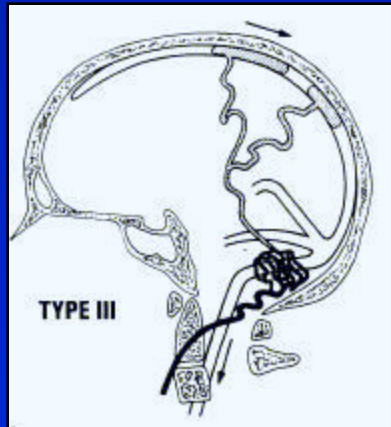
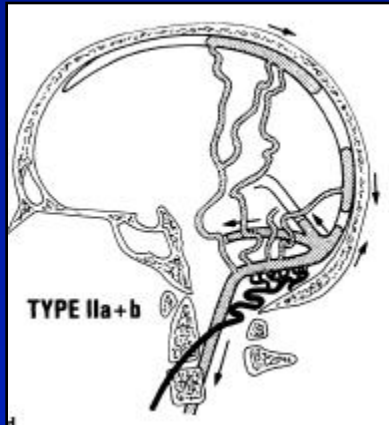
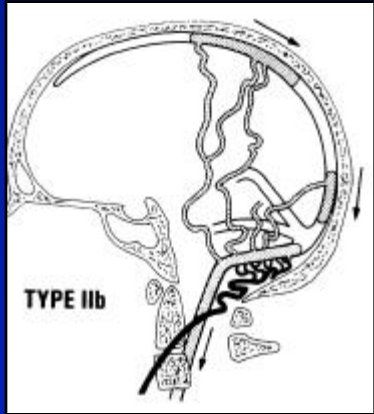
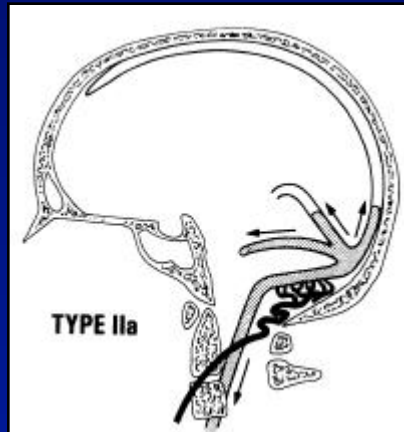
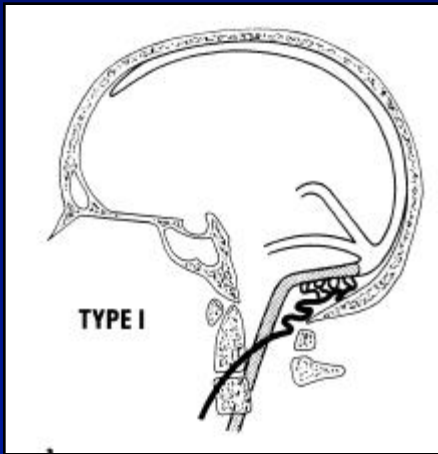




Cognard Classification



Borden 1



Borden 2

Borden 3

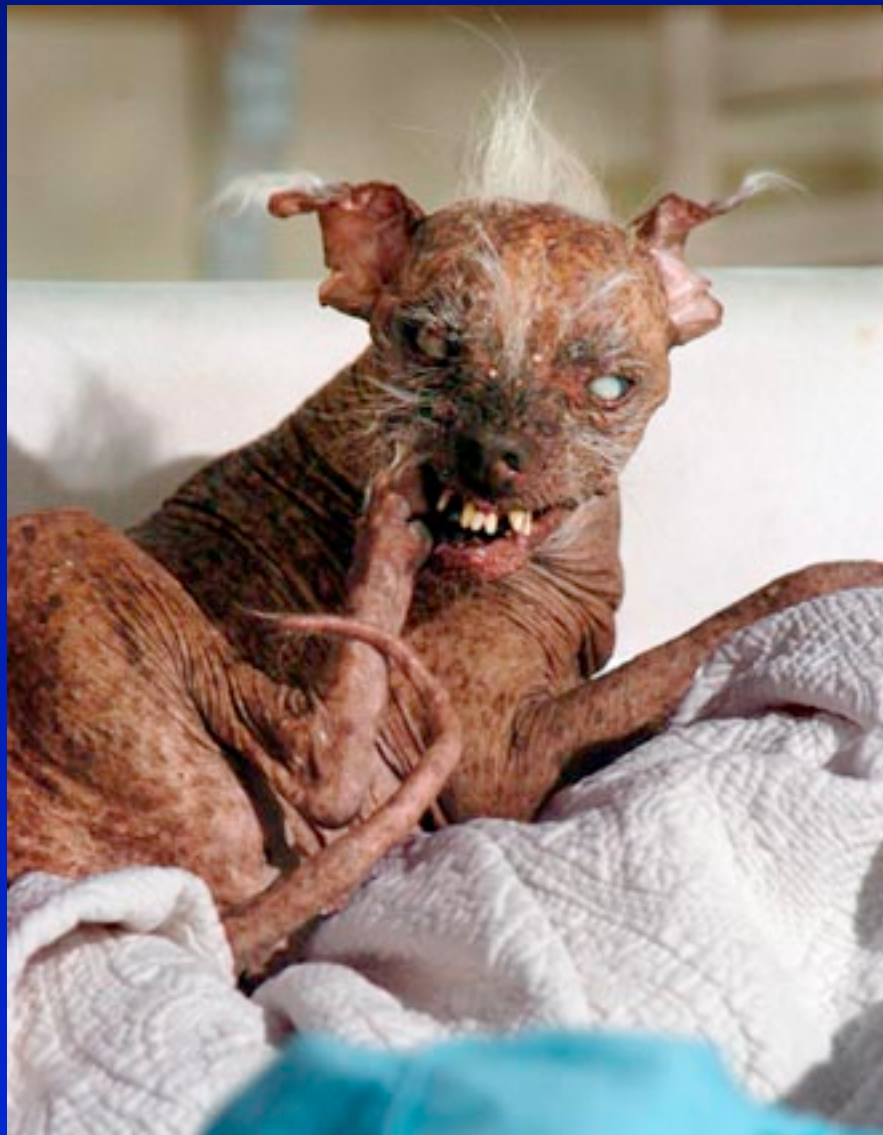
Clinical- Generalities

- Lesions related to large dural sinuses are less likely to bleed than those with restricted flow
- Leptomeningeal drainage, varices, galenic drainage are more dangerous situations

Historical Treatments

- Surgical
- Endovascular
 - Polyvinyl alcohol PVA
 - N butyl-cyanoacrylate NBCA (glue)
 - Coils - Coated or platinum
 - Stents
- Arterial versus venous approach

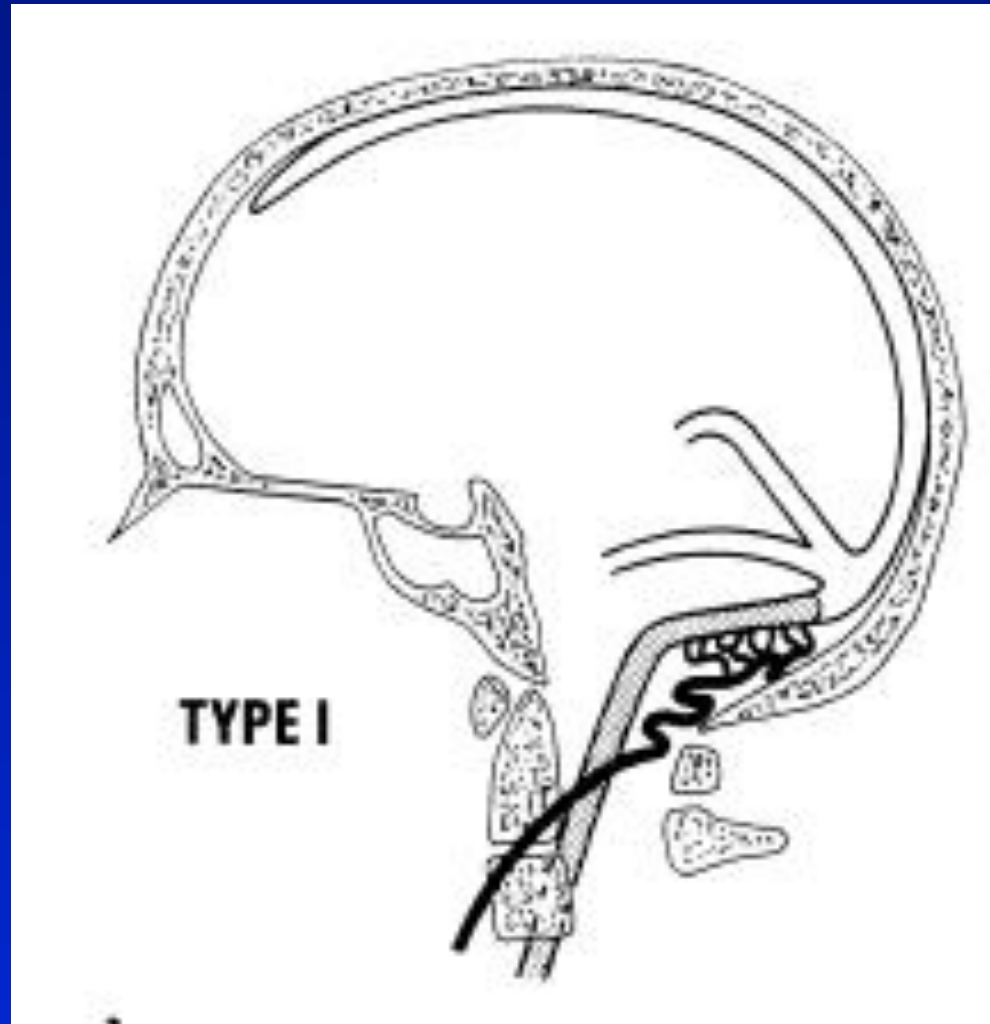
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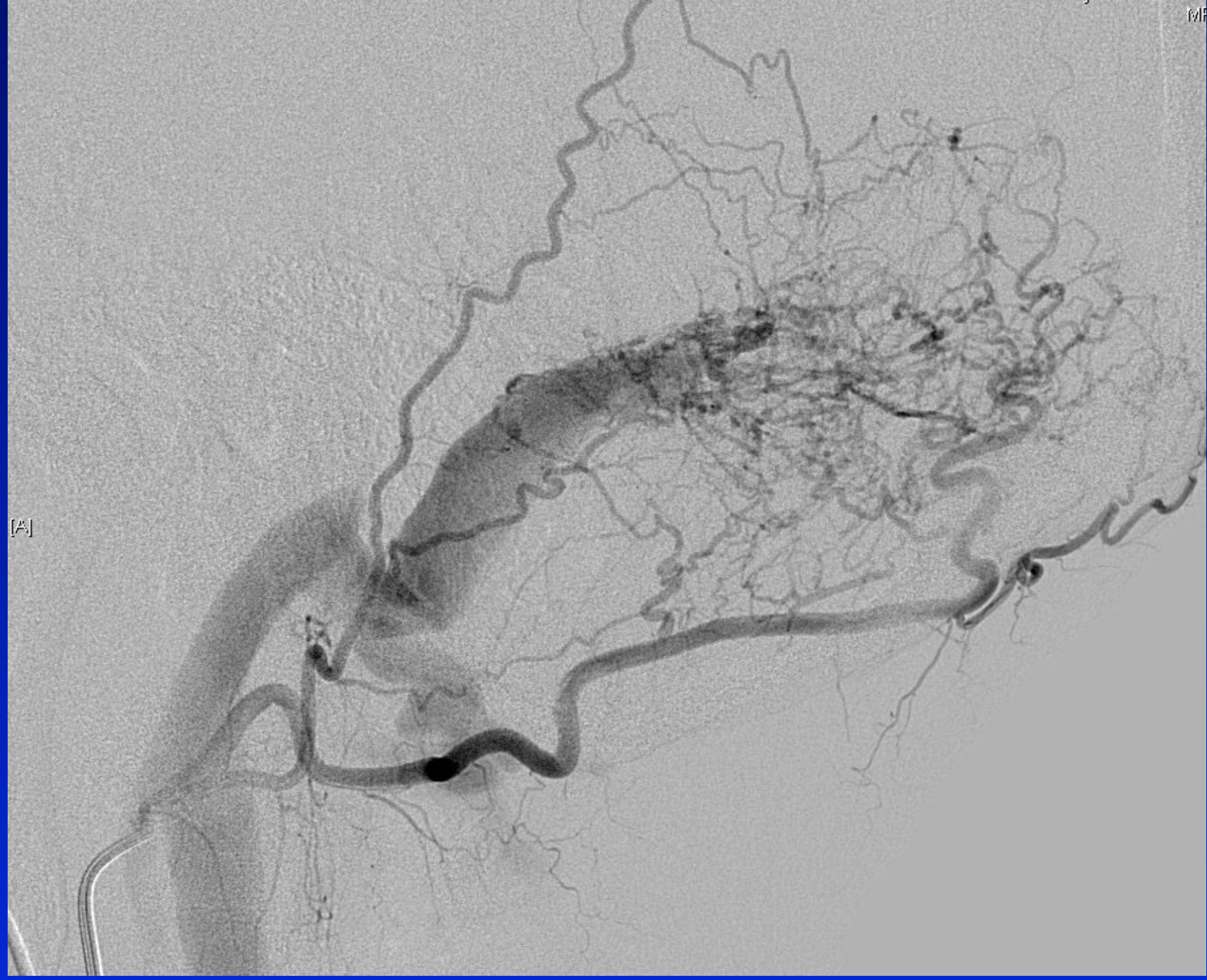


POST



Cognard Type I (Borden I)





[A]

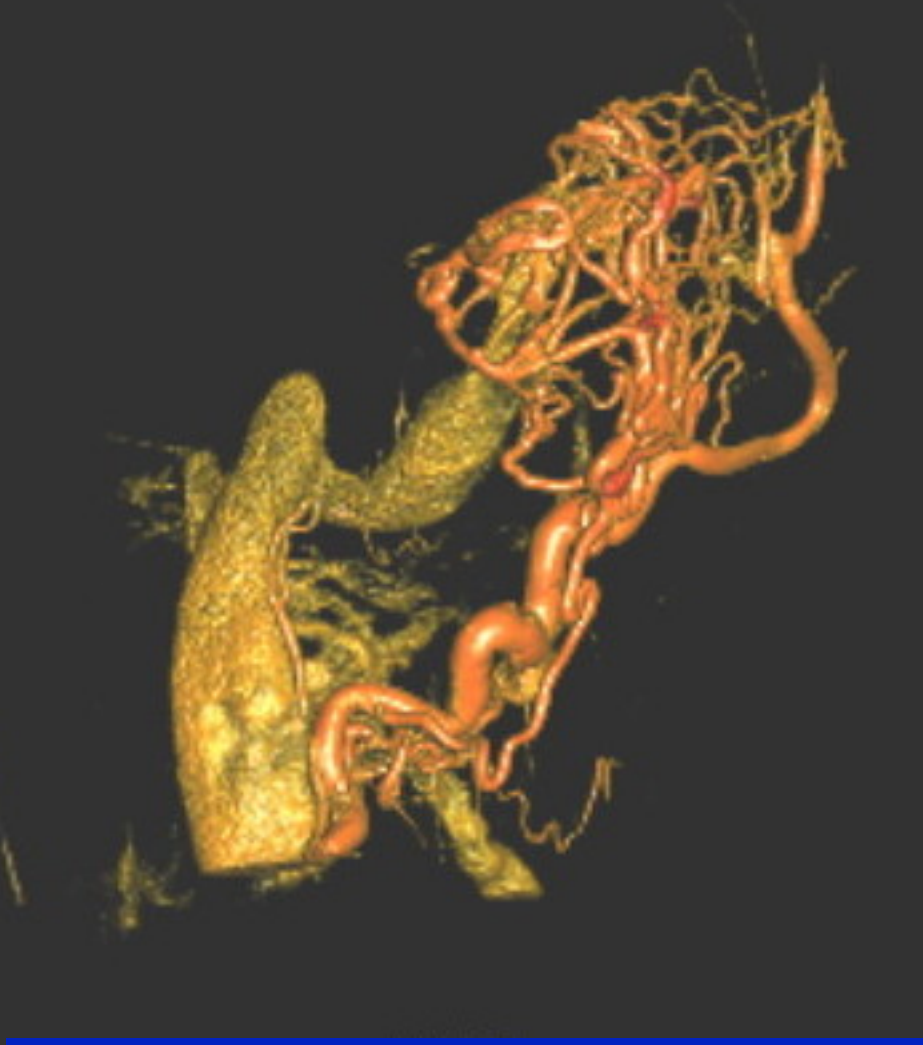
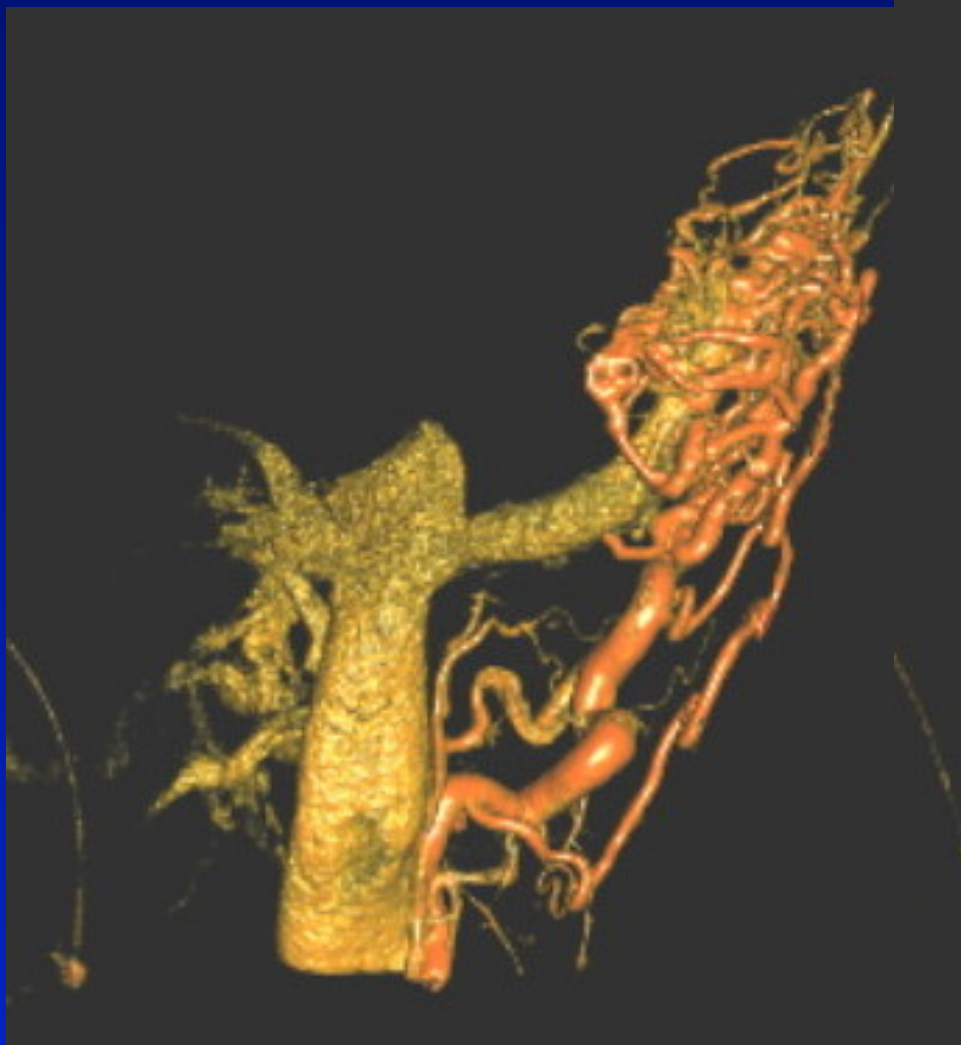
Type I Presentation

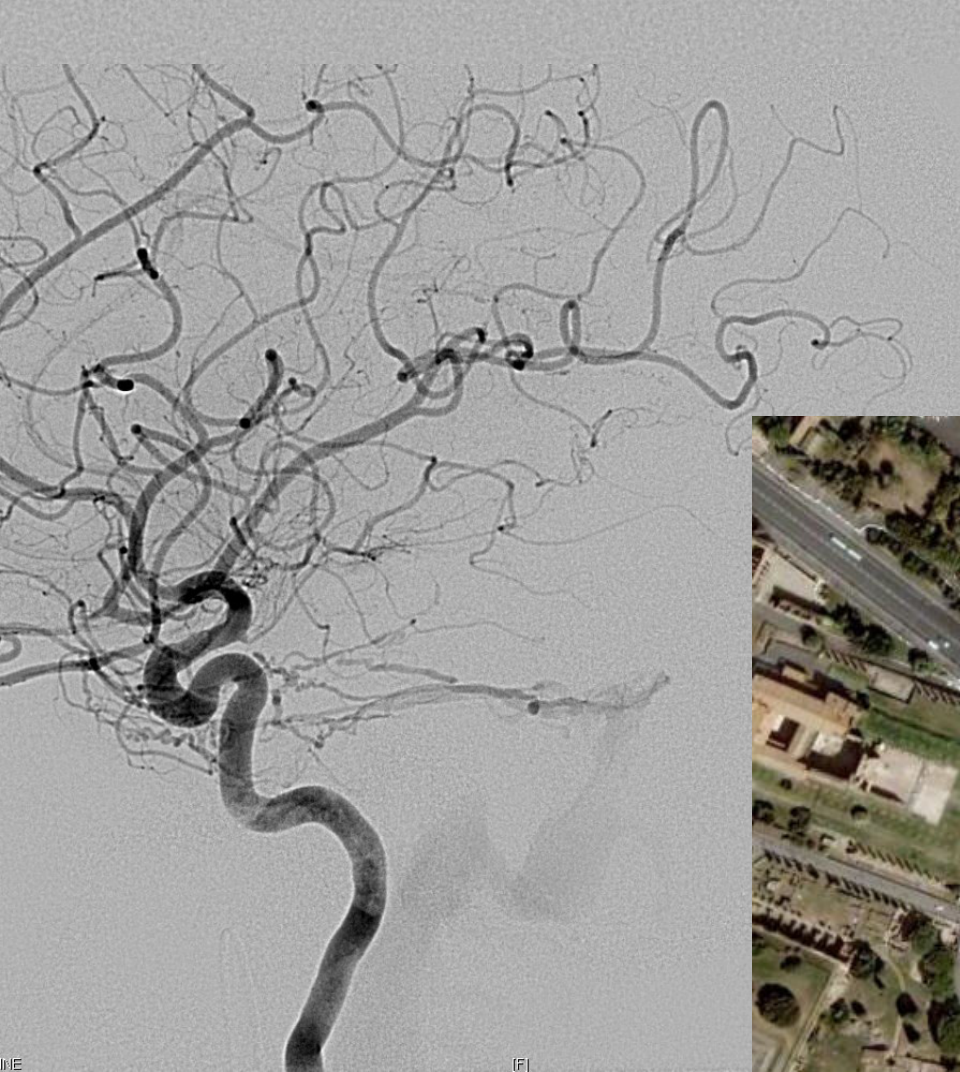
- Type I considered non-aggressive present with bruit, pulsatile tinnitus and sometimes increased ICP
- Treatment based on symptoms as these can alter lifestyle

Type I Combination Approach

- One of the more common appearances and treatments is illustrated in this case



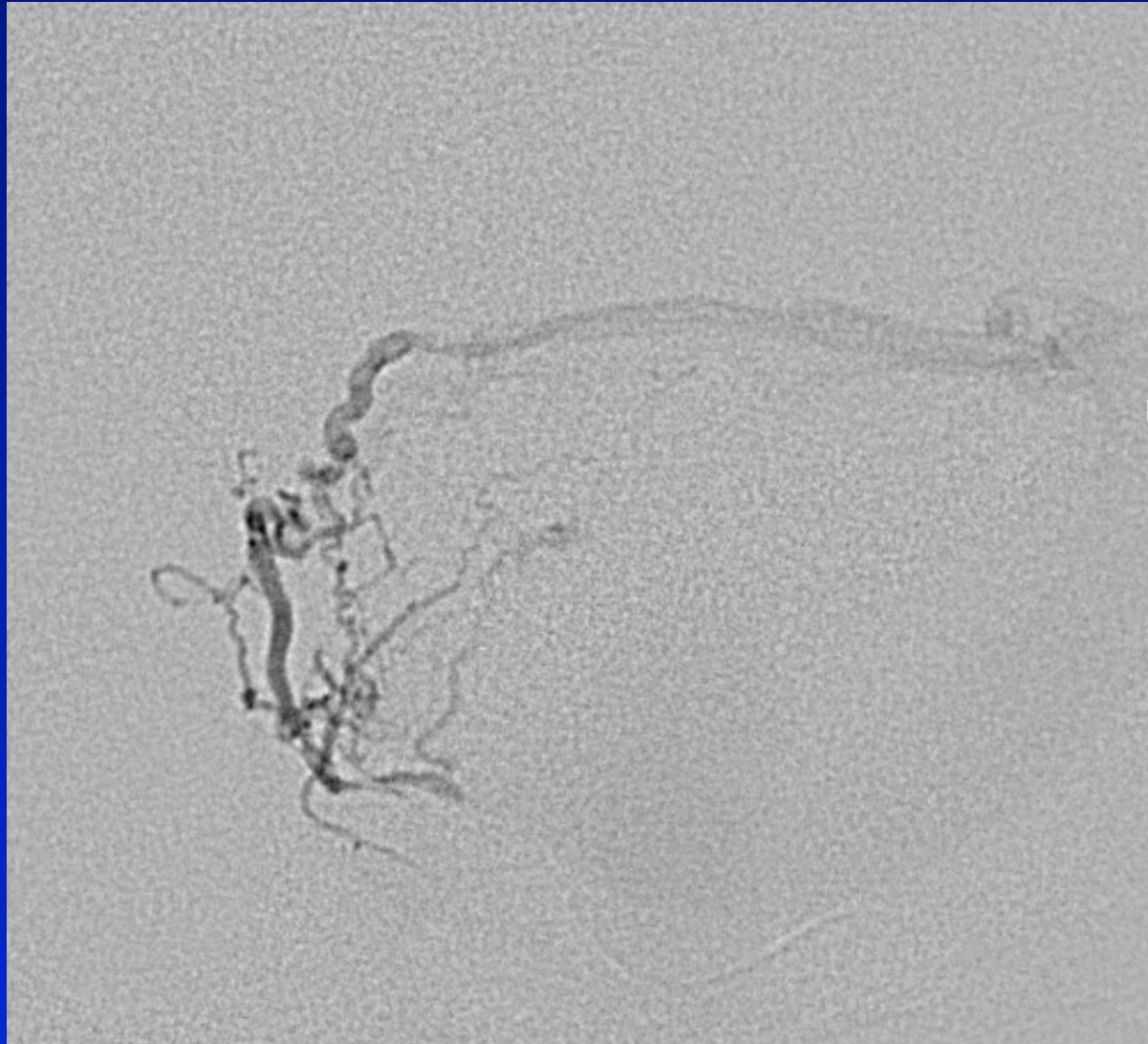


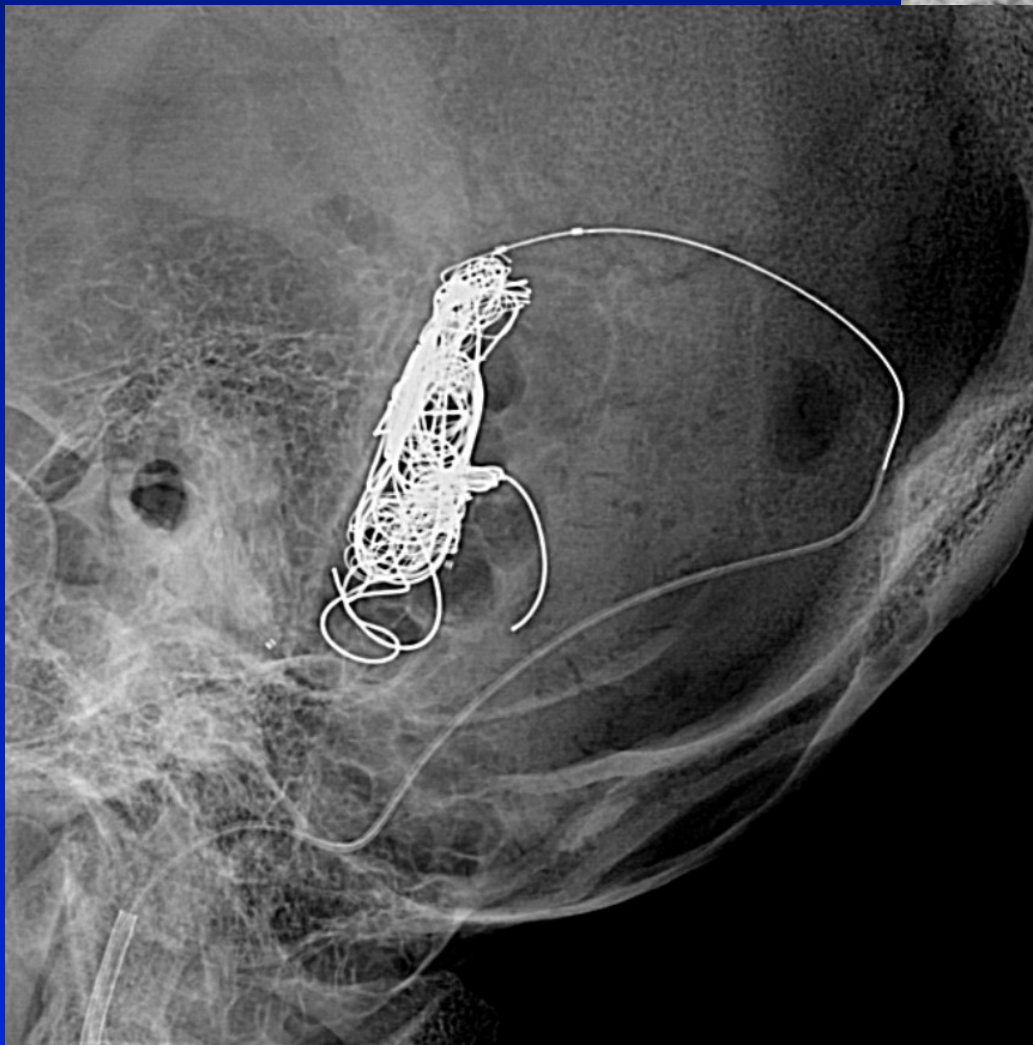


NE

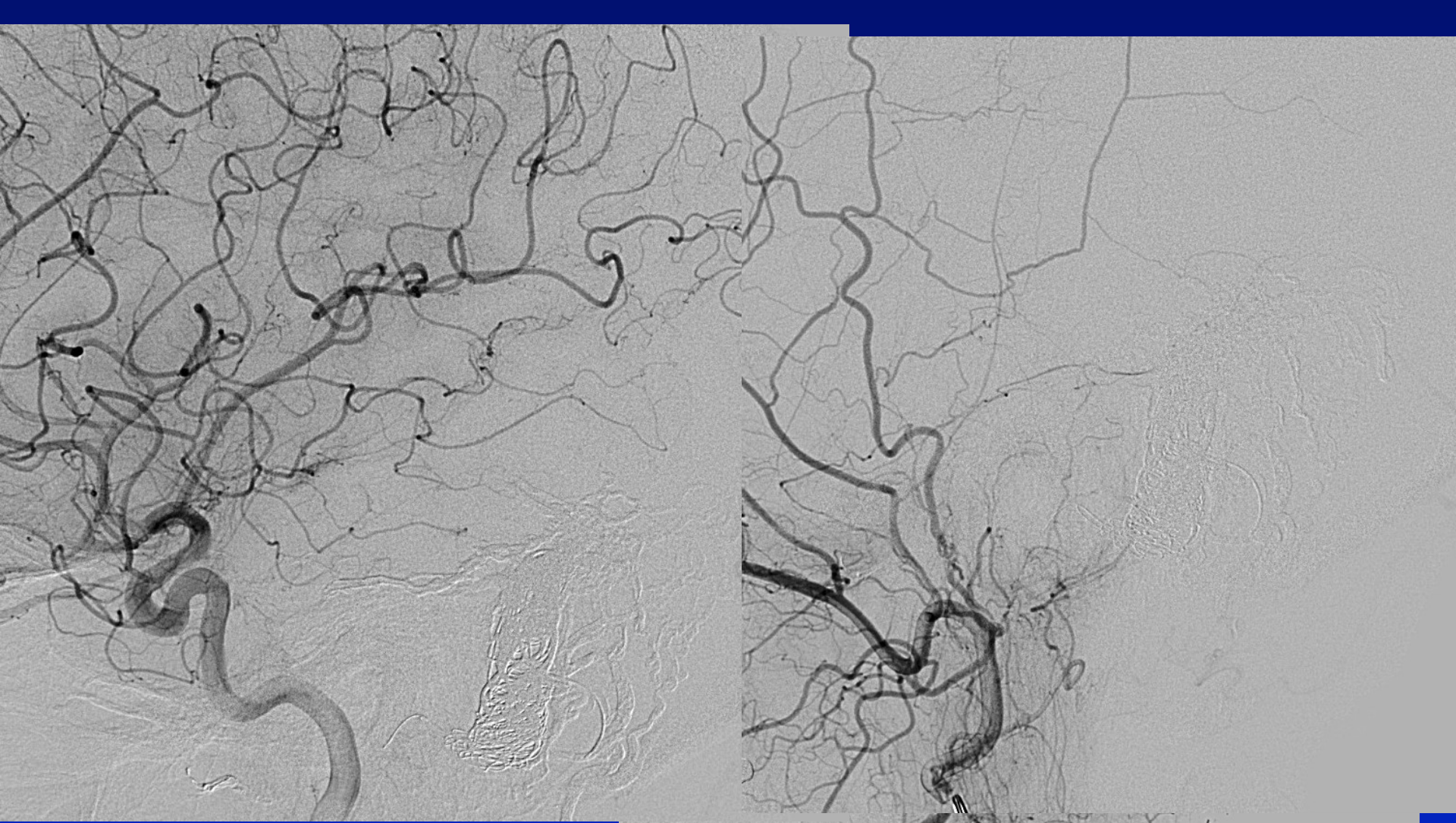
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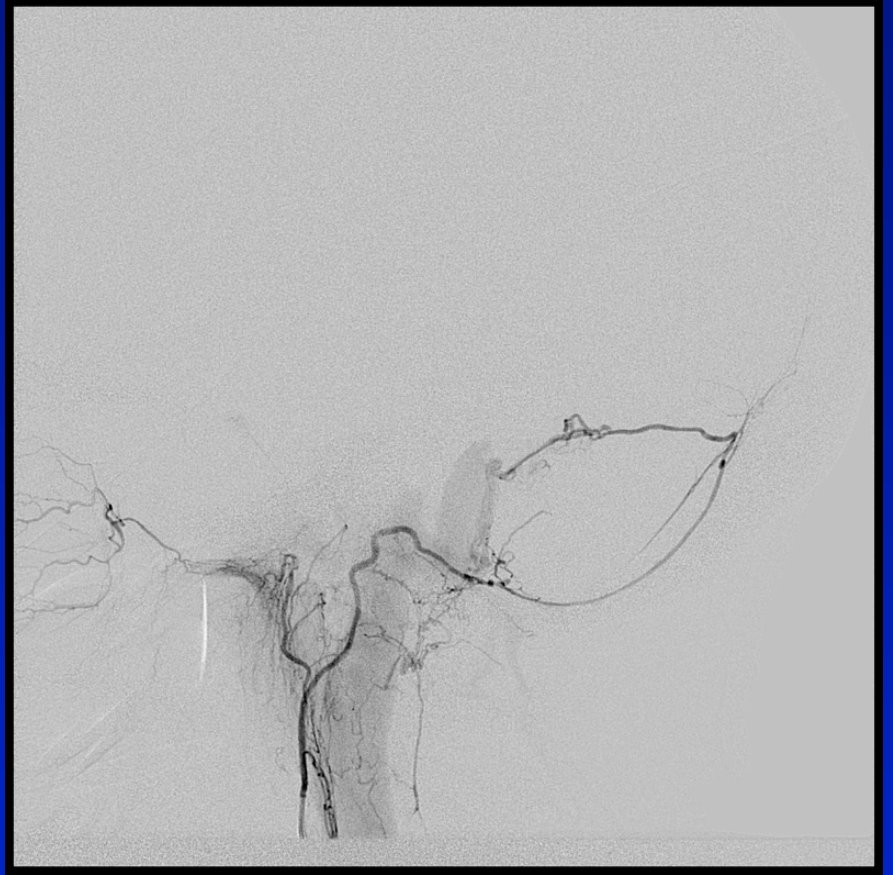
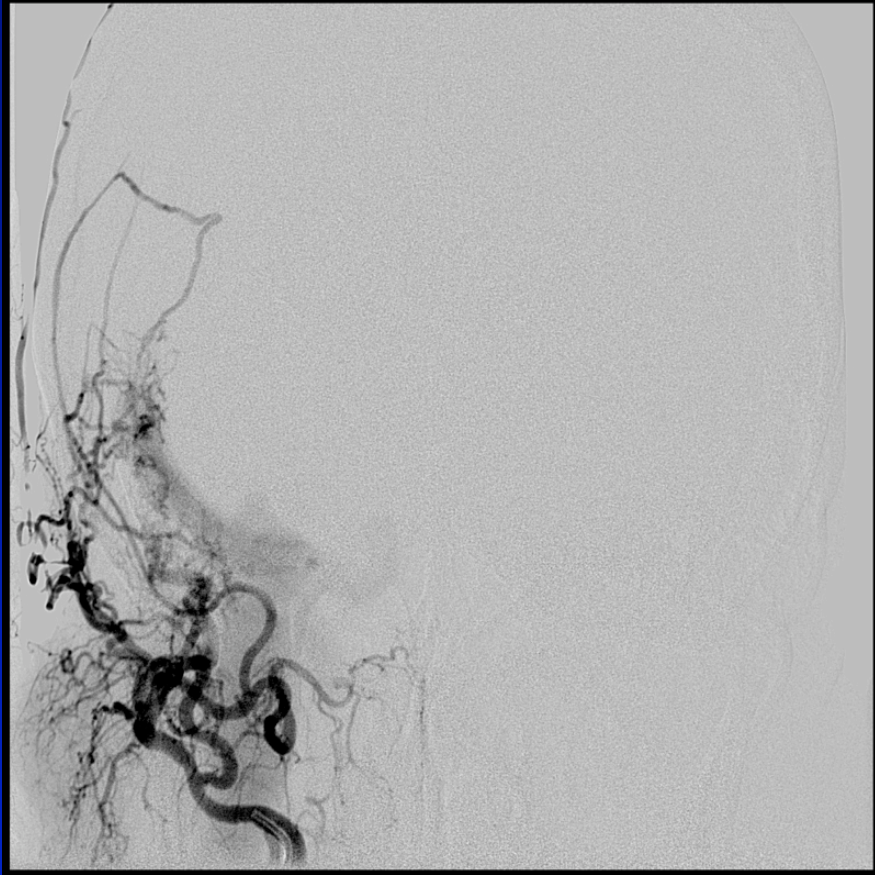
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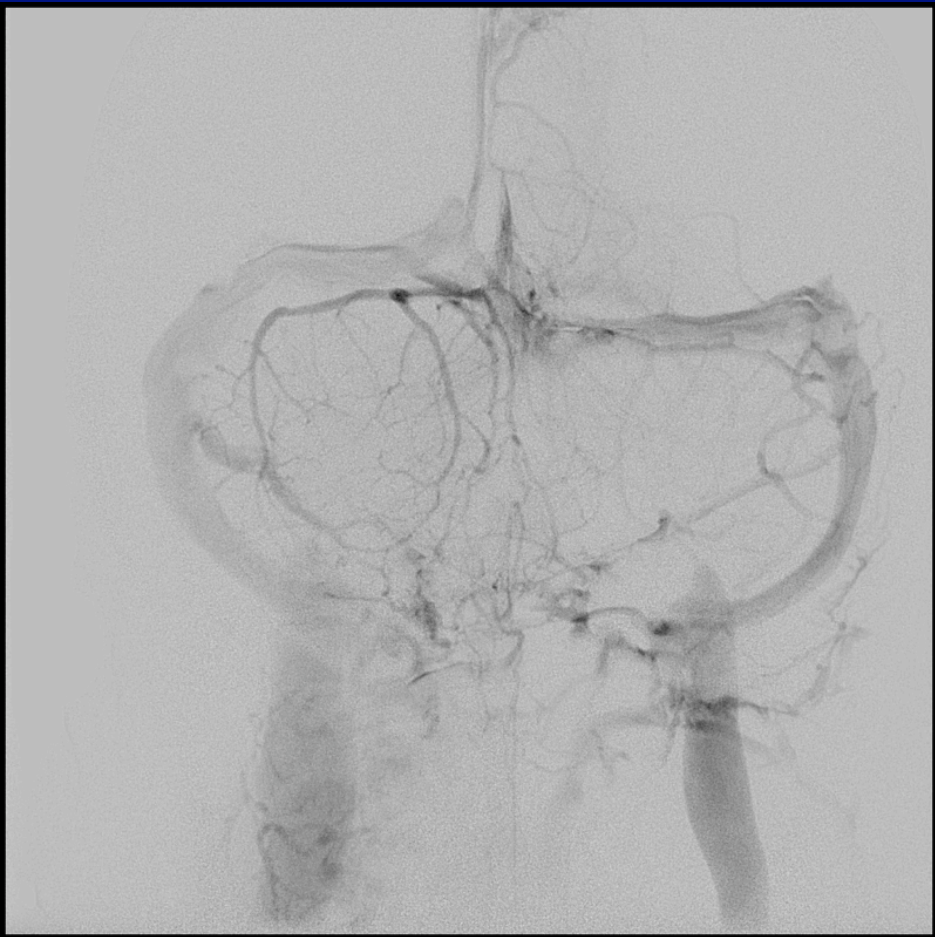


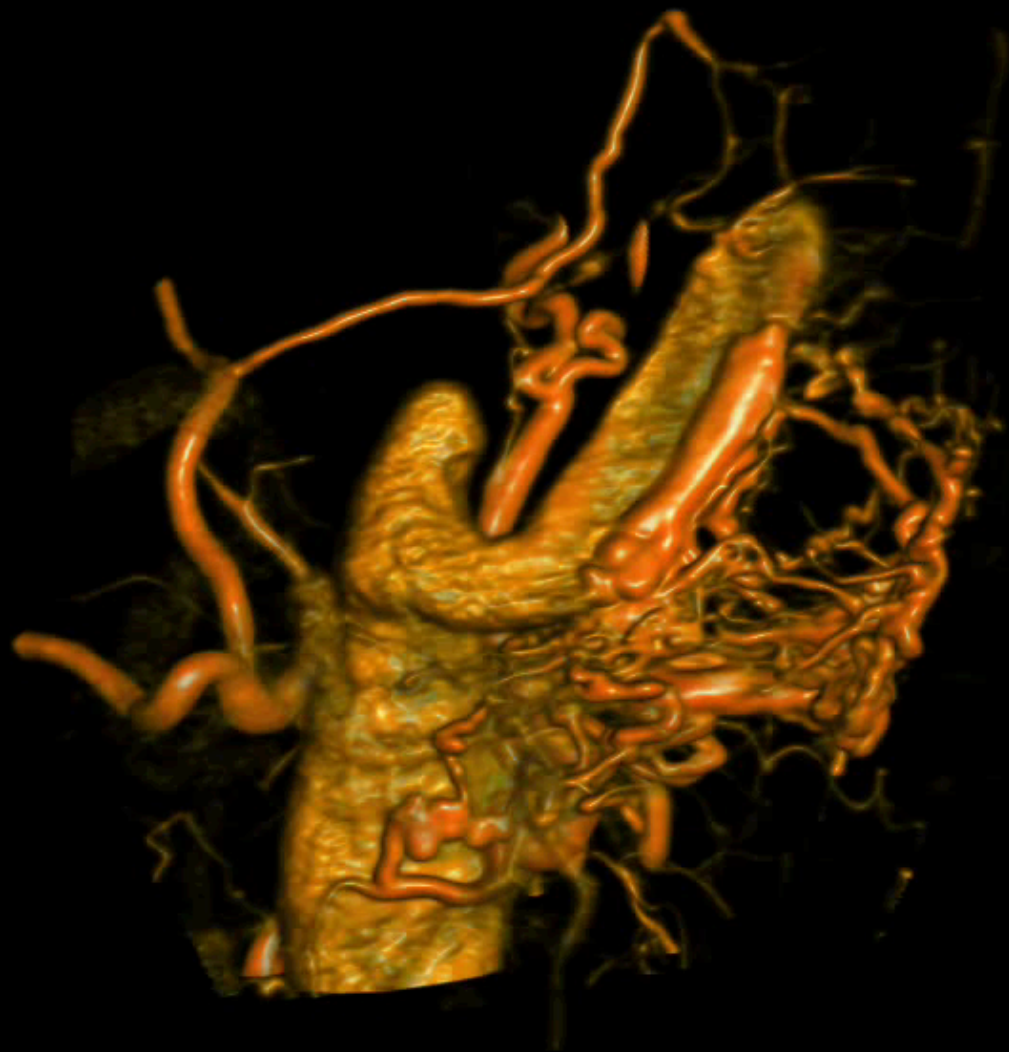


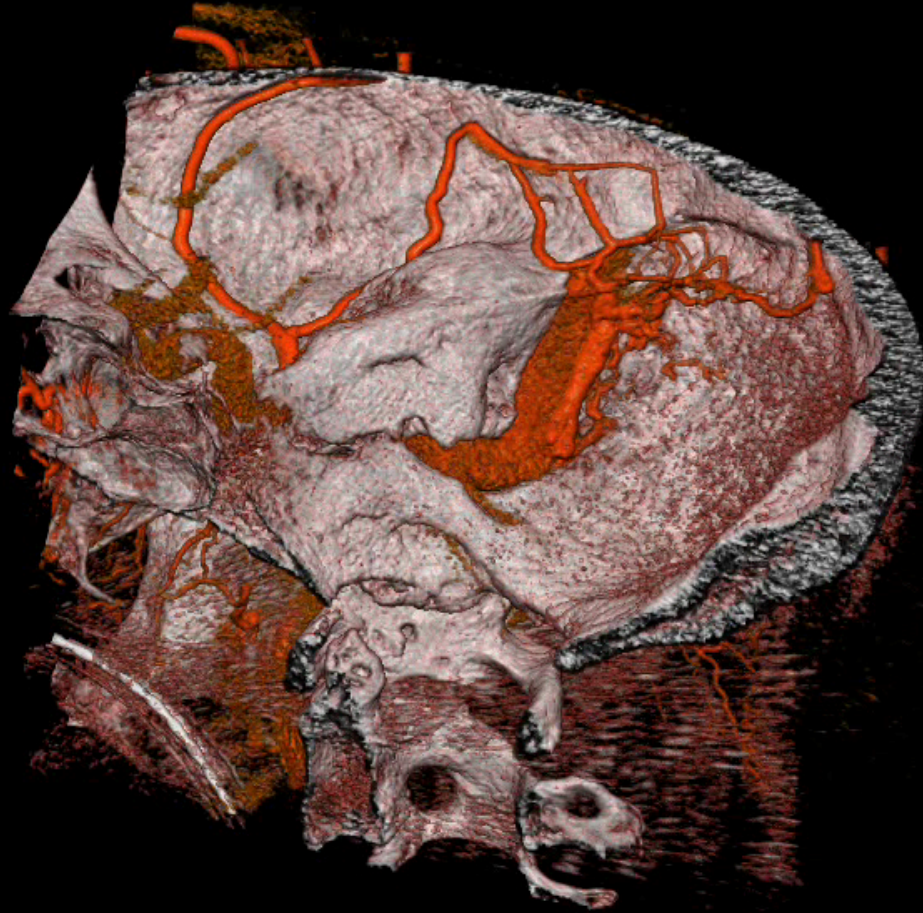




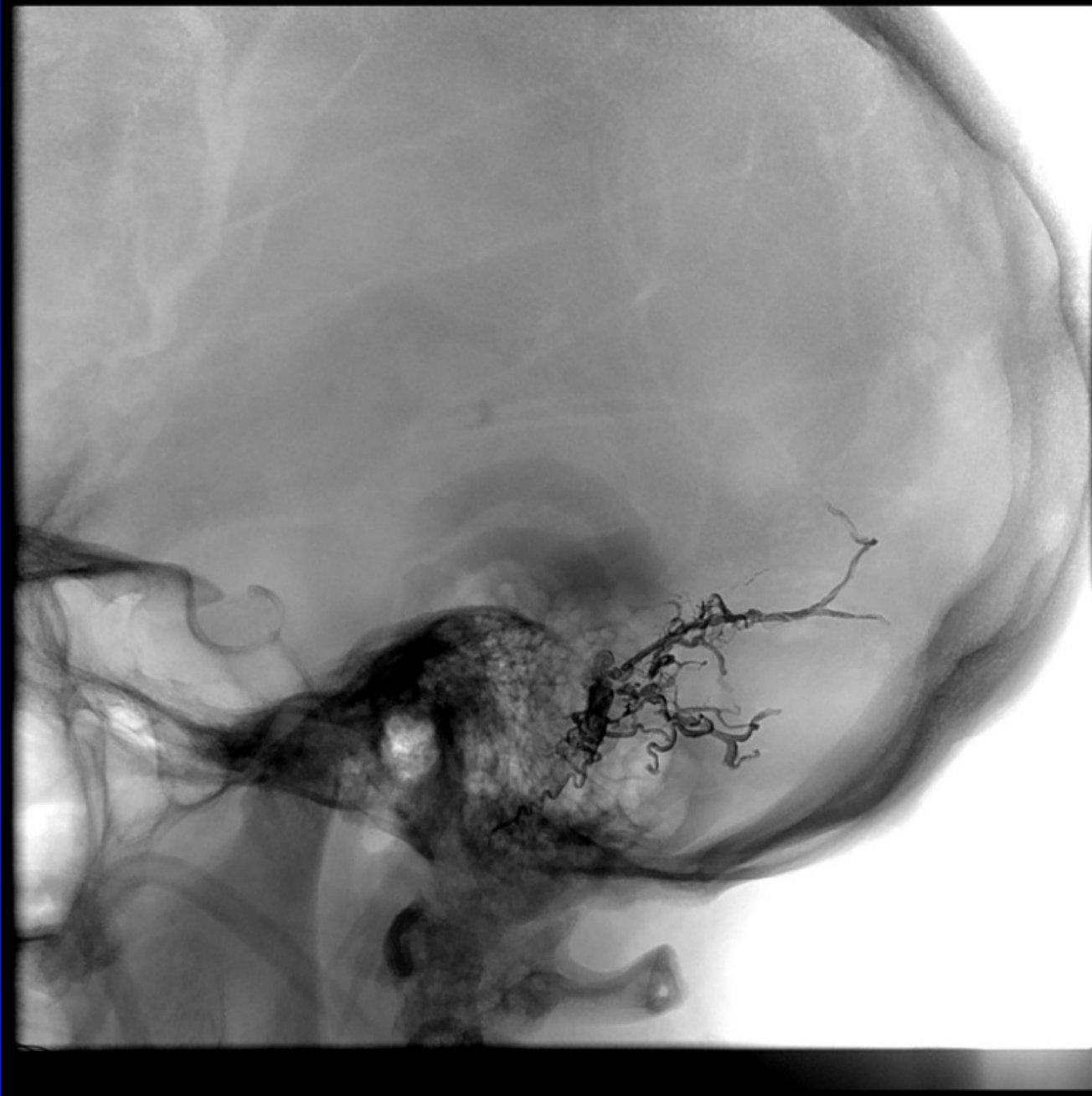




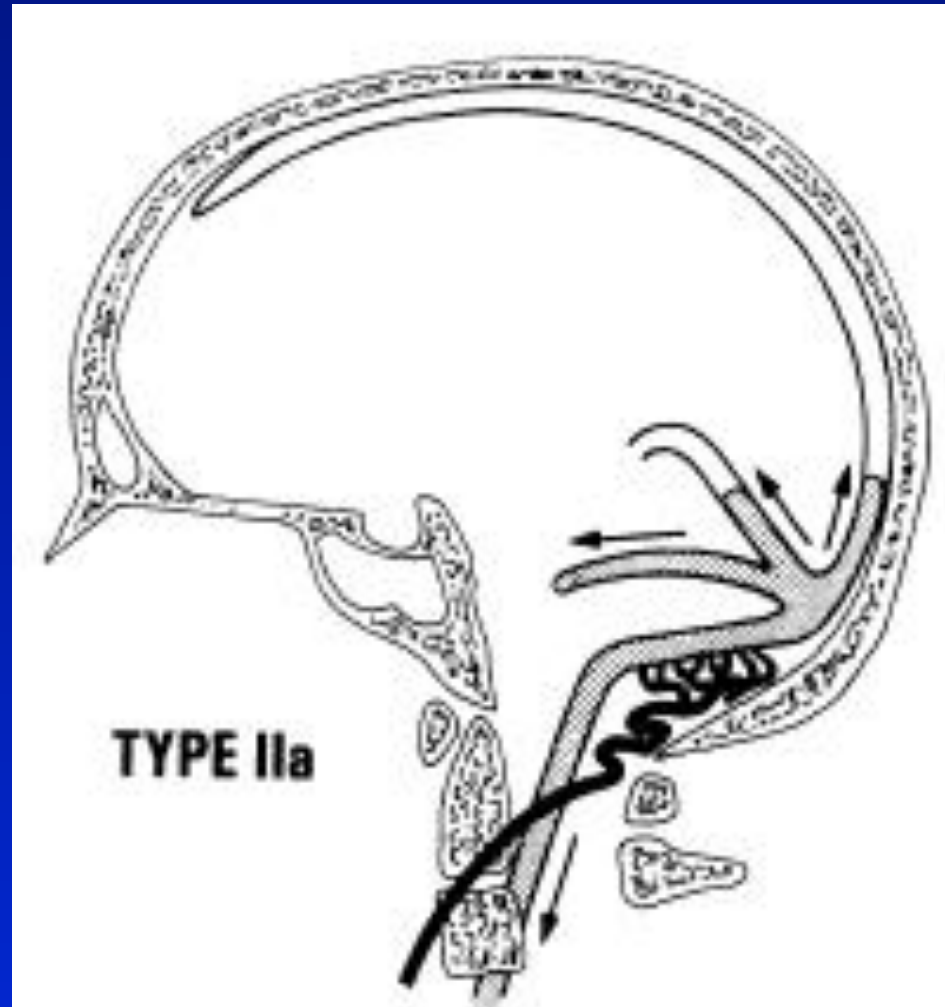




R 100 W 64



Cognard Type IIa (Borden I)



Type II Presentation

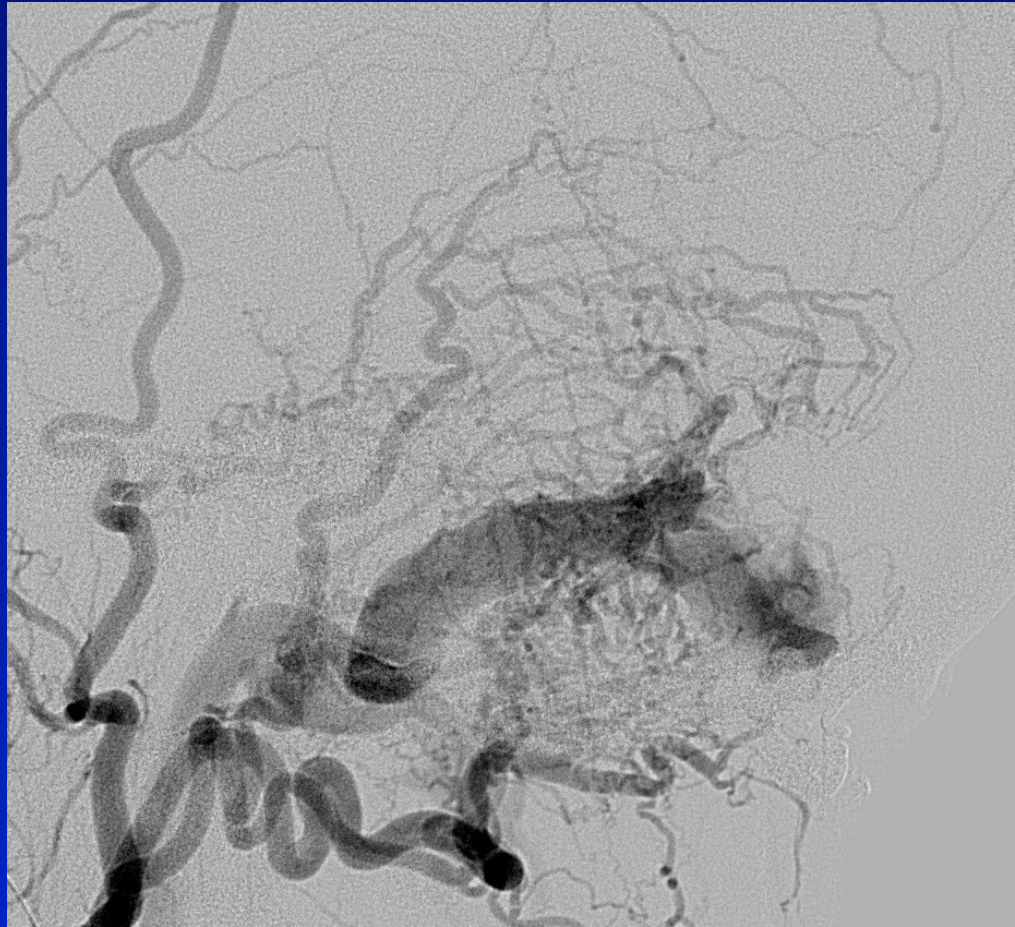
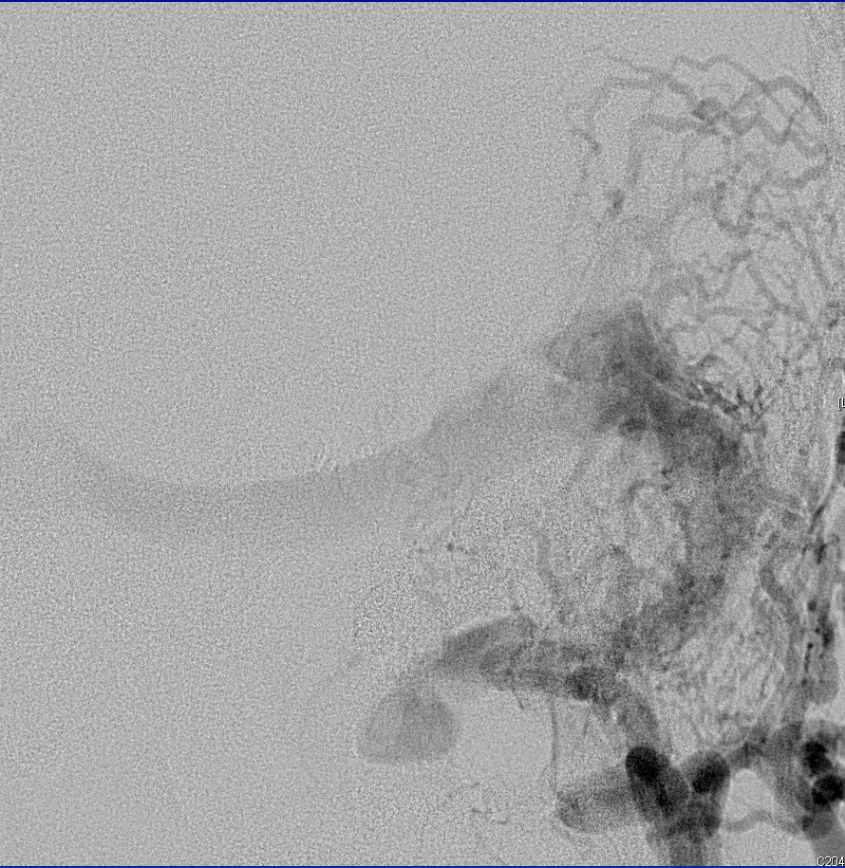
- Type IIa similar to Type I, considered non aggressive but can have HA's, papilledema
- However IIb, IIa+b have higher risk due to cortical venous involvement
 - Intracranial hypertension (do not shunt!)
 - Hemorrhage, more aggressive neurologic symptoms

Combination of Covered Stents, Coils, Onyx

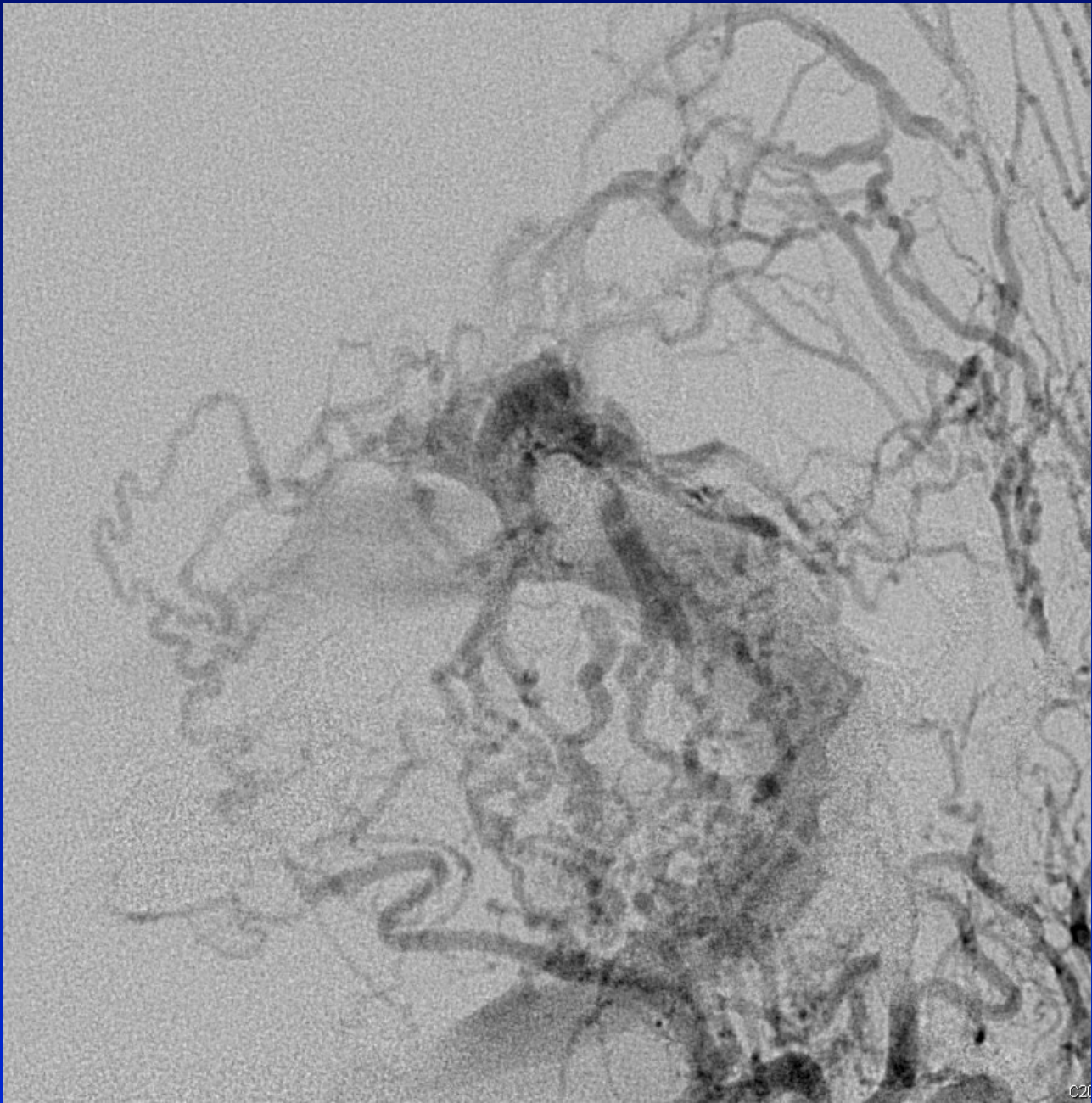
- Middle aged male with audible bruit
- Noise is so bad he cannot sleep

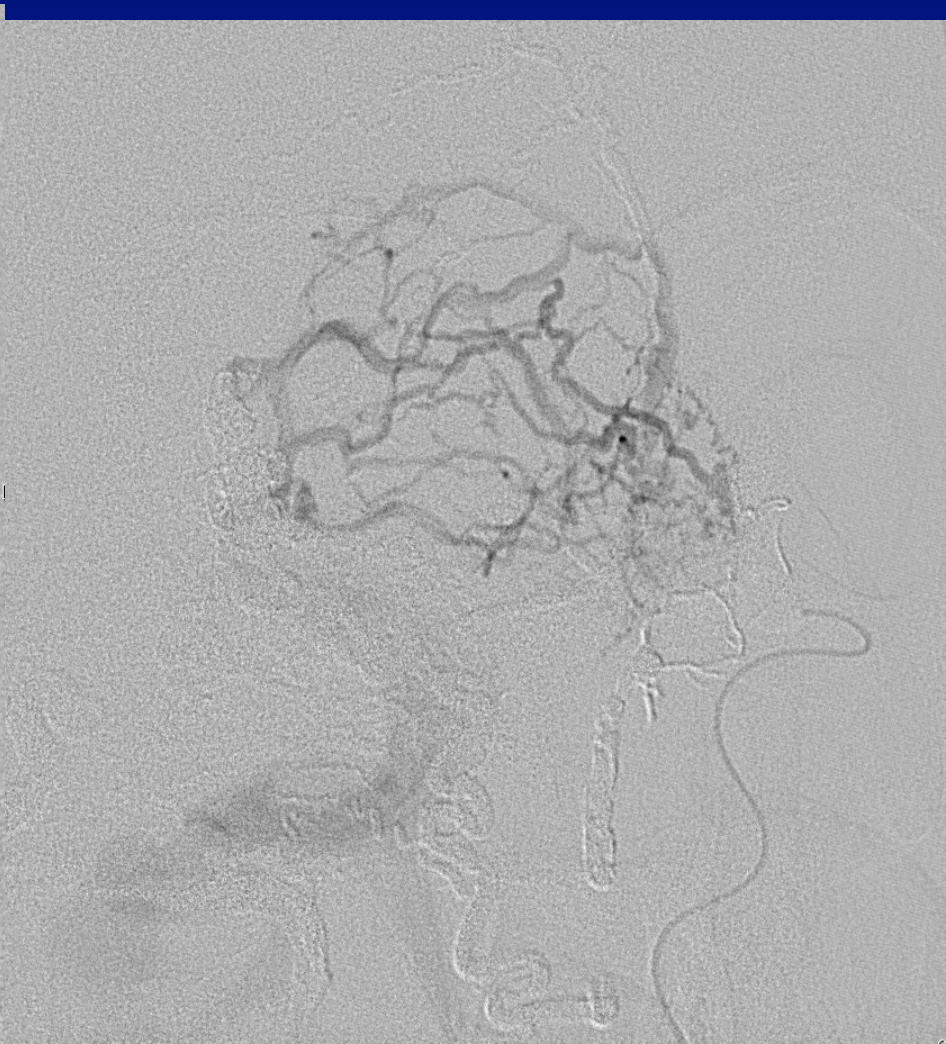
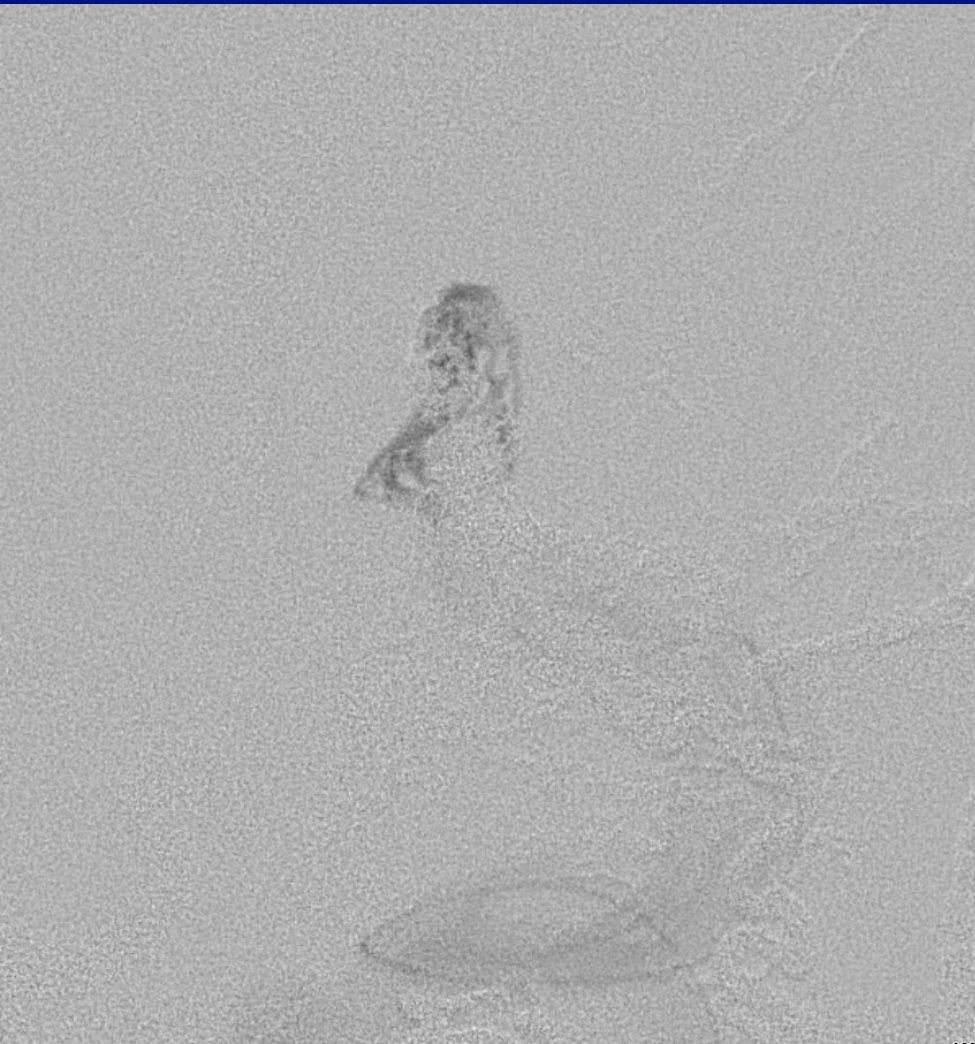




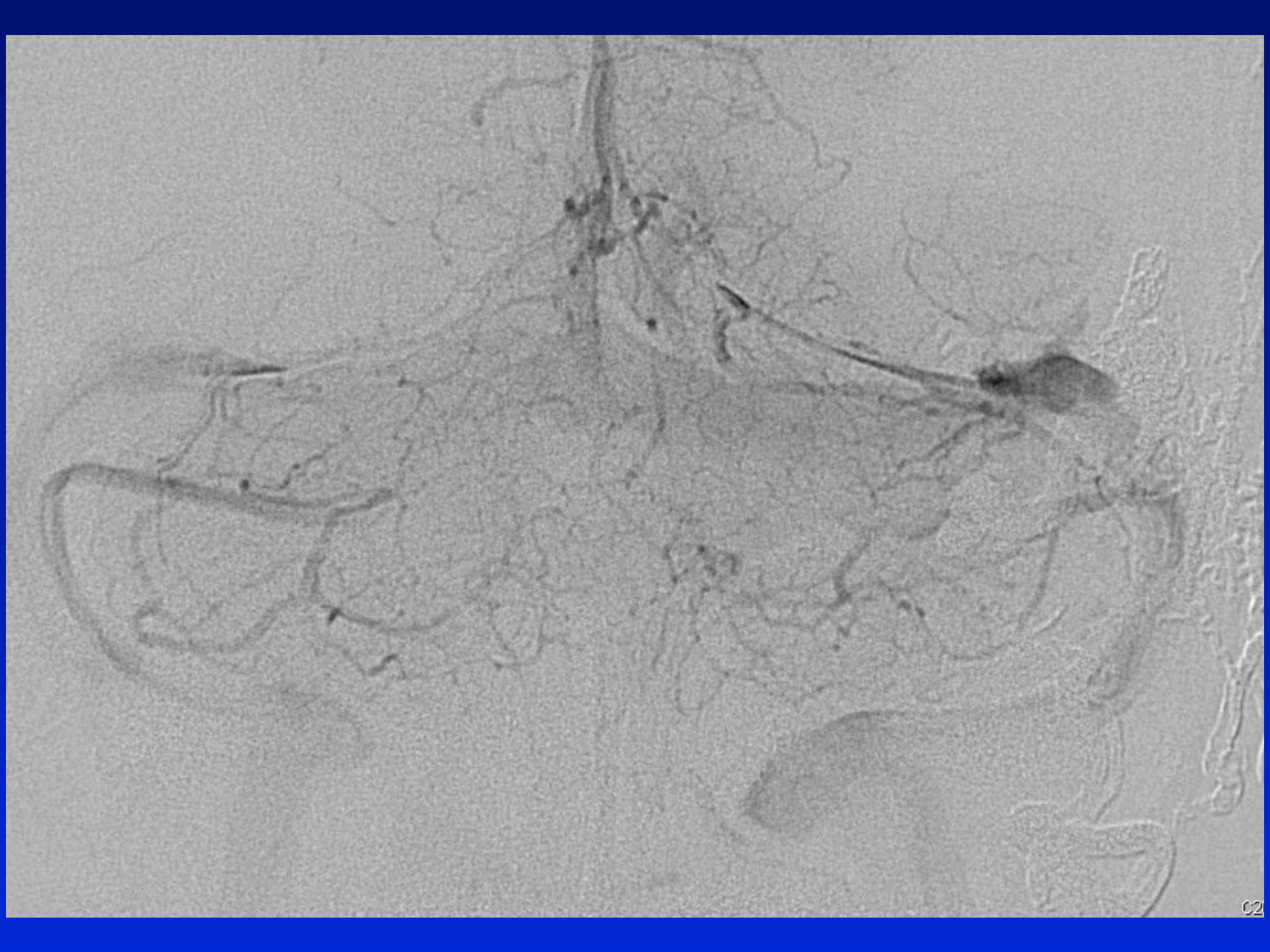


Fun
Mansion.com



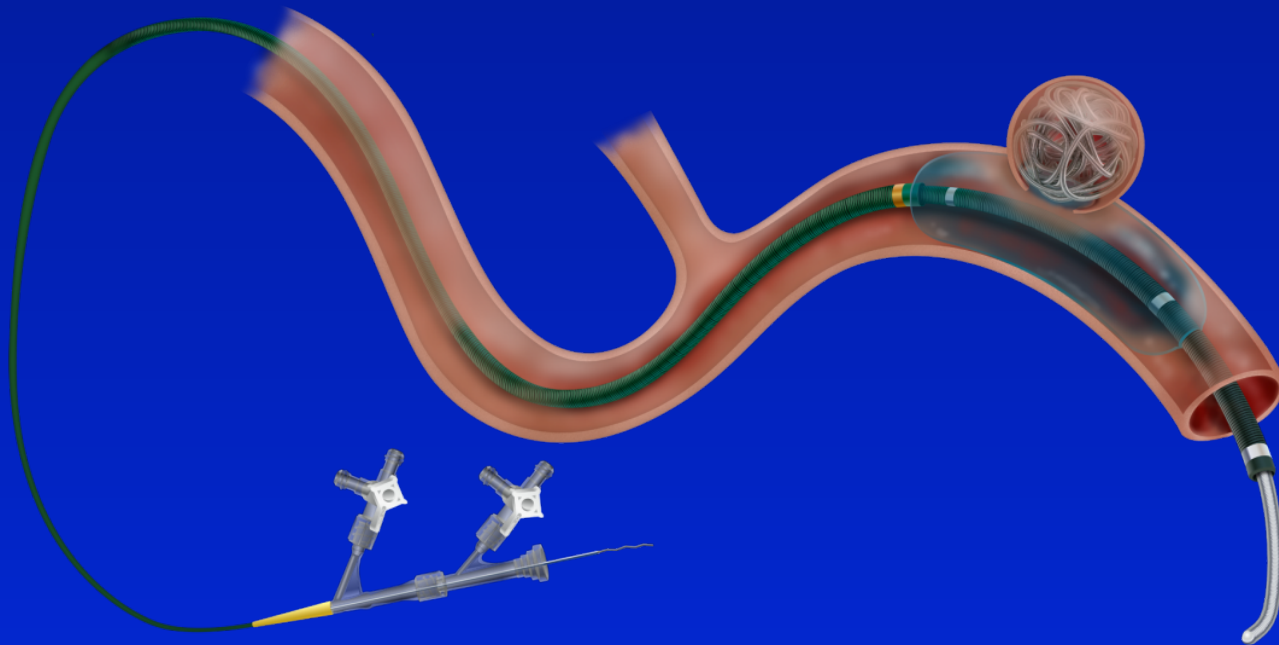


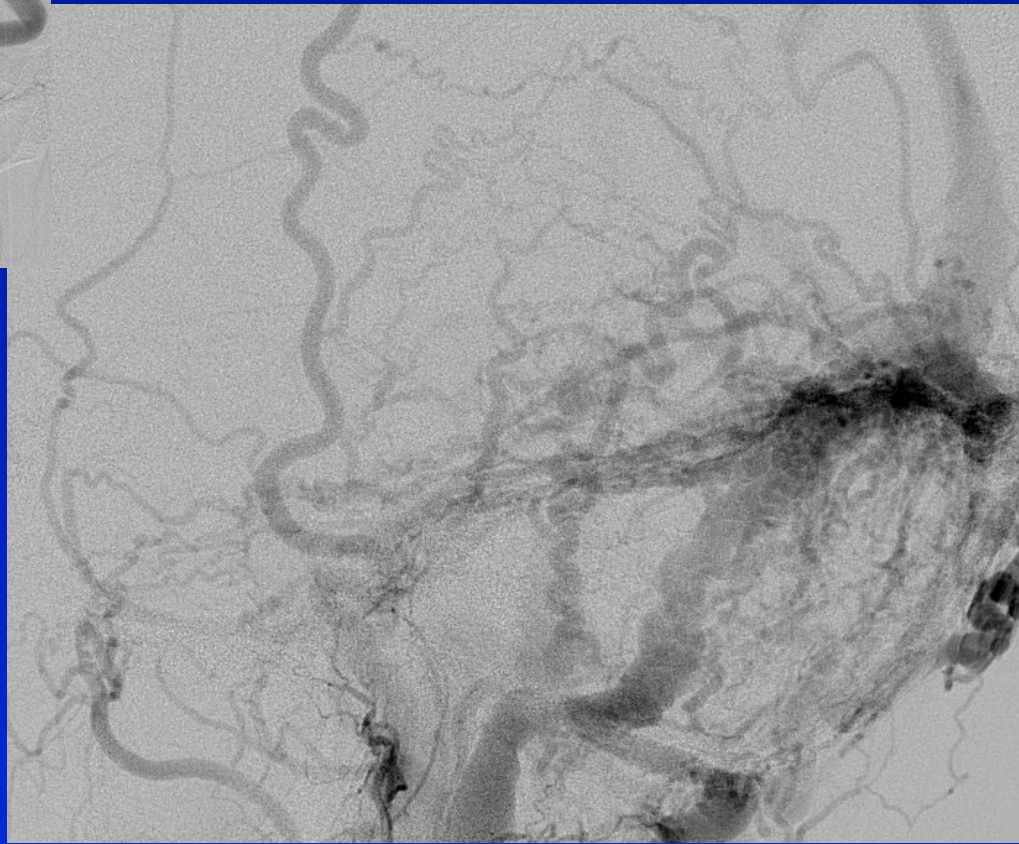
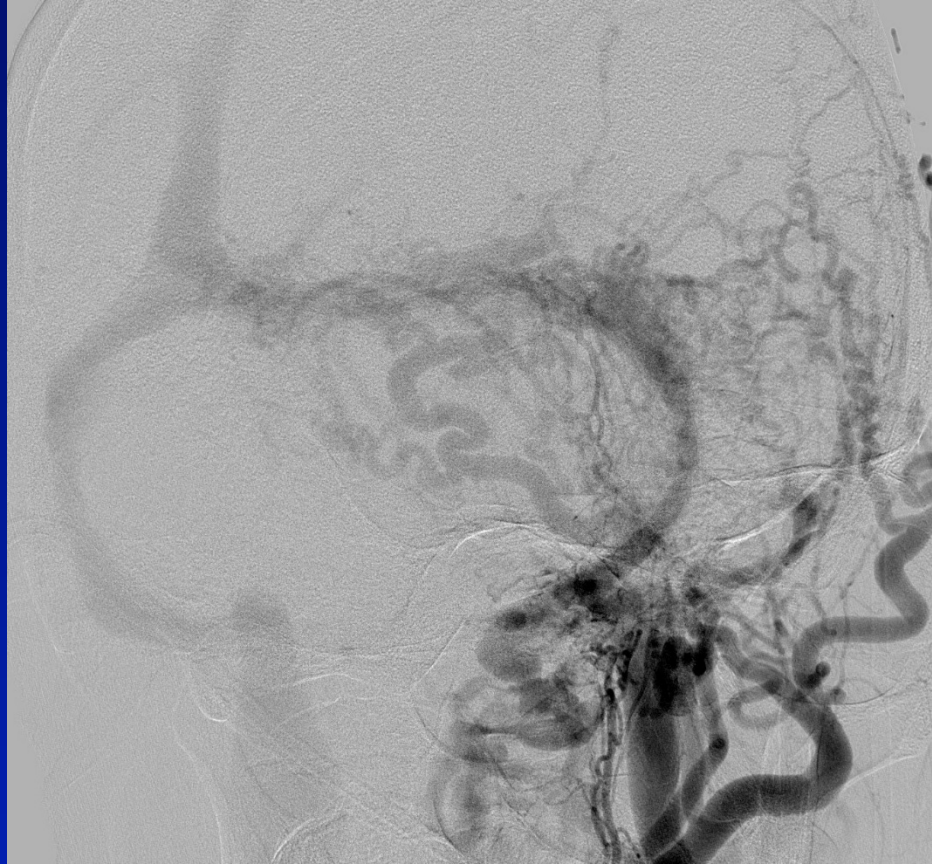


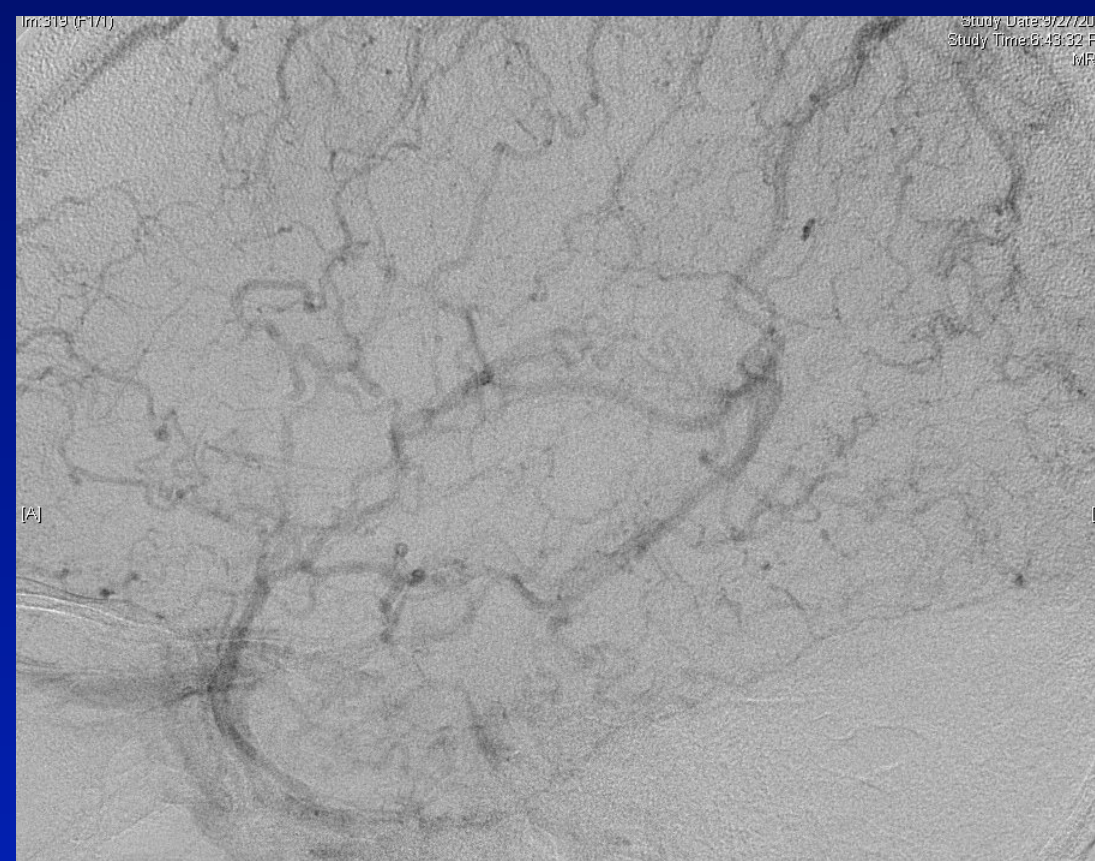


Type 2a

Recent case using Scepter XC Balloon

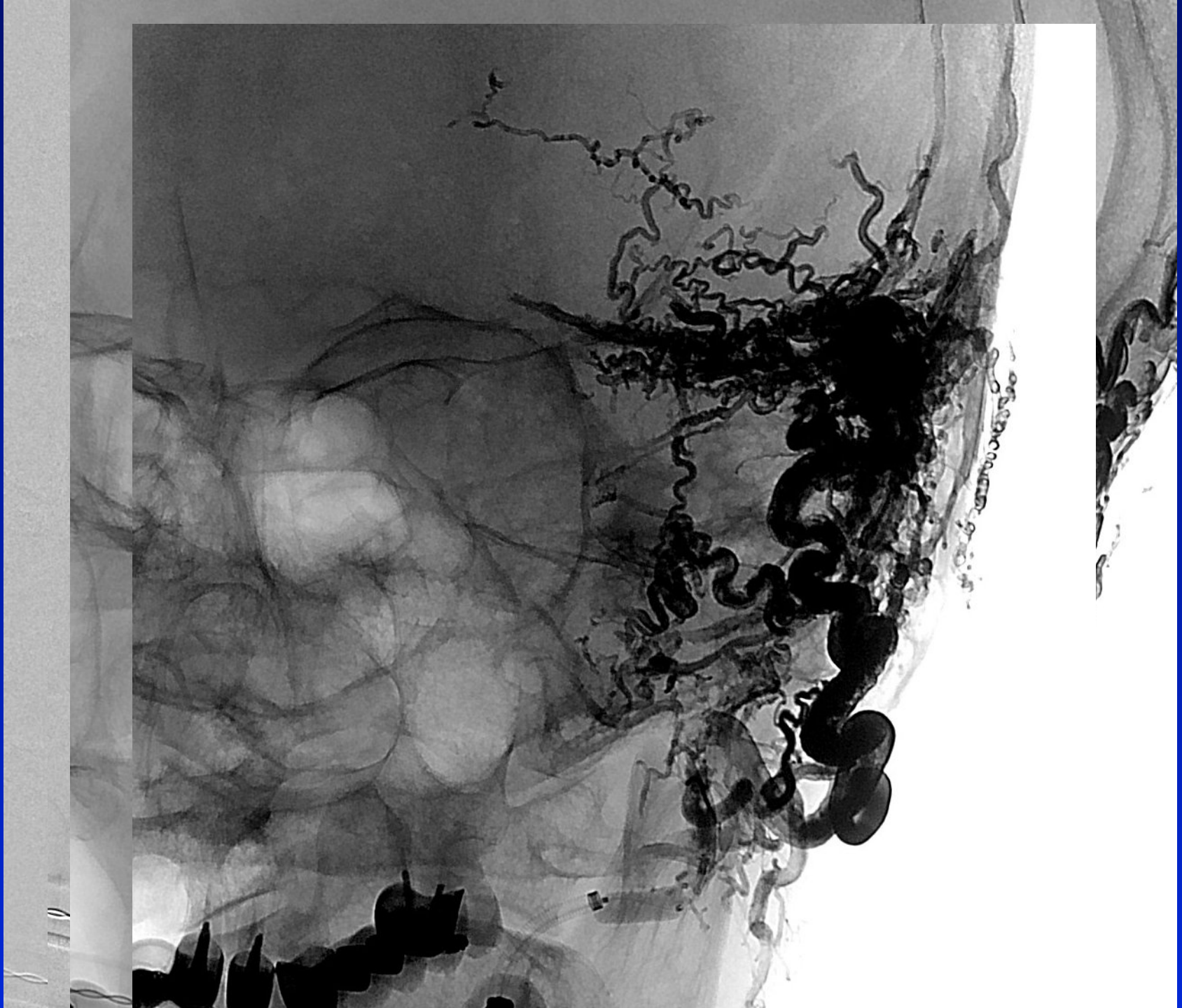


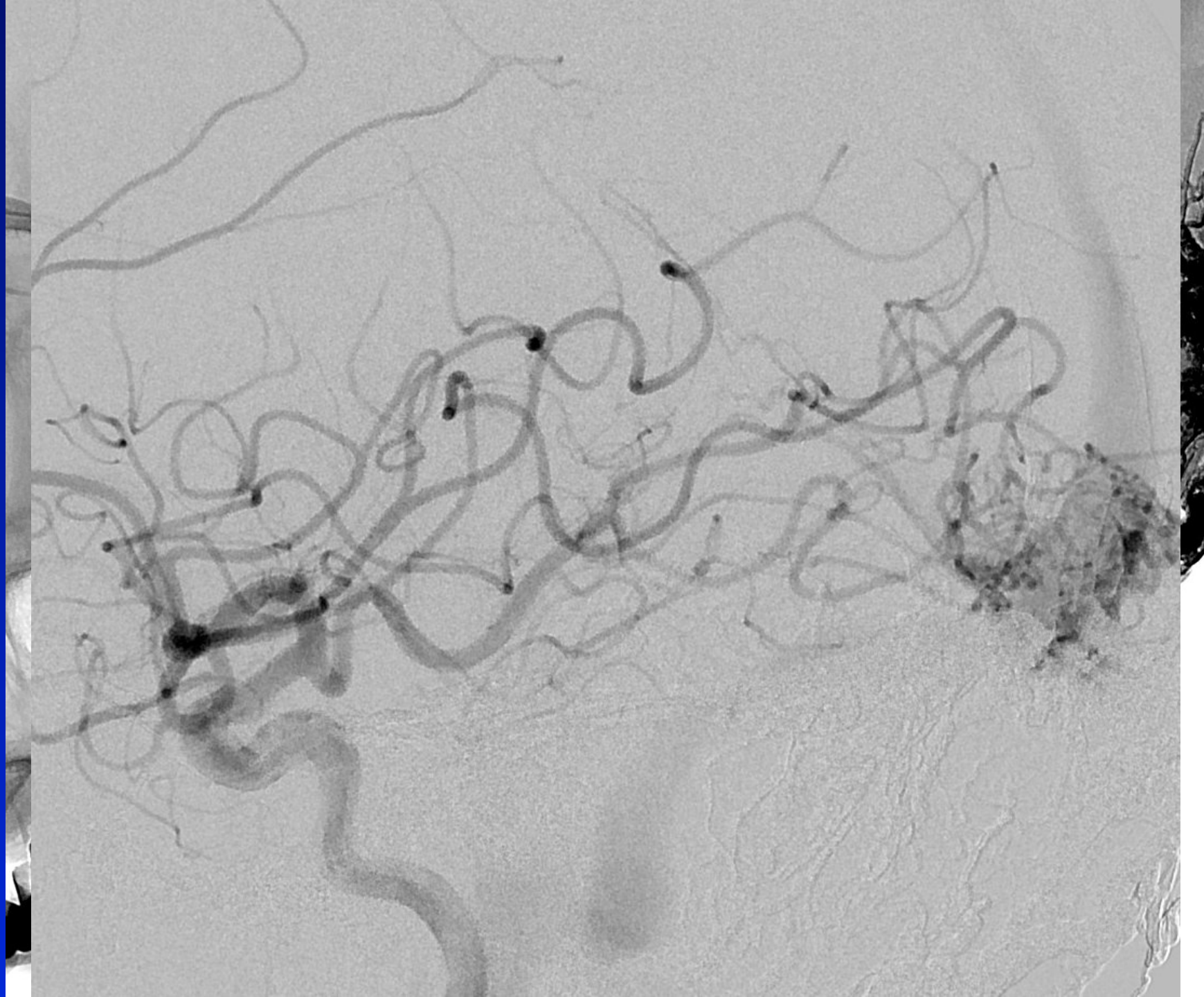




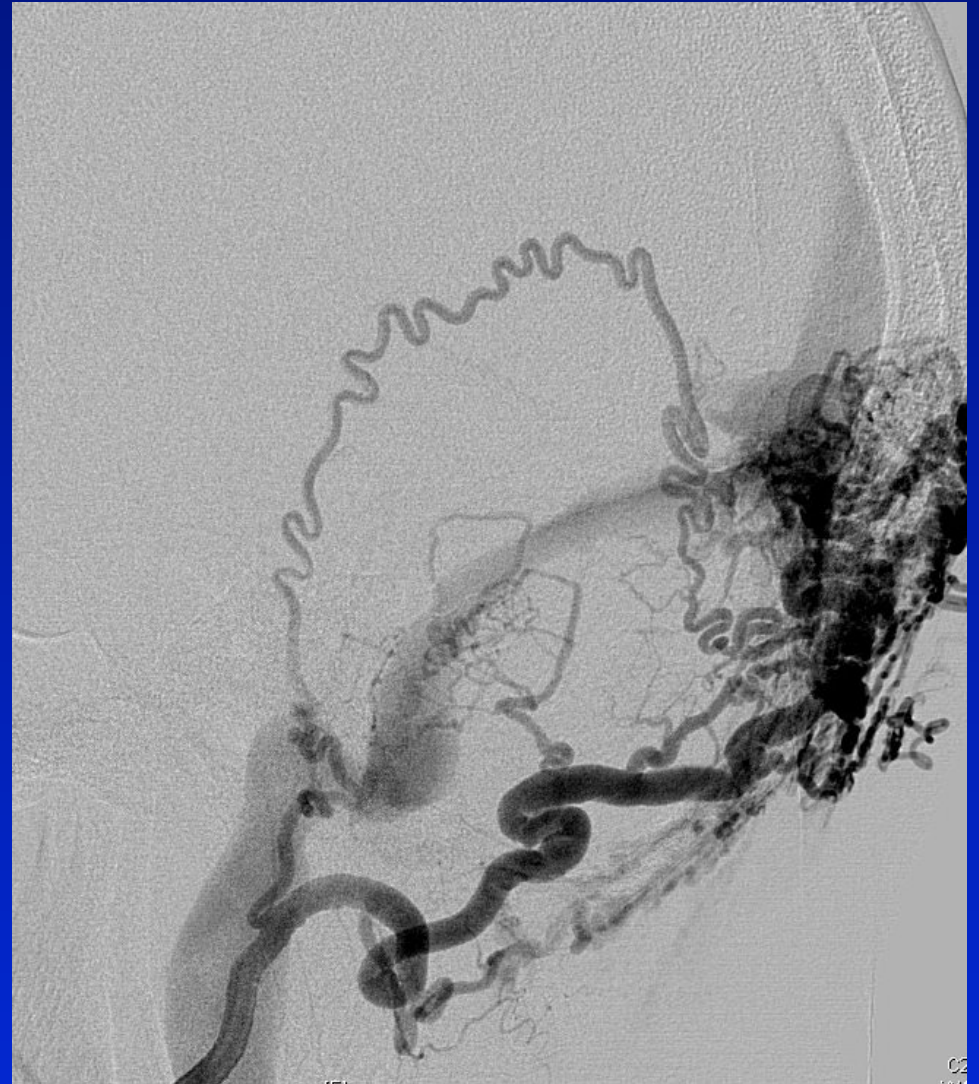
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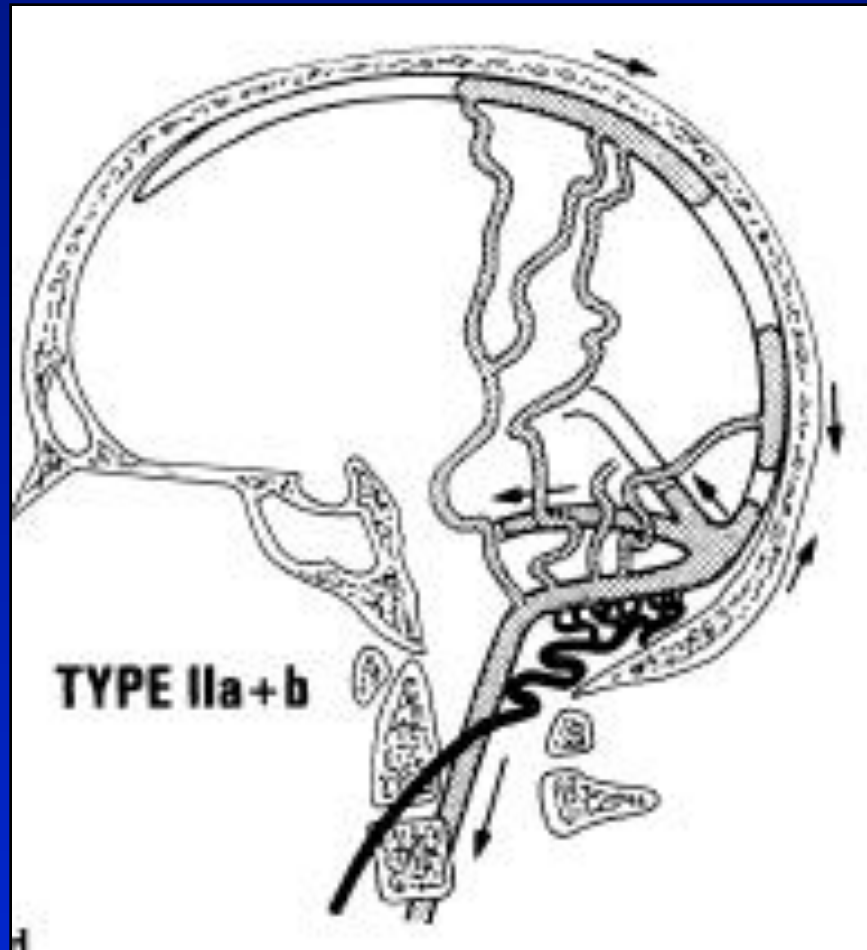


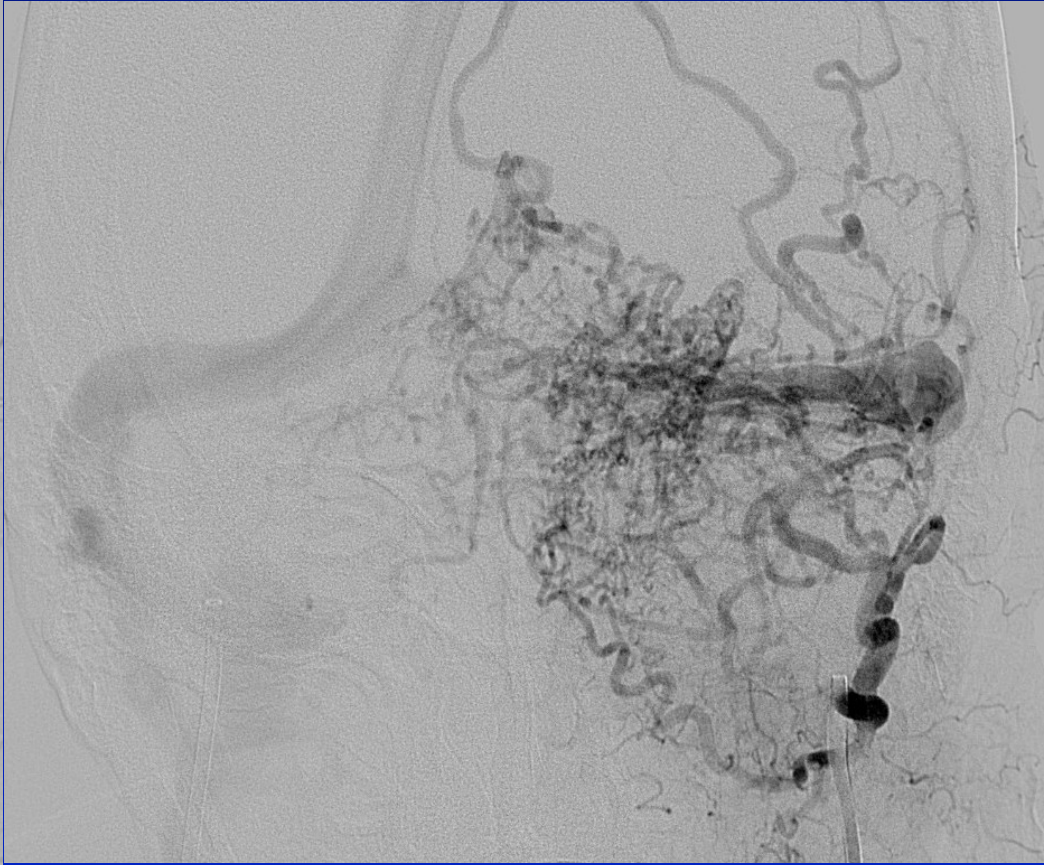
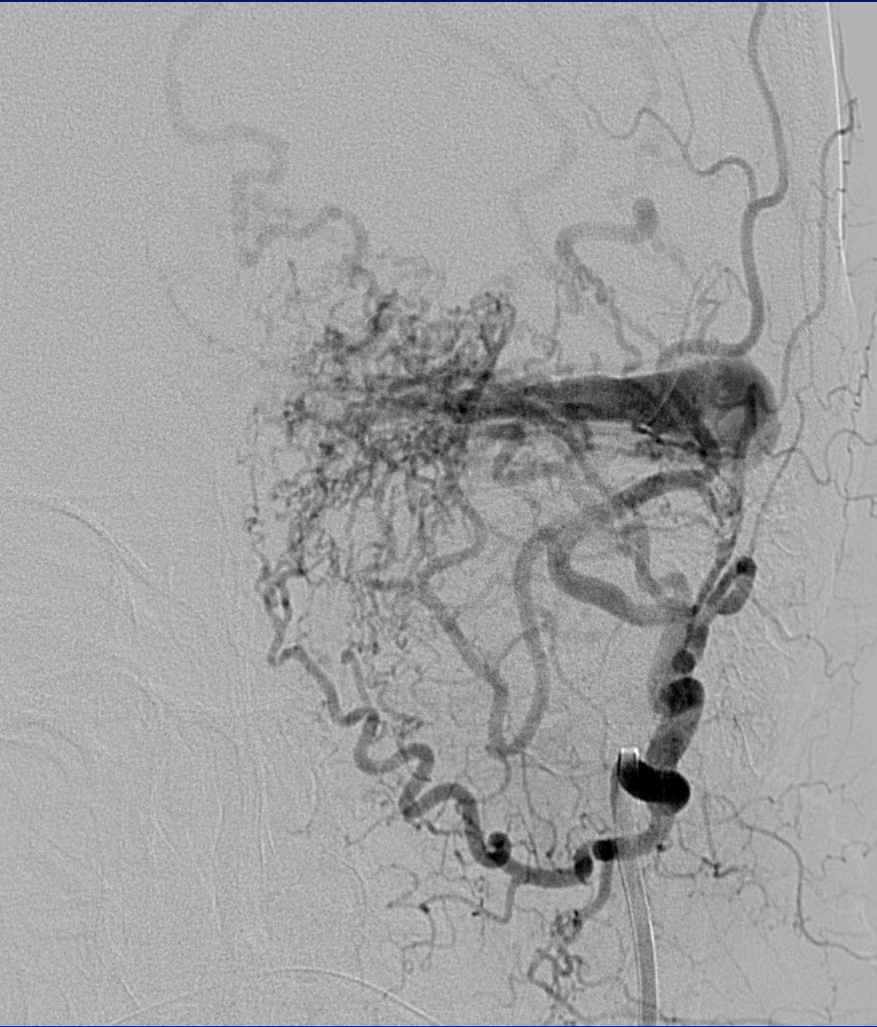


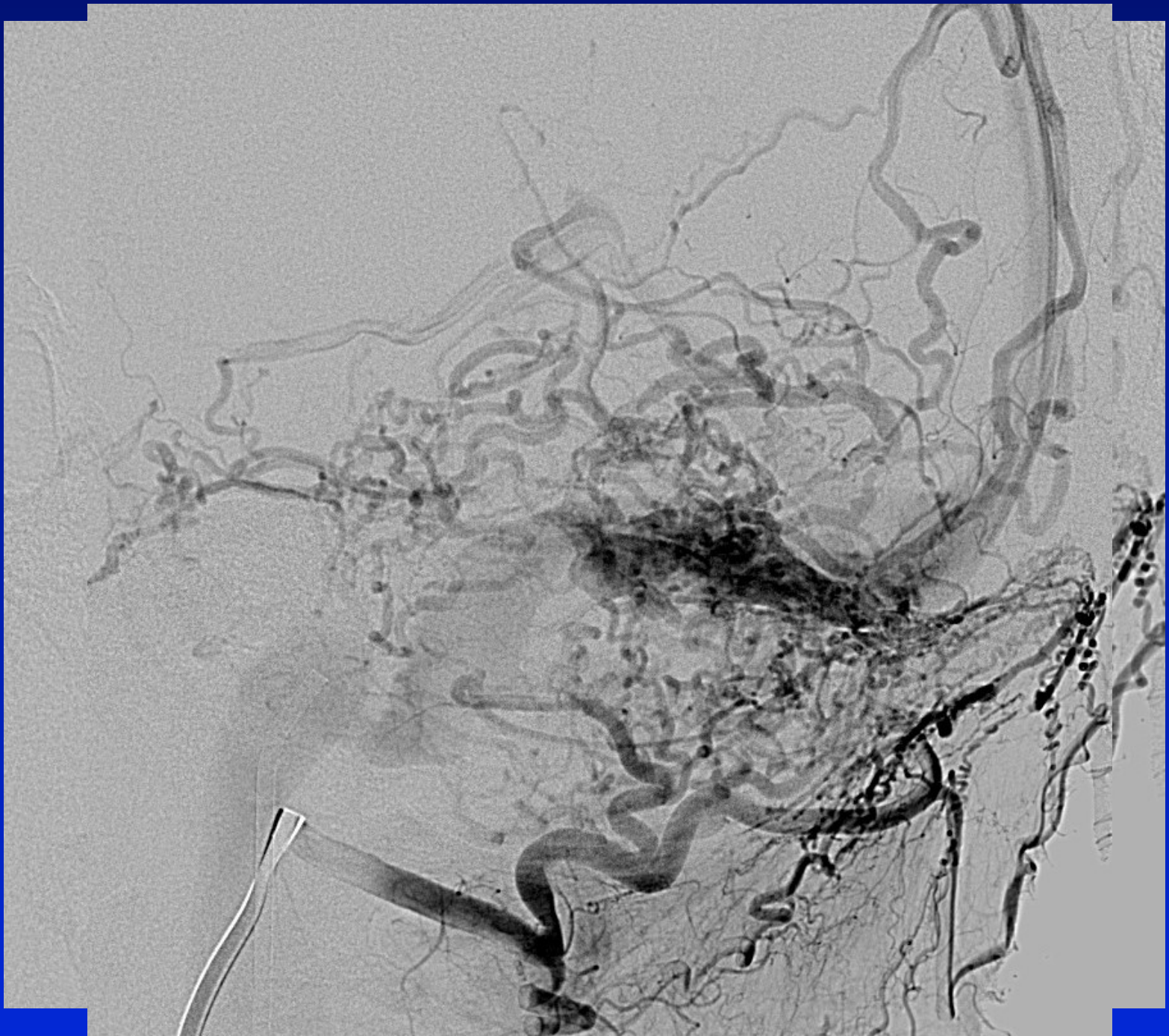
Other side

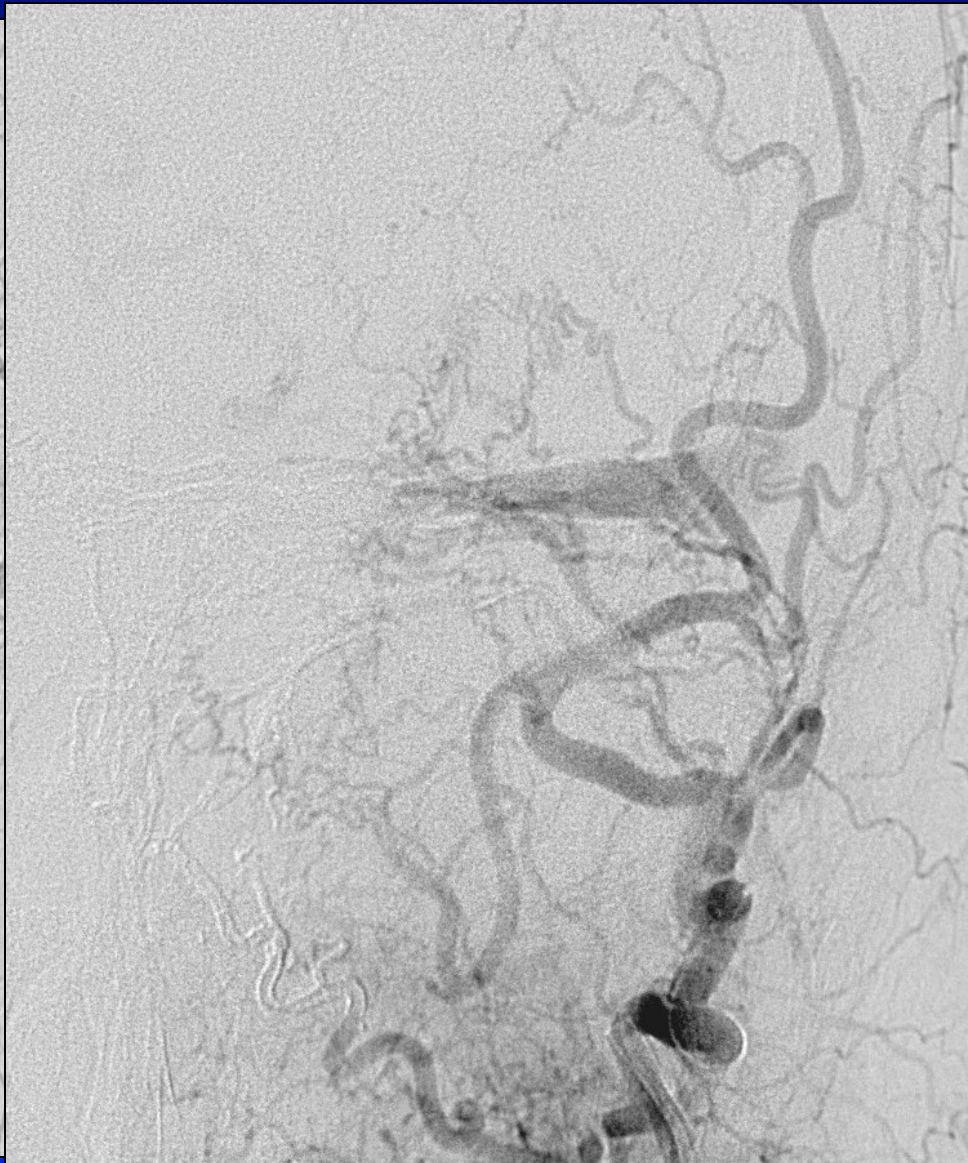
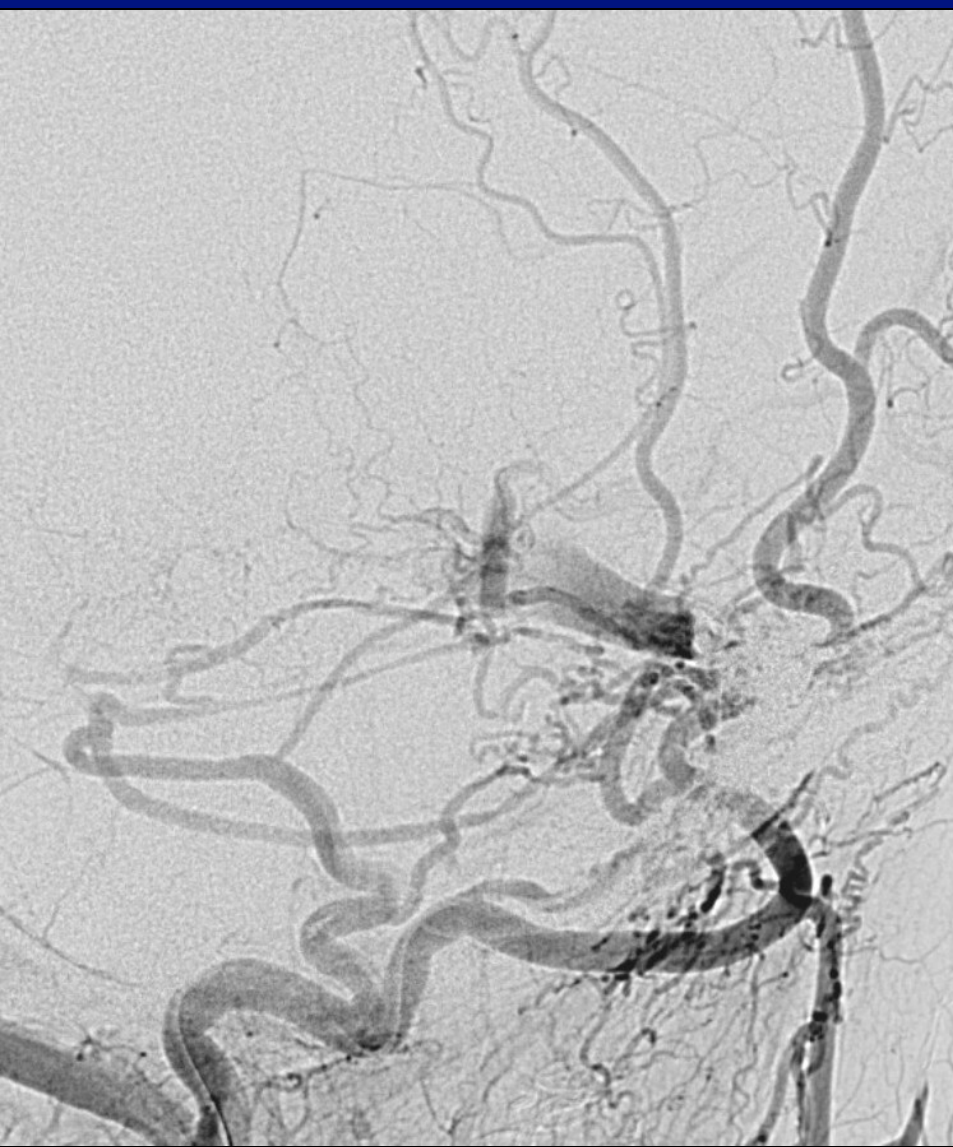


Cognard Type II b (Borden II)

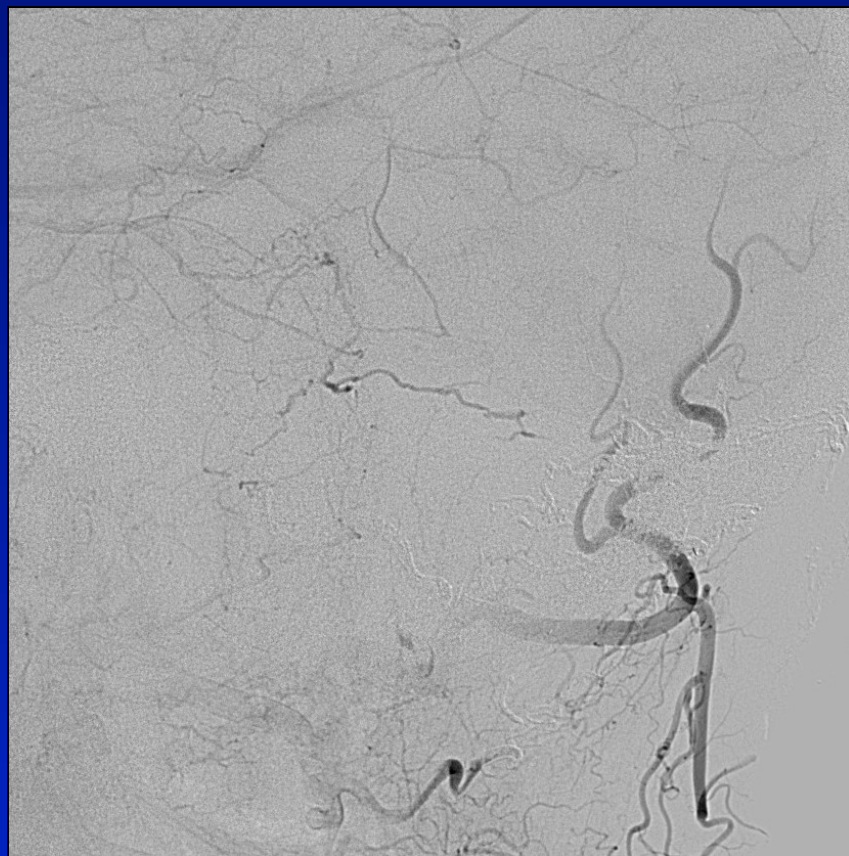




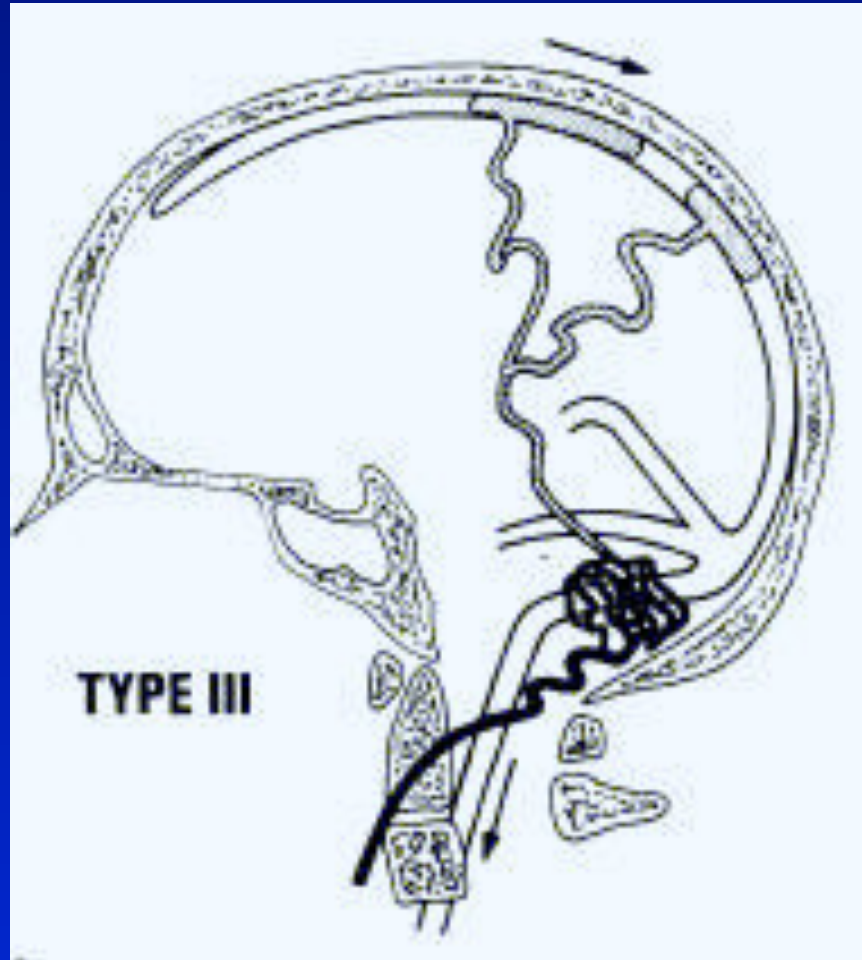








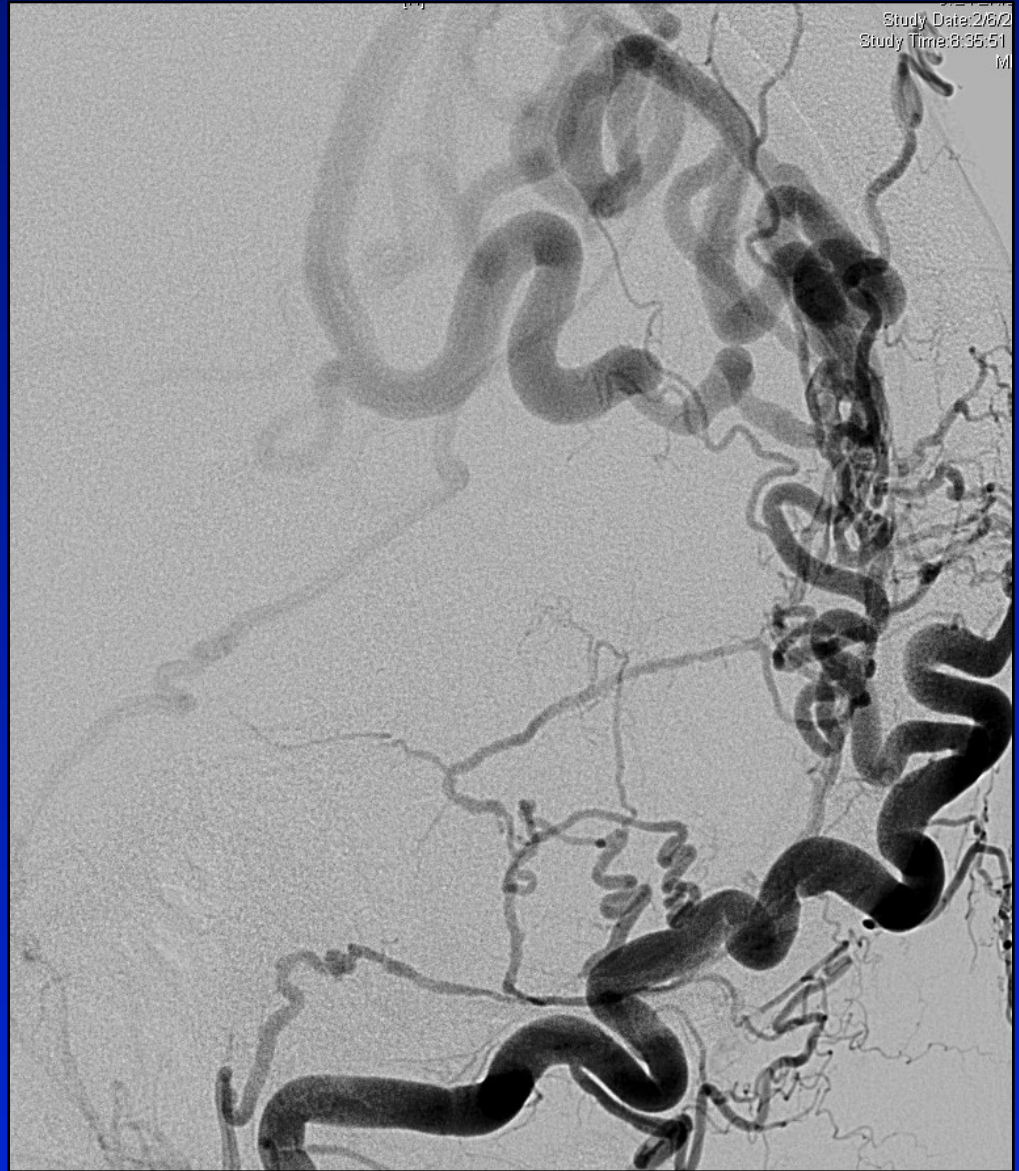
Cognard Type III (Borden III)

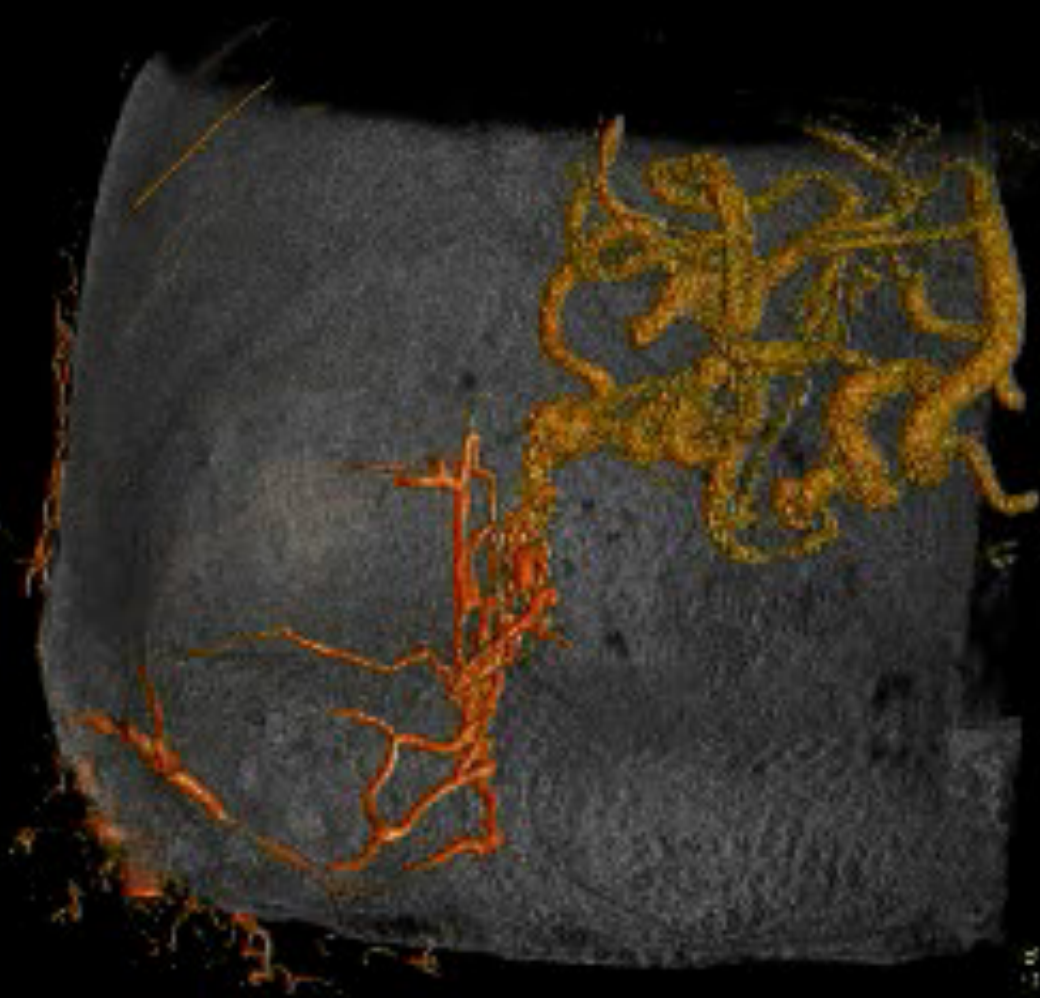


Type III and IV Presentation

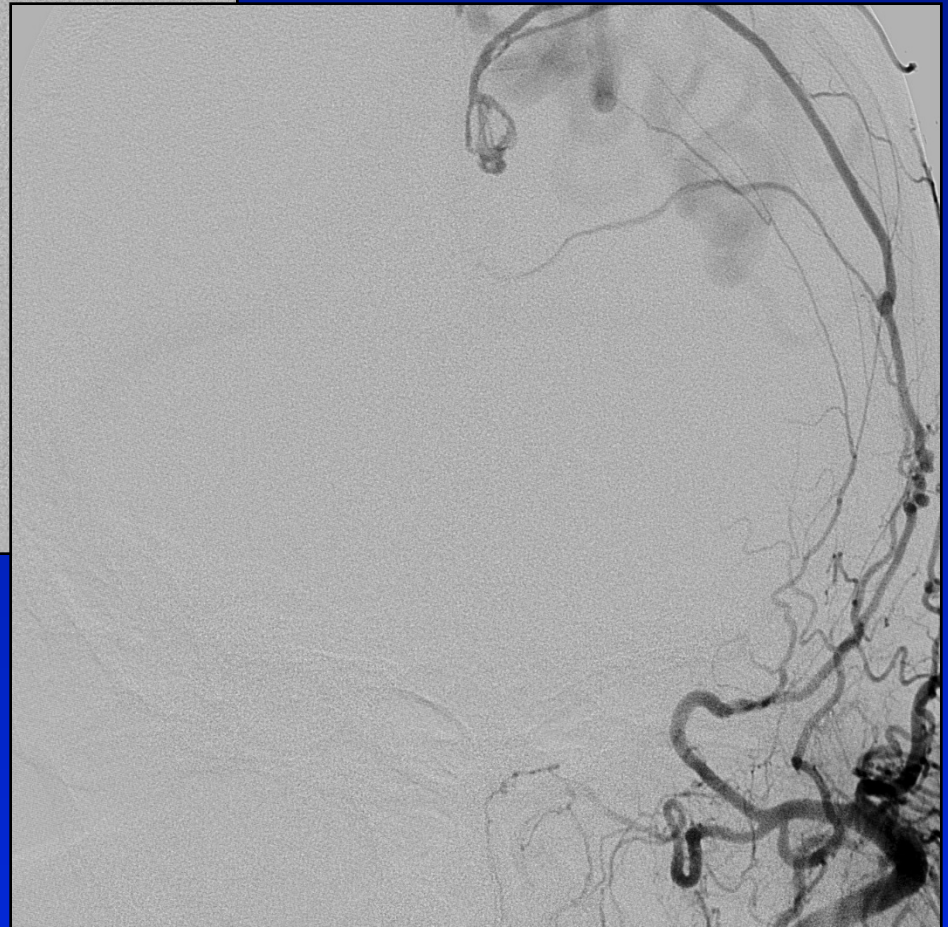
- Hemorrhage in 40% Type III, 65% in Type IV
- Must cure completely because subtotal produces risk for hemorrhage
 - Cases where pt died soon after embolization



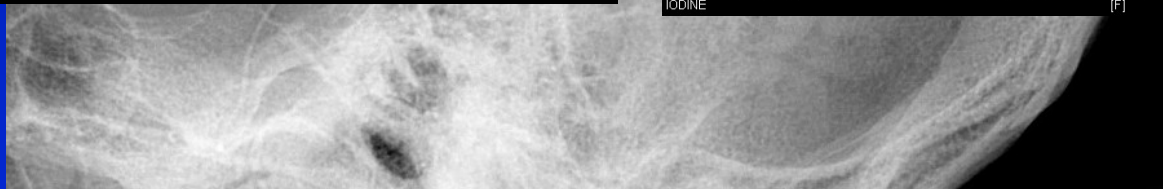




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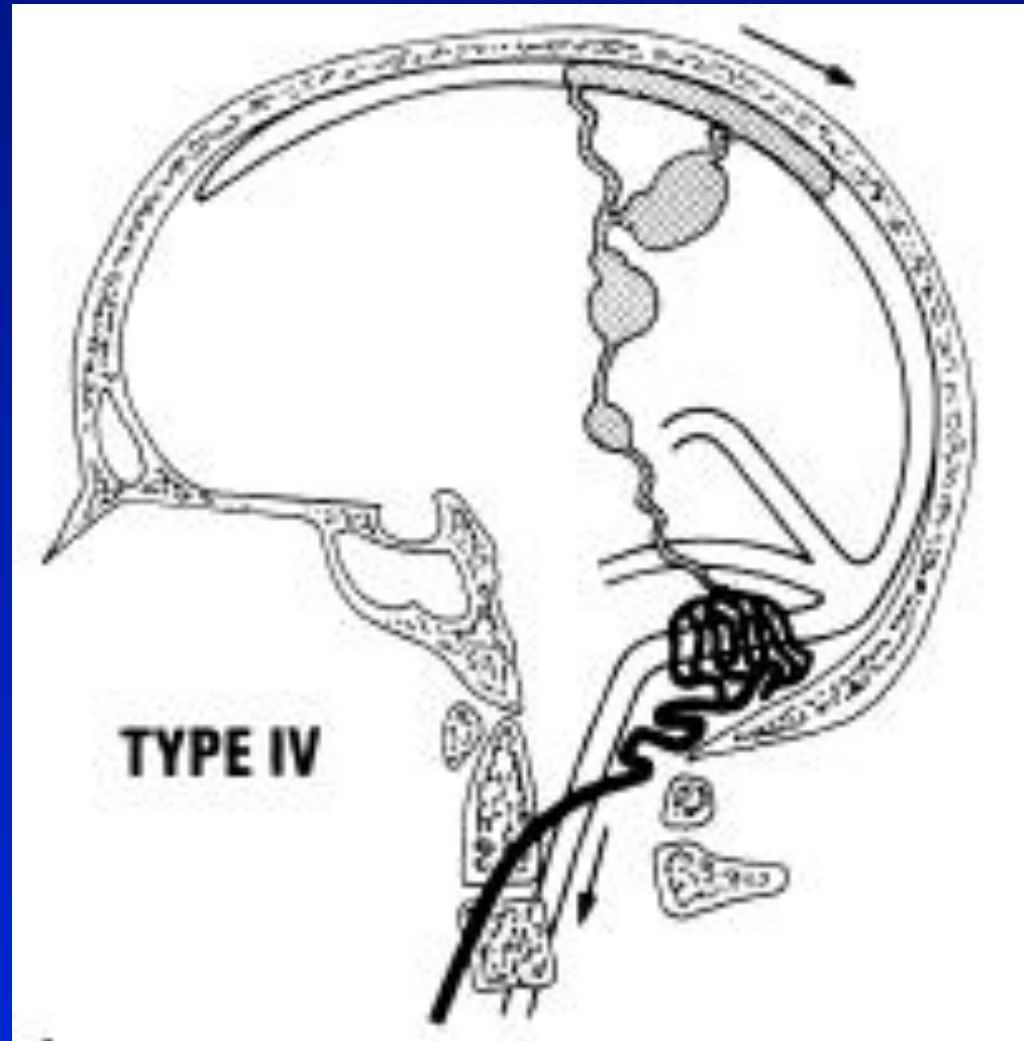
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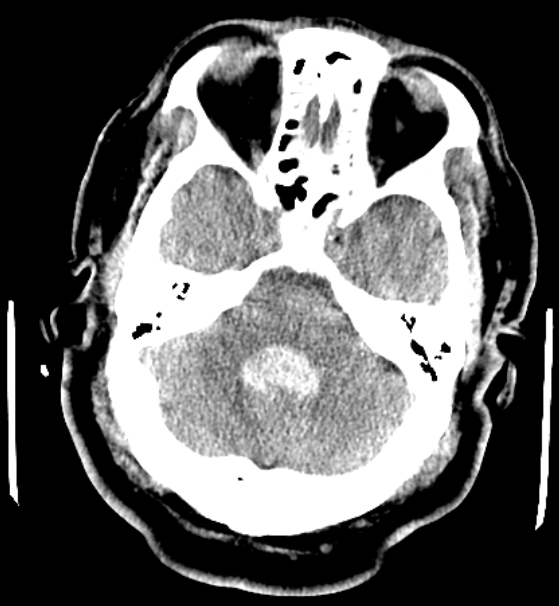


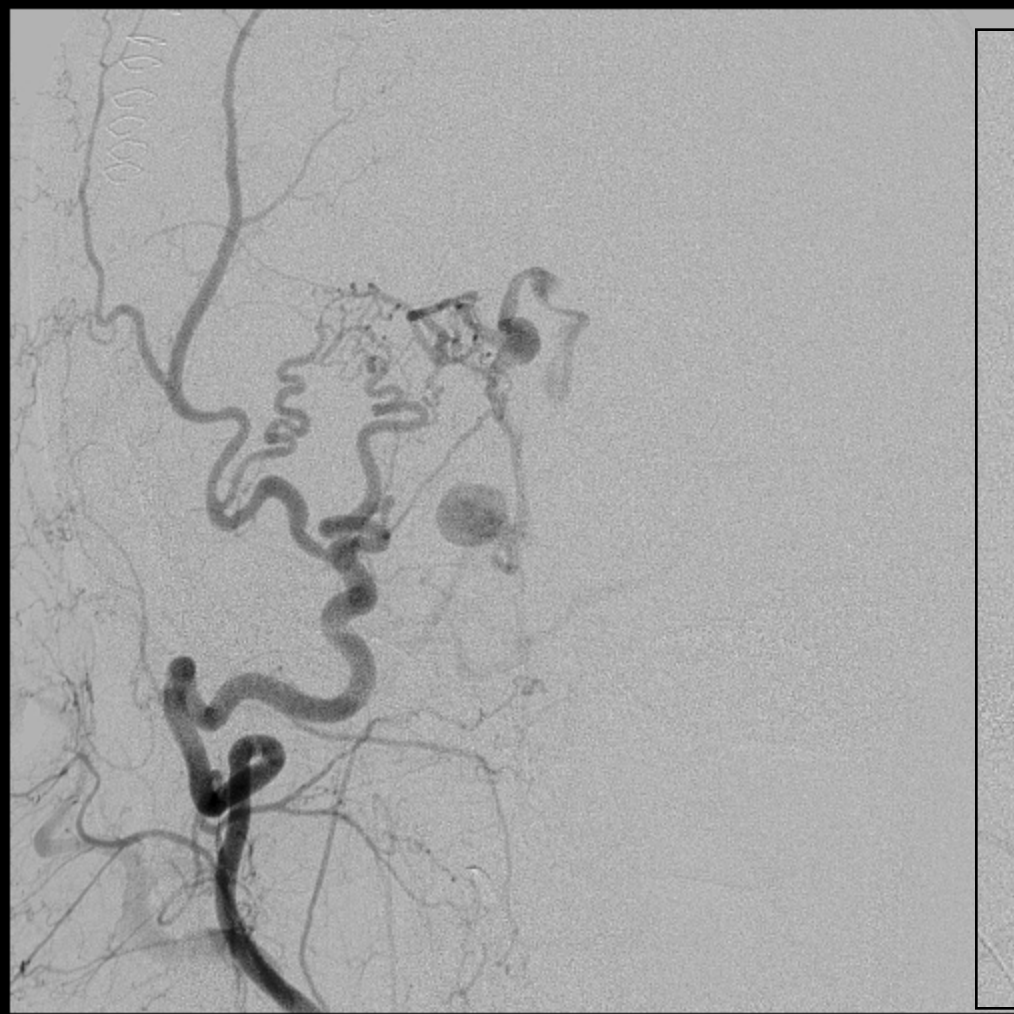
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Cognard Type IV (Borden III)













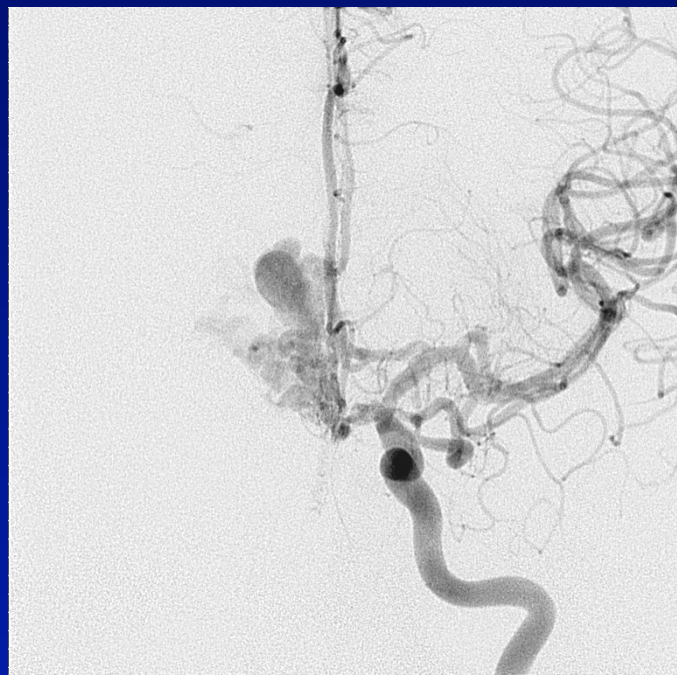
Lesion we would never have touched with glue

- Pt has proptosis, headaches, feels pressure sensation over sinuses



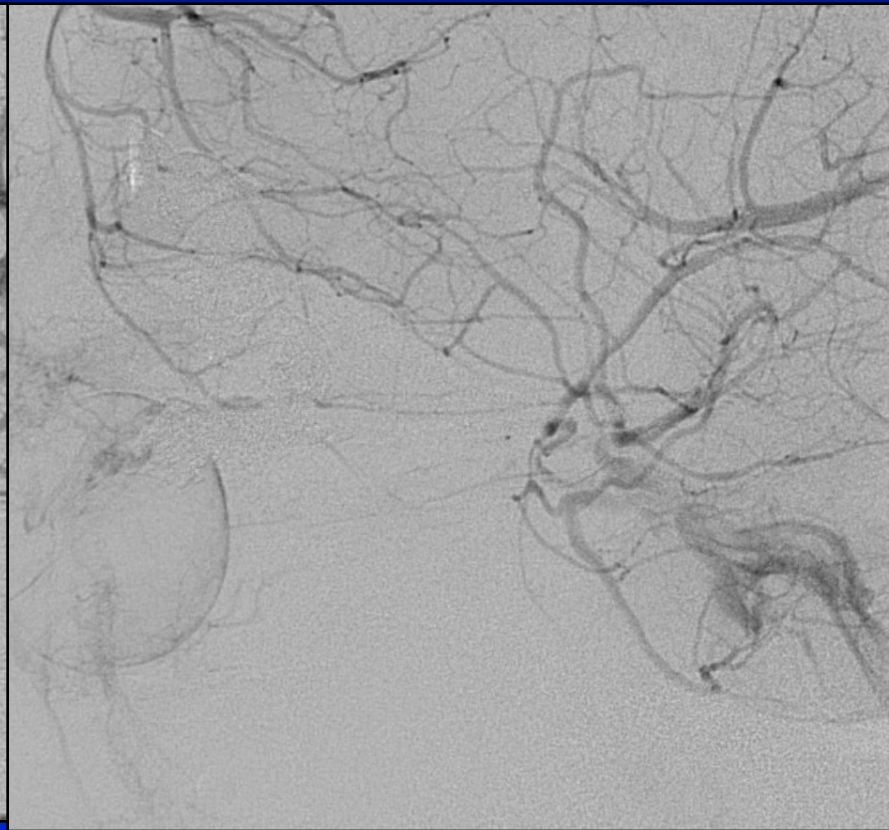
WWW.STILEPROJECT.COM

FOX 8



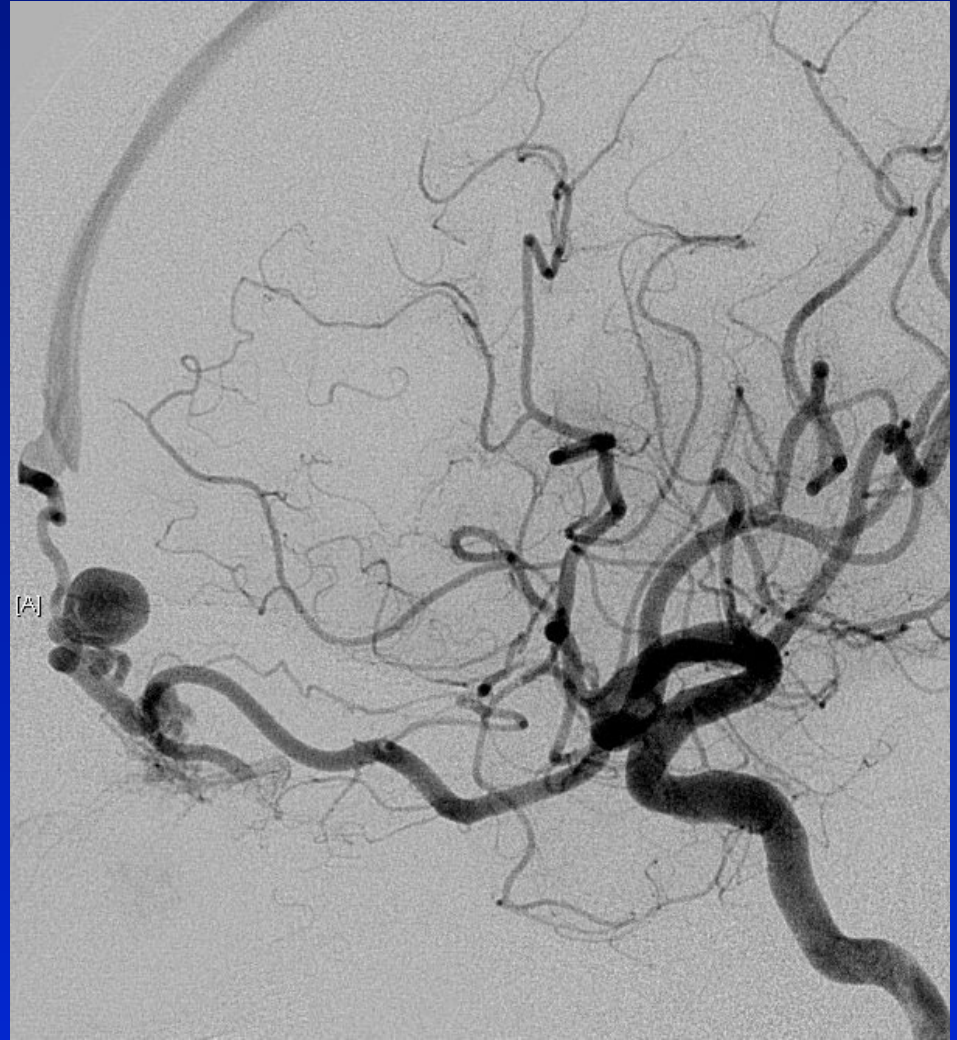
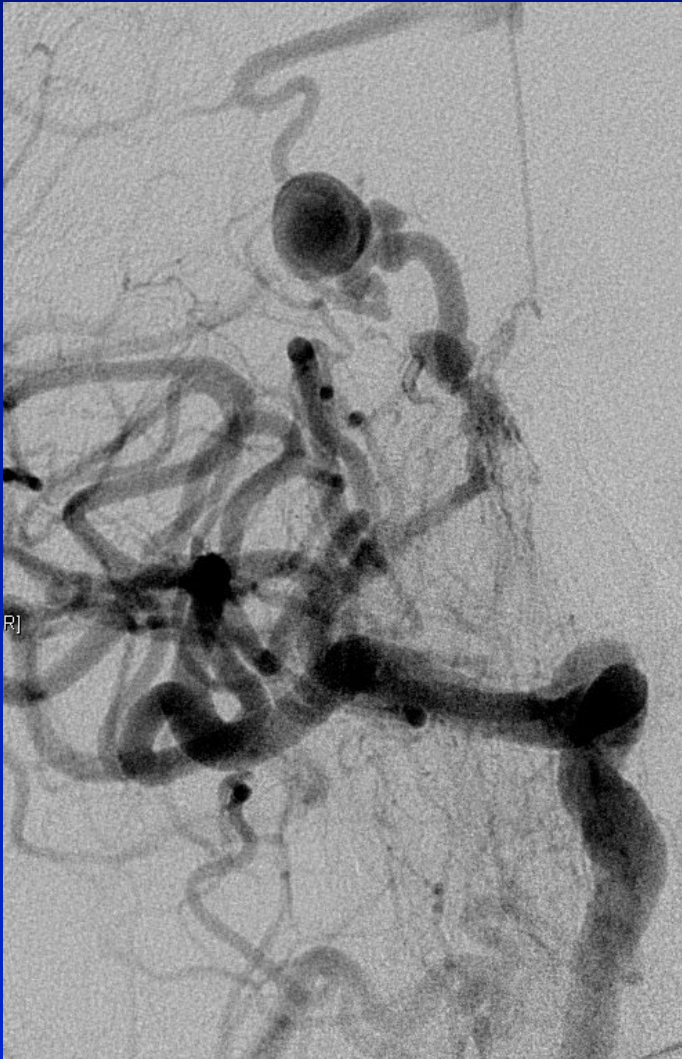
Low-contrast Dyna-CT

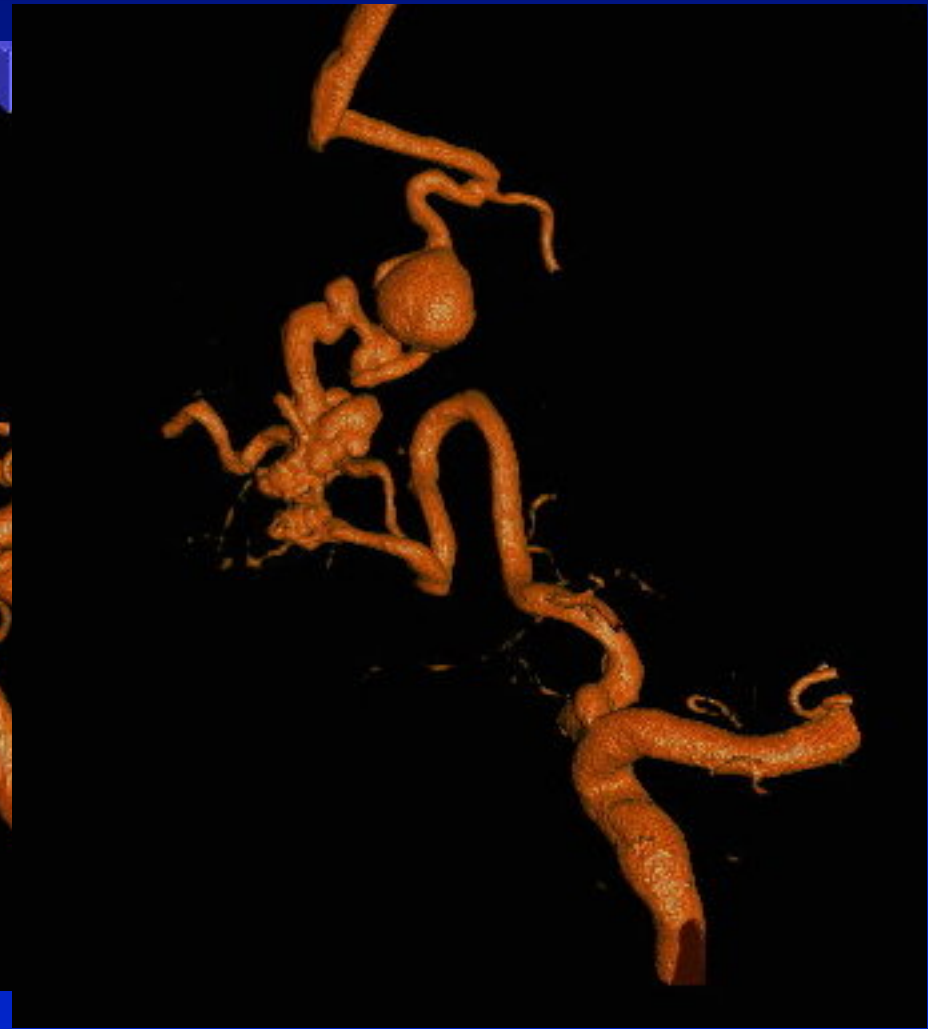
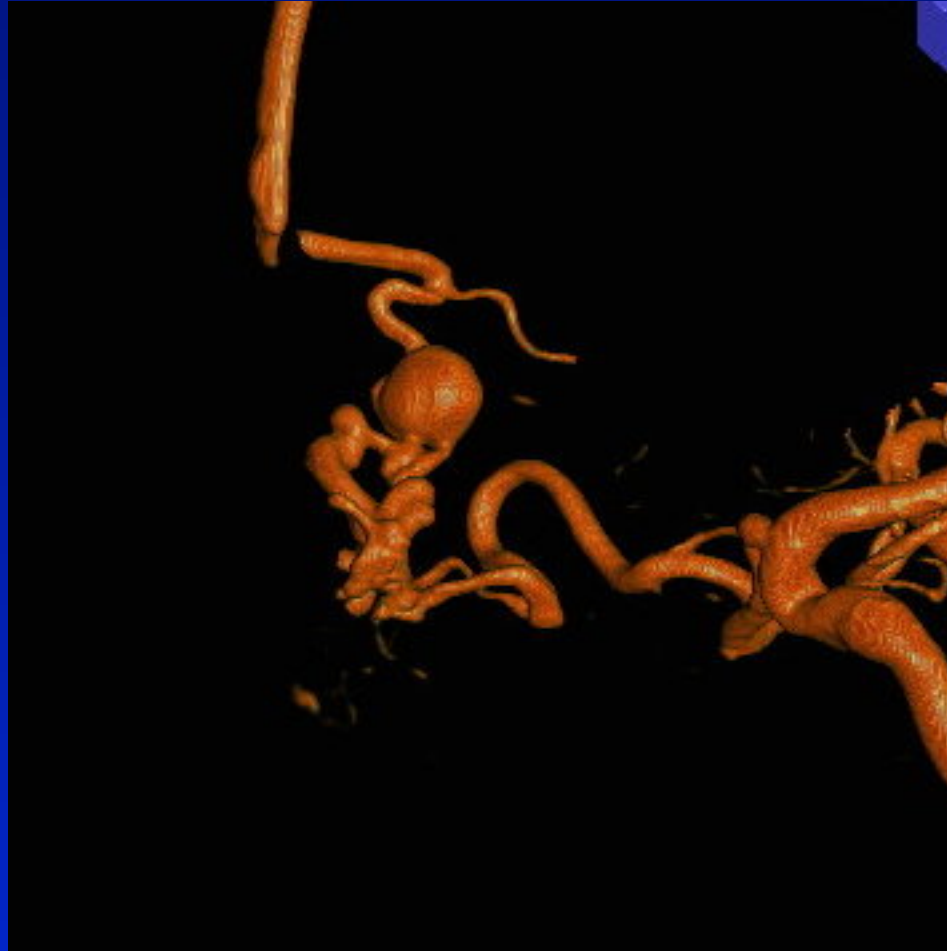
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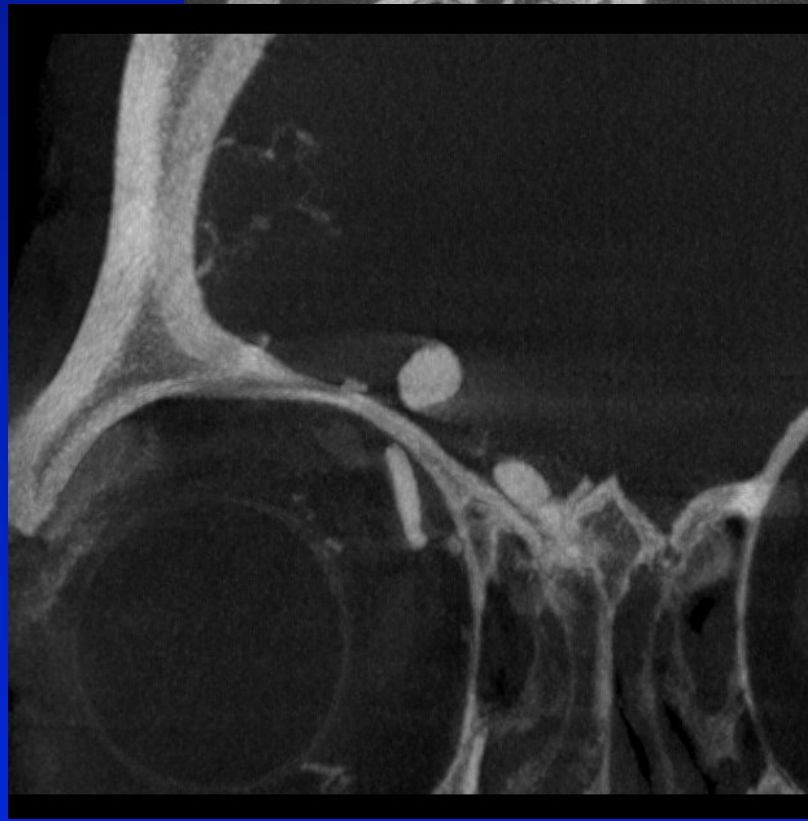
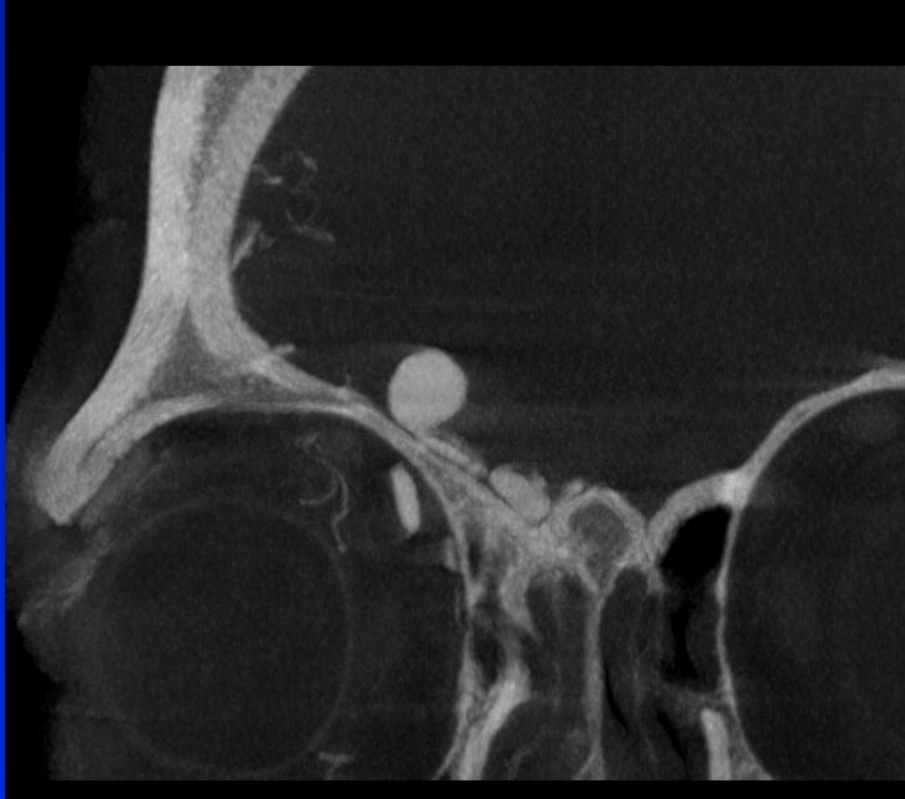
Similar case but several years
later

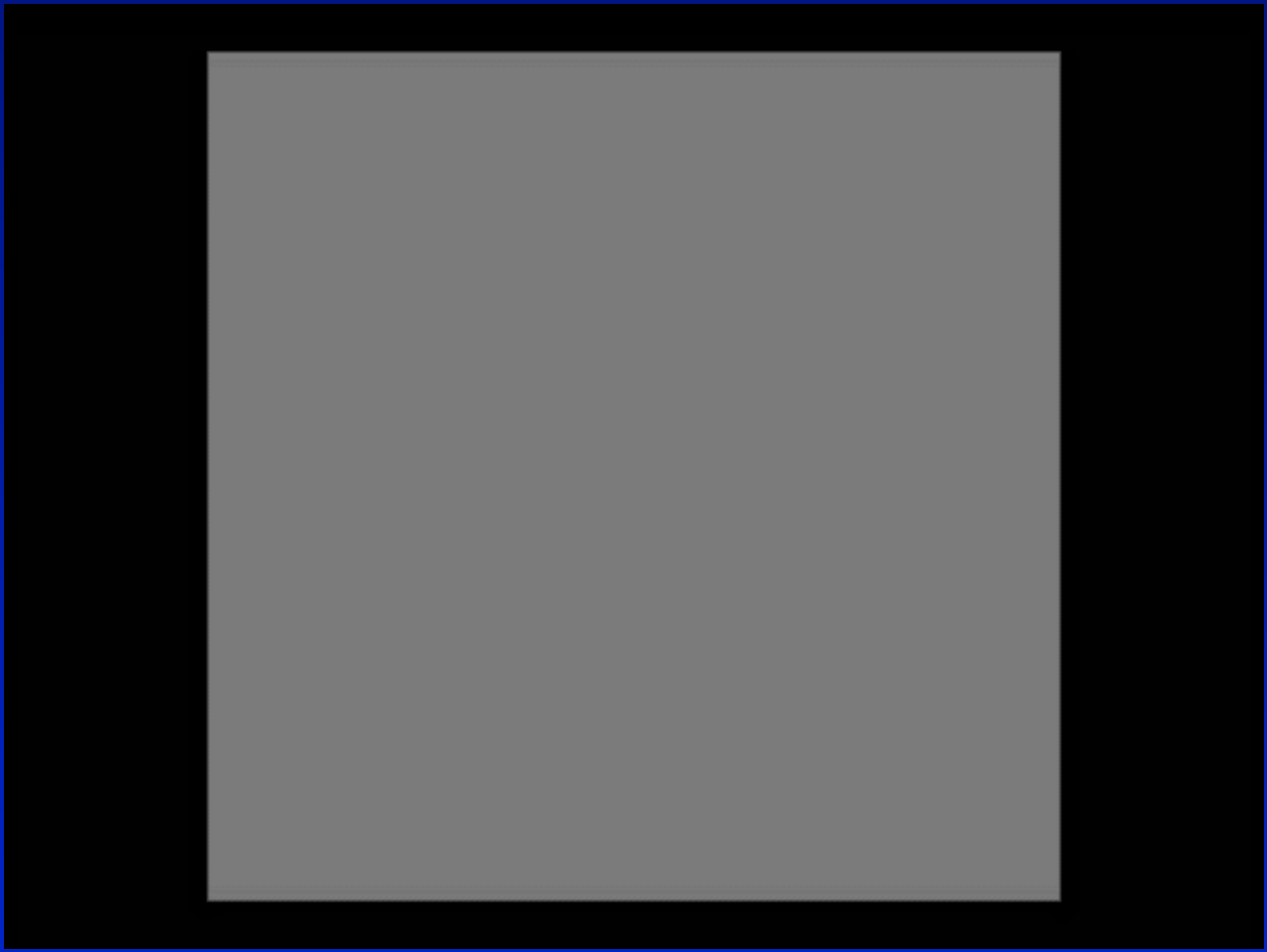
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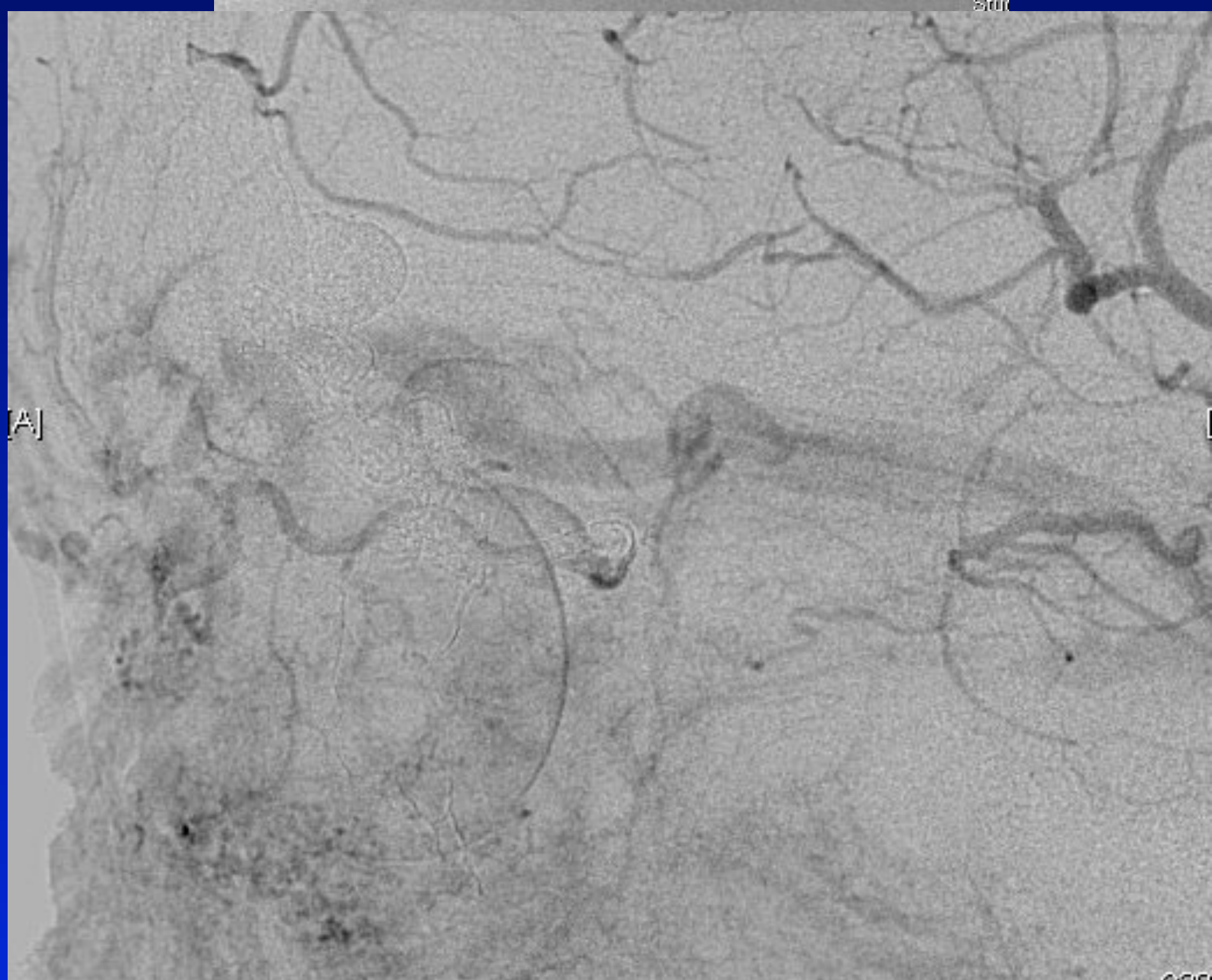




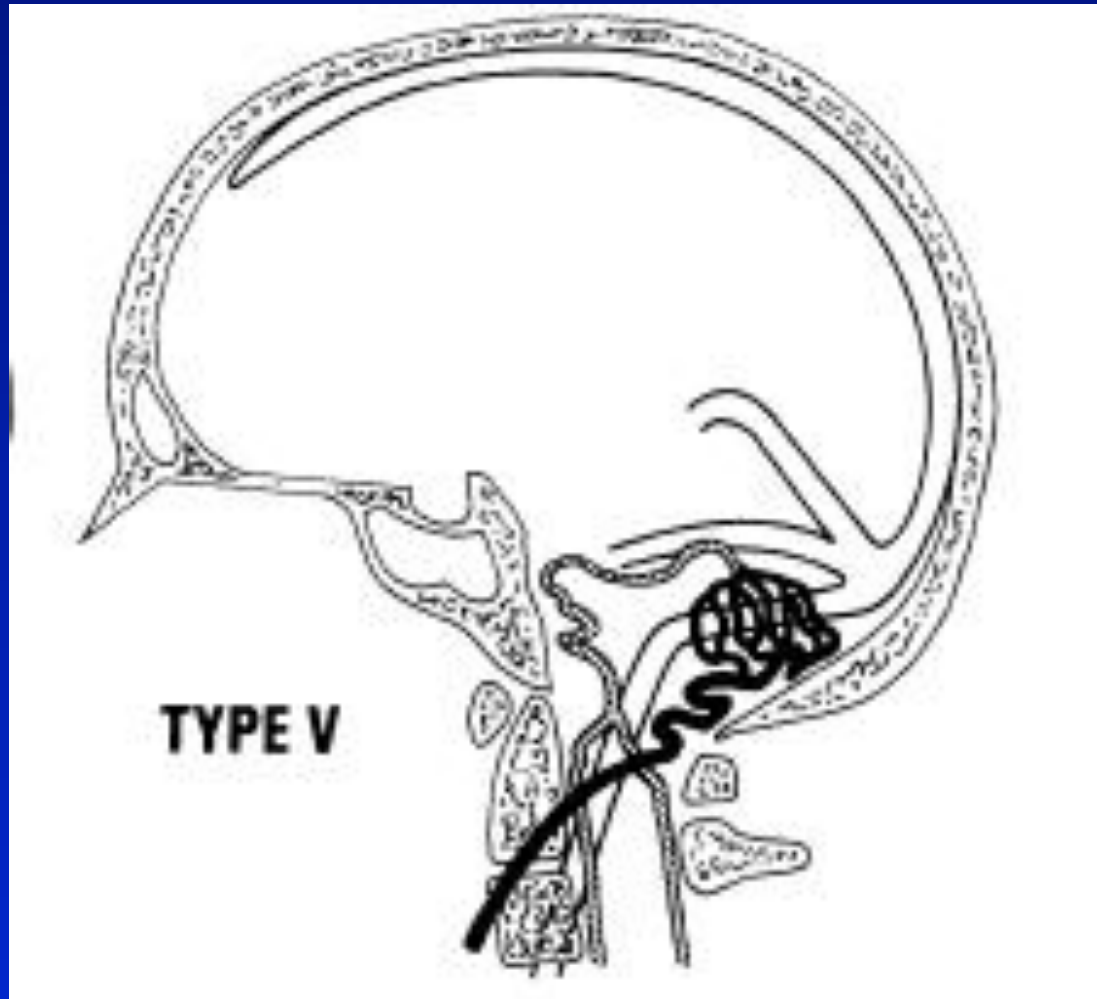
Dyna CT







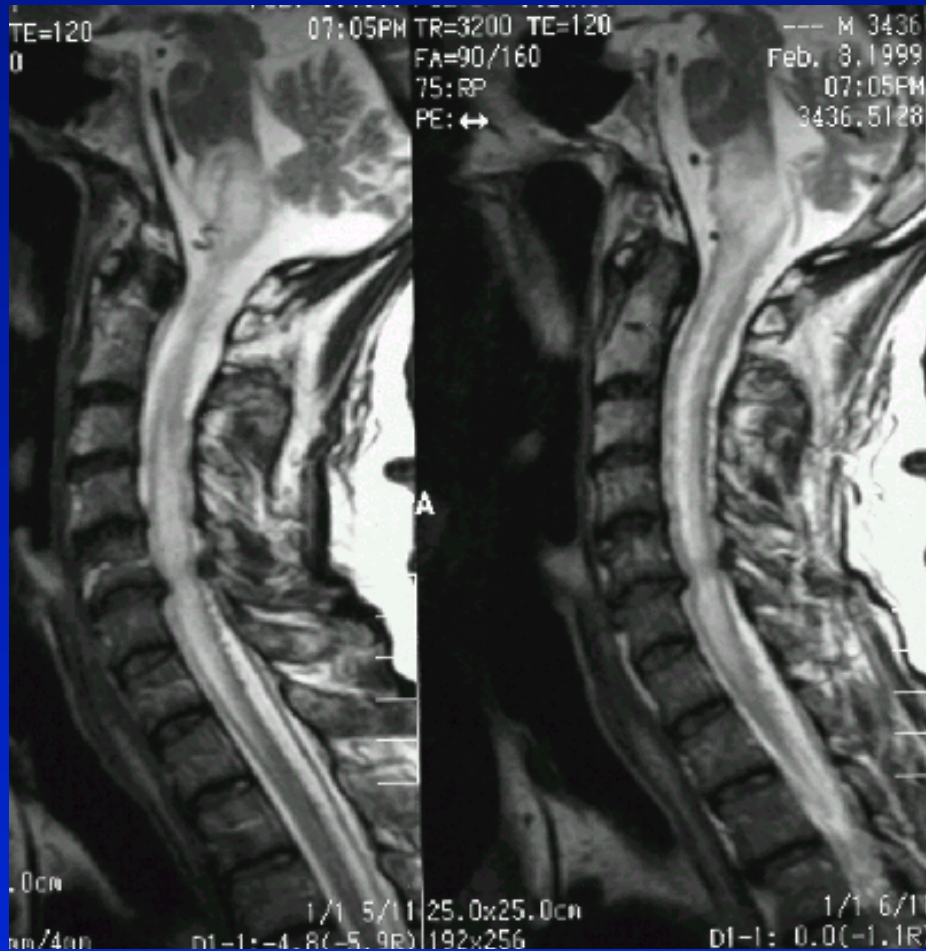
Cognard Type V (Borden III)

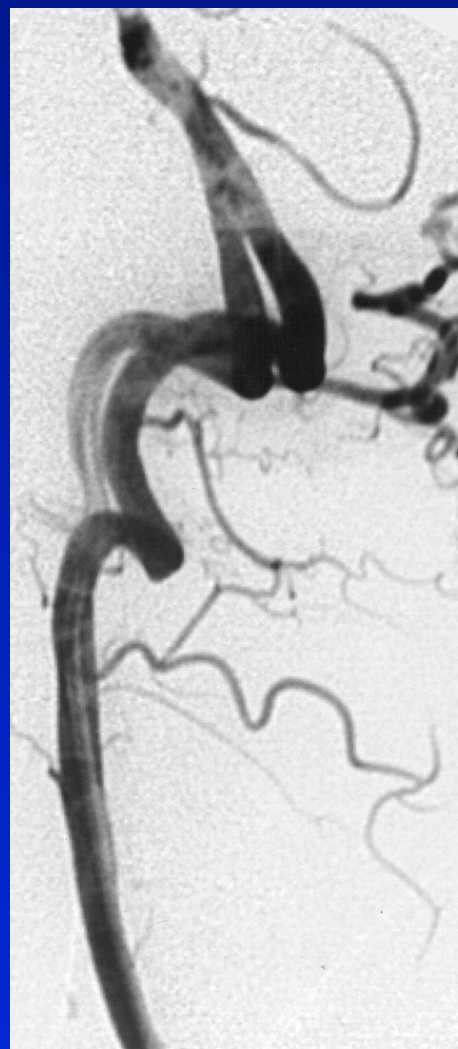
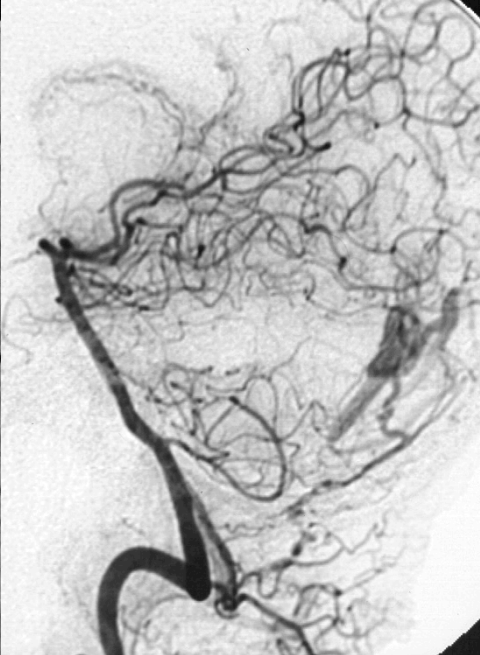
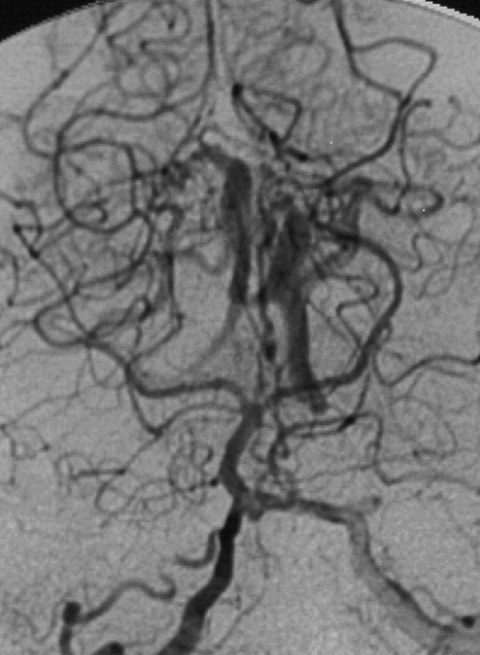


Type V Presentation

- Unique due to drainage into spinal veins
- Can produce spinal cord venous hypertension, myelopathy with slow flow spinal perimedullary venous drainage

Male 79 y/o 2 years progressive dysesthesias in hands and feet





Illustrative case of how Onyx is better than glue

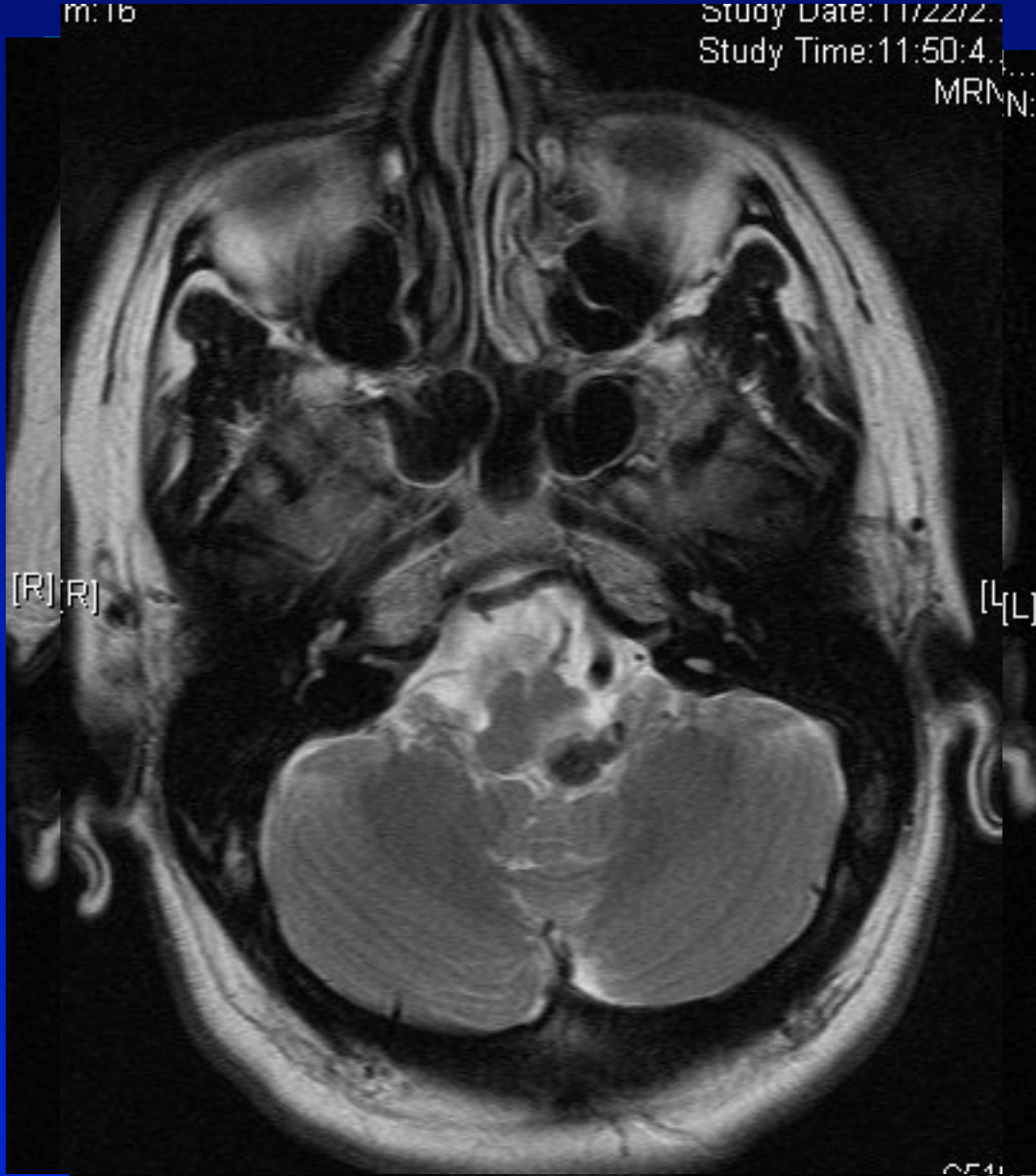
- Pt bled into posterior fossa and evaluated at another institution.
- When stabilized transferred to Houston
- Grade III-IV
- Following treatment returned to the other hospital for rehab

m: 1b

Study Date: 11/22/20...

Study Time: 11:50:4...

MRN: ...



[R] [R]

[L] [L]

[PF]

C617
W1237

Se:2
Im:307 (F1/1)

Shift Overlay from 80:xx to 7FE0
[H]

SCA T017
Study Date:11/23/2004
Study Time:2:35:10 PM
MRN:

[P]

[L]

IODINE

[F]

C2048
W4096





[F]

C20
W40

Se:13
Im:300 (F1/1)

Shift Overlay from 60kx to 7FEO
[H]

Post
Study Time: 2:55:44 PM
MRN

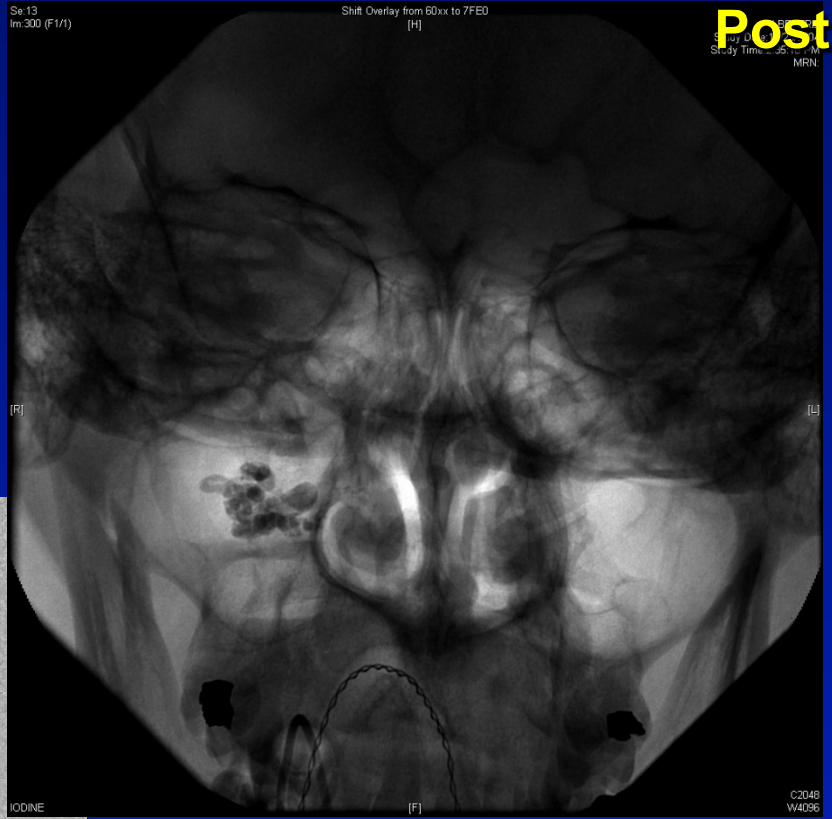
[R]

[L]

IODINE

[F]

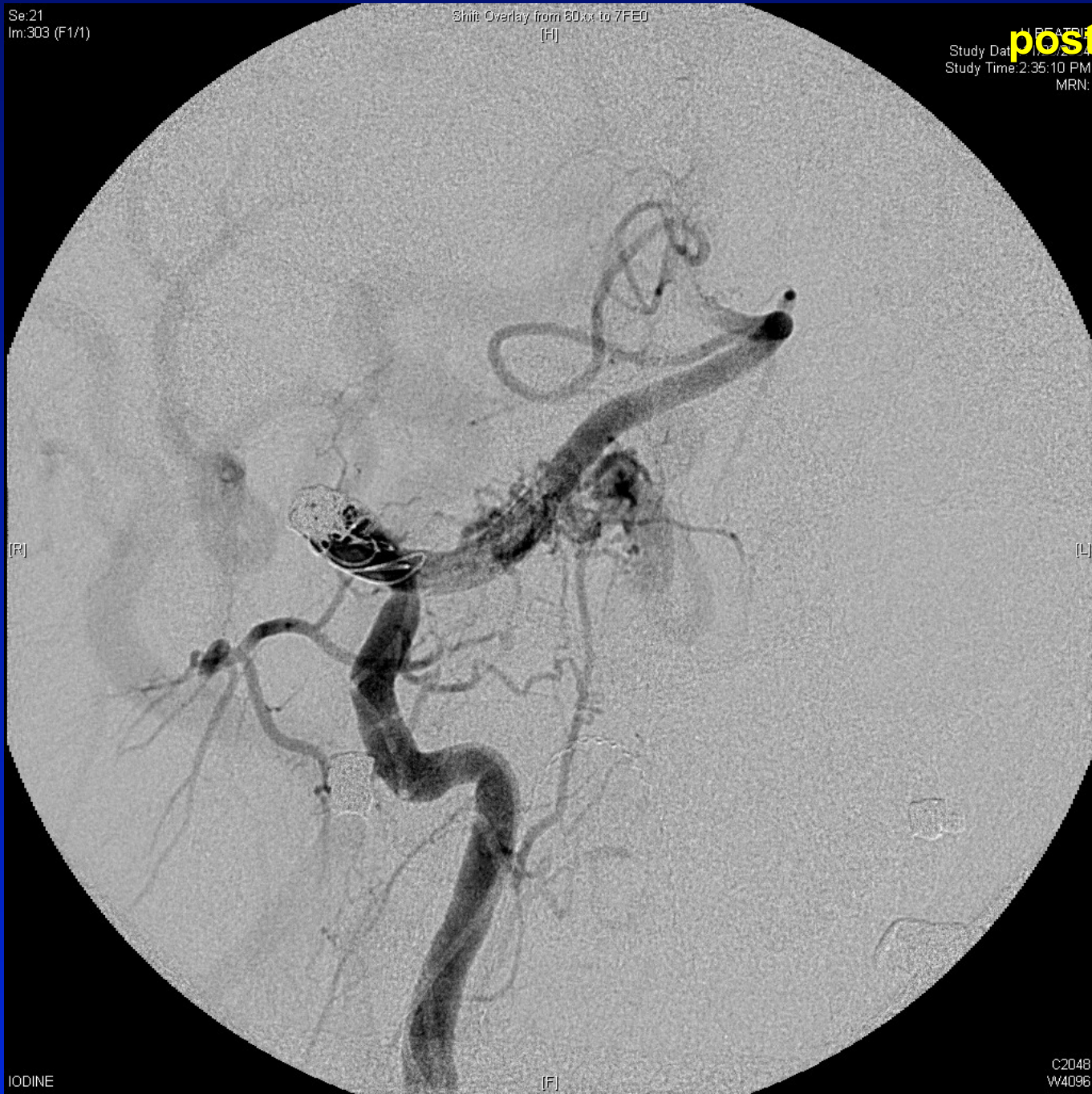
C2048
W4096



Se:21
Im:303 (F1/1)

Shift Overlay from 80xx to 7FE0
[H]

Study Date: **post**
Study Time: 2:35:10 PM
MRN:



[R]

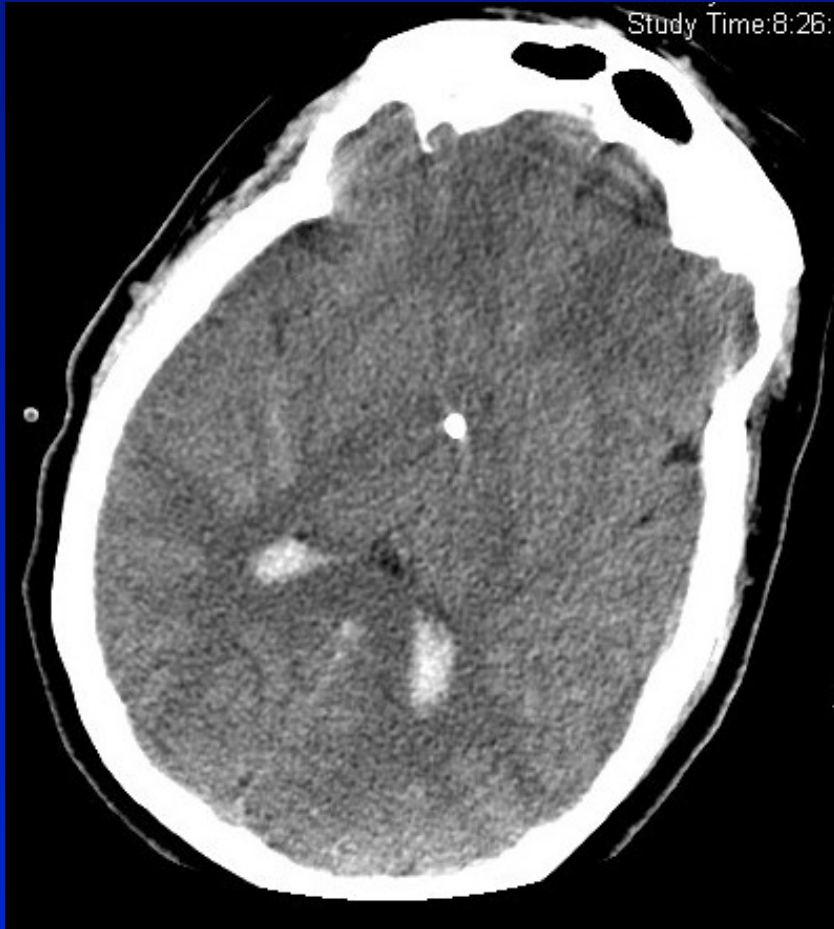
[L]

IODINE

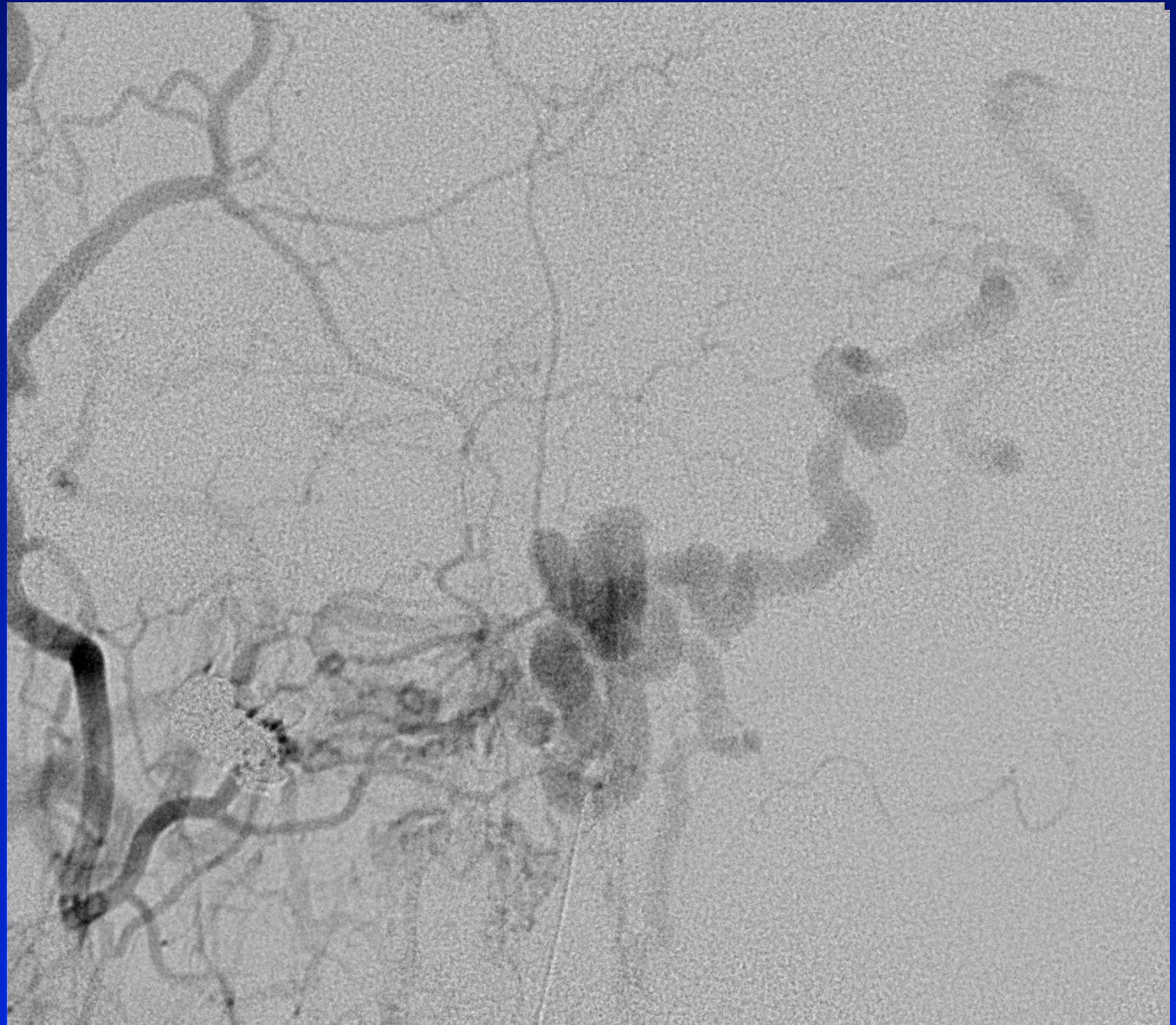
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C2048
W4096

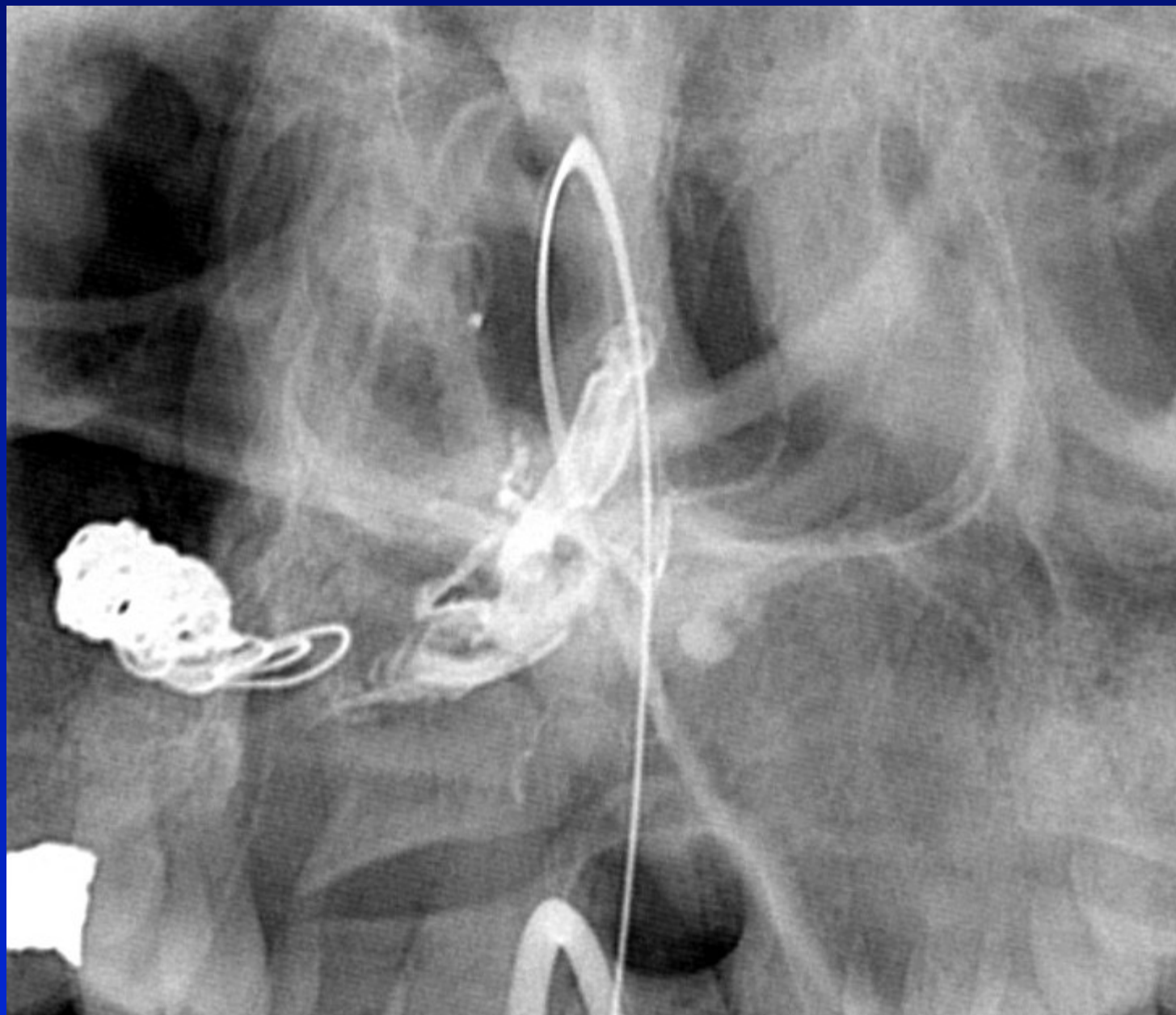
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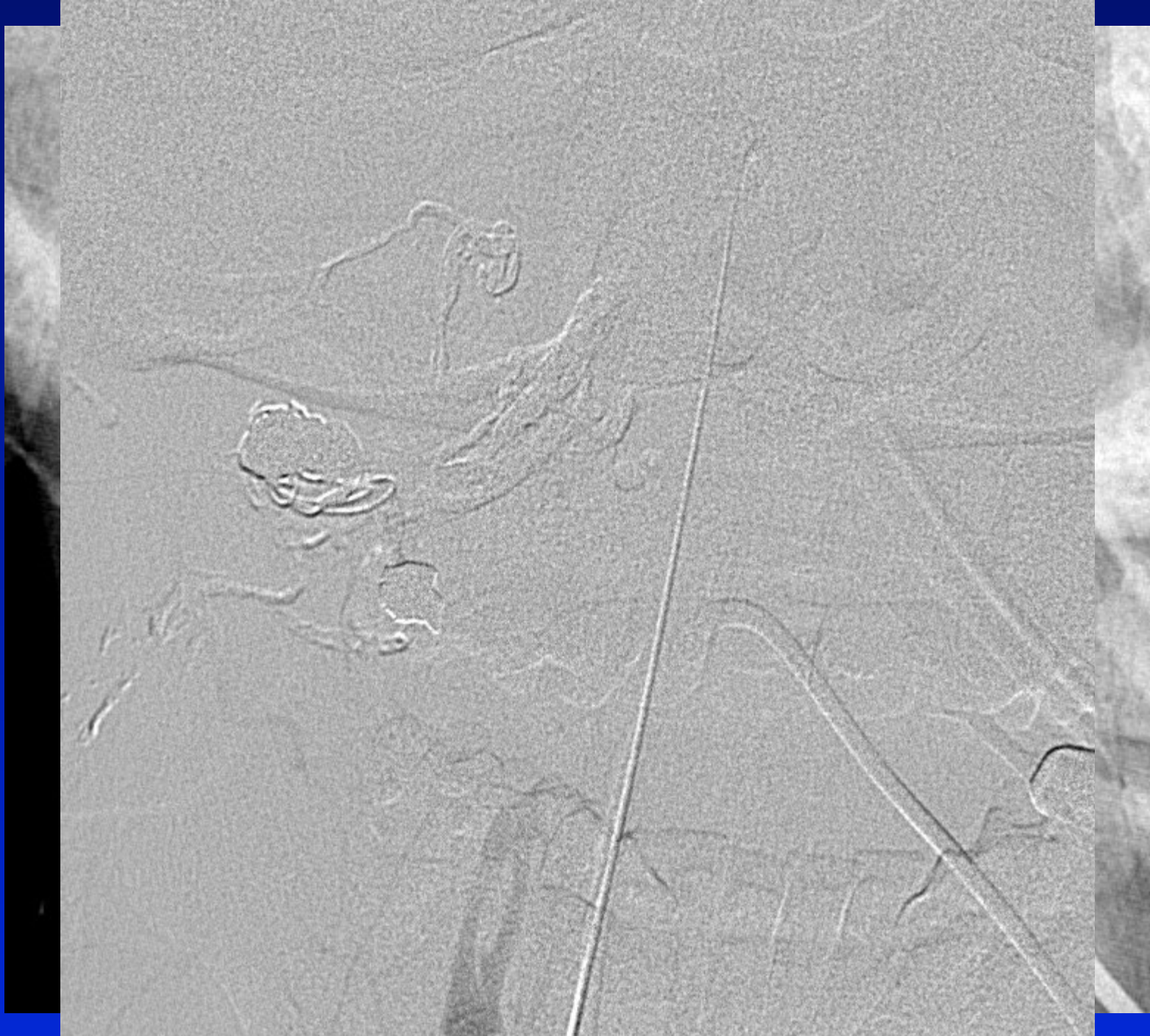












Summary

- Onyx is the best material for treatment of AVF's
- Type I-IIa are some of most difficult and may need combined approach
- We have had great success with Types IIb to V just using Onyx alone



The End

SQUIZZLE.COM

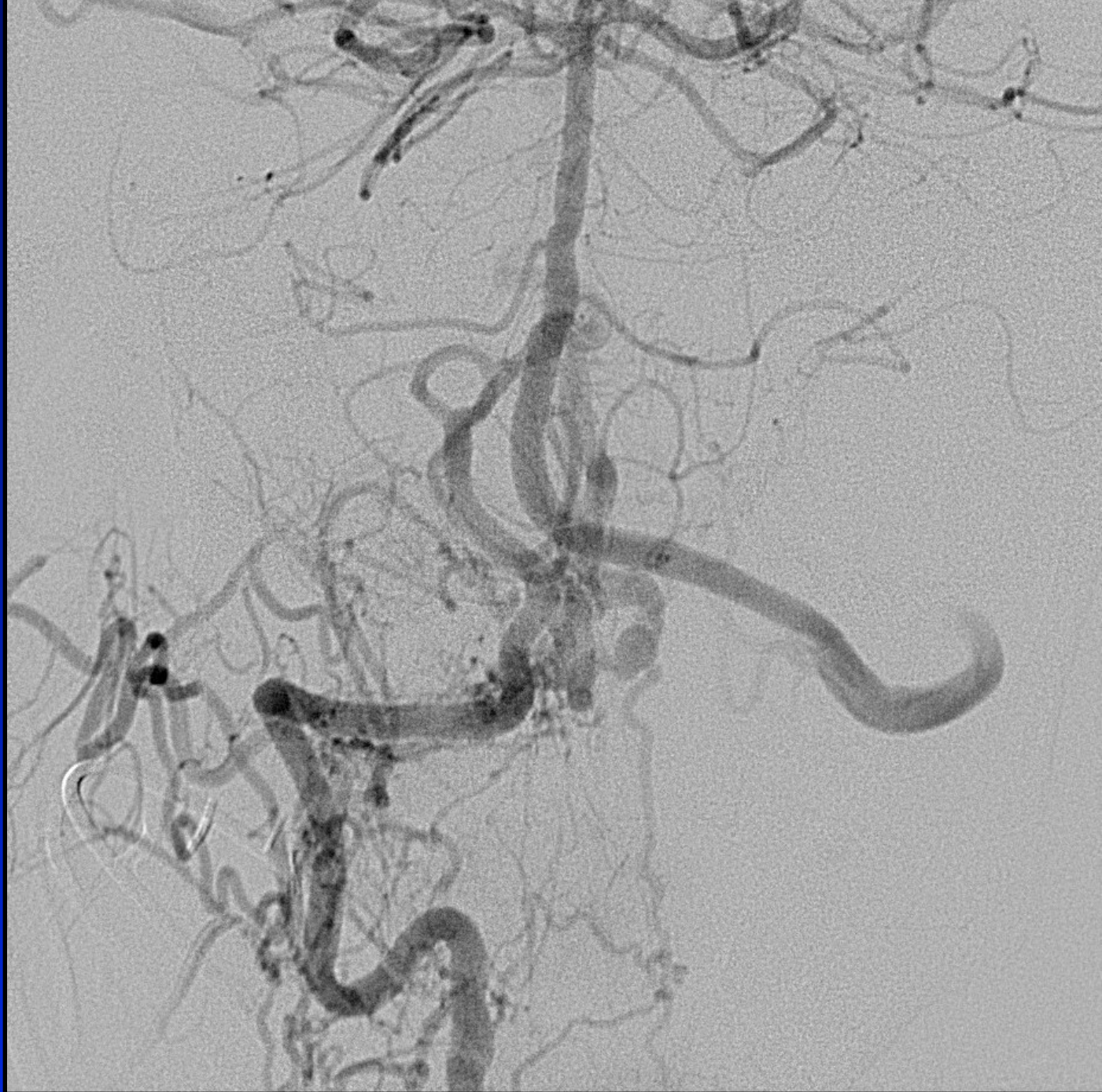
Thank You for Attention

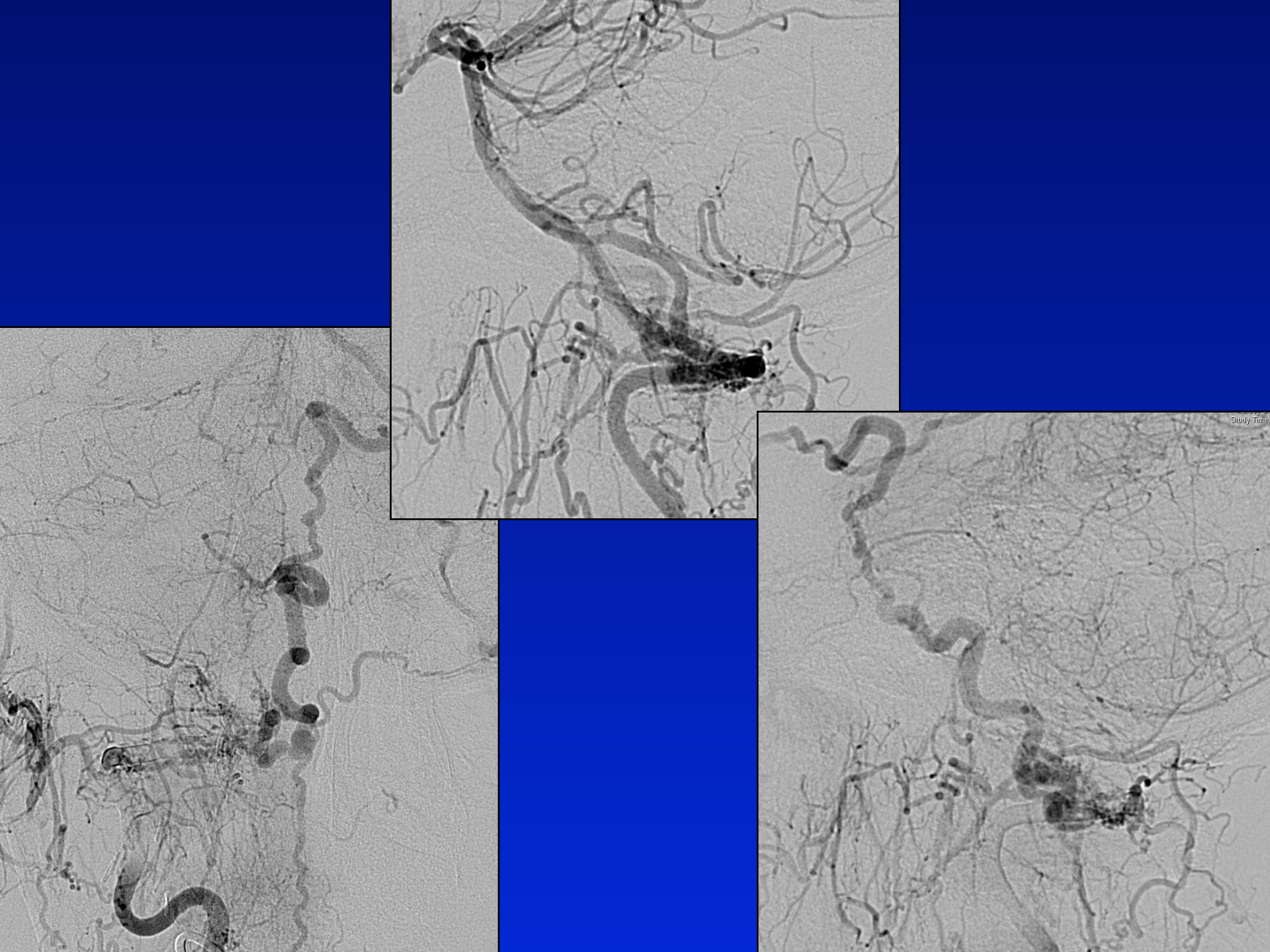


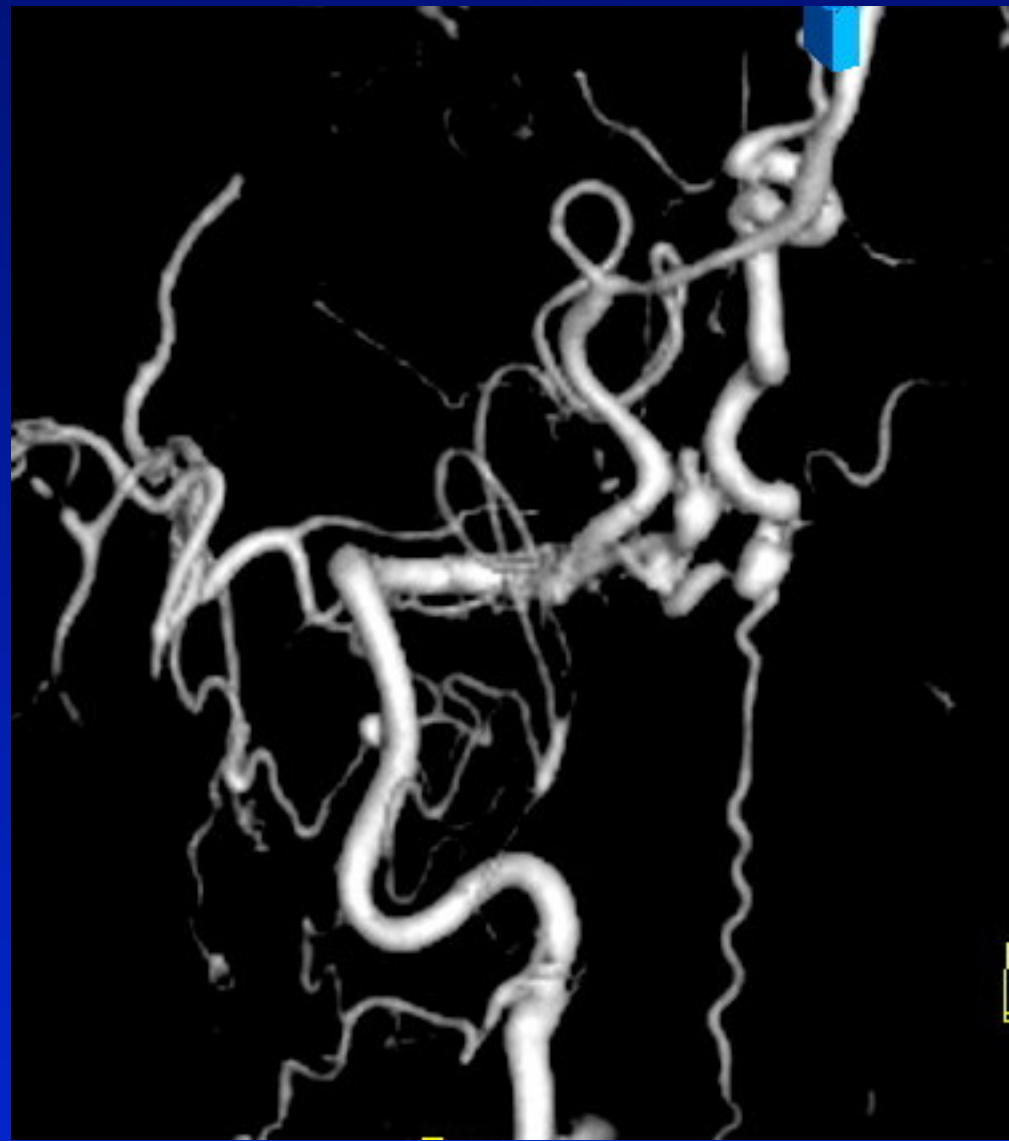
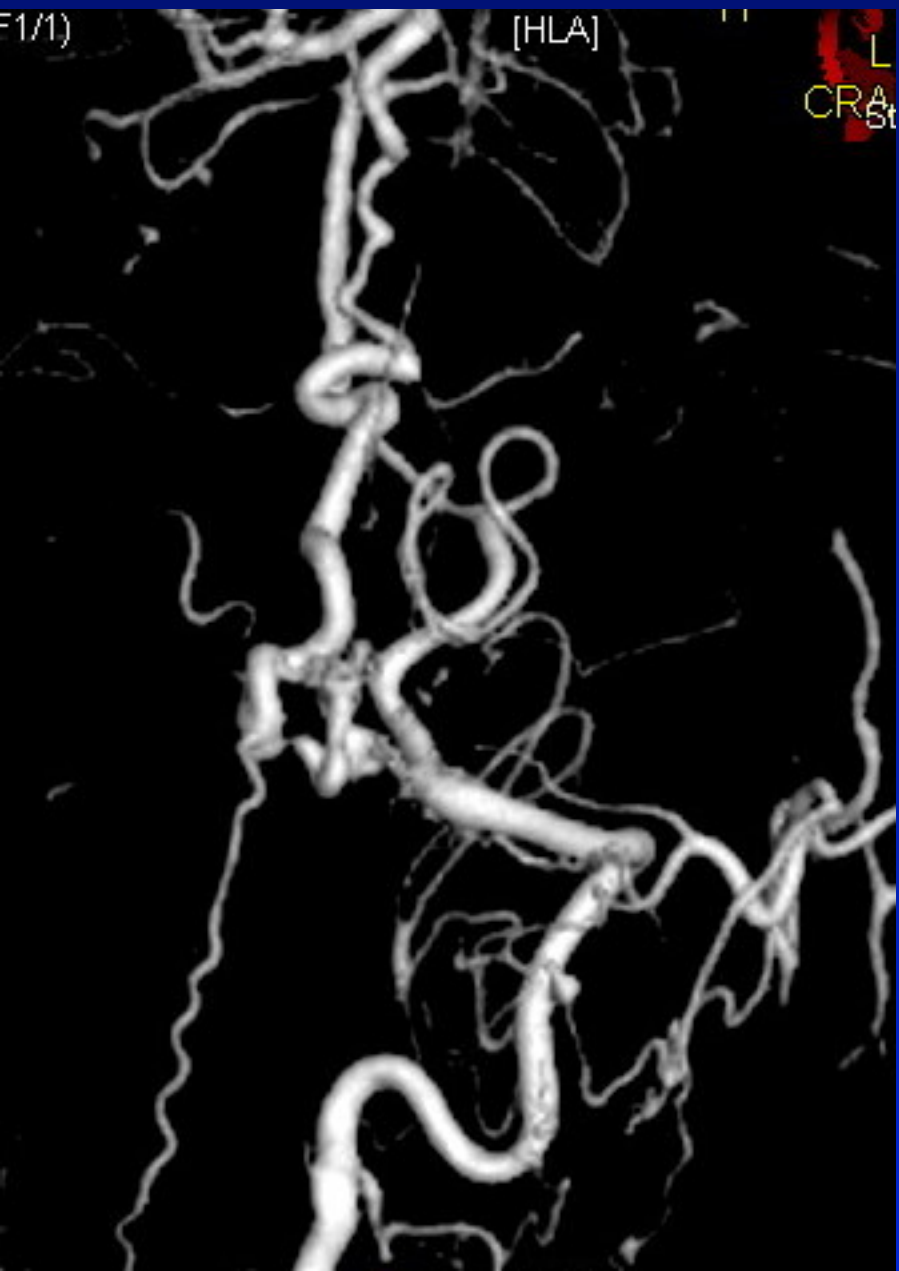
The end



geeTrish.com



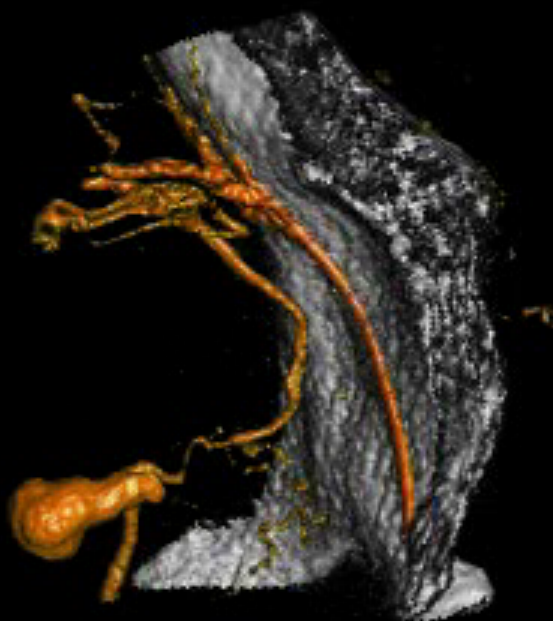
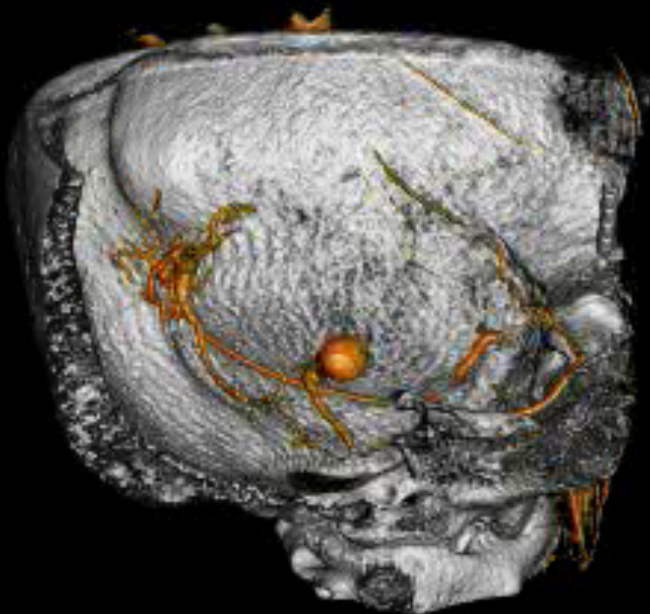


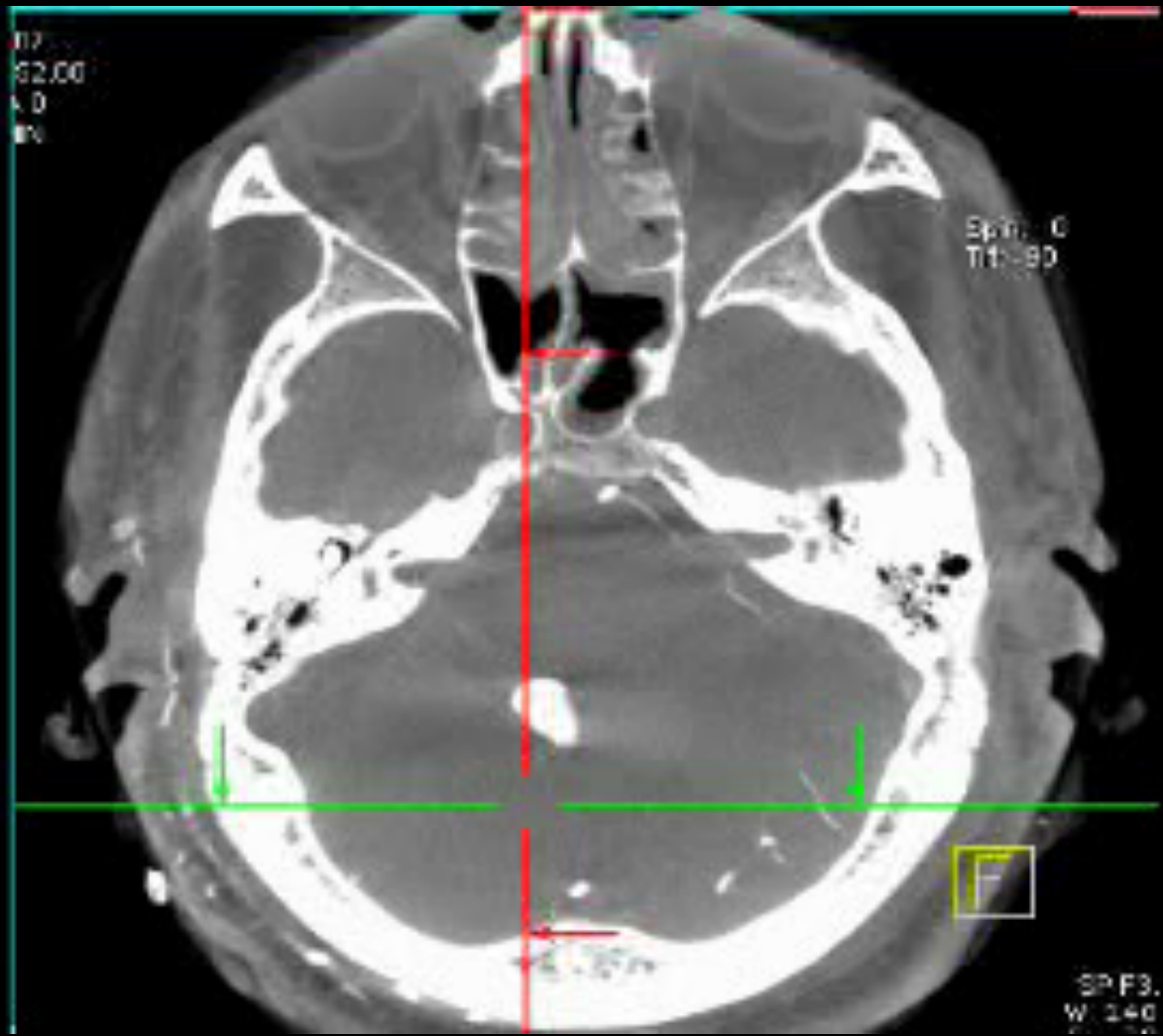




Location

- Transverse sinus
- Cavernous sinus
- Tentorium
- Superior sagittal sinus
- Anterior cranial fossa



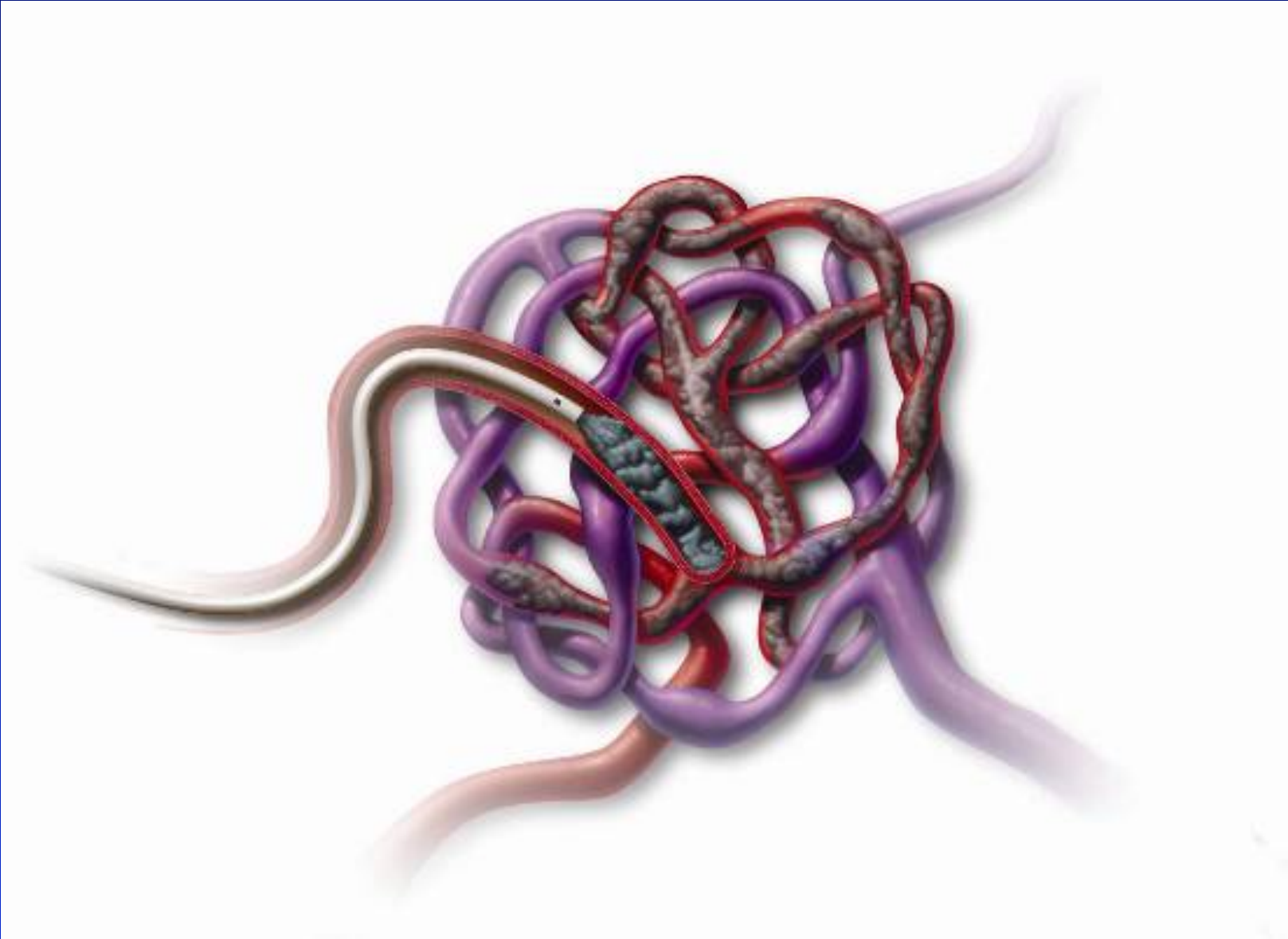


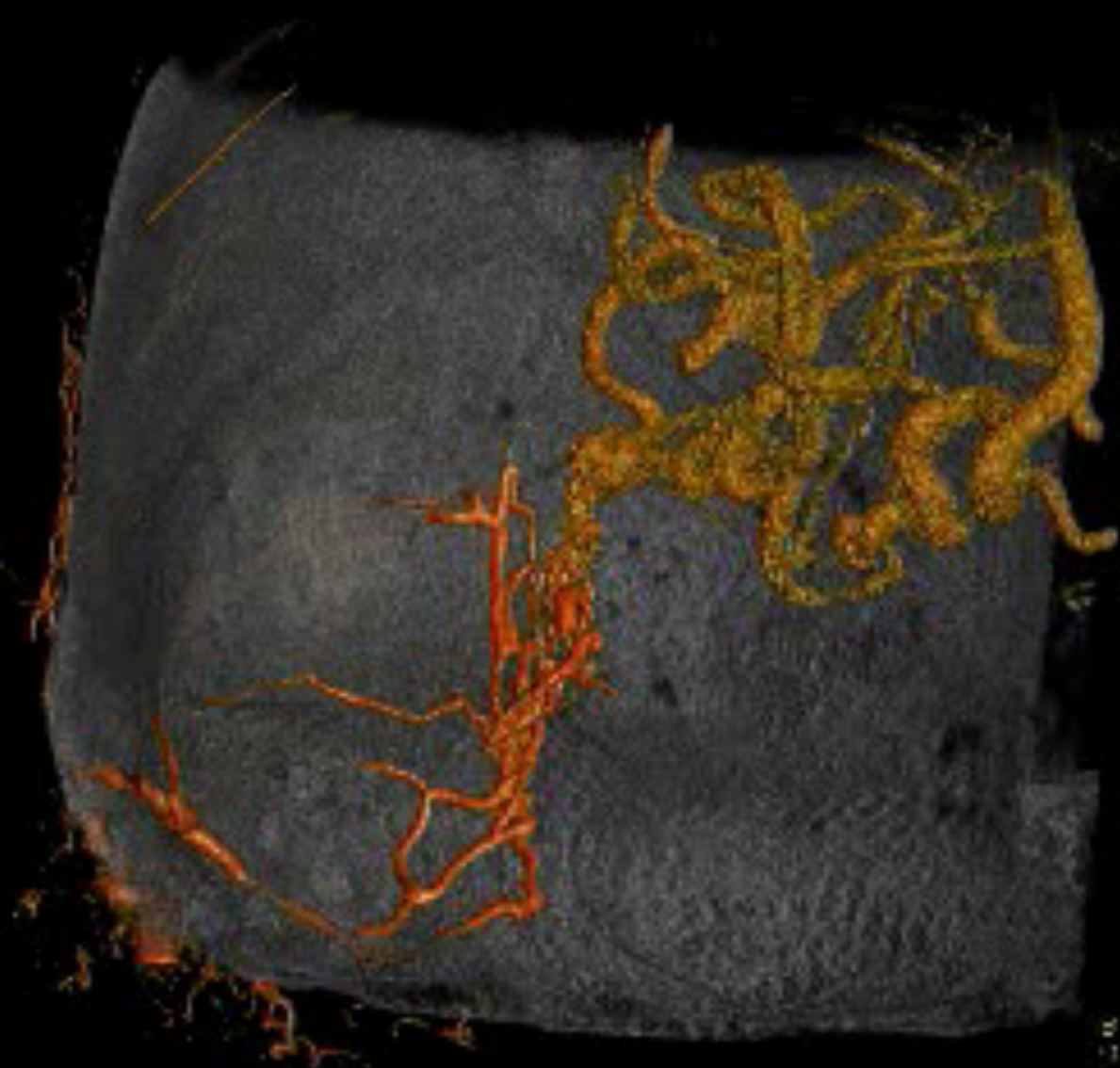
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Ep: 0
T1: 80

F

SP F3
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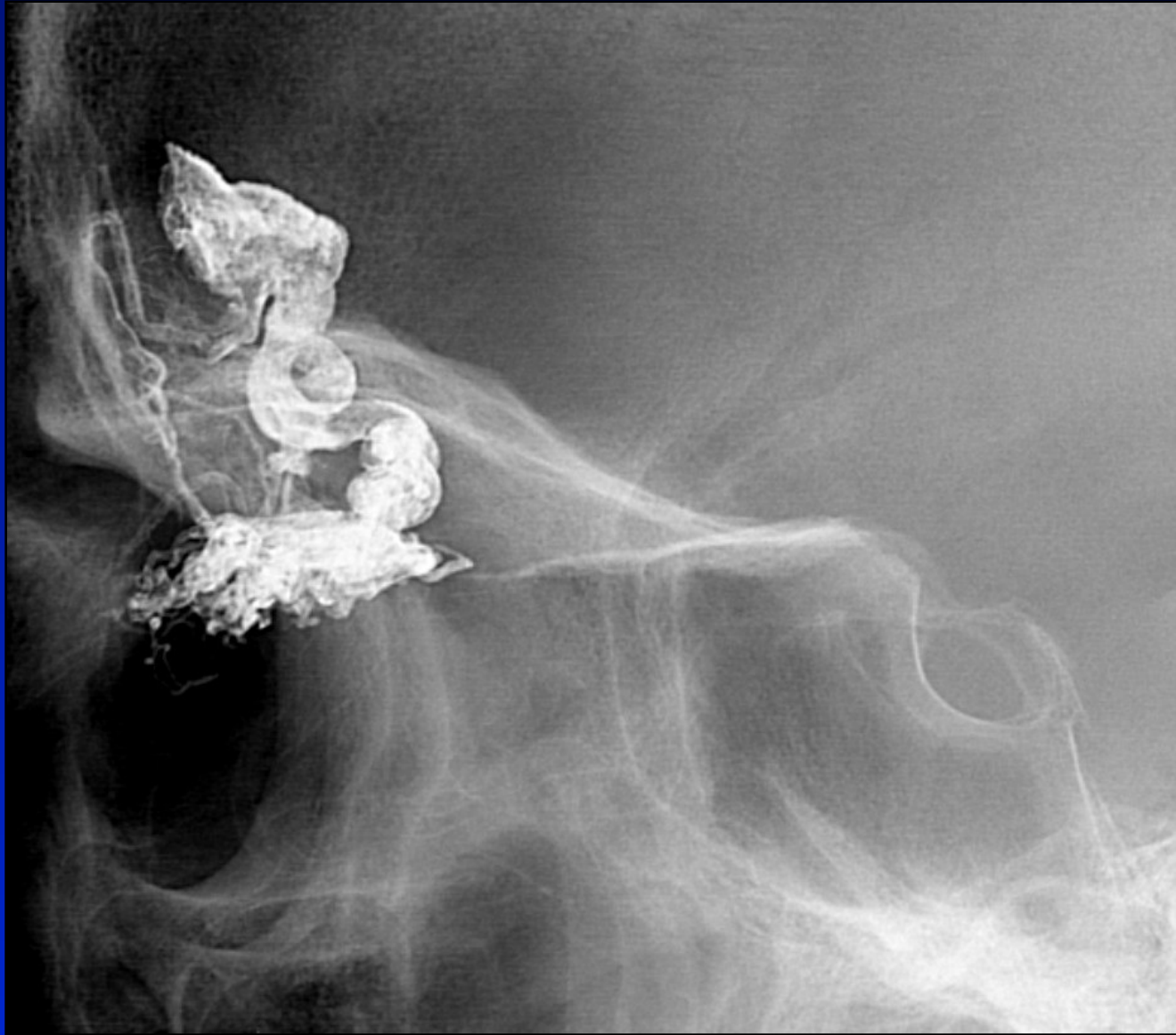


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In Treatment of Fistulas, all roads lead to Rome







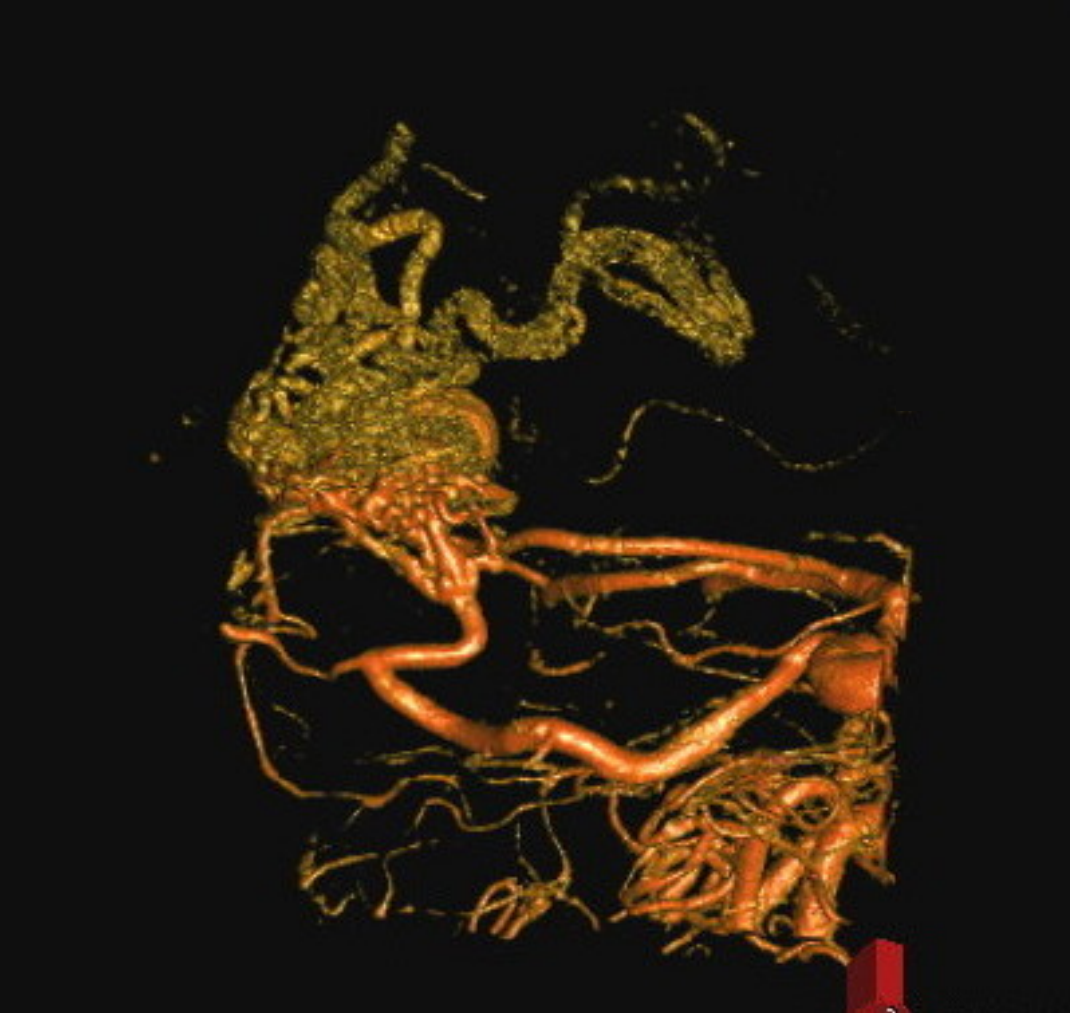
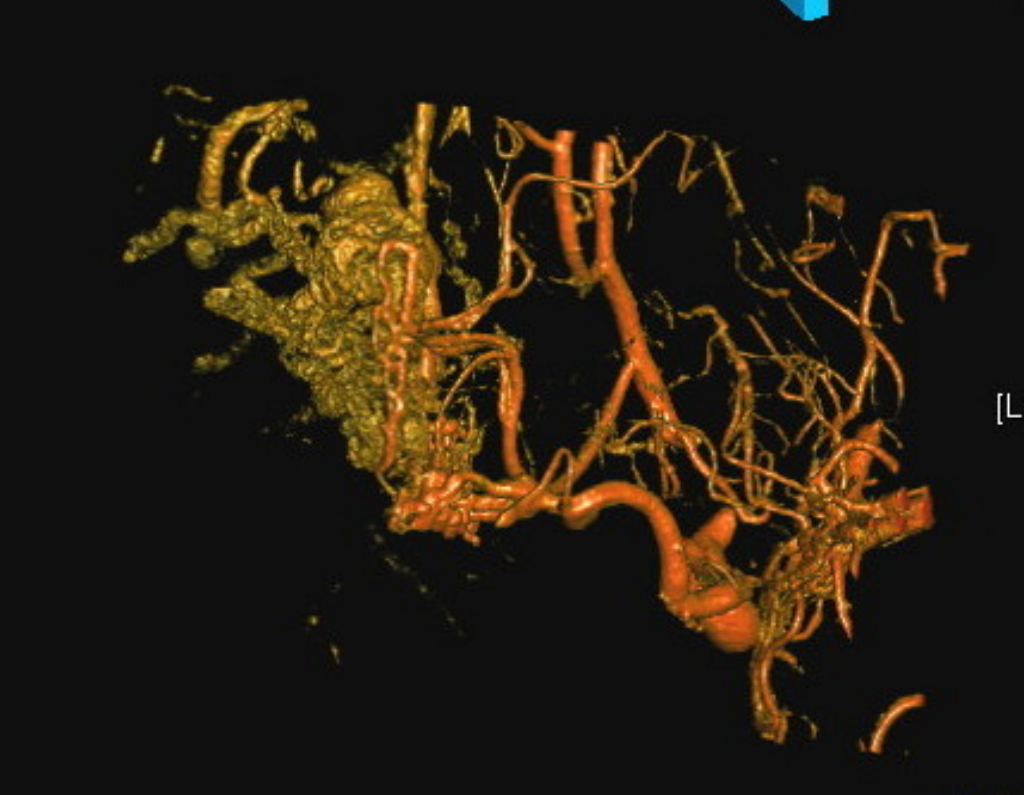
Outline

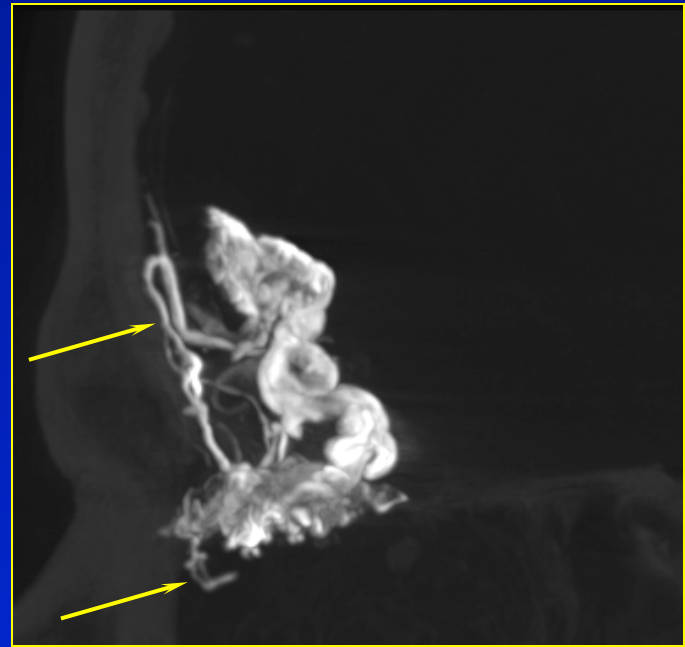
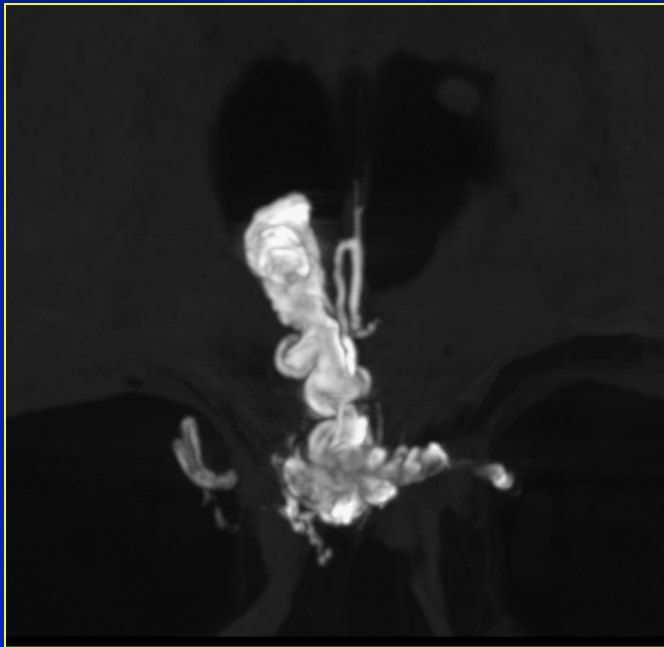
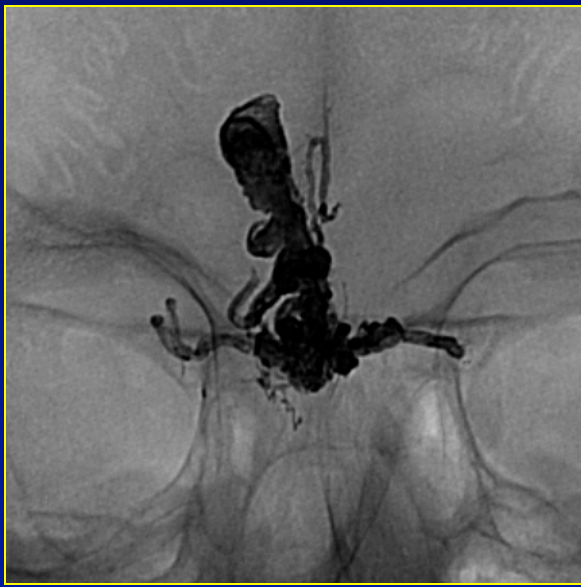
- Discuss Dural Fistulous Malformations
 - Clinical
 - Classification
 - What is Onyx
 - Discuss individual cases by type

Onyx Liquid Embolic System

- Ethylene-vinyl alcohol copolymer
 - EVOH
- Dimethyl Sulfoxide Solvent
 - DMSO (patients stink!!!!!!)
- Micronized tantalum powder
 - Ta





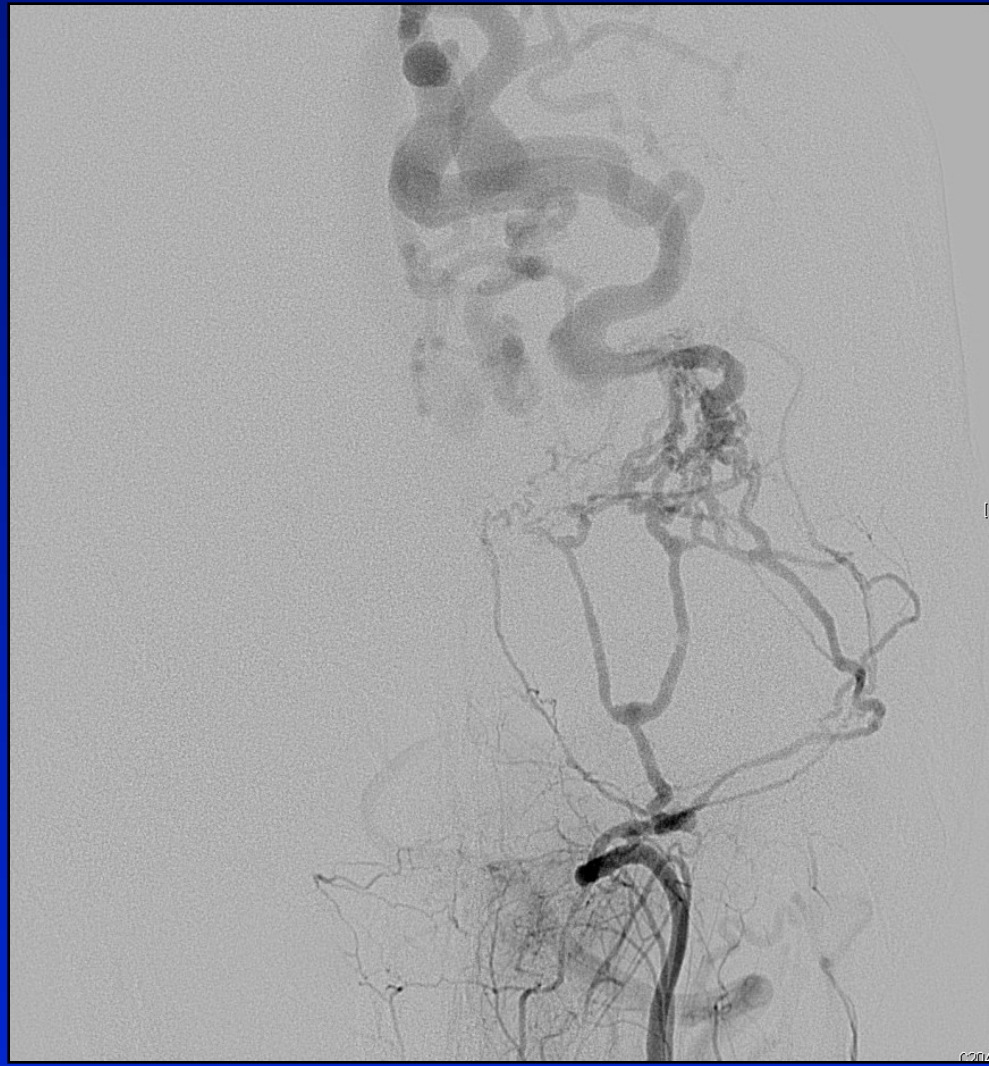
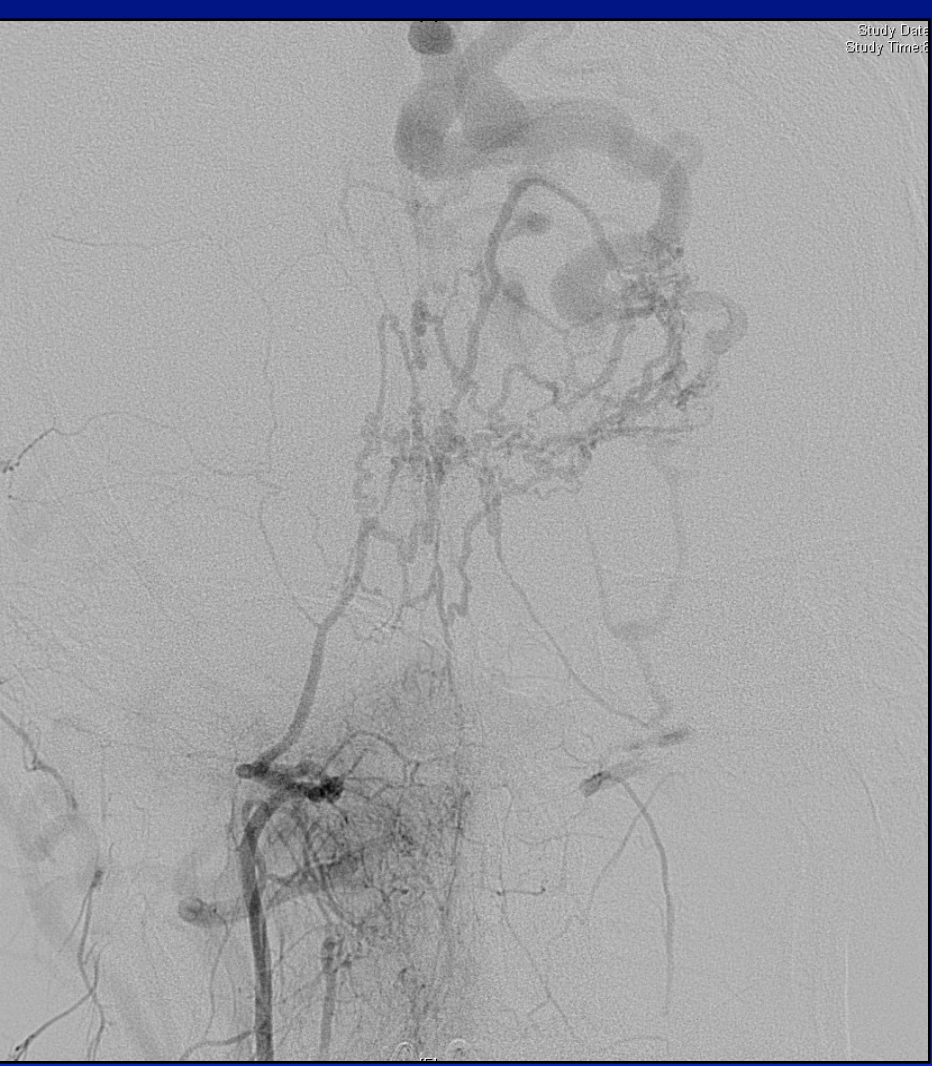


Native DynaCT

Type IV

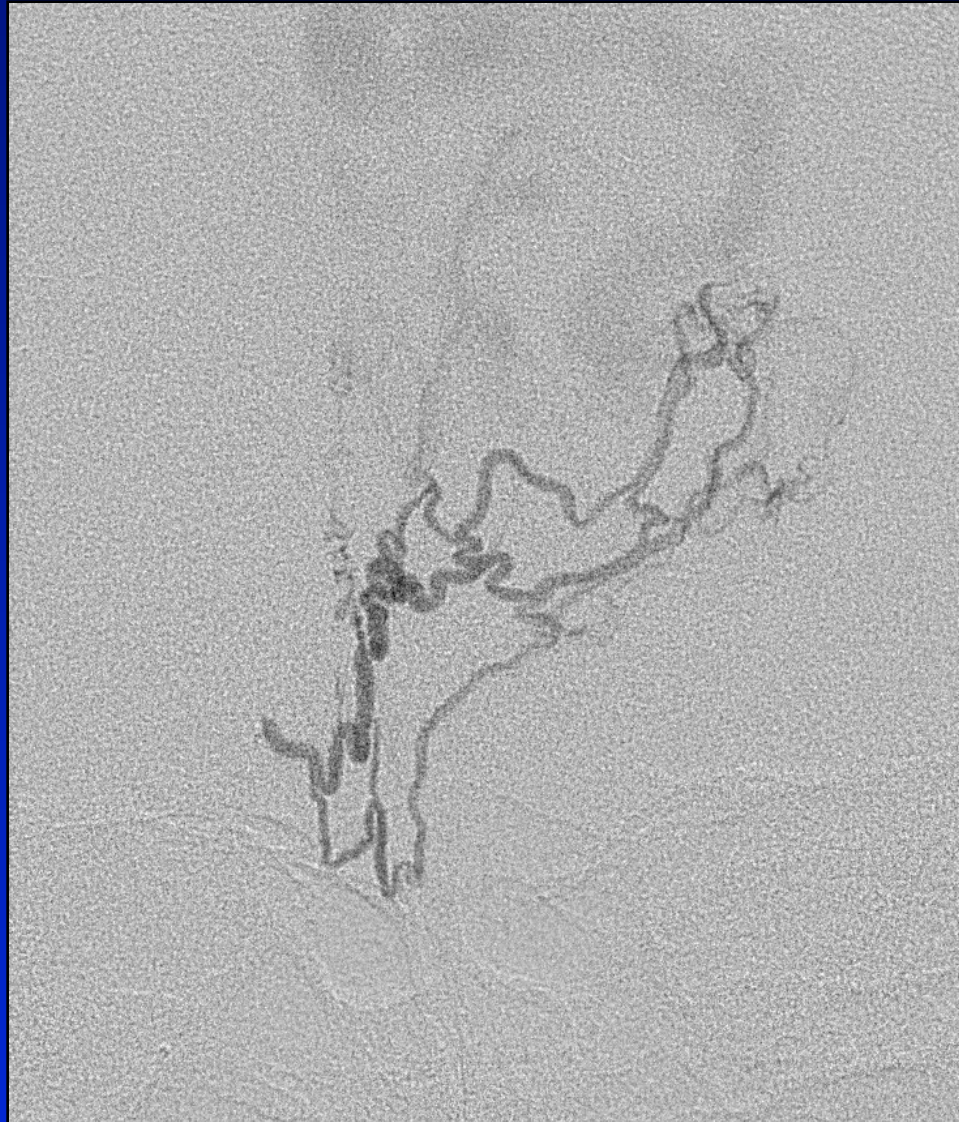
- Pt presents with small headache and small hemorrhage

Study Date:
Study Time:

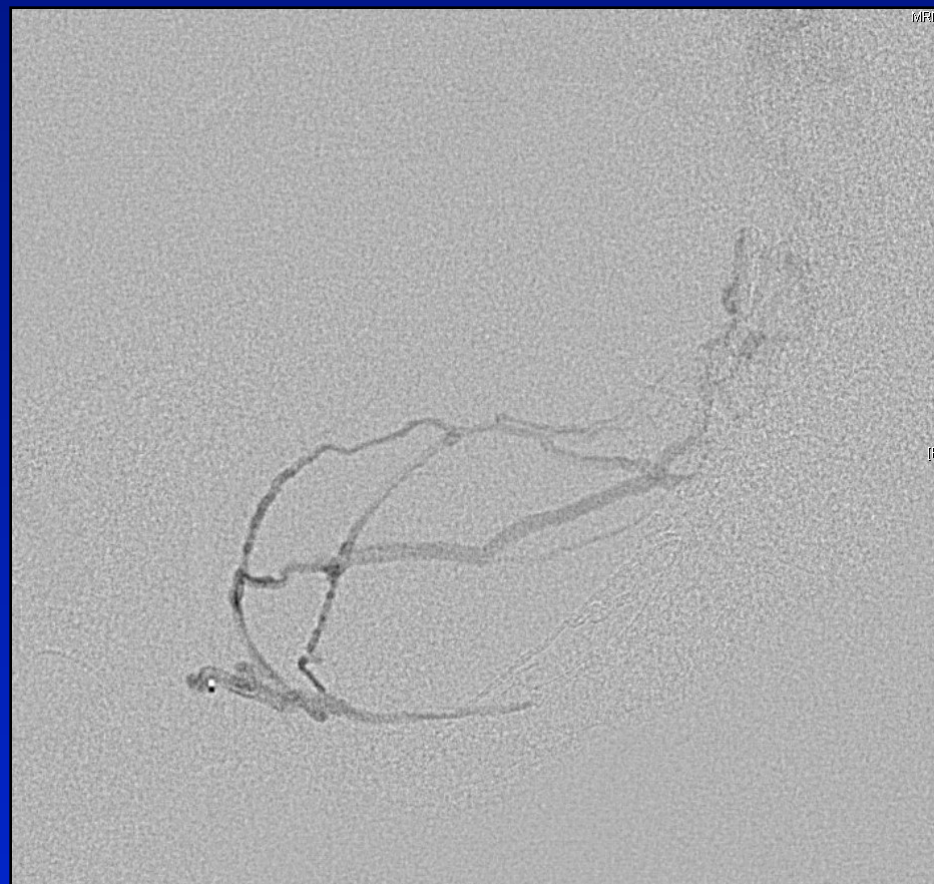
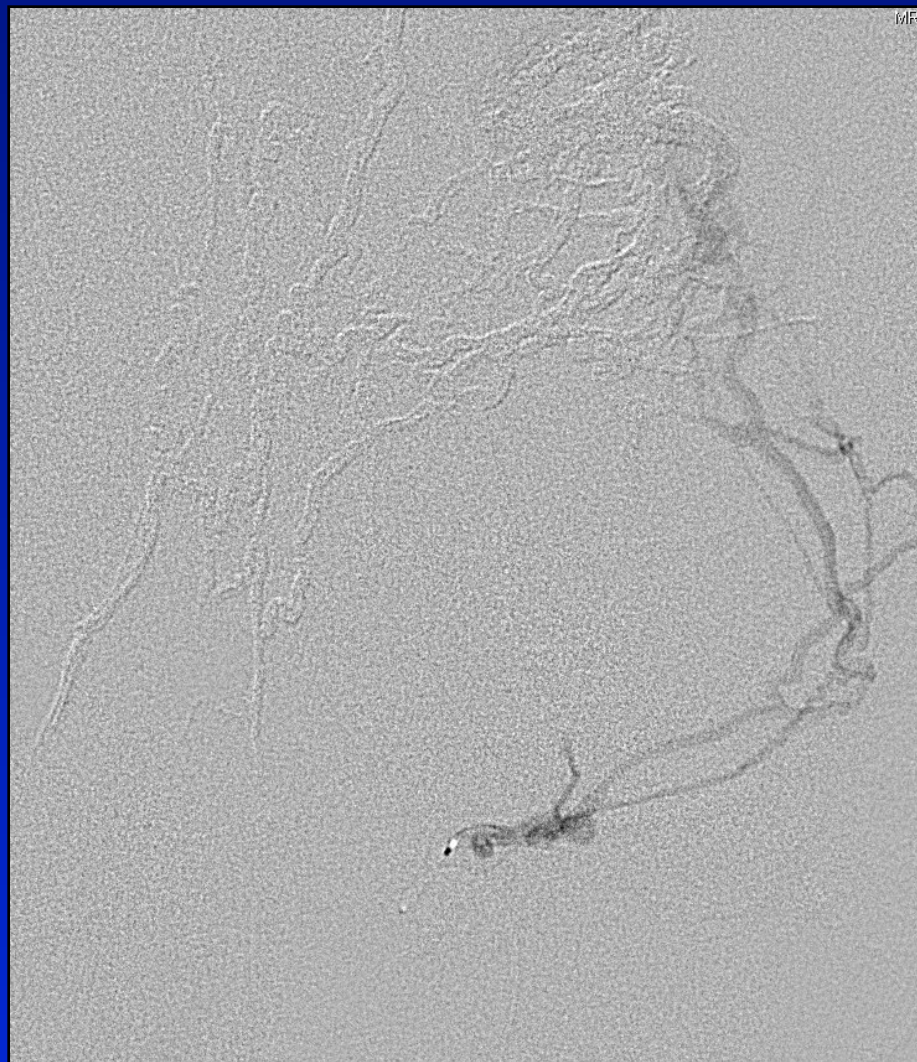




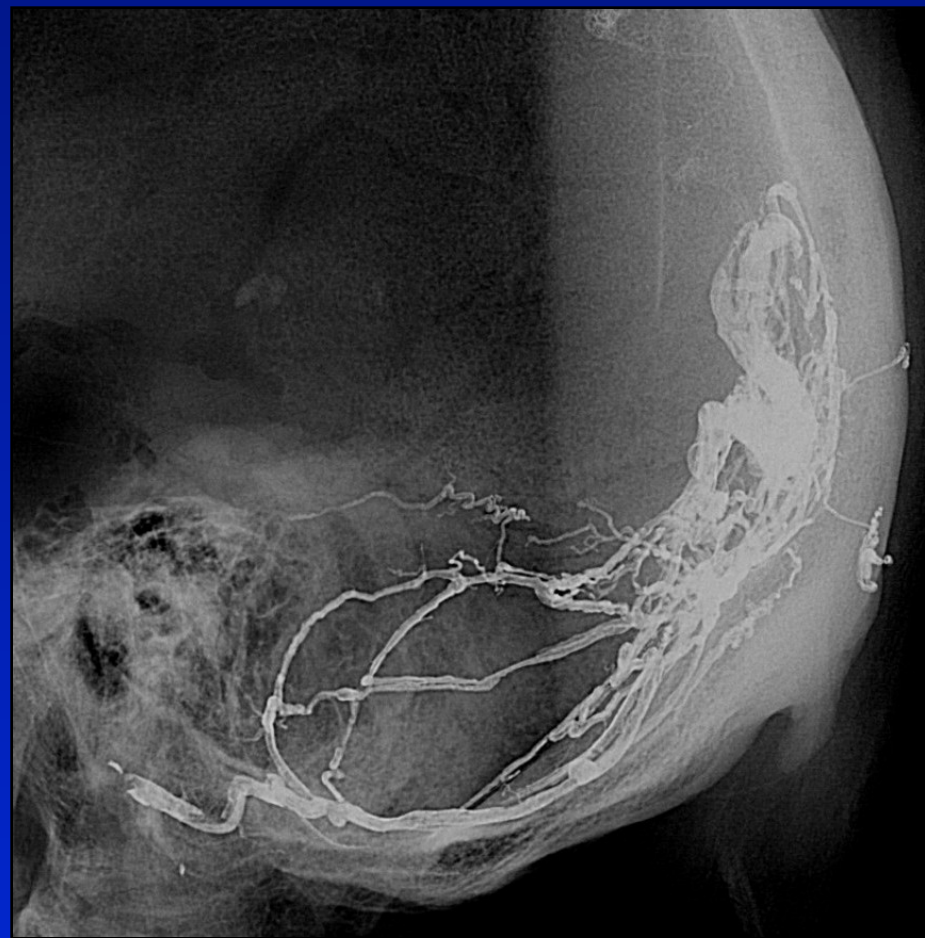
Right Approach



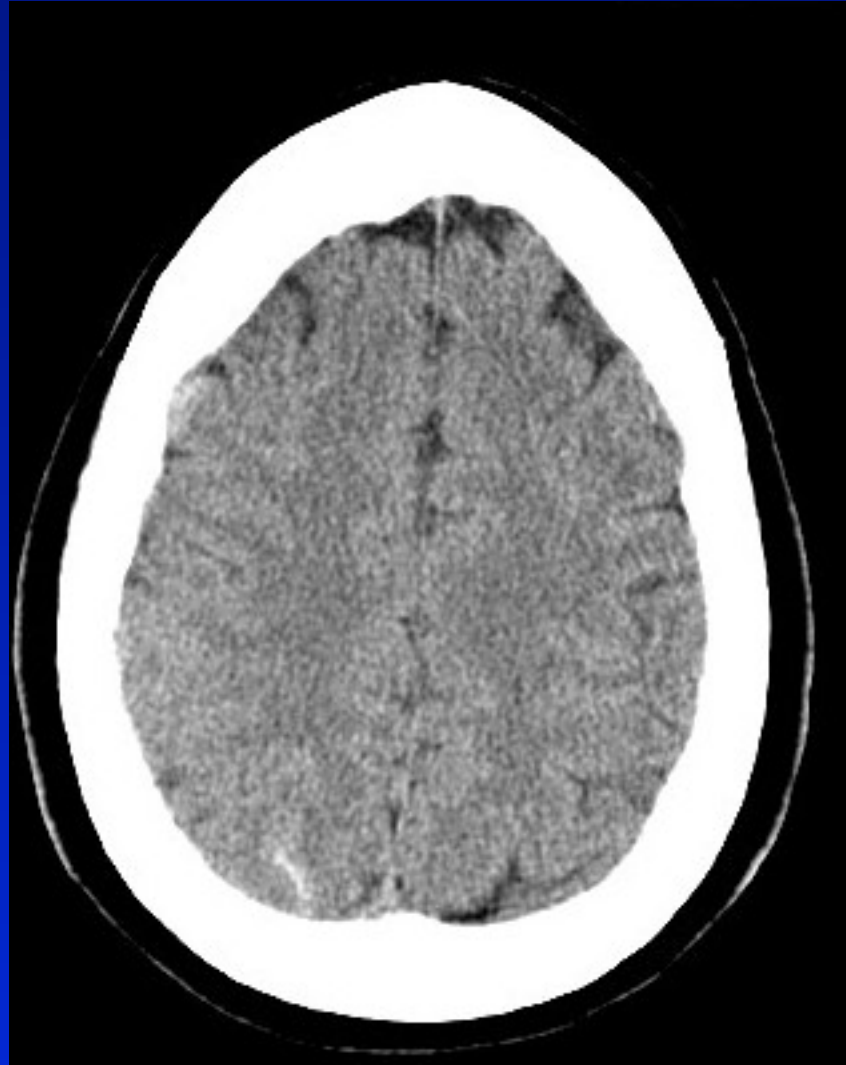
Left Approach



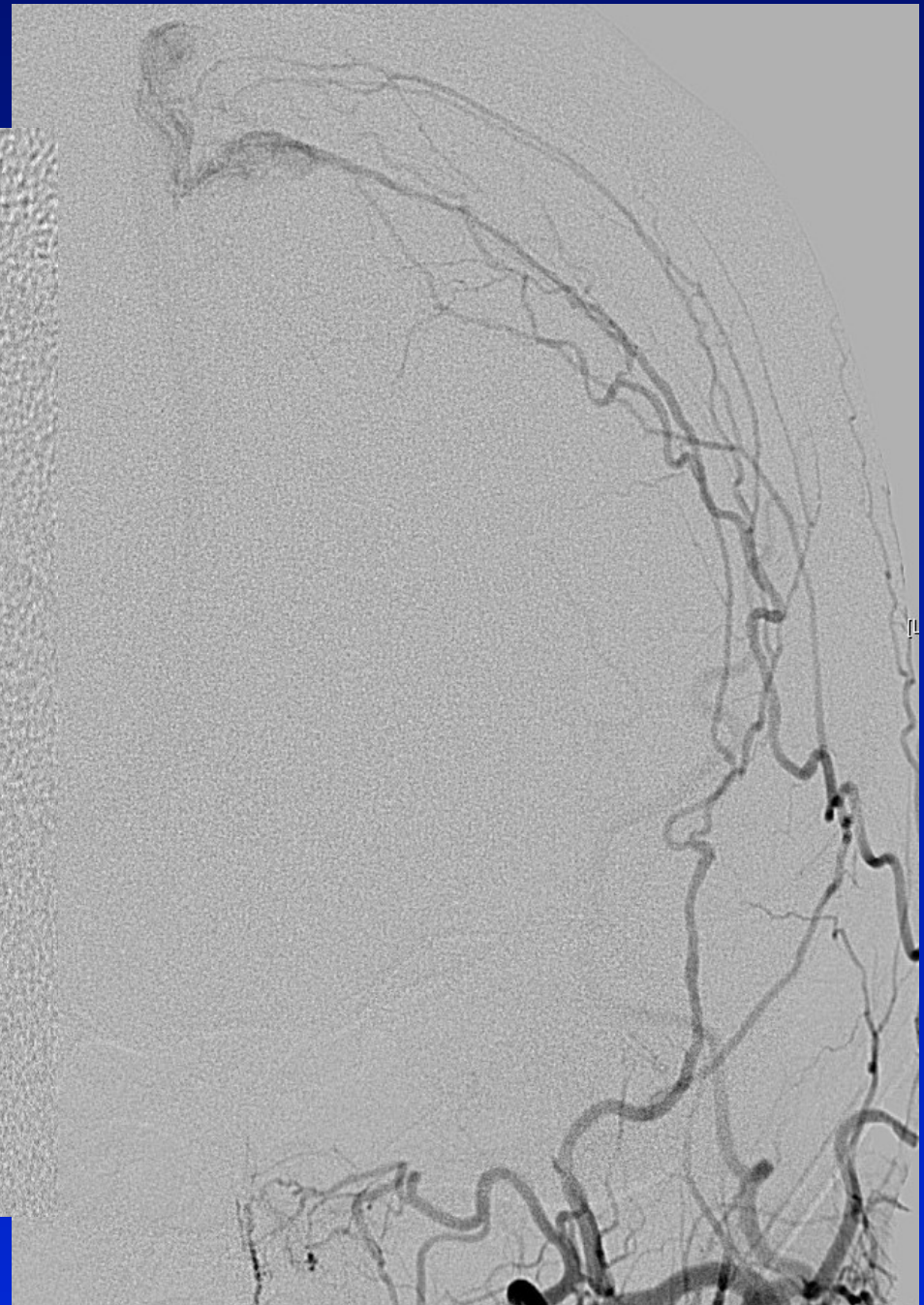
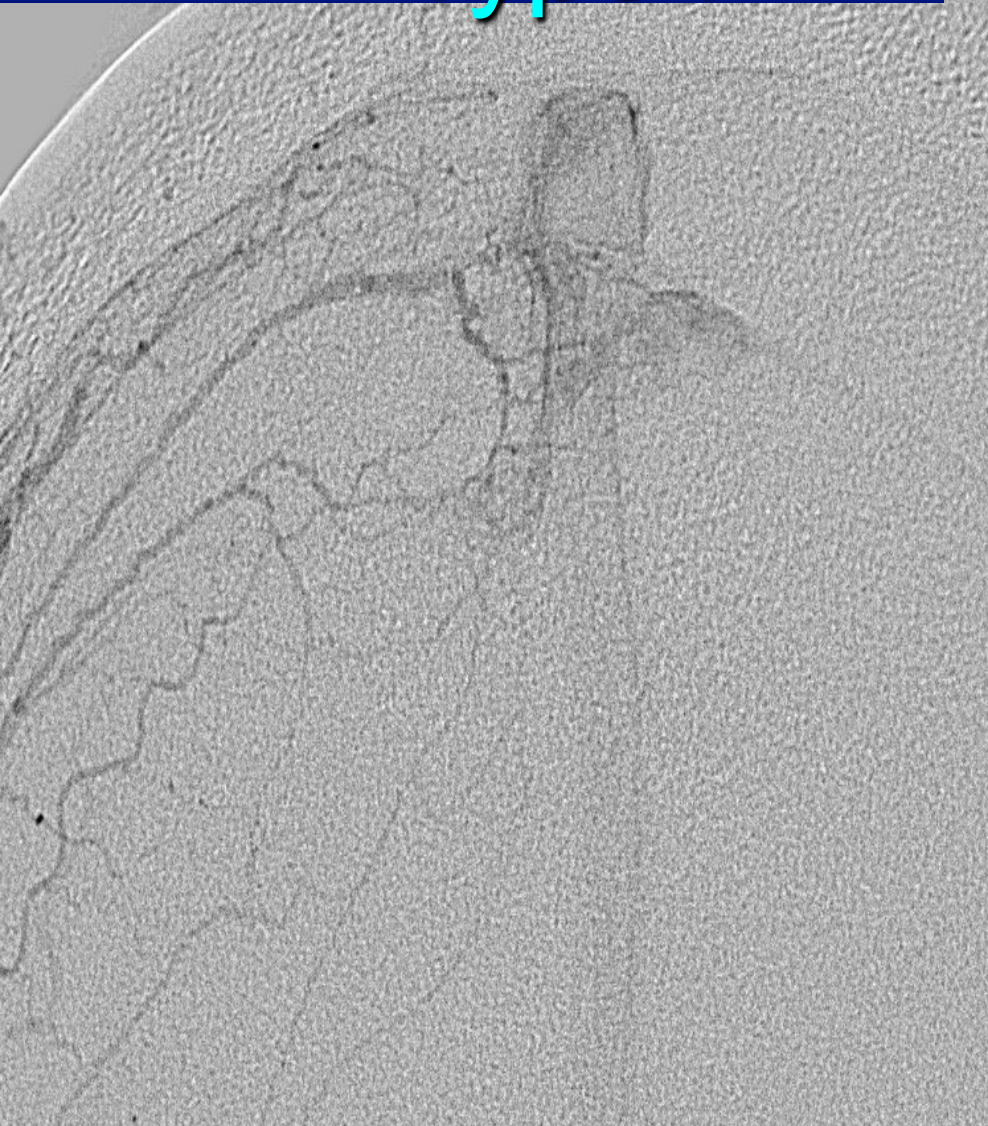
Post

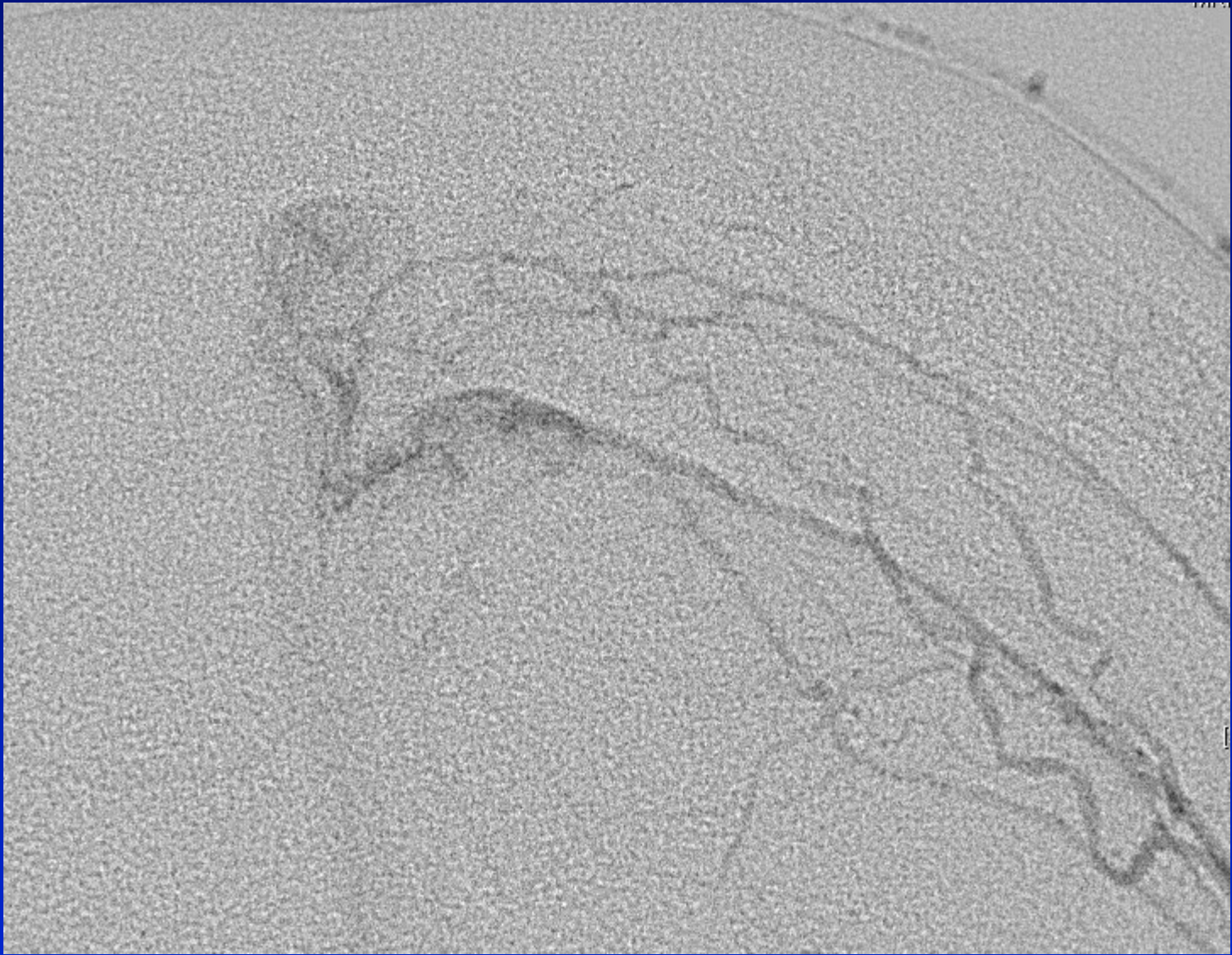


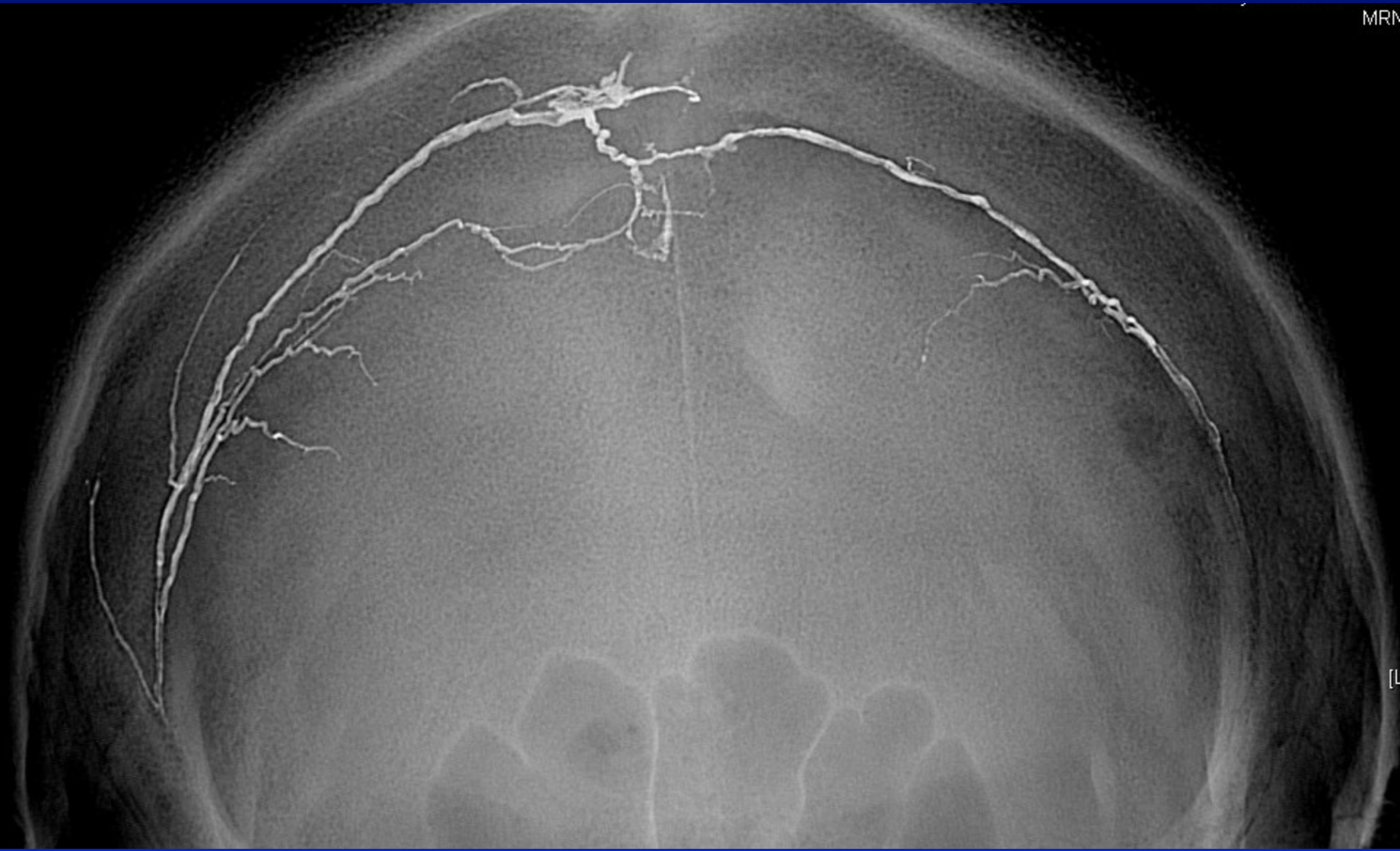
Type I - Young woman with headaches

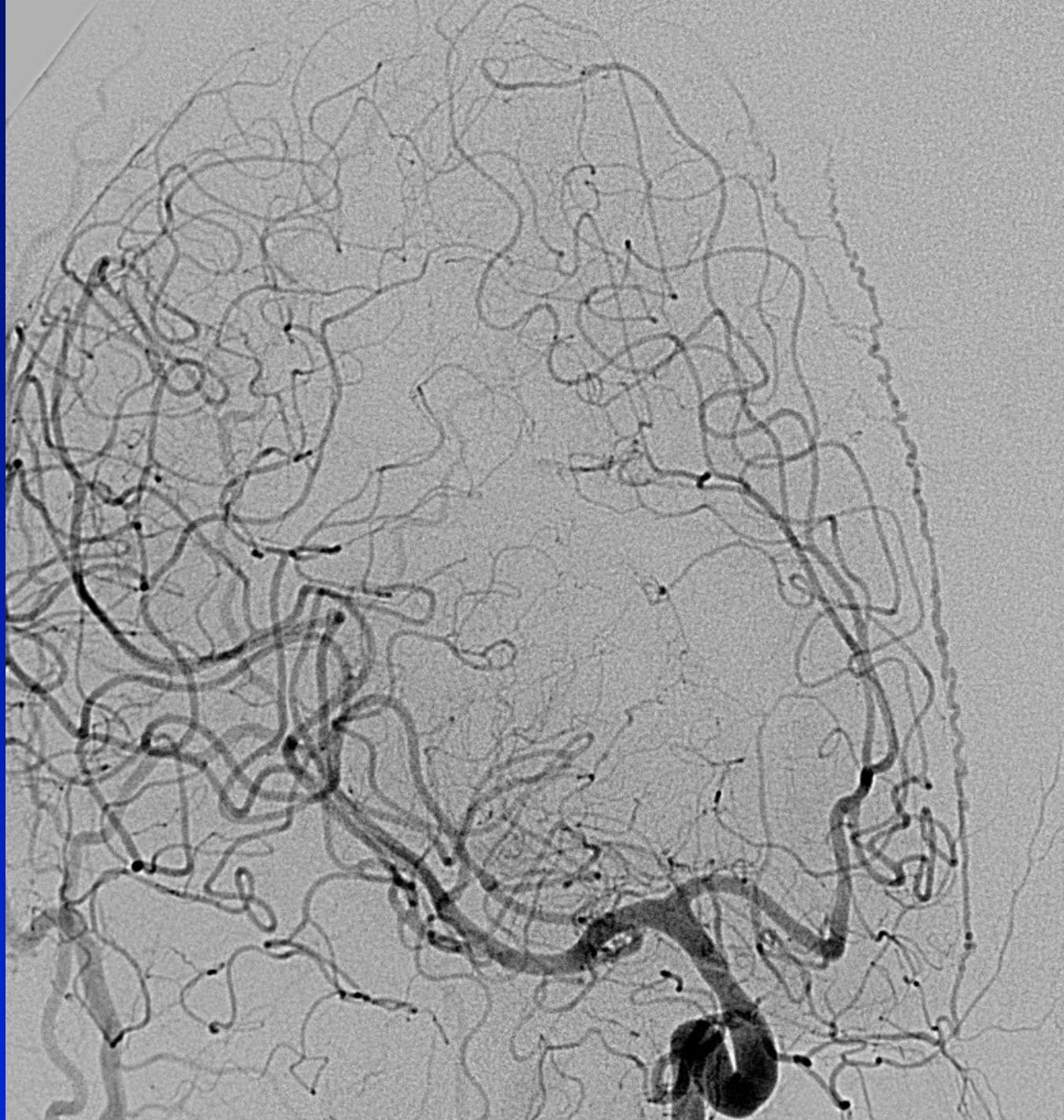


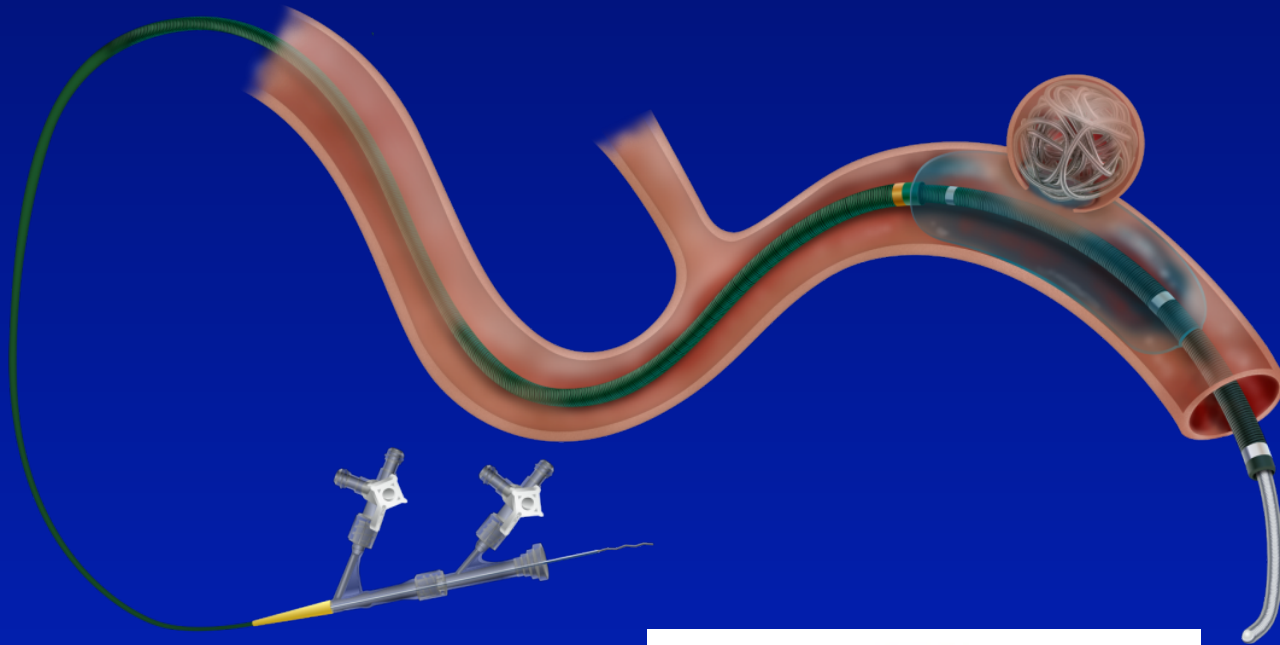
Type I



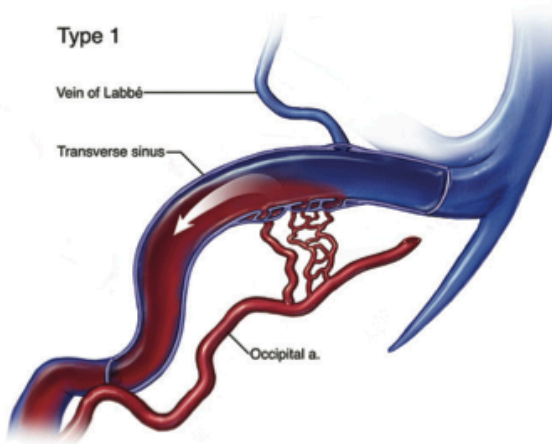




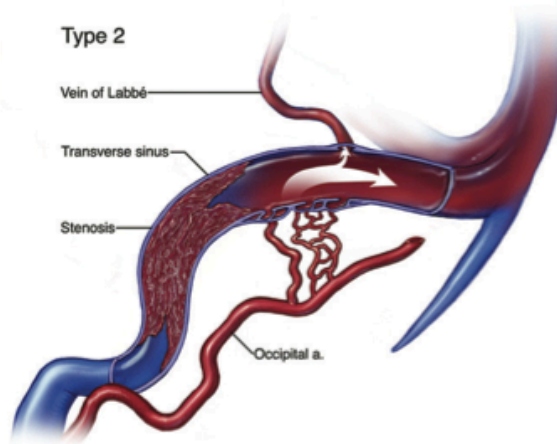




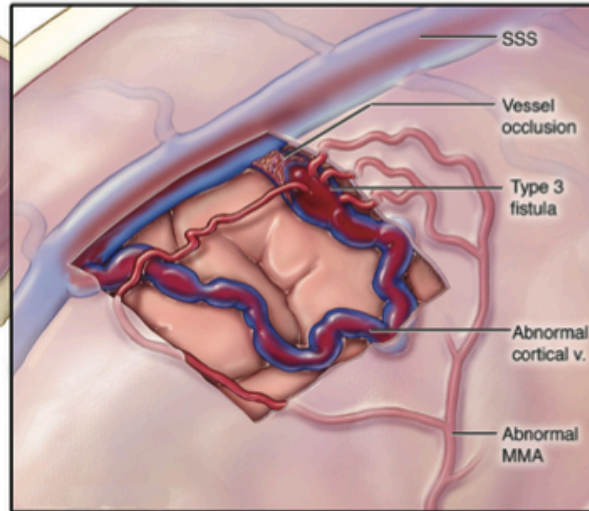
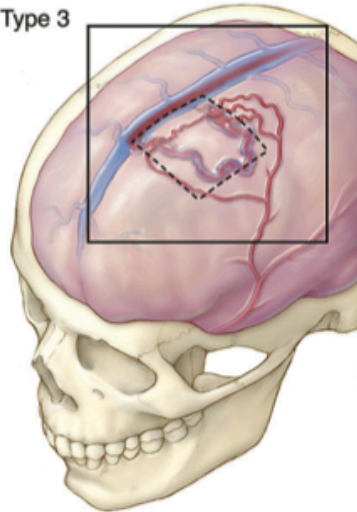
Type 1



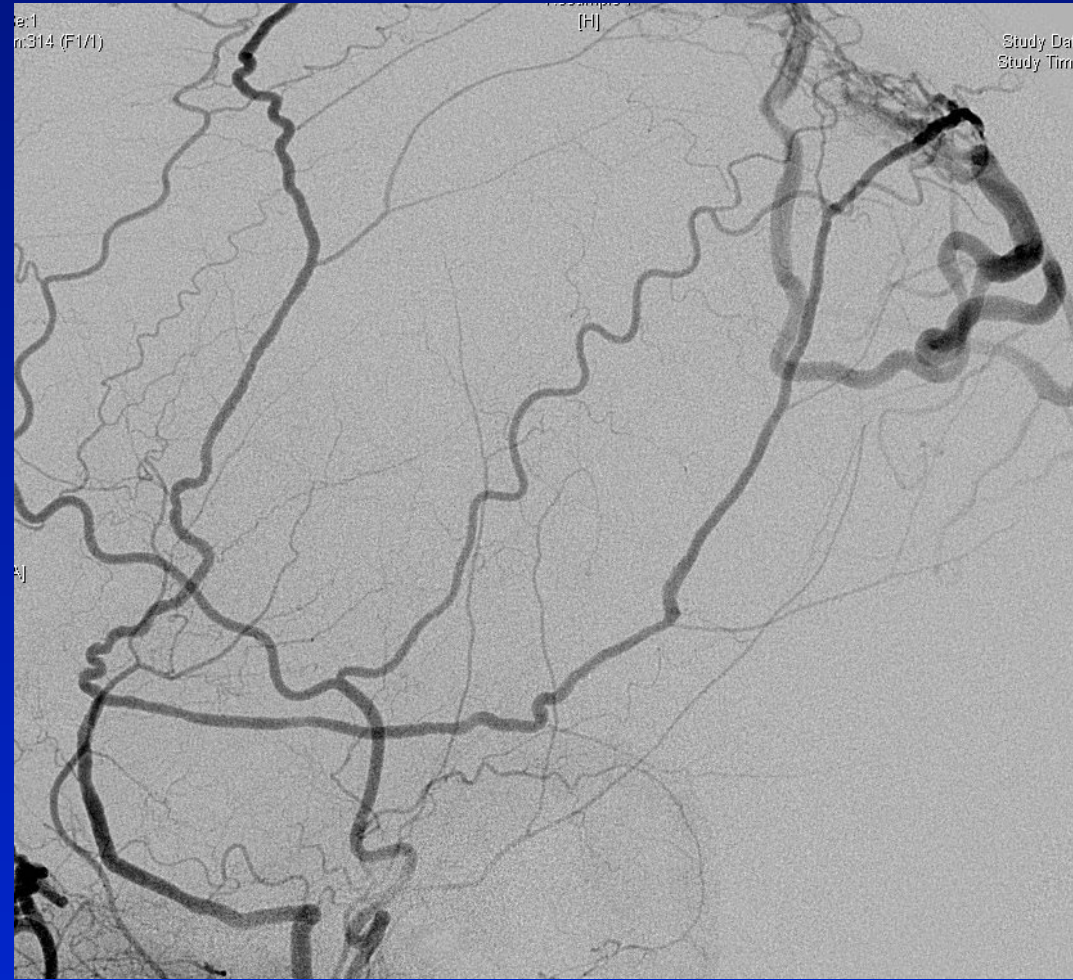
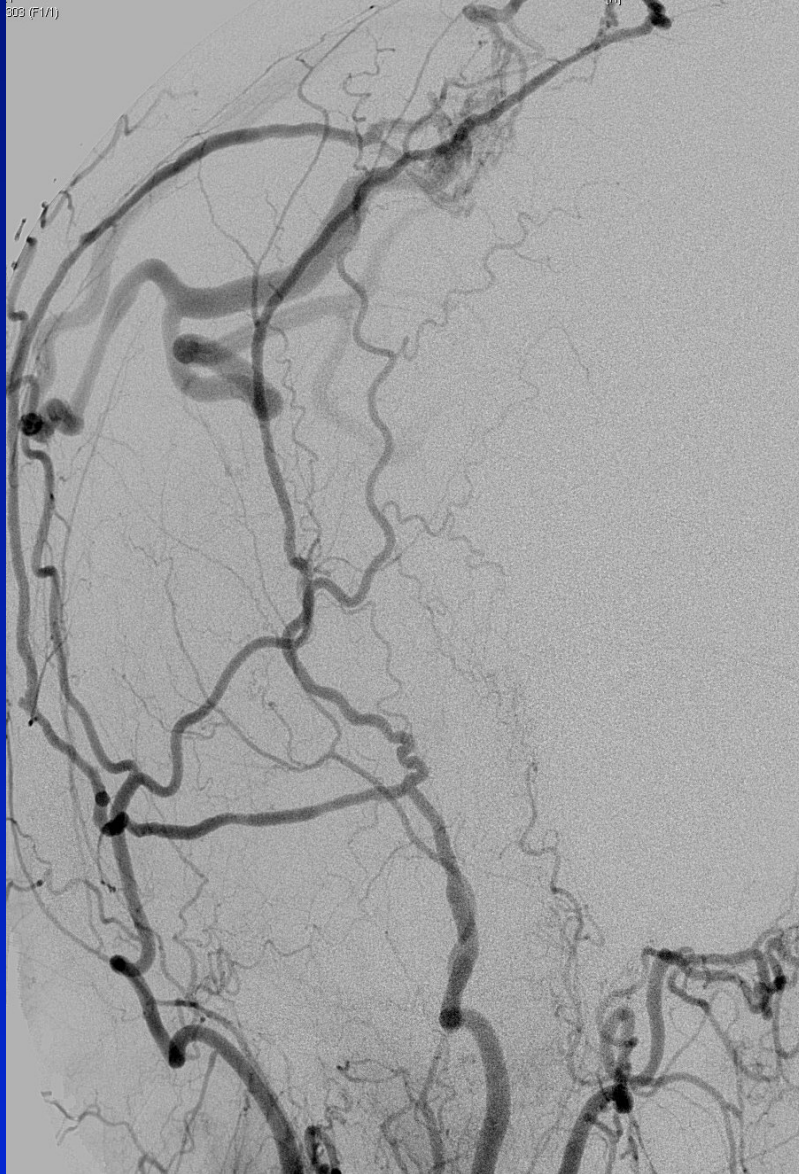
Type 2



Type 3



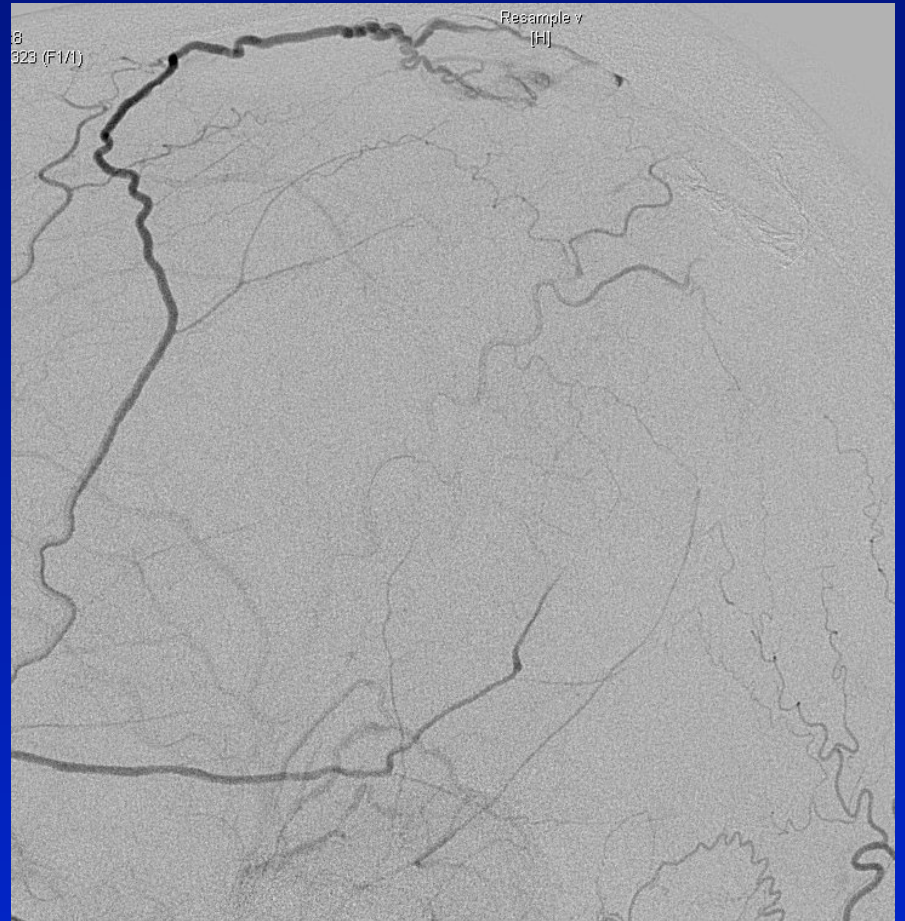
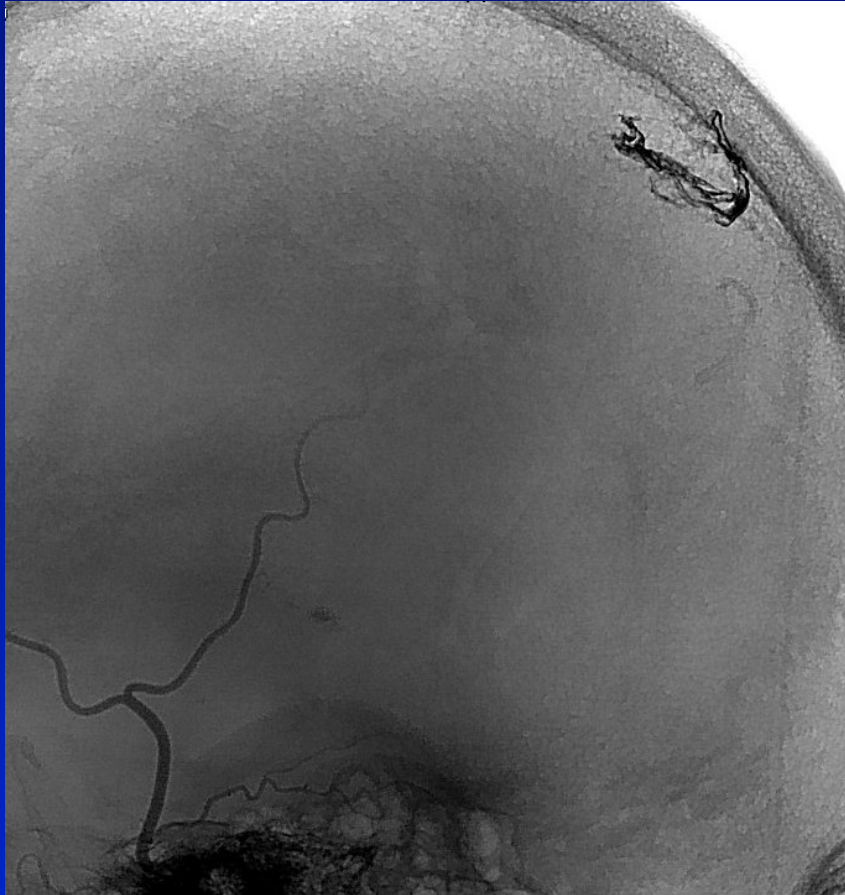
Type III Scepter XC



Middle meningeal approach



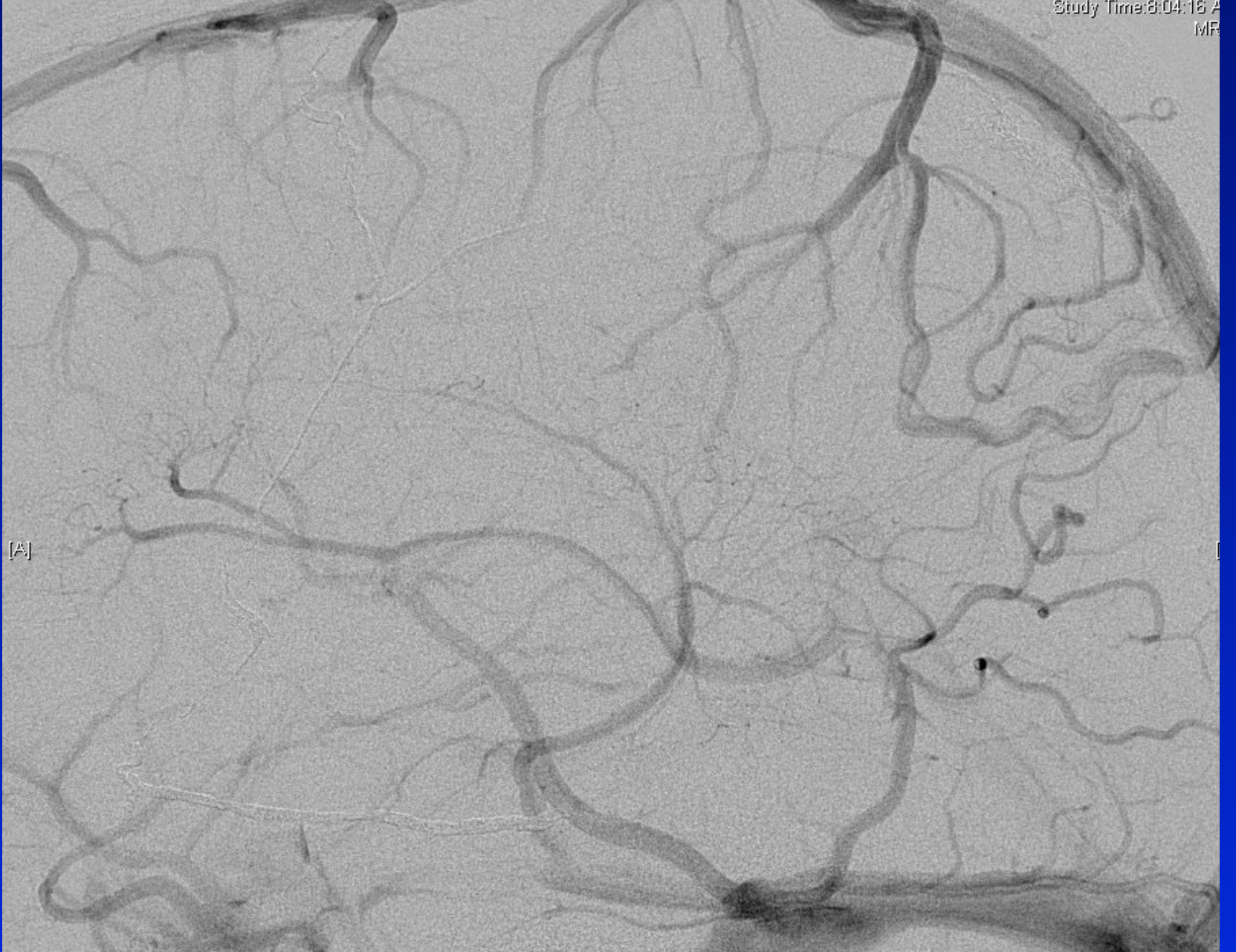
Post #1



2nd Scepter

Imm:328 (F1/1)

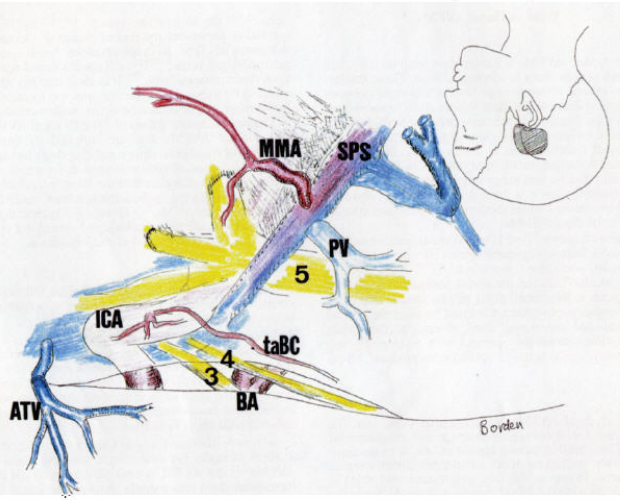
Study Date:10/14/20
Study Time:8:04:18 A
MR



[A]

Borden Classification

J. A. Borden, J. K. Wu, and W. A. Shucart



J. A. Borden, J. K. Wu, and W. A. Shucart

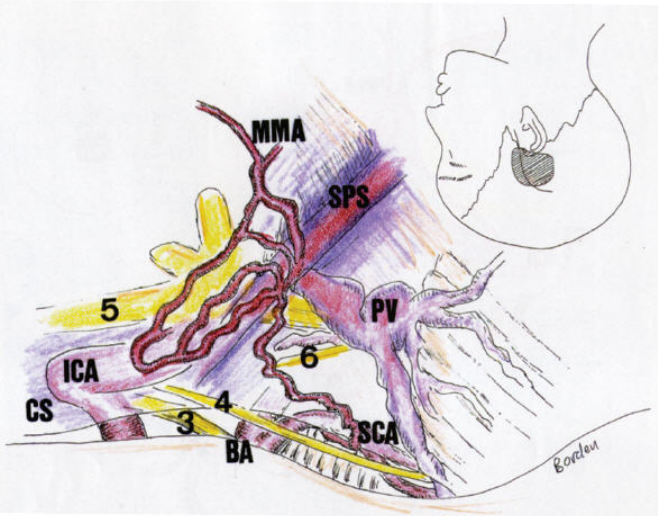
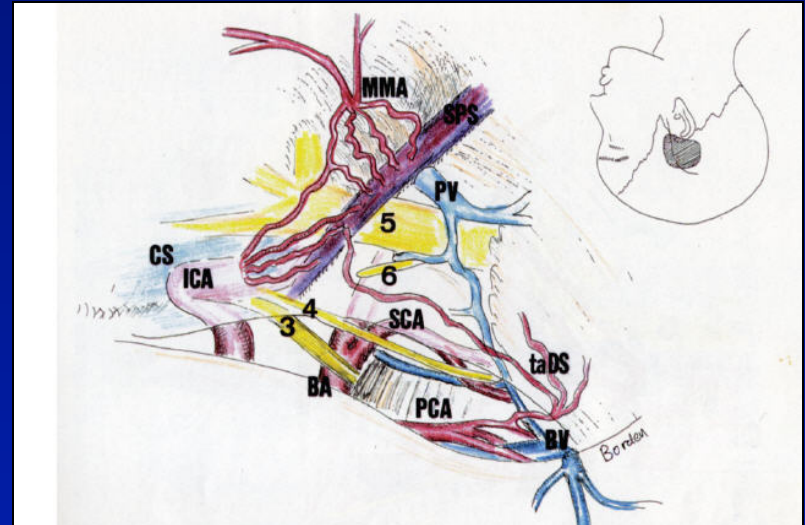


FIG. 3. Illustration showing a Type II(b) dural arteriovenous fistulous malformation of superior petrosal sinus (complex nidus) from the right subtemporal approach. The nidus on wall of superior petrosal sinus drains in retrograde fashion into petrosal vein. Number 3 = oculomotor nerve; number 4 = trochlear nerve; number 5 = trigeminal nerve; C = cerebellum; ICA = internal carotid artery; SCA = superior cerebellar artery; T = tentorium and tentorial branch of superior cerebellar artery; MMA = middle meningeal artery; PV = arterialized petrosal vein.



J. A. Borden, J. K. Wu, and W. A. Shucart

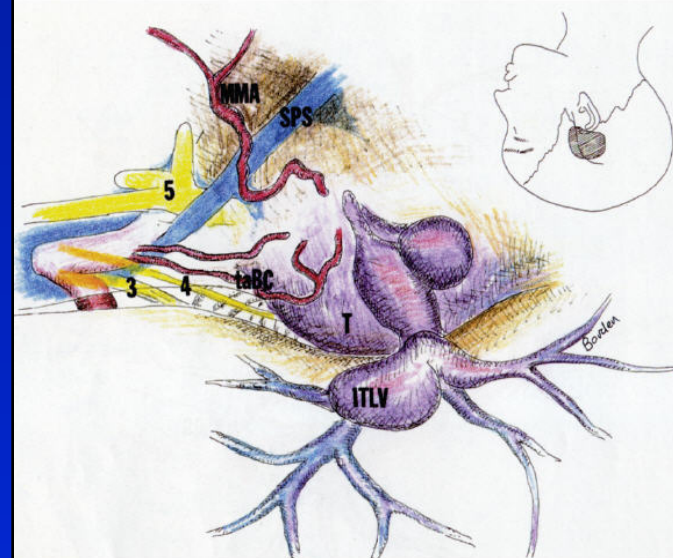


FIG. 5. Illustration showing a Type III(b) dural arteriovenous fistulous malformation of tentorium cerebelli from the right subtemporal approach. The nidus on tentorial venous lake drains in retrograde fashion through inferior temporal lobe vein. The nidus is supplied by middle meningeal artery (MMA) and tentorial artery (taBC). The tentorial dural lake

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