Pitfalls and How to Spare in Neurosurgery

-From my Experience of Surgical Complications-

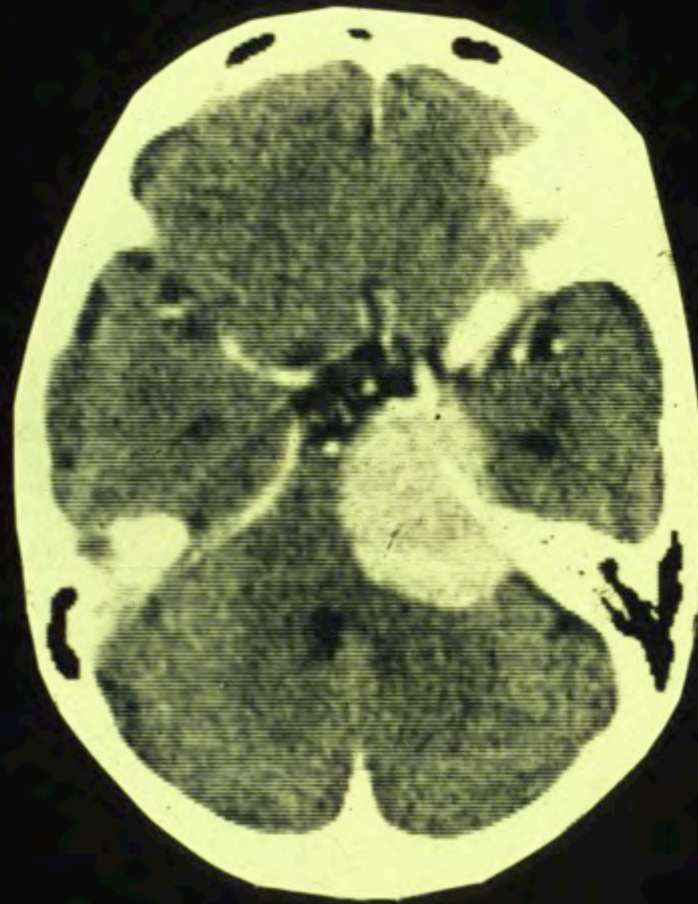
Takeshi Kawase, M.D.

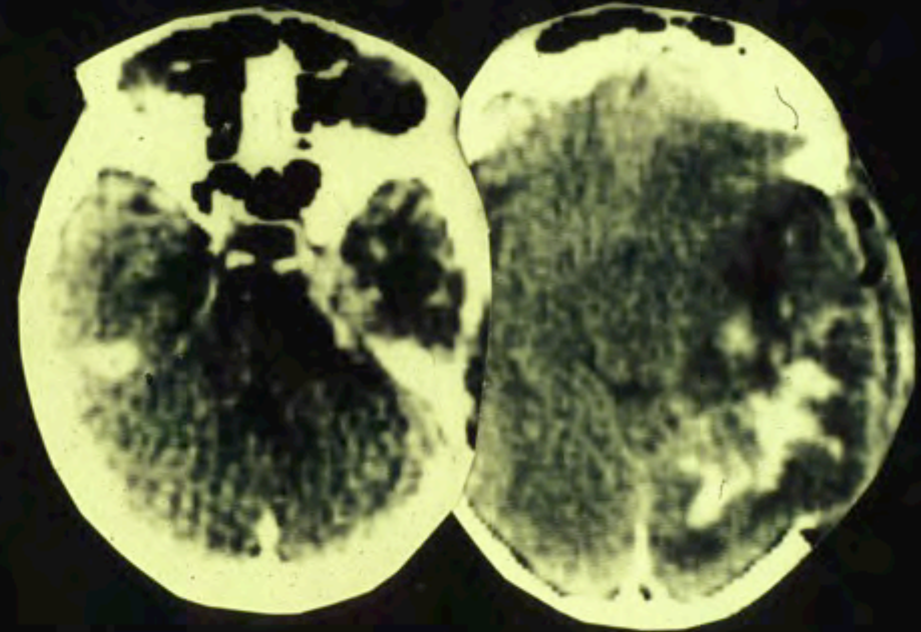
The best teacher teaches well,
however,
the worst teacher teaches
three times more

Surgical Pitfalls in Neurosurgery

Retraction brain injury
Venous injury
Vascular and cranial nerves injury
CSF leakage

Typical complication by over retraction of the temporal lobe by the subtemporal approach in 1979



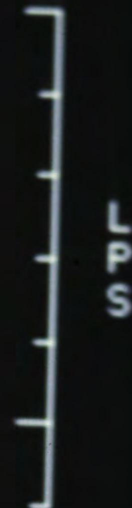


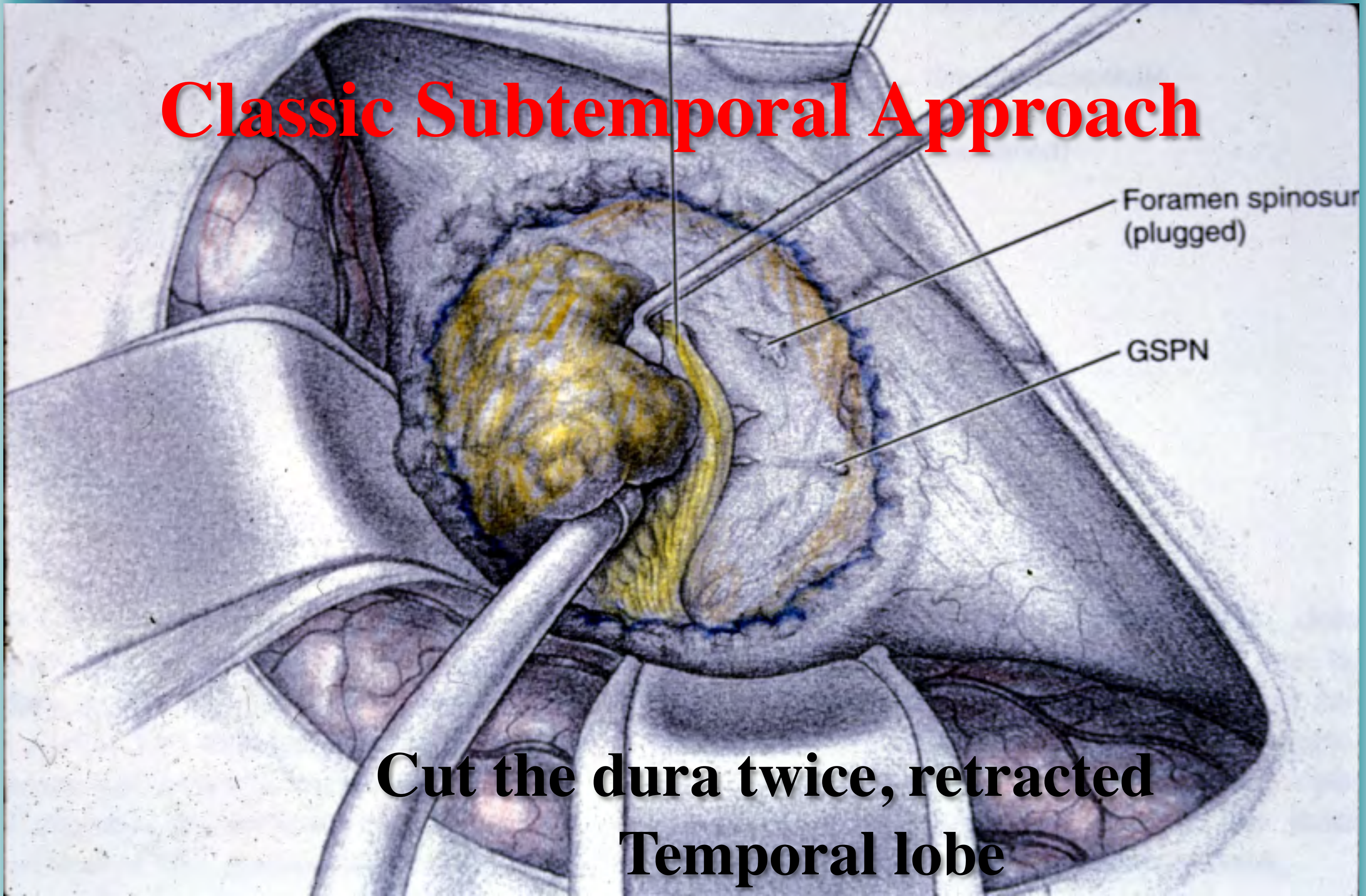
Case 1; 35y F: Hemangiopericytoma
How do you access?

ET:16

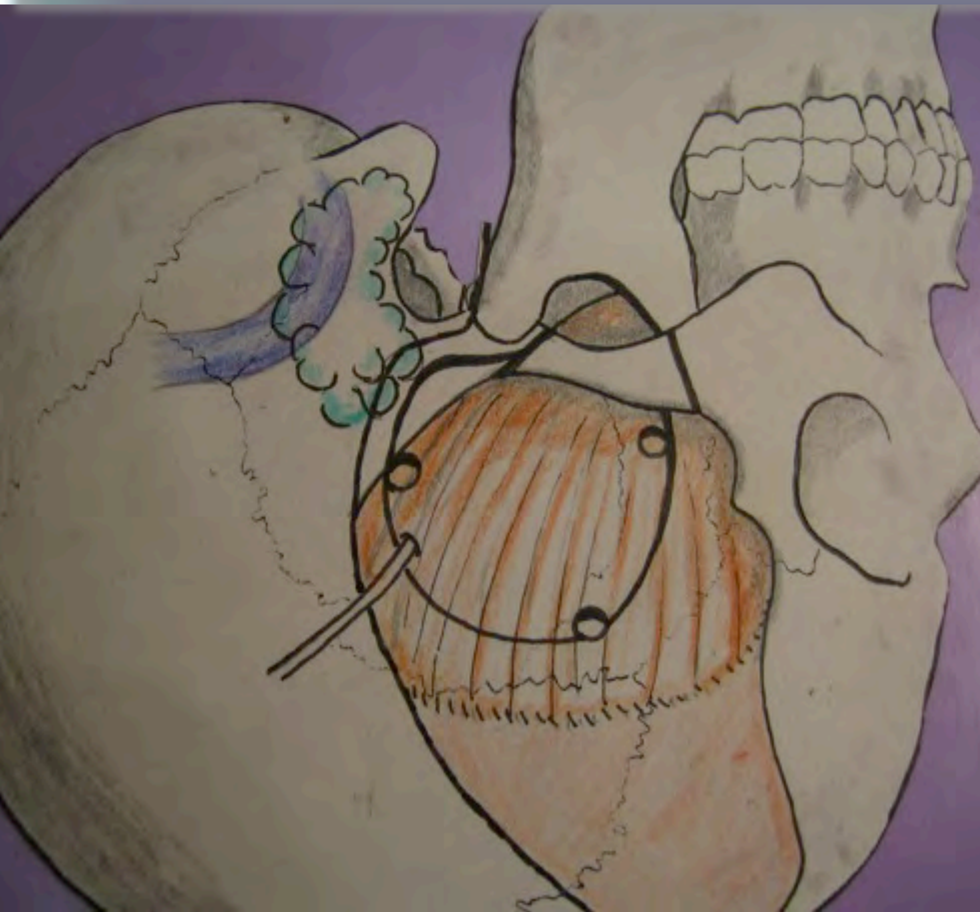
se-xl/90
:4200
:97.8/Ef
:1/1 31.2kHz

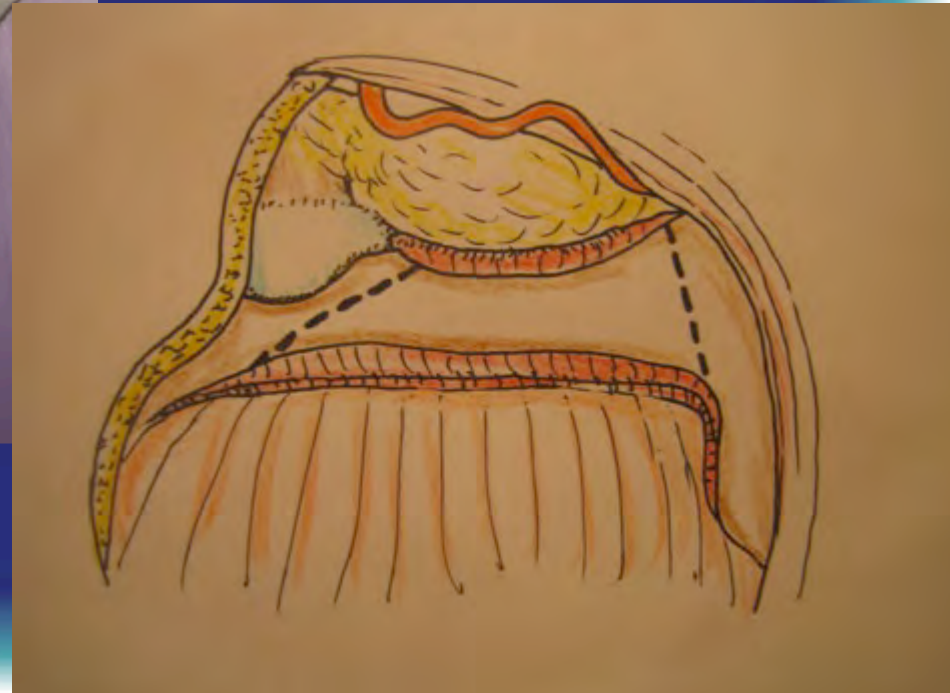
AD
V:20x20
0thk/2.0sp



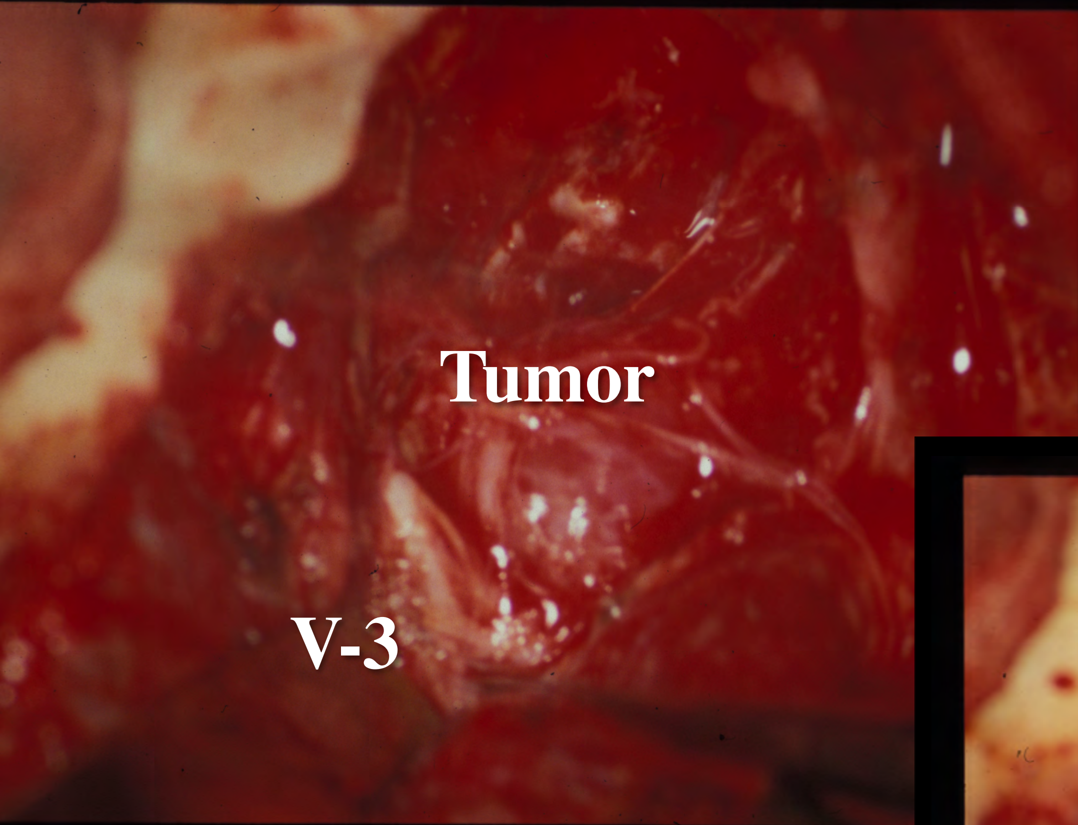

Classic Subtemporal Approach
Foramen spinosum
(plugged)
GSPN
Cut the dura twice, retracted
Temporal lobe

Epidural Subtemporal Approach with Zygomatic Osteotomy Reduced Retraction Damage to the Temporal Lobe





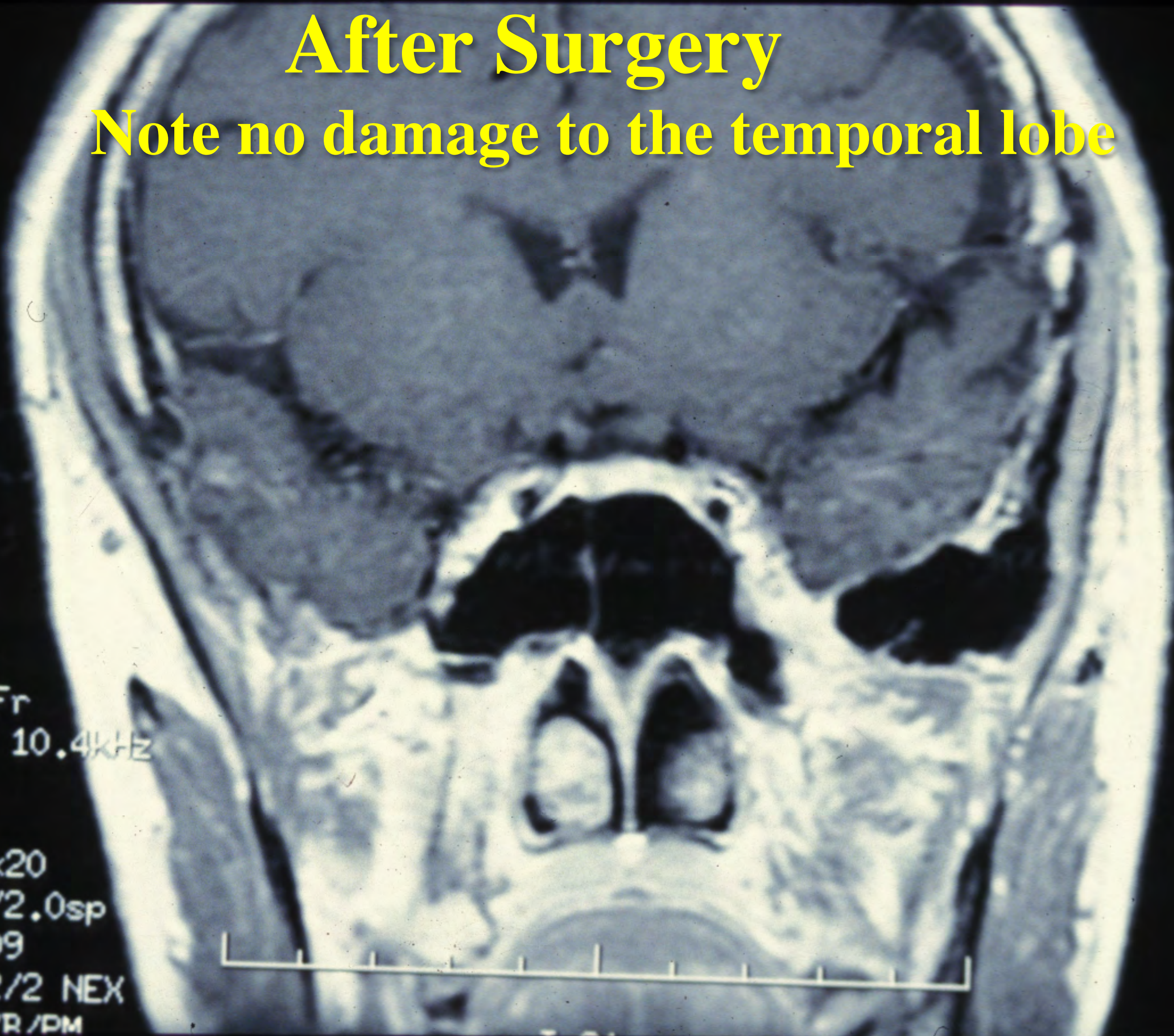
Epidural Tumor View after Zygomatic Osteotomy



After removal

After Surgery

Note no damage to the temporal lobe



How to spare retraction injury?

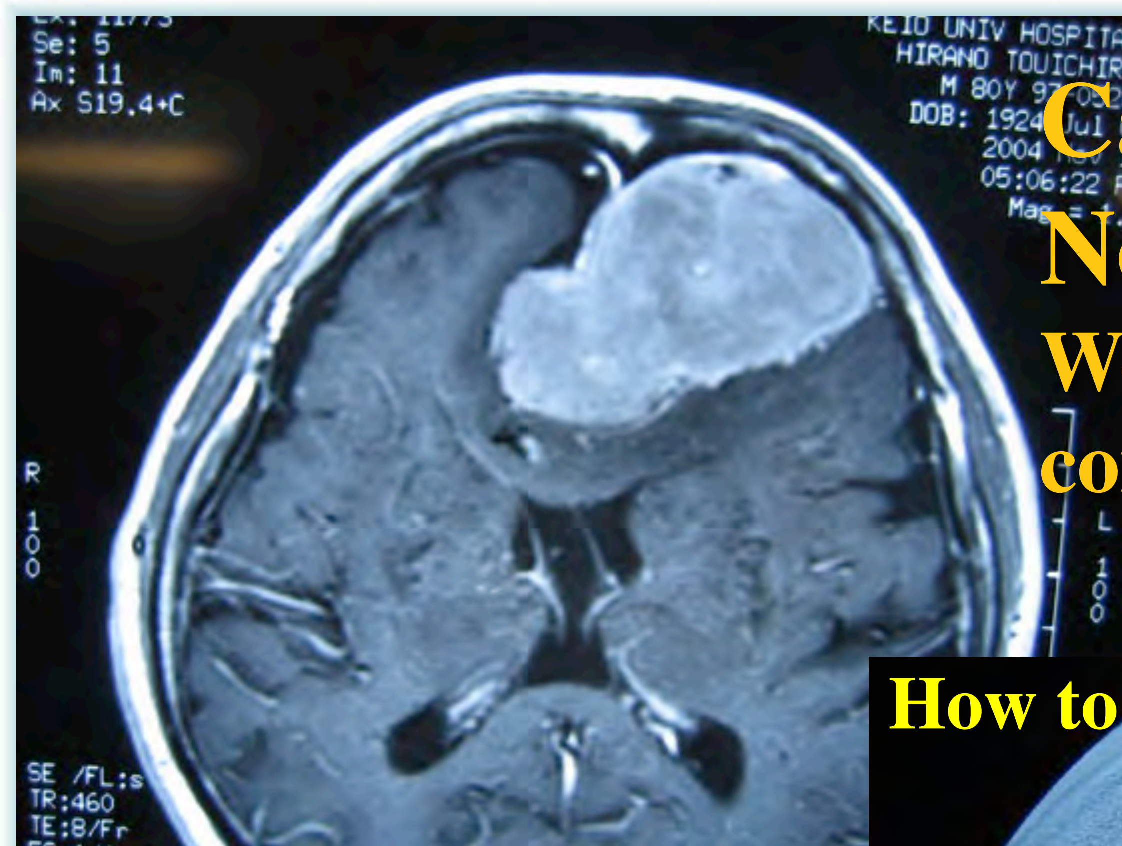
***Epidural and inferior access**

***Intermittent retraction**

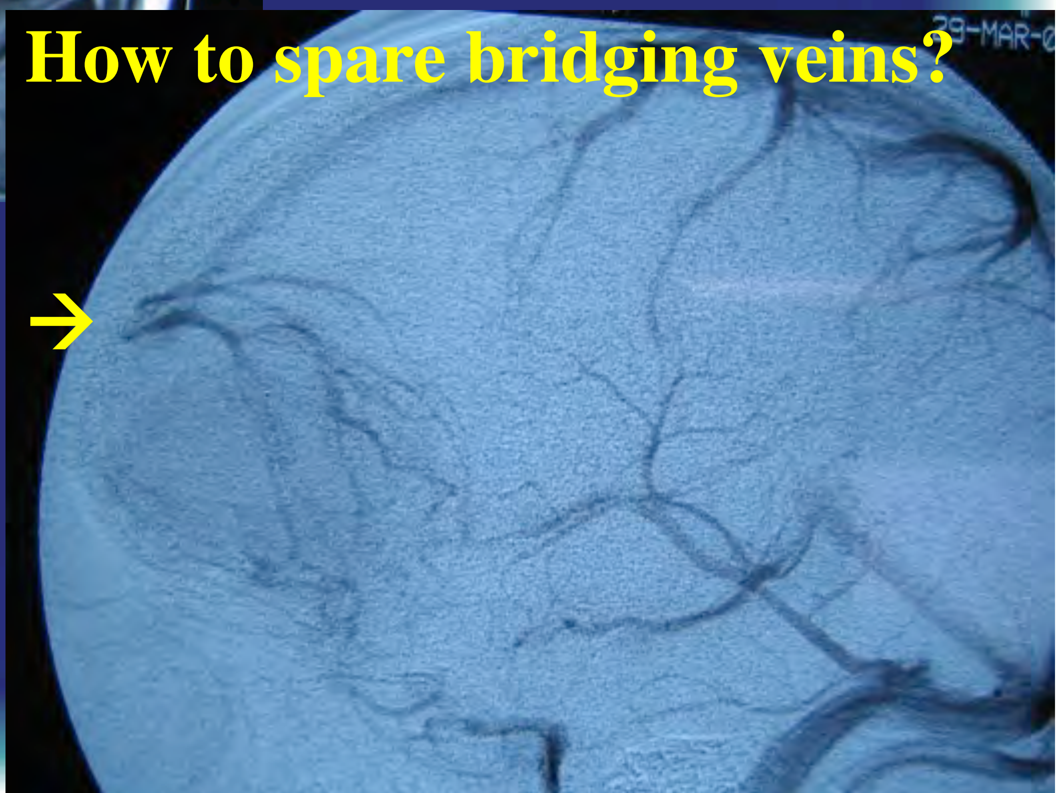
Case 2; 80y M

No symptom

Working as a company president



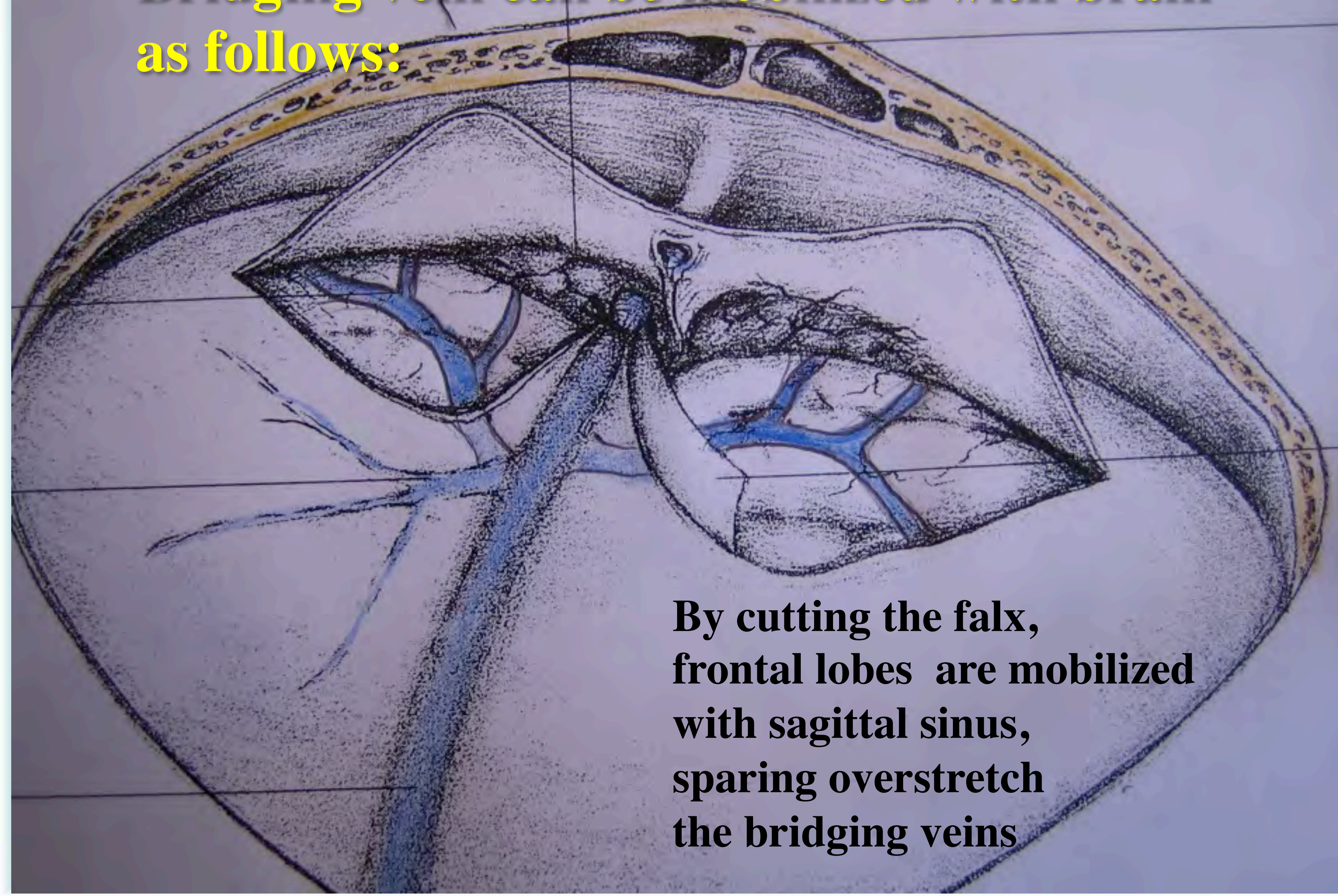
How to spare bridging veins?



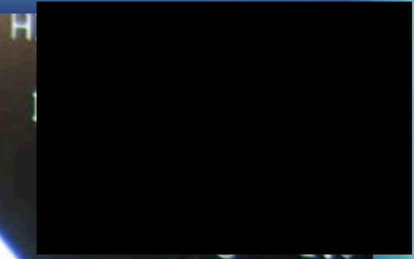
Arachnoid dissection →
Along the vein?

No!

Bridging vein can be mobilized with brain as follows:

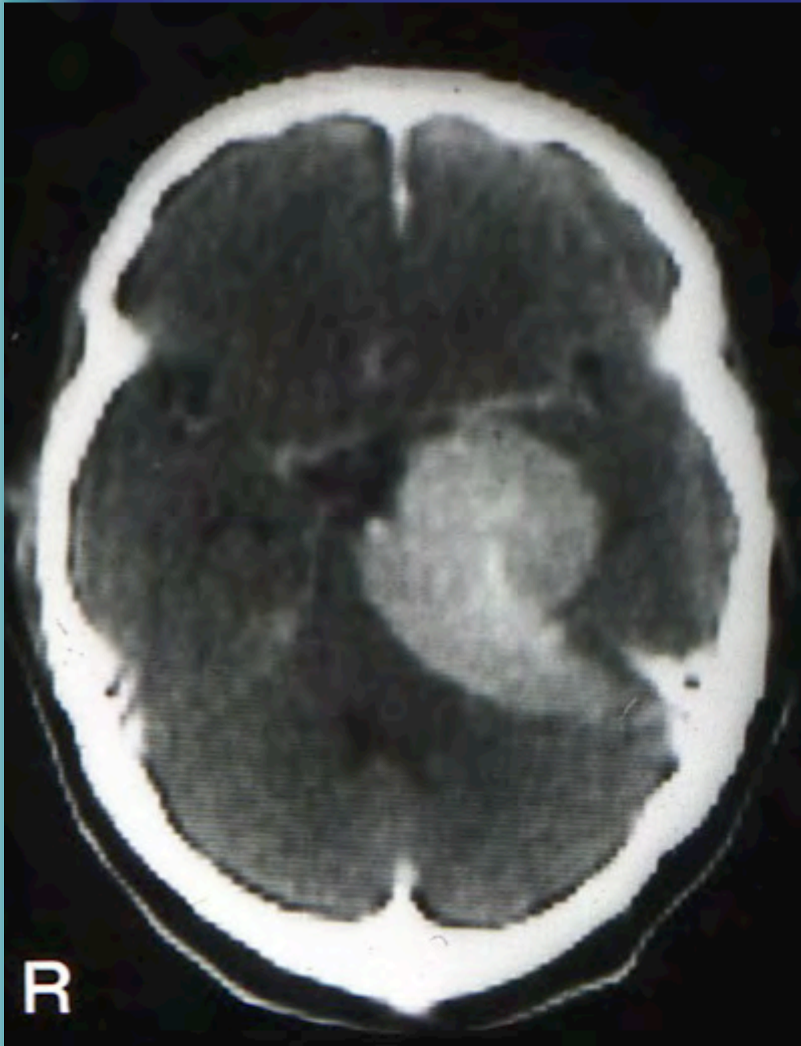


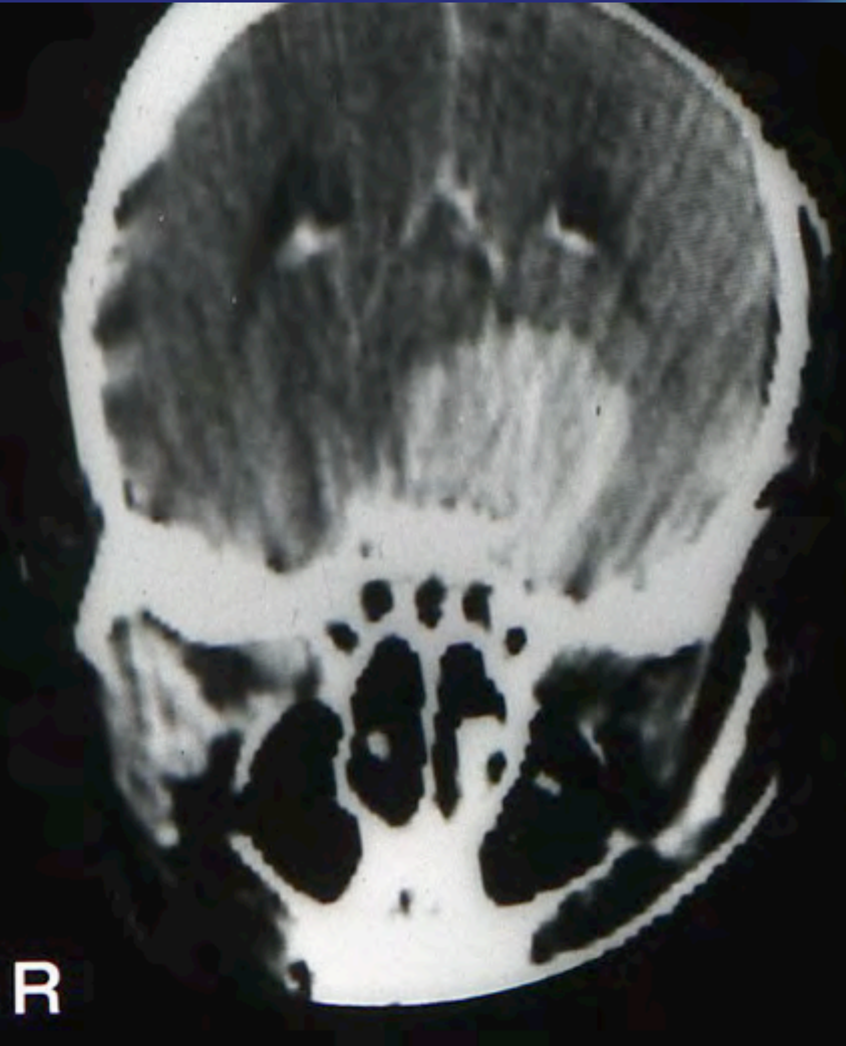
By cutting the falx,
frontal lobes are mobilized
with sagittal sinus,
sparing overstretch
the bridging veins



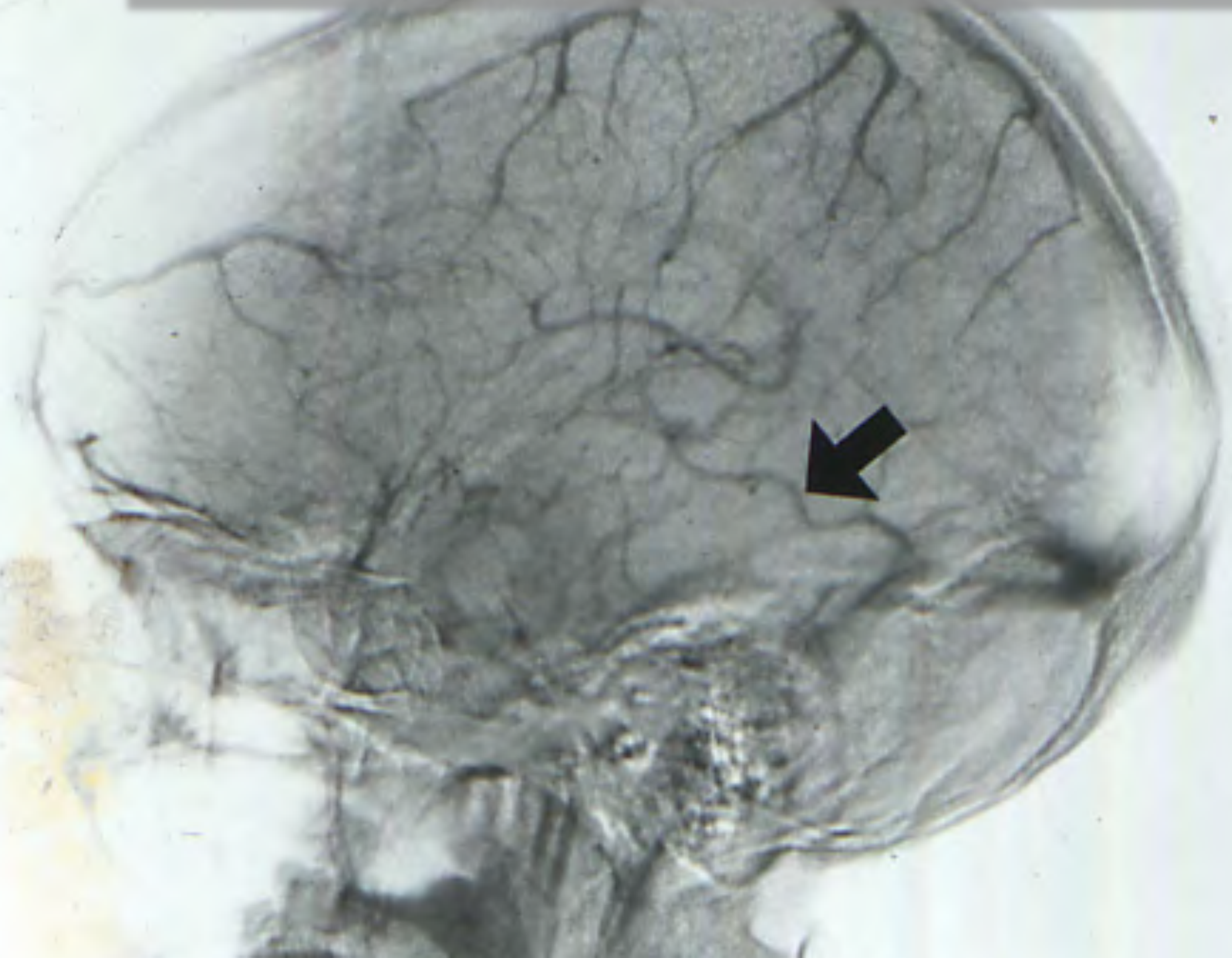
Patient came back to the job without problem

Case 3; 51y M, ataxia (op. in 1982)
By presigmoid approach, what do you take care?

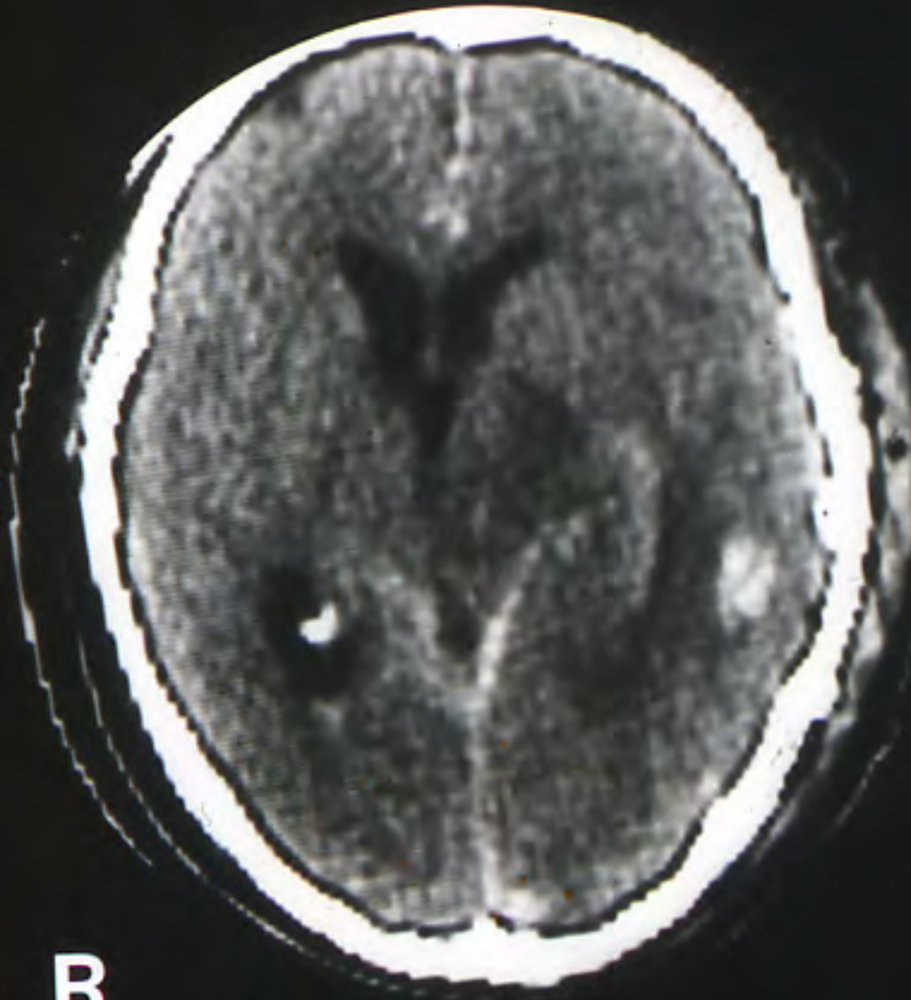


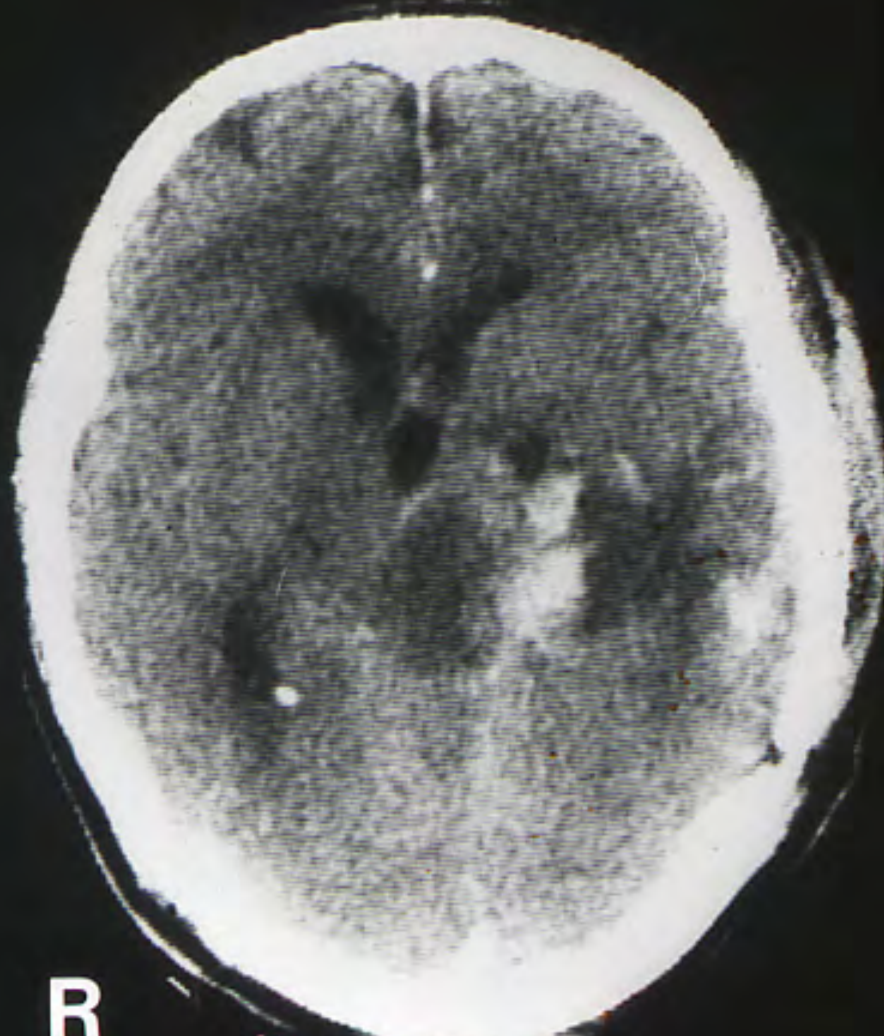


Take care anteriorly located vein of Labbe



1982





An example of complication of Vein of Labbe after Presigmoid approach

Rt. presigmoid approach; anteriorly located vein of Labbe

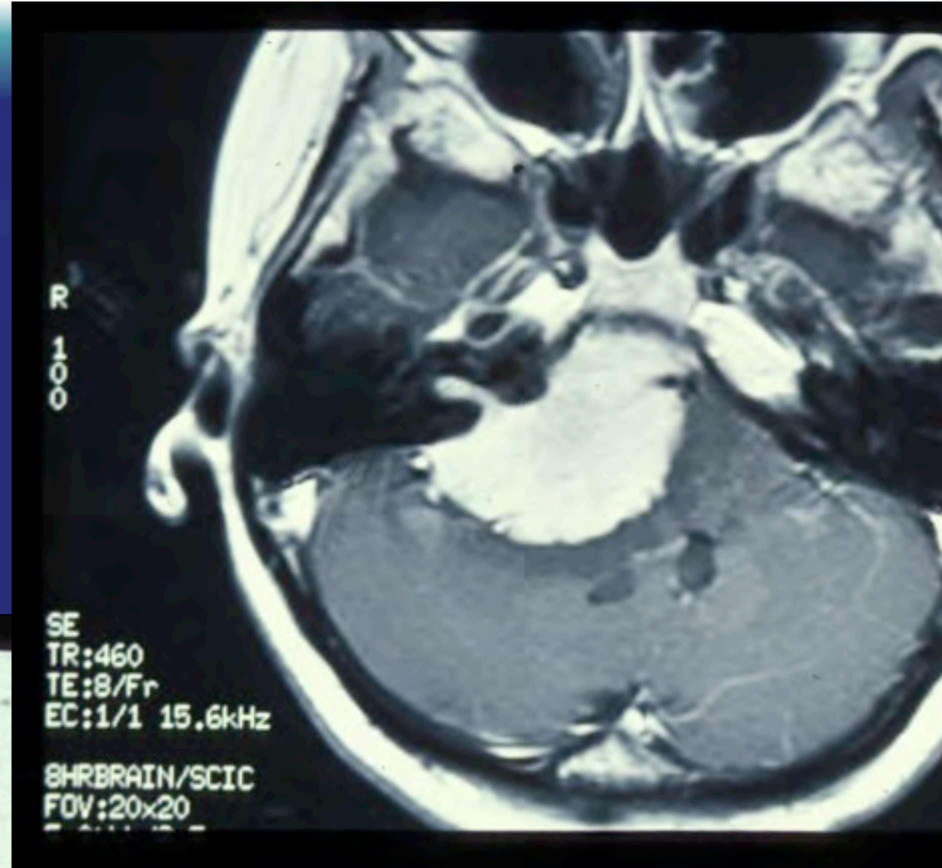
If dural incision is long, retractor may compress or stretch the vein of Labbe (from Rhoton's book)

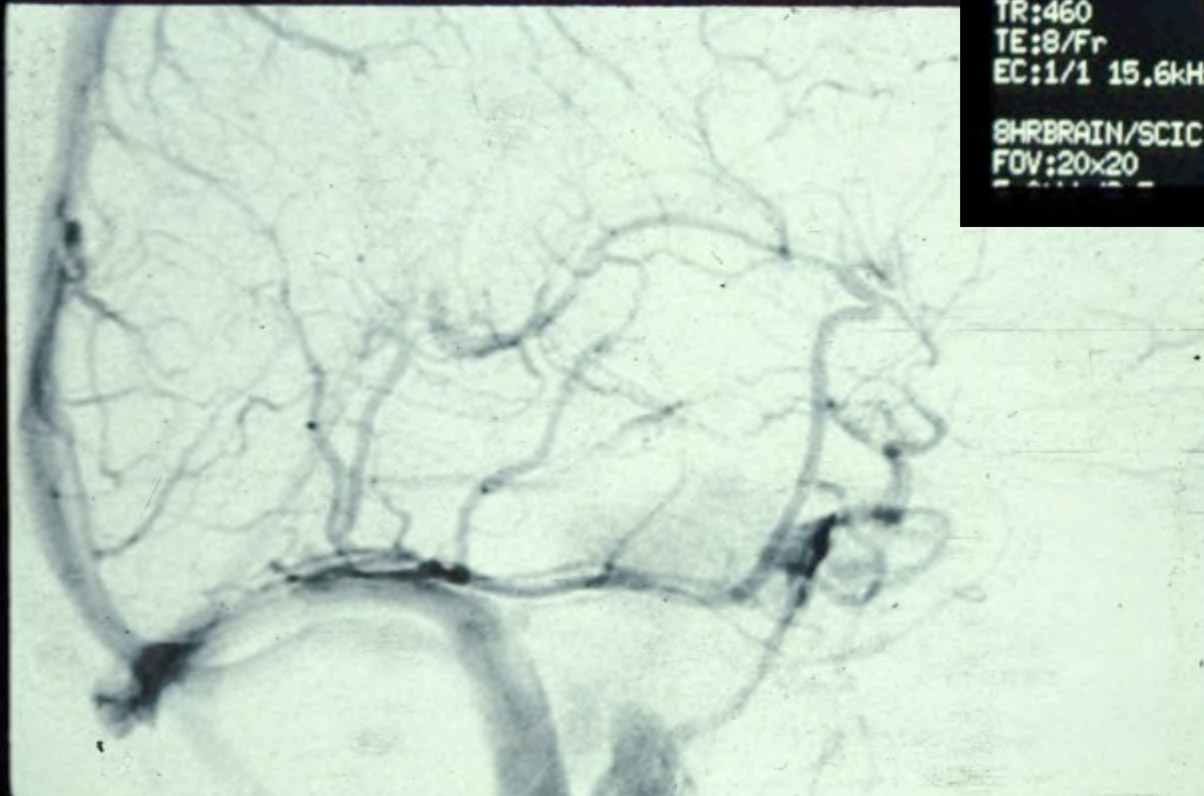
To Spare injury to Vein of Labbe by Presigmoid Approach

Dural incision of the temporal base must be minimal in presigmoid approach

Case 4; 45y F; hearing dist.
How do you access?

Note VII, VIII were involved by the tumor





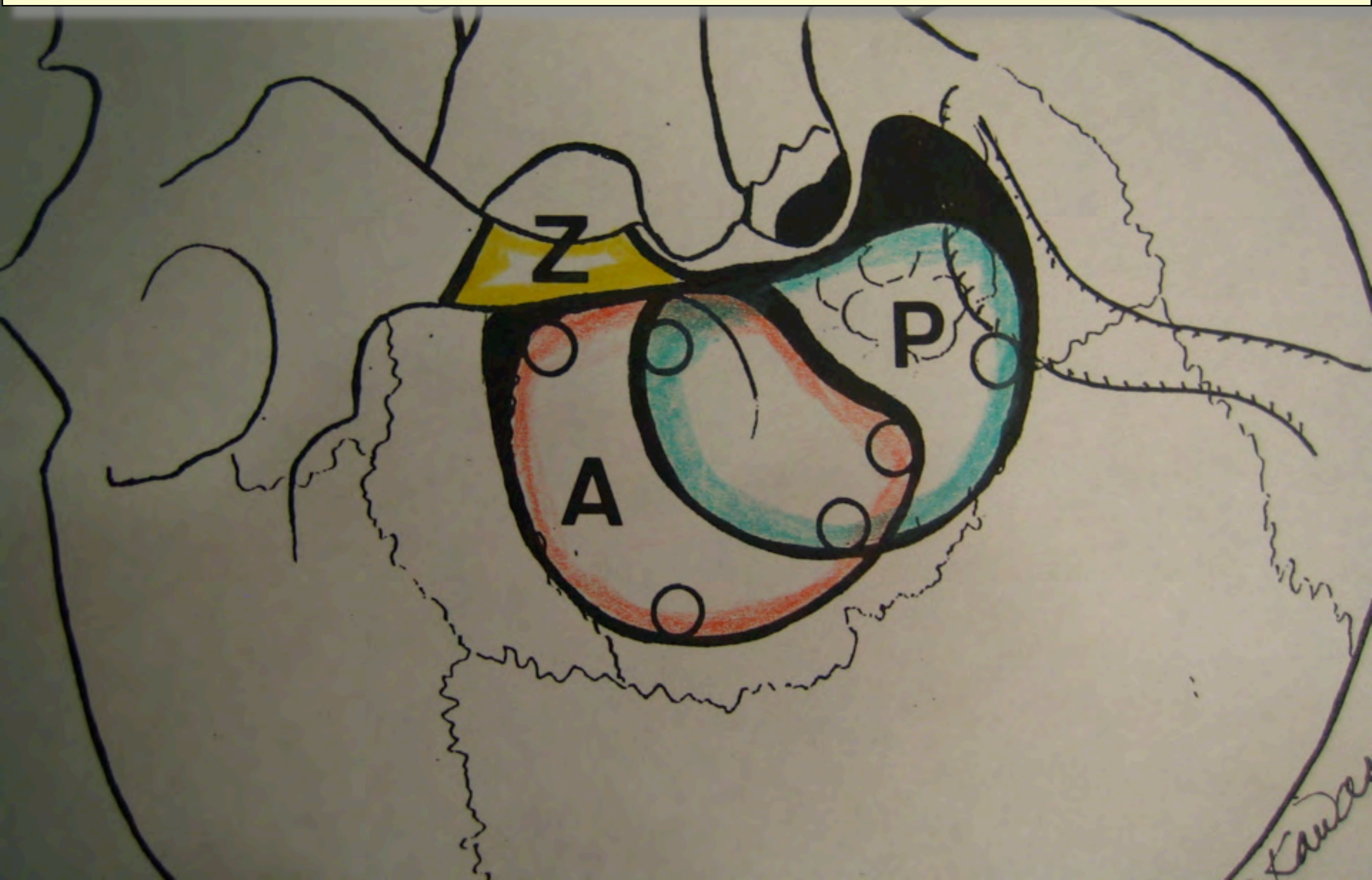
Note the long middle temporal vein

Presigmoid approach was spared: Two Step Operations

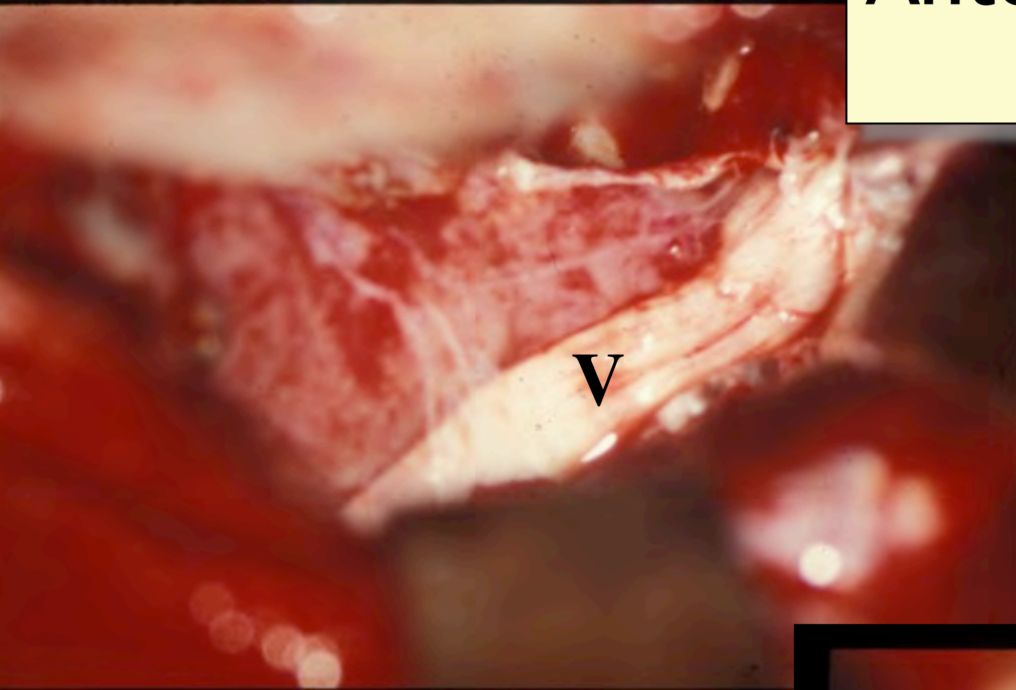
1 st: Anterior petrosal approach with partial labyrinthectomy to remove upper 2/3

2 nd: Suboccipital approach to remove lower 1/3

Anterior Petrosal Approach(A), with a craniotomy more anteriorly, reduced venous complication compared to Presigmoid Approach (P)

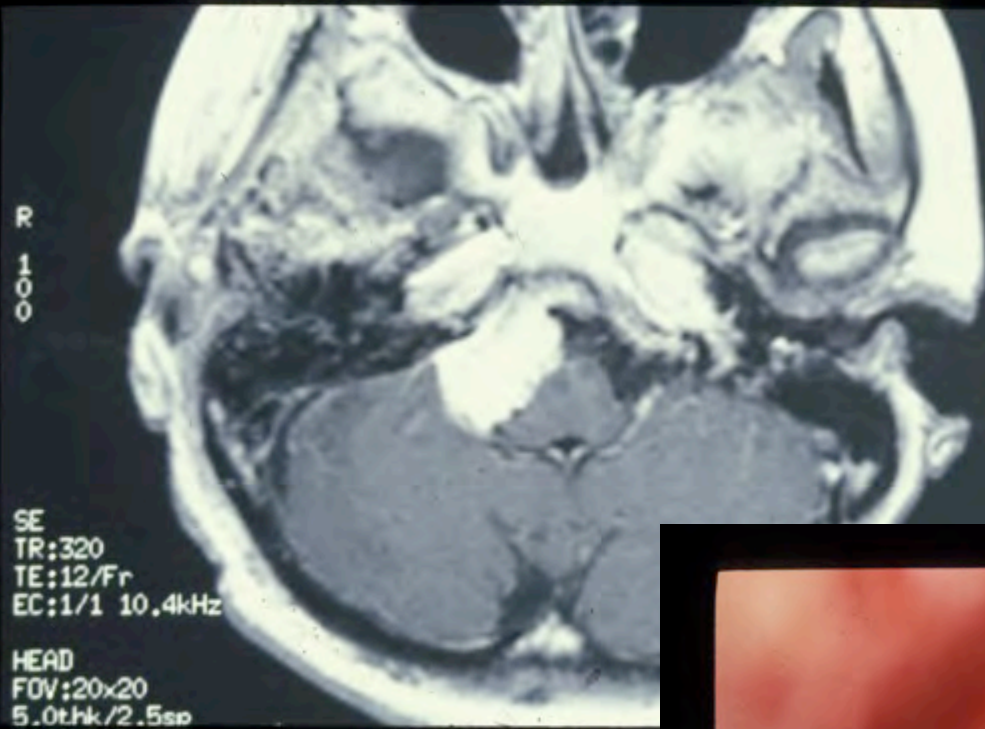


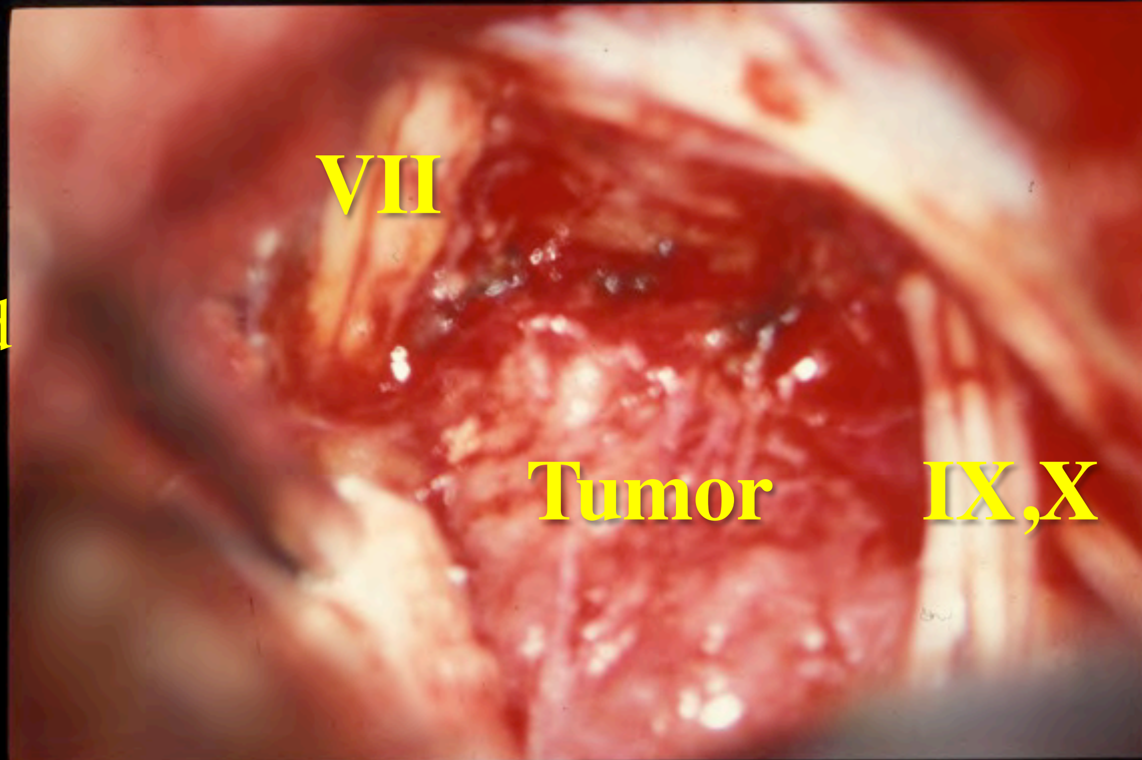
Anterior Petrosal Approach



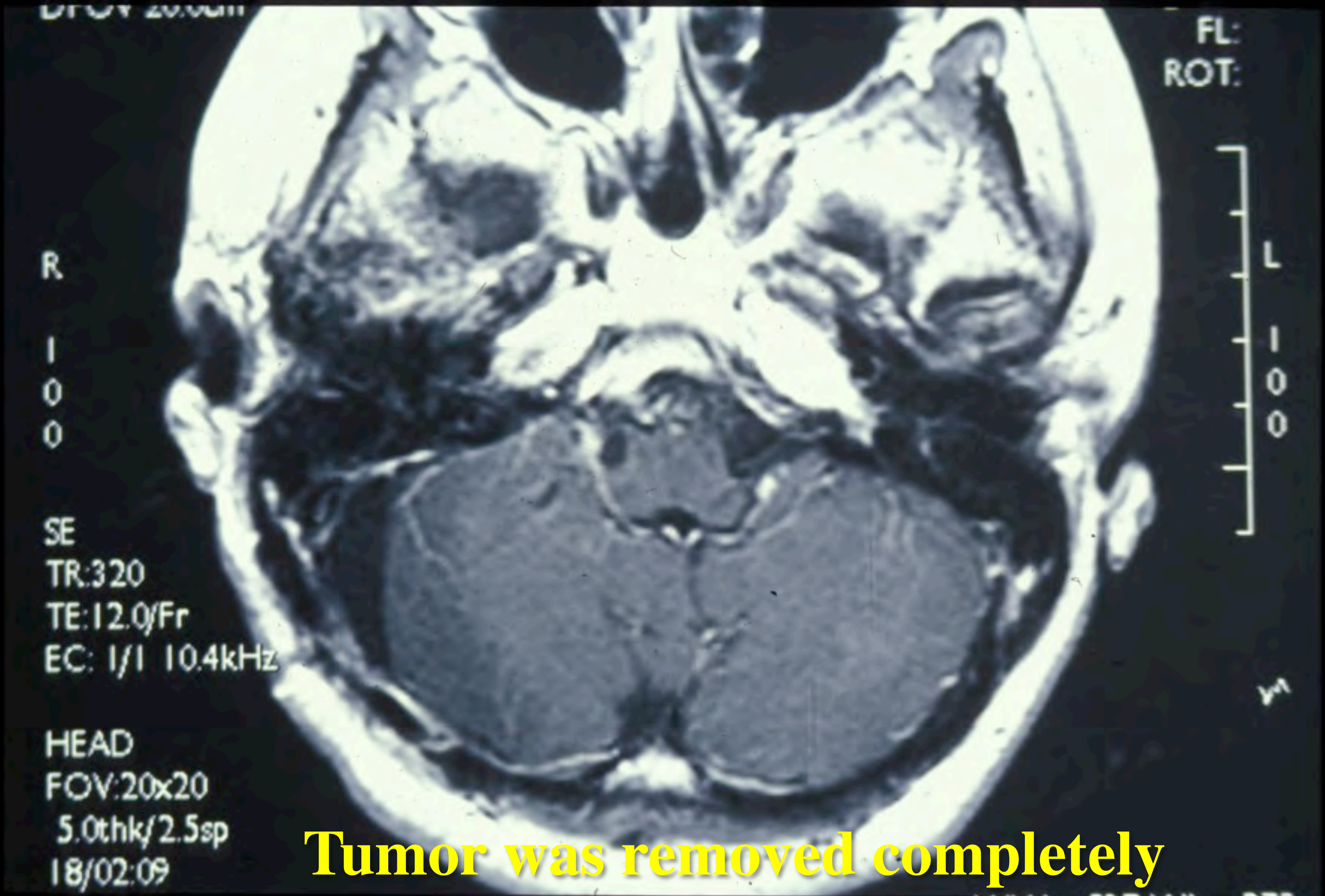
Tumor removal was discontinued in lower part under VIIth nerve

Residual tumor was removed easily by Suboccipital Approach 1.5 month later





Enough subarachnoid Space was found at the second surgery


FL:
ROT:
R
100
L
100
SE
TR:320
TE:12.0/Fr
EC: 1/1 10.4kHz
HEAD
FOV:20x20
5.0thk/2.5sp
18/02:09
Tumor was removed completely

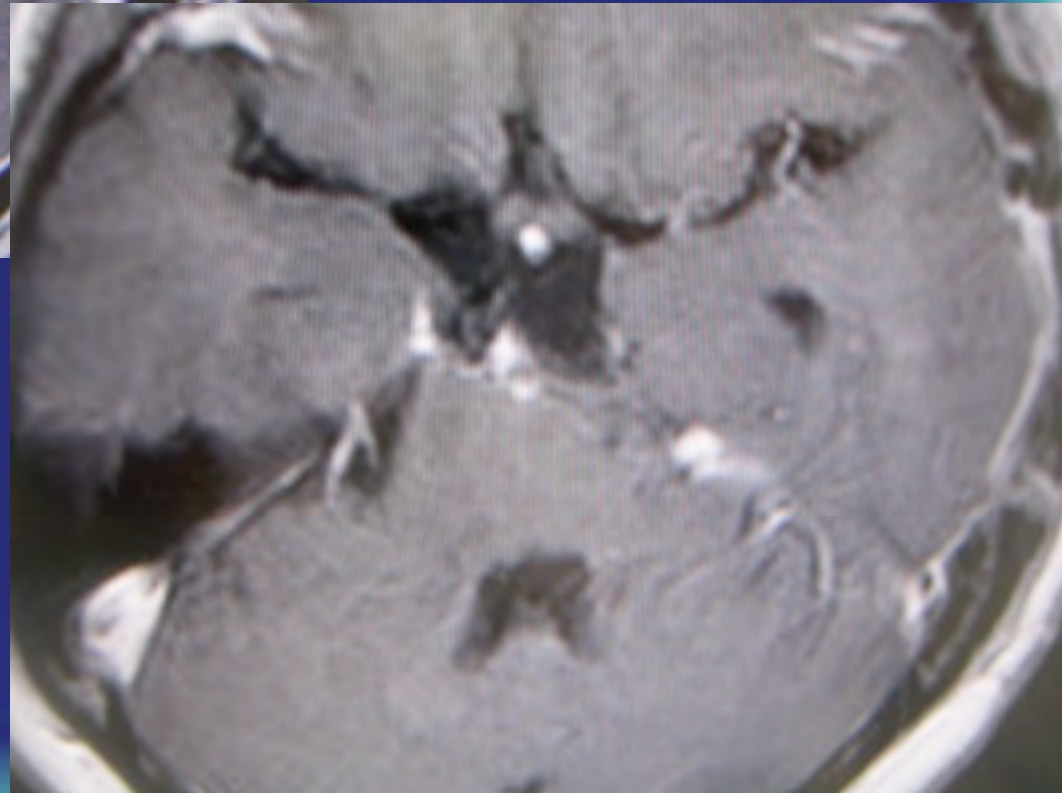
Solution

How to spare injury to bridging veins and encased cranial nerves?

* Do not cross important nerve and veins!

Two step operation offered safe surgical space for dissection

Anterior Petrosal approach has reduced venous complication

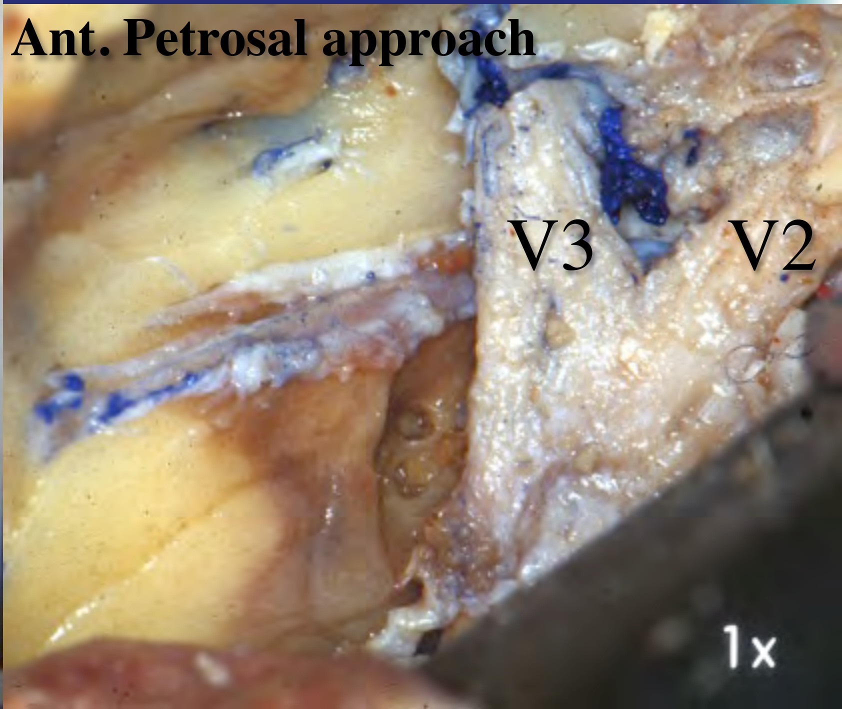


However, please note The followings!

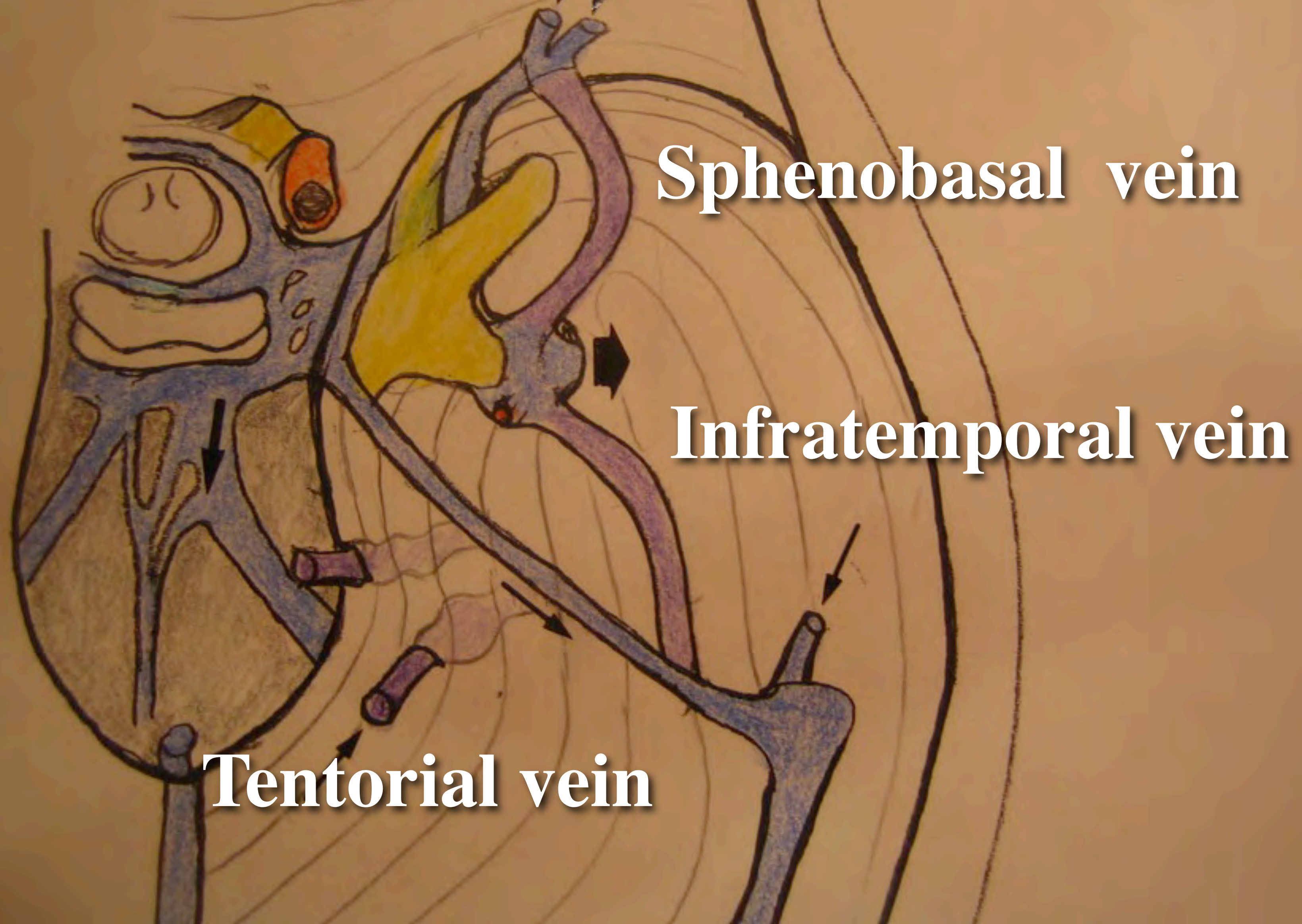
A disadvantage of anterior petrosal approach: Epidural venous bleeding around foramen ovale:

Check the venous variation!

(from Rhoton's book)

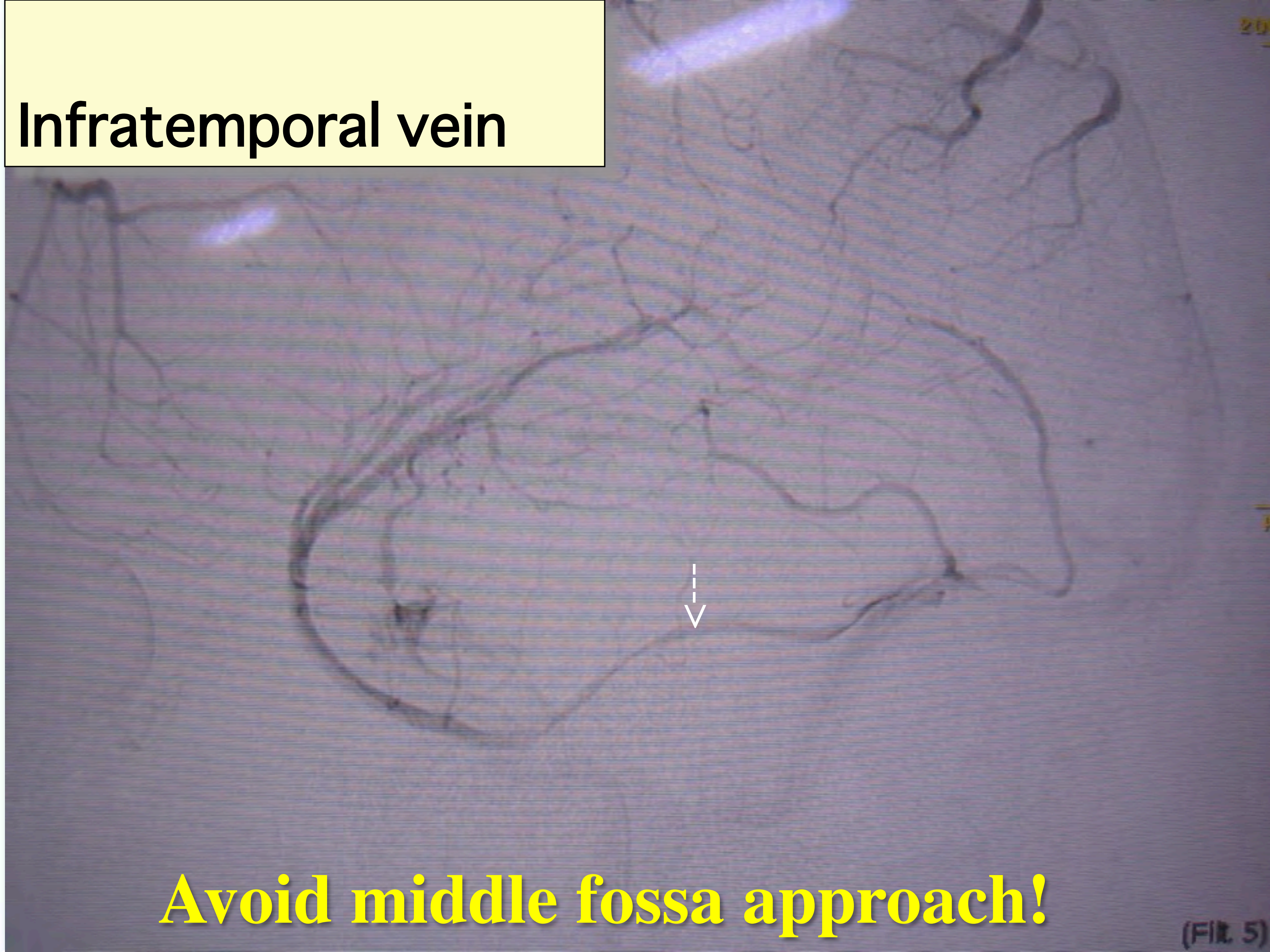


Venous Anomaly in the Middle Fossa



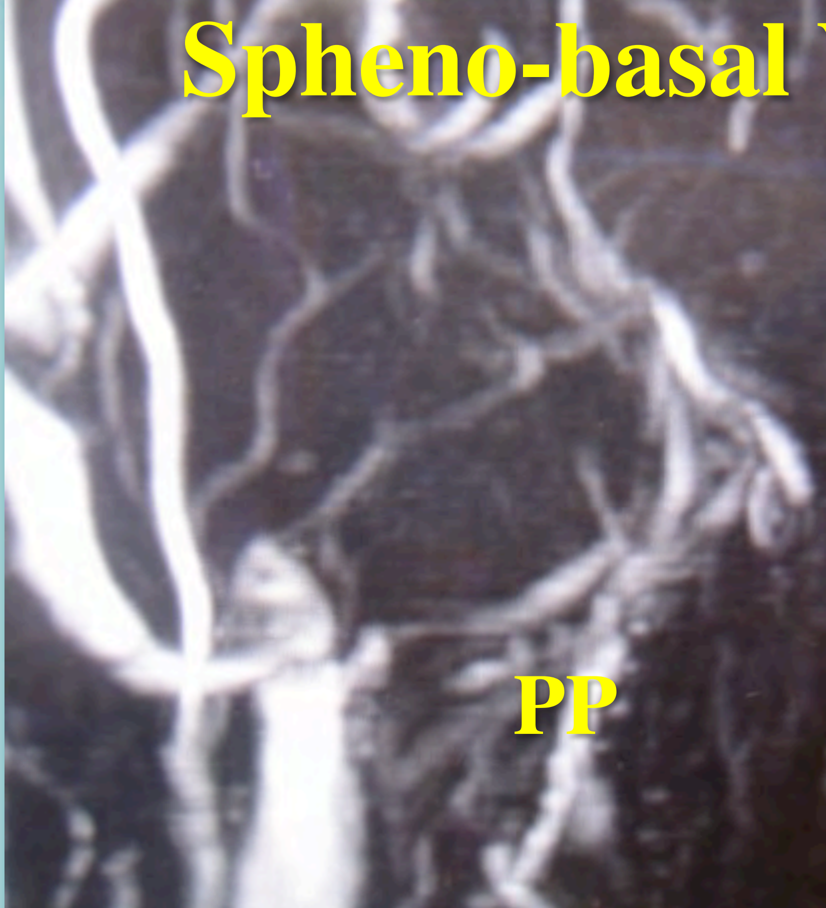
Sylvian vein Normal pattern

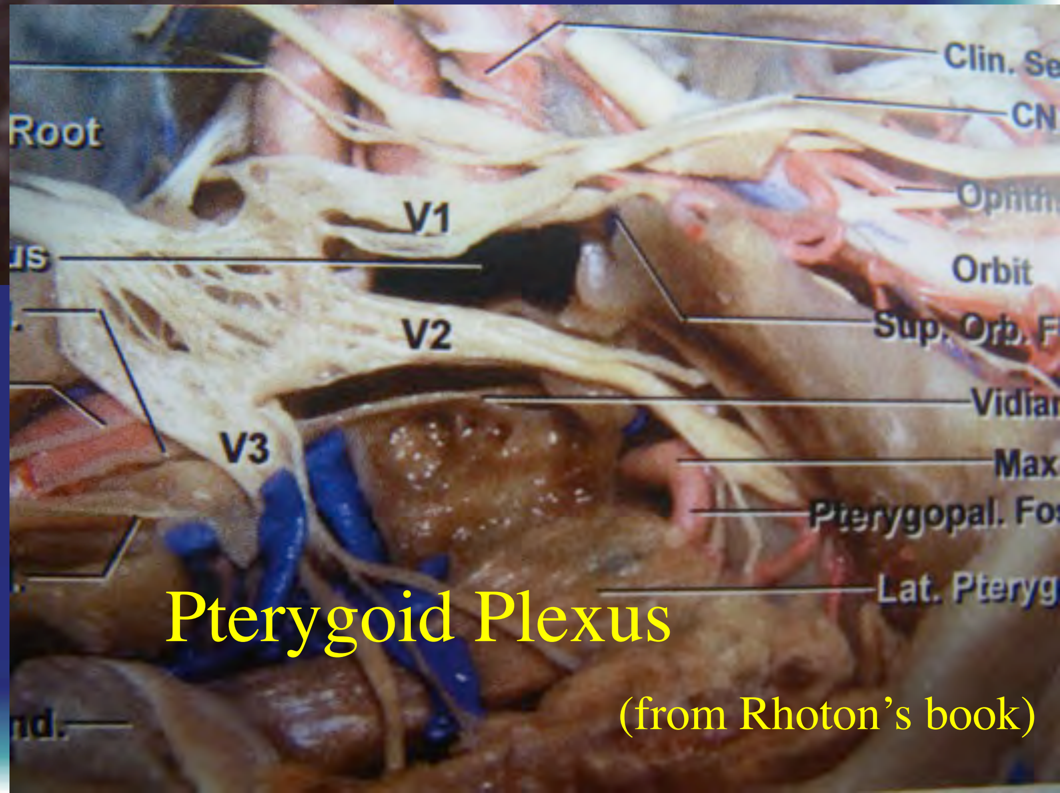
Drained into Cavernous Sinus


Infratemporal vein
Avoid middle fossa approach!
(Fil. 5)

Spheno-basal Vein on MR Venogram

--Sylvian vein directly drained into pterygoid plexus (PP) (20 %, not rare!)





(from Rhoton's book)

Spheno-basal Vein

(nominated by K. Ohata)

must be cared for

*epidural temporopolar approach

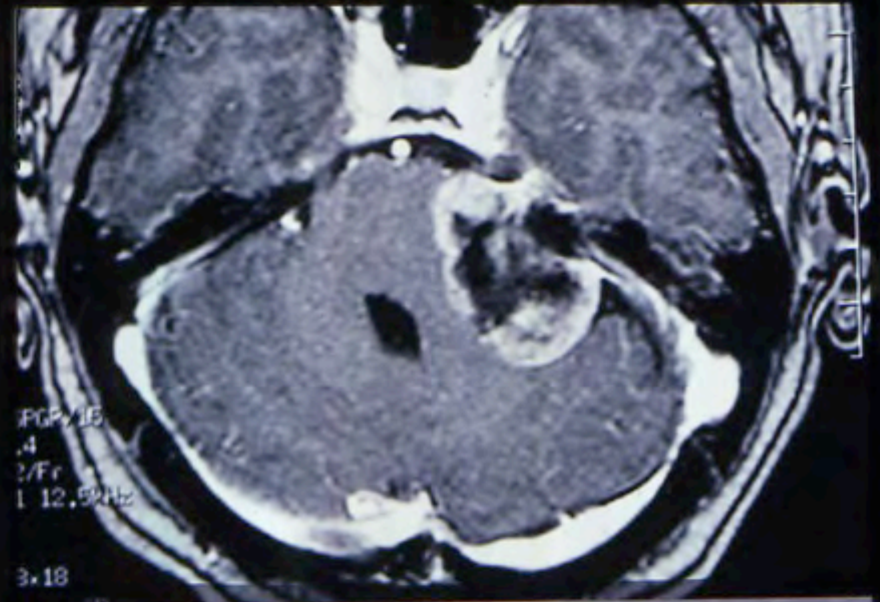
*anterior petrosal approach

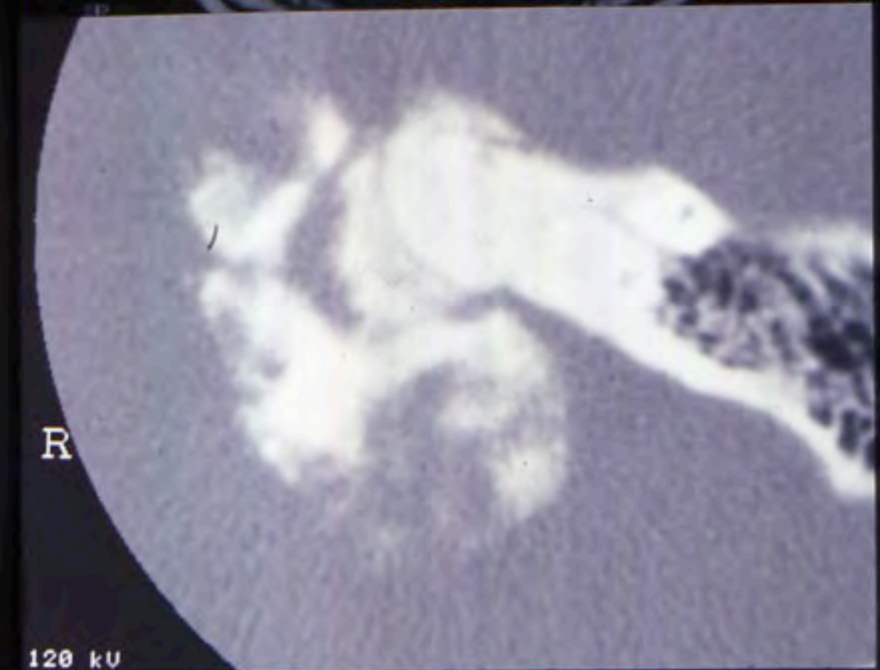
The subdural approach might be indicated

Case 5; 54 F
Hearing disturbance

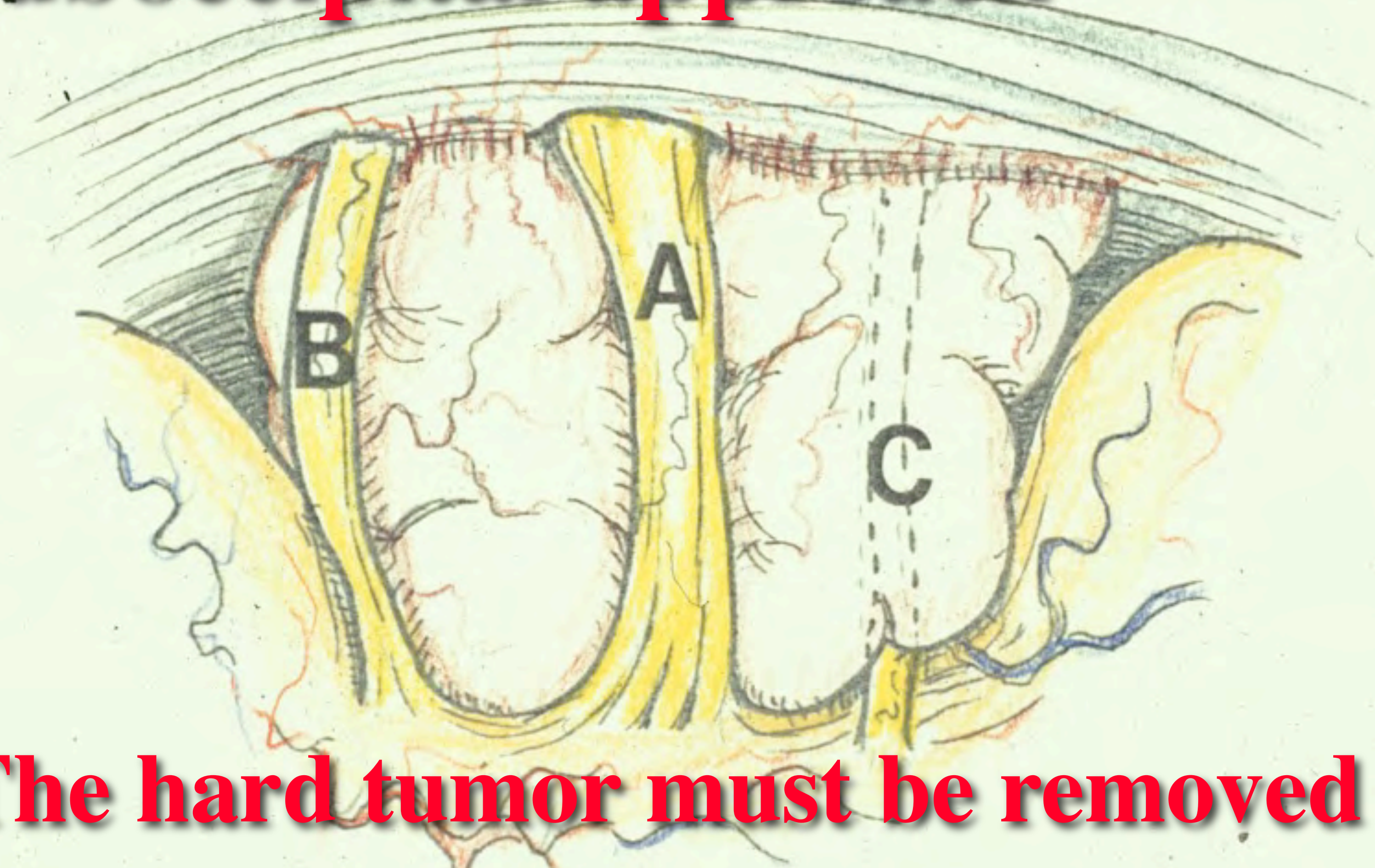
CPA Meningioma, calcified
Facial N might be posterior to tumor

How do you operate?

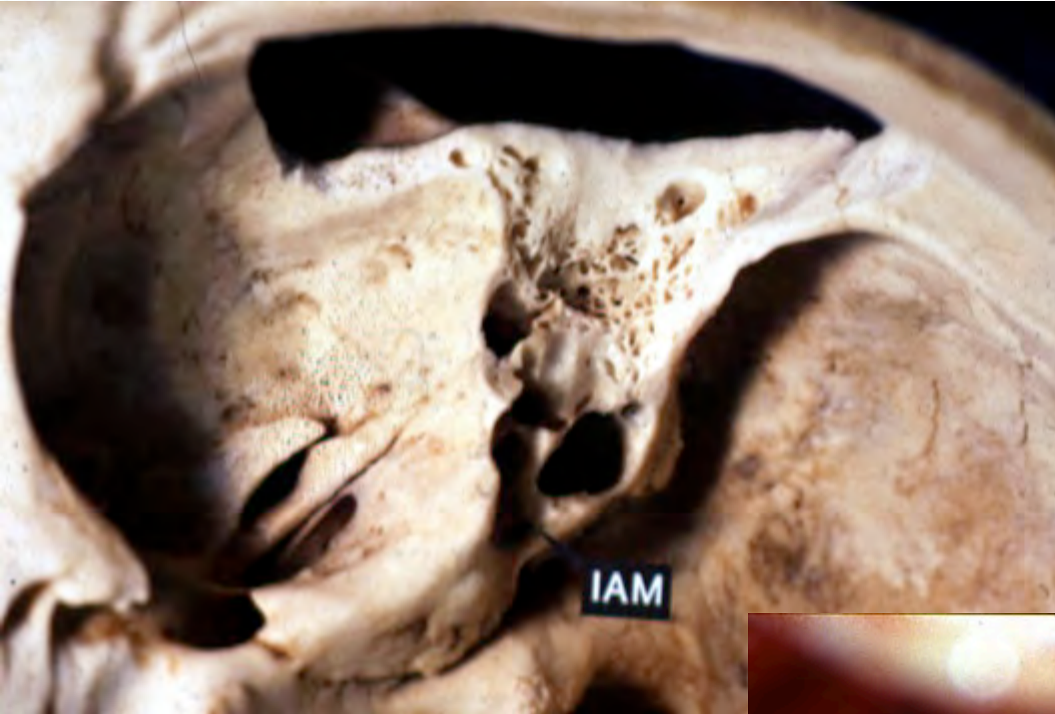




Suboccipital approach



The hard tumor must be removed by crossing facial nerve(A)



Petrosal Approach was safer than Suboccipital approach

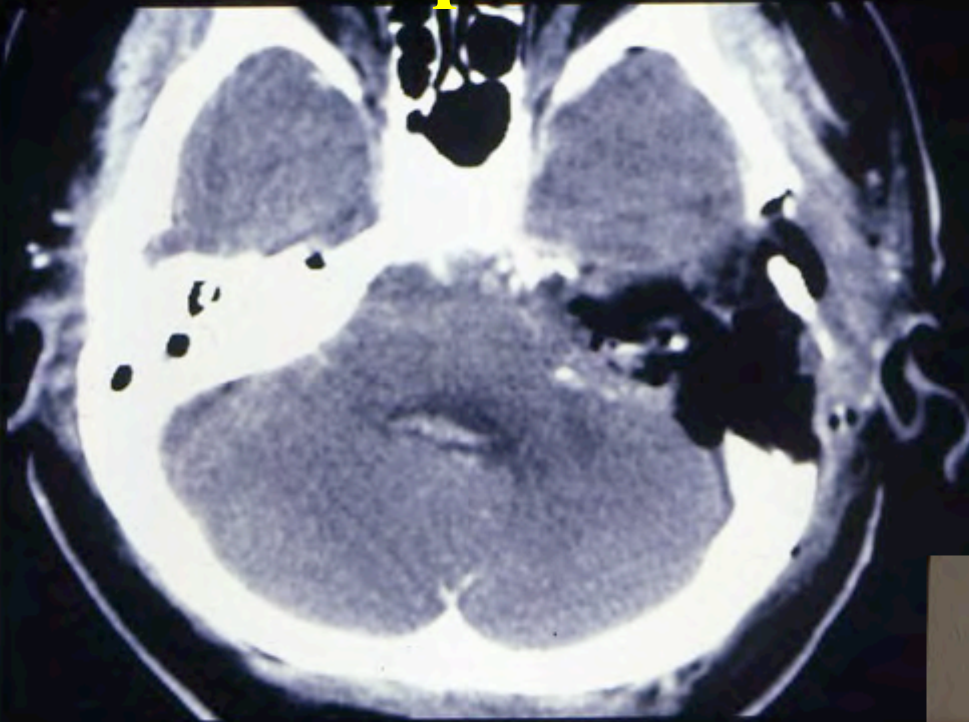
It did not cross
Facial nerve --------→

V

VII

After removal

After op.



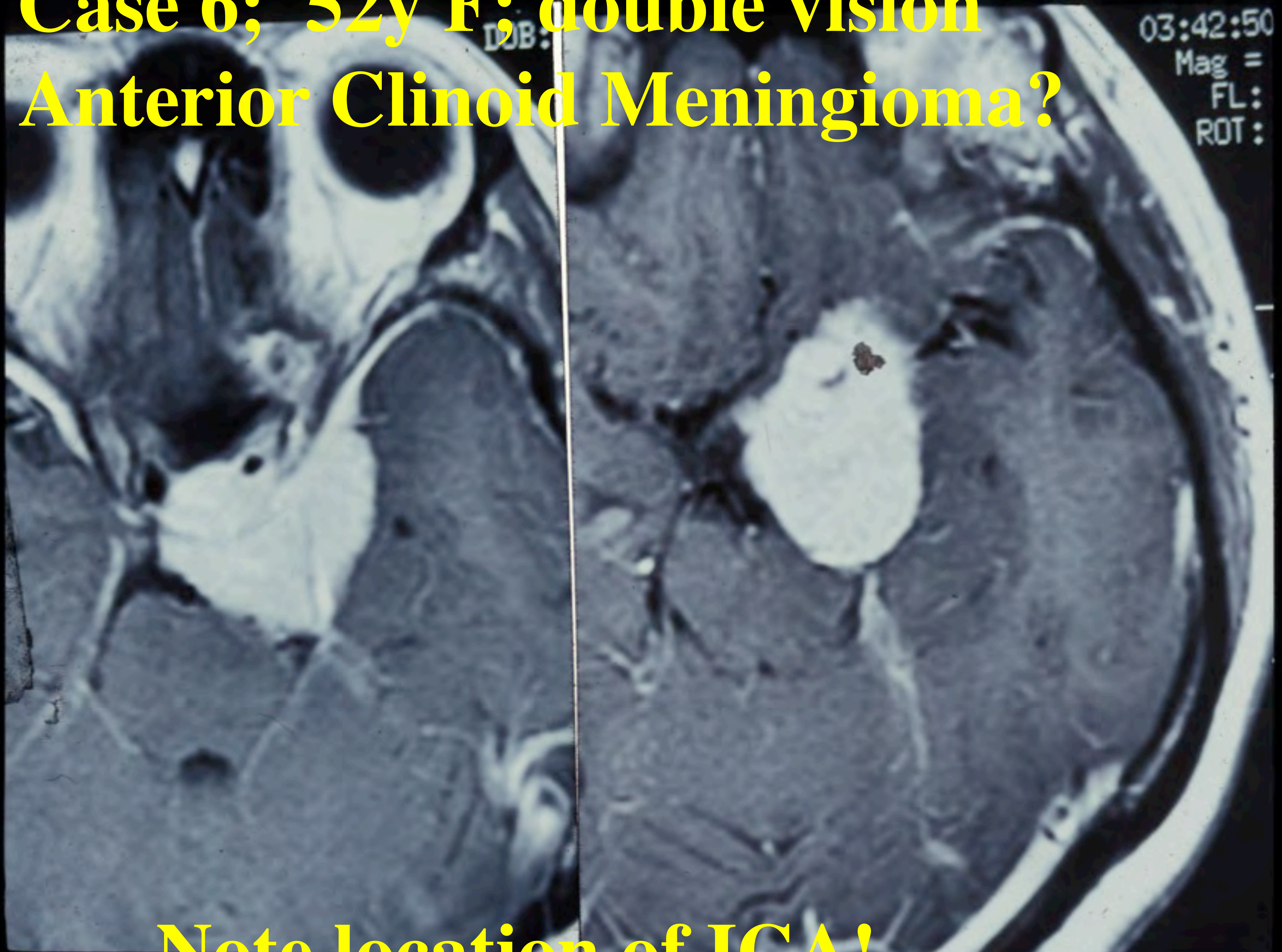
No facial palsy

Solution

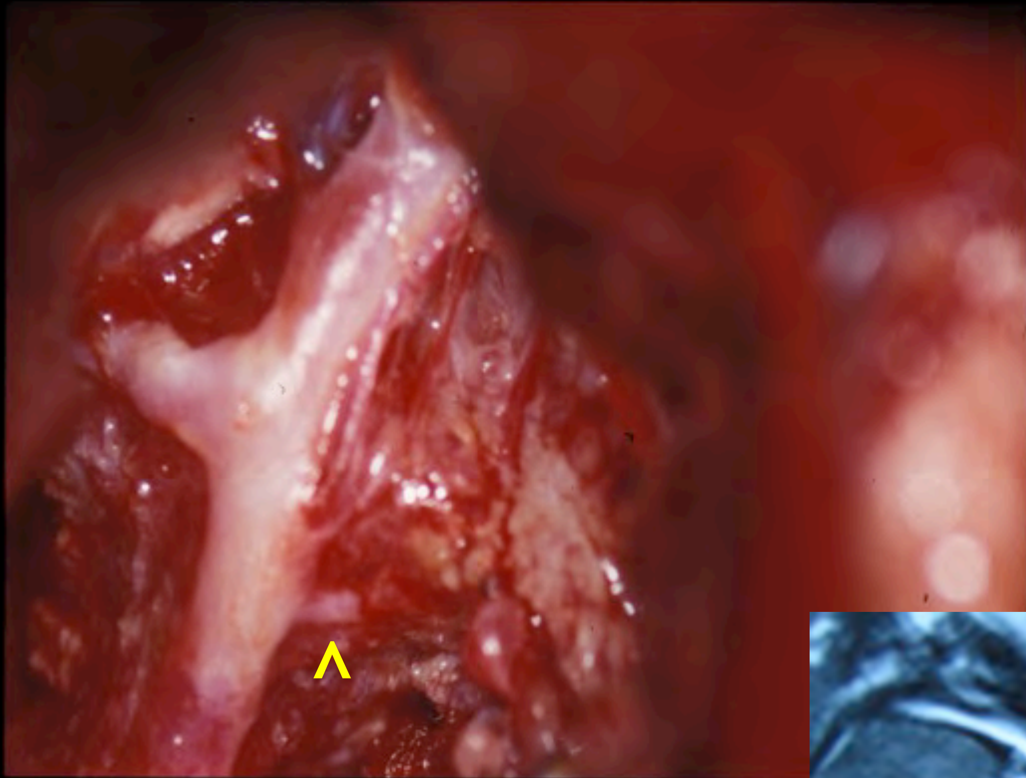
How to spare cranial nerve injury in consistent tumor?

Select surgical approach not to cross the important cranial nerve

Case 6; 52y F; double vision
Anterior Clinoid Meningioma?



Note location of ICA!



Only partially removed

Pcom Perforators were encased

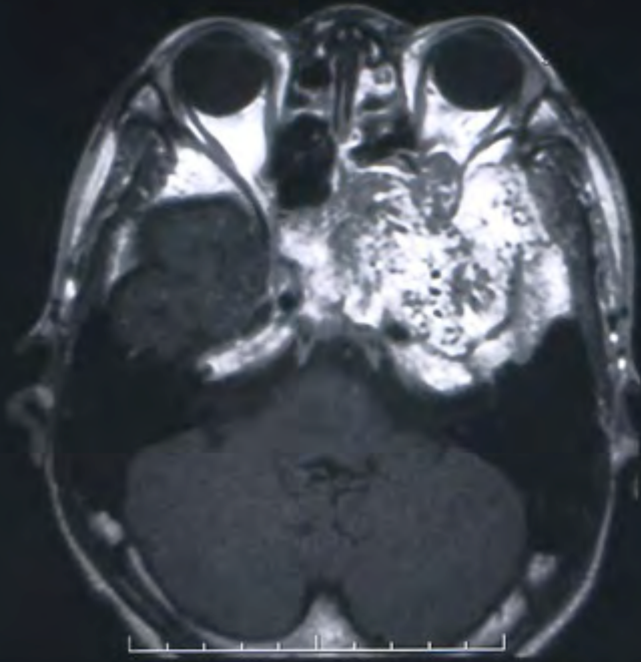
Pitfall

Meningioma posterior to ICA (posterior clinoid meningioma)

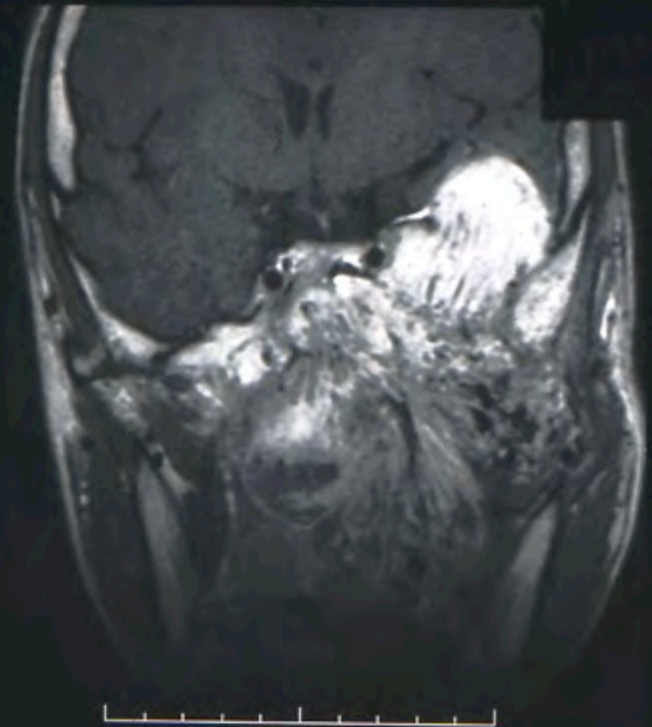
→ **Encasement of perforators**

Posterior clinoid meningioma

- *An attempt of total removal was risky due to perforator injury
- *Presigmoid approach sometimes resulted good outcome (GTR; 3/5 K. Ohata, 2008)



Case 7; 26y M What kind of Tumor?

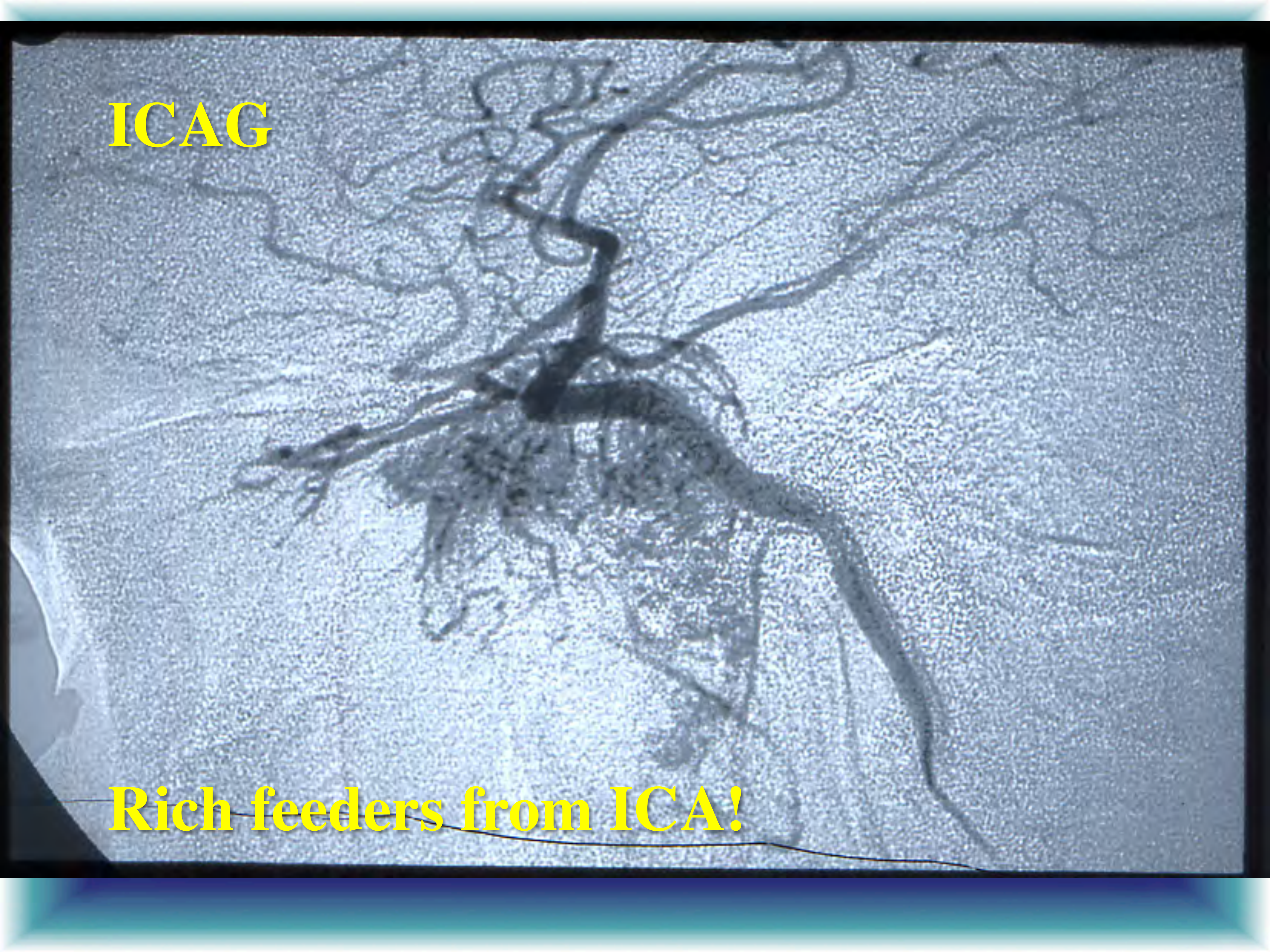


Angiofibroma
- A Devil Tumor–

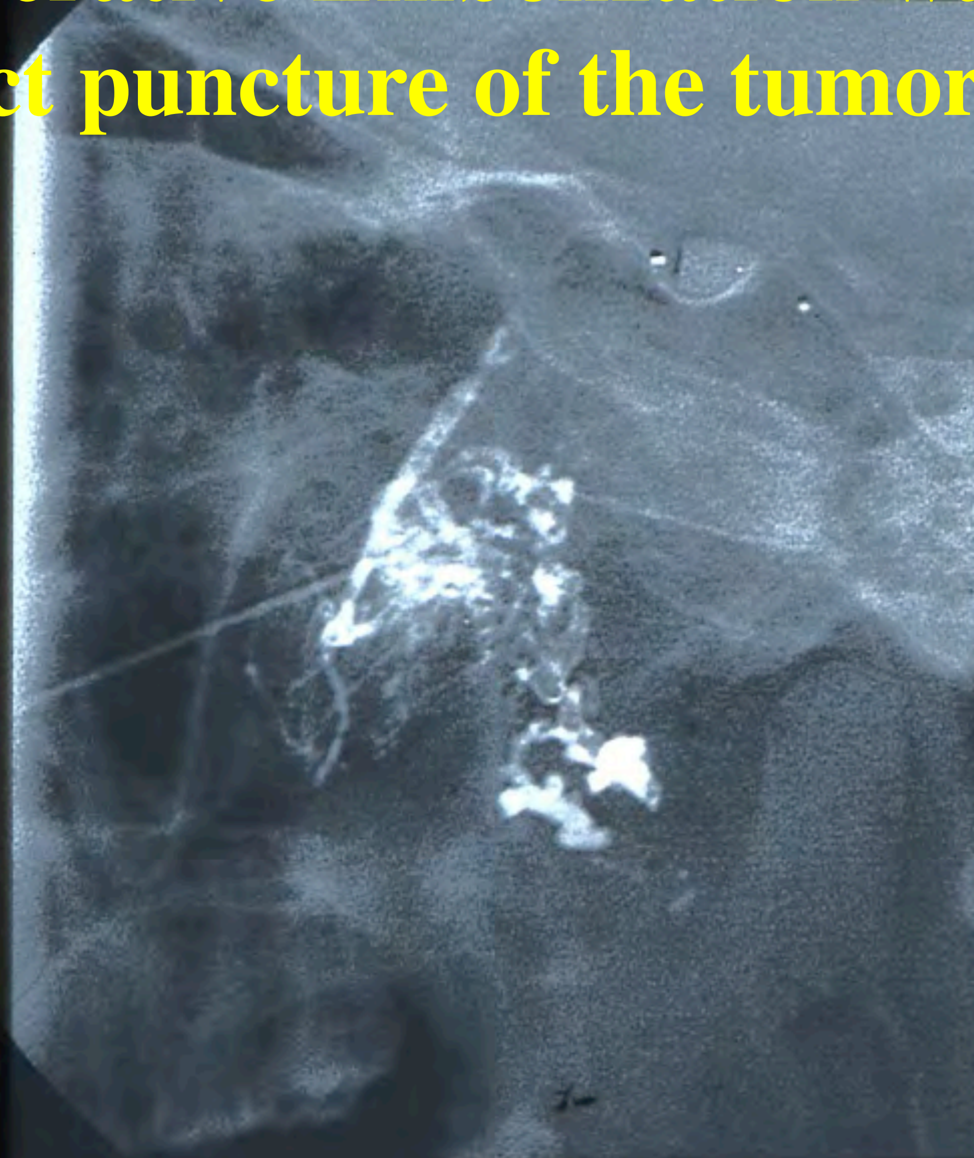
ECAG

After embolization,

still contrasted


ICAG
Rich feeders from ICA!

Intraoperative Embolization was added by direct puncture of the tumor

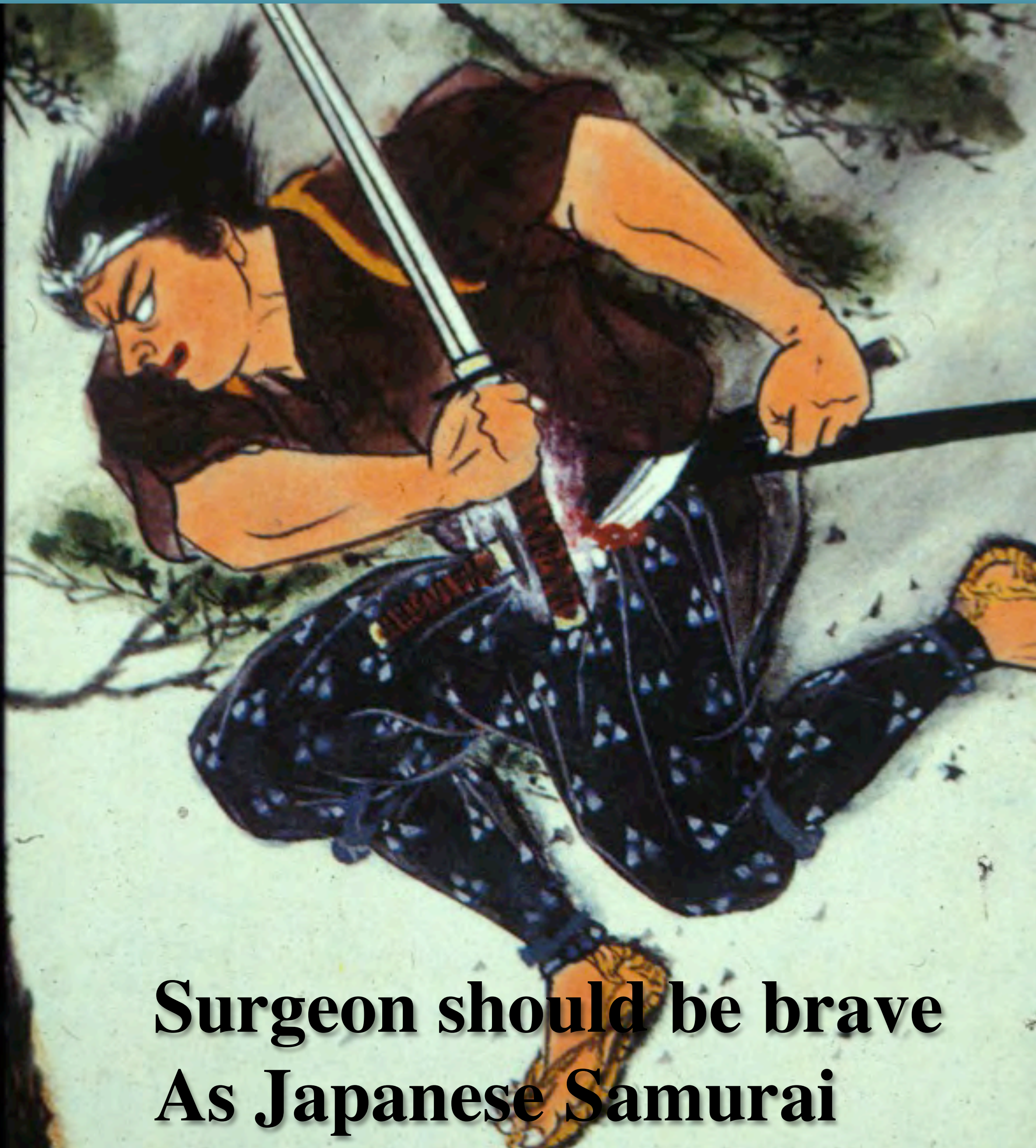


The tumor was consistent and fibrous. Bleeding never stop by coagulation and hemostatic materials. Compression by fingers was only way to stop bleeding.

How to treat the bleeding?

My Solution:
How to stop tumor bleeding?

Compress the tumor with artificial bone and fix it to the cranium.



Surgeon should be brave
As Japanese Samurai

However, it is most important to learn how to spare the complications from senior surgeon's experience.

Thank you for your attention!

Takeshi Kawase