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?
Classic Subtemporal Approach

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

Tumor

V-3

After removal

Sphenoid mucosa

V-2
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
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

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

2nd: Suboccipital approach
to remove lower 1/3
Anterior Petrosal Approach (A), with a craniotomy more anteriorly, reduced venous complication compared to Presigmoid Approach (P)
Tumor removal was discontinued in lower part under VIIth nerve.

Encased facial N was dissected.
Residual tumor was removed easily by Suboccipital Approach 1.5 month later.

Enough subarachnoid Space was found at the second surgery.
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

- Sphenobasal vein
- Infratemporal vein
- Tentorial vein
Sylvian vein

Normal pattern

Drained into Cavernous Sinus
Avoid middle fossa approach!
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.

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!
Pcom Perforators were encased

Only partially removed
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
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