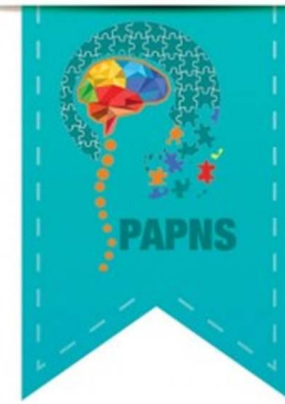




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INTERNATIONAL SOCIETY FOR  
PEDIATRIC NEUROSURGERY



# Suprasellar Arachnoid Cysts

Wan Tew SEOW *FRACS*

Singapore



KK Women's and  
Children's Hospital

SingHealth

DUKE  NUS  
GRADUATE MEDICAL SCHOOL SINGAPORE



National  
Neuroscience Institute

SingHealth

# Intracranial Arachnoid Cysts

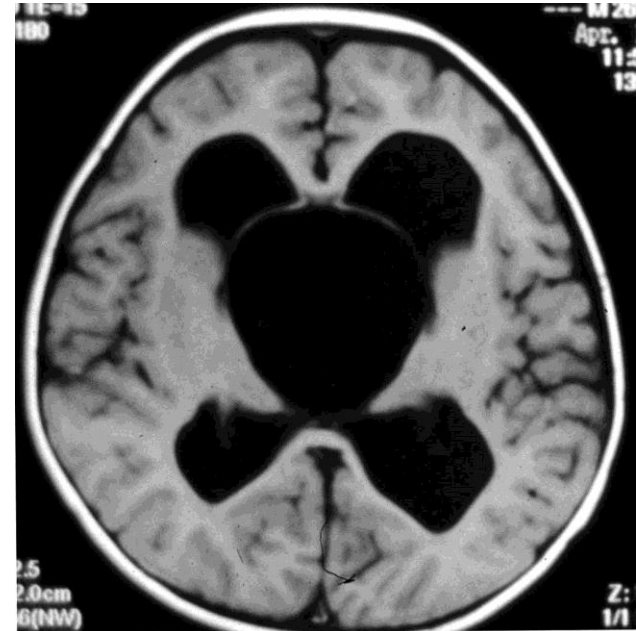
- Distribution
  - Sylvian fissure – 49%
  - CPA – 11%
  - Quadrigeminal – 10%
  - Vermian – 9%
  - Sellar and suprasellar – 9%
  - Interhemispheric – 5%
  - Cerebral convexity – 4%
  - Clival 3%

# Suprasellar Arachnoid Cysts

- Pathogenesis
  - Miyamashi proposed some suprasellar arachnoid cysts are caused by cystic dilatation of the interpeduncular cistern.
  - Fox and Al-Mefty proposed suprasellar cysts develop from a diverticulum of an imperforate membrane of Lilliequist due to preceding inflammation
  - Enlargement:
    - Arachnoid cysts may develop around tufts of ectopic choroid plexus
    - One-way valve phenomenon

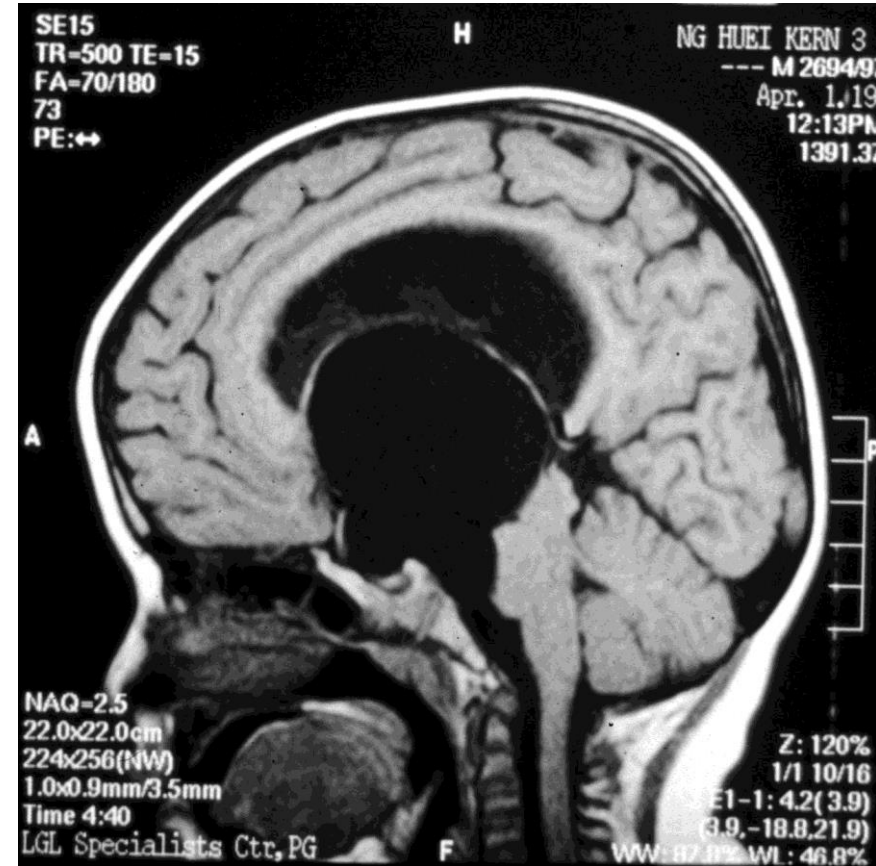
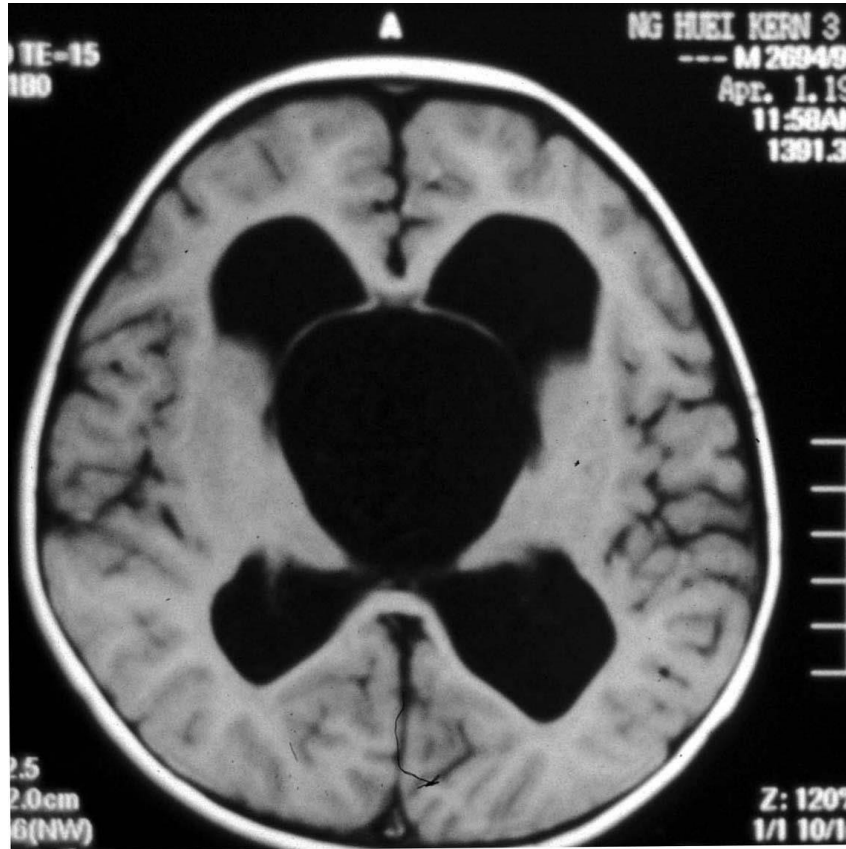
# Suprasellar Arachnoid Cysts

- Most common presentation is usually with hydrocephalus
- May present with endocrinopathies and visual field/acuity deficit
  - Most common endocrinologic symptoms is isosexual precocious puberty (10-40% in pts with suprasellar cysts)
  - Growth hormone deficiency
  - Bitemporal visual field deficit
  - Decreased visual acuity
  - Optic atrophy/papilloedema



- Bobble-head doll syndrome - rhythmic flexion and extension movement of the head, neck and trunk – decreased during periods of concentration, disappears during sleep and increased on standing and walking – for cysts in III ventricle
- Hypothalamic syndromes : failure to thrive, eating disturbance, emotional liability, psychomotor retardation, excessive obesity

# Suprasellar arachnoid cyst

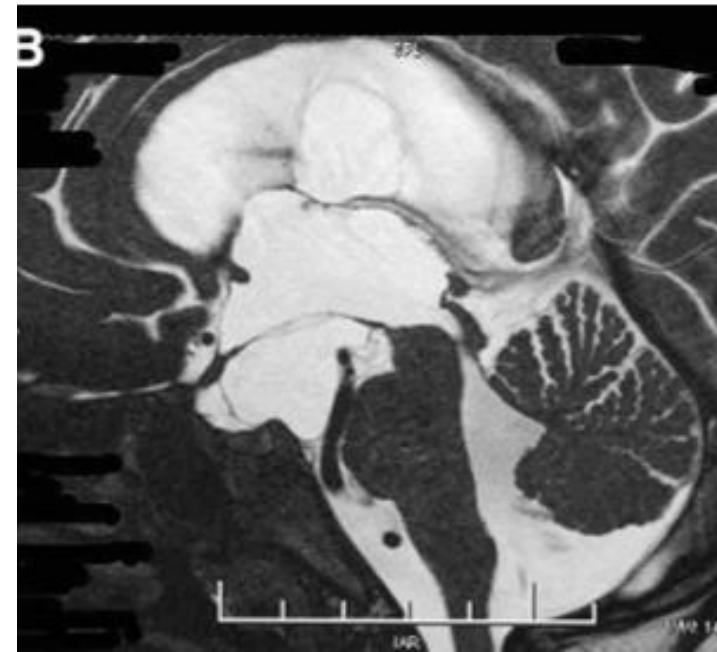
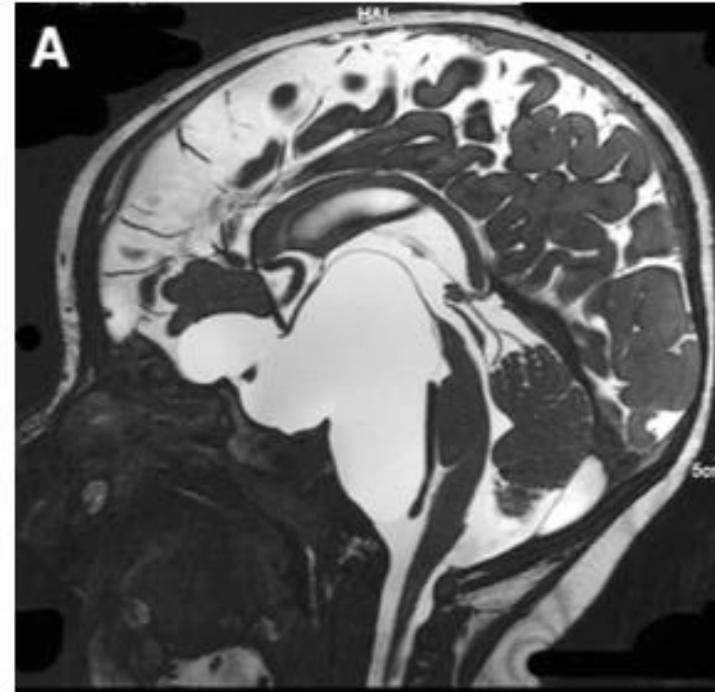


# Surgical anatomy

- Anatomy of the interpeduncular cistern together with its relationships to other adjacent cisterns and of the Liliequist membrane are of paramount importance for understanding suprasellar cysts
- The cyst is a lobulated arachnoid complex, and is composed of 2 distinct arachnoid sheets – the diencephalic membrane and the mesencephalic membrane
- Liliequist membrane is located between the interpeduncular and chiasmatic cisterns

Miyajima divided the suprasellar cysts into 2 different subtypes:

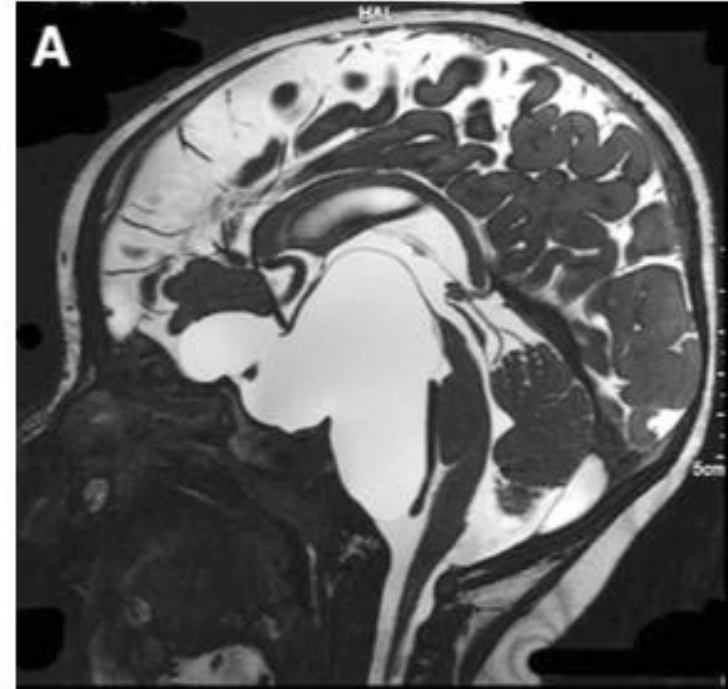
- A. cystic dilatation of the interpeduncular cistern
- B. intra-arachnoid cysts of the diencephalic membrane of Liliequist



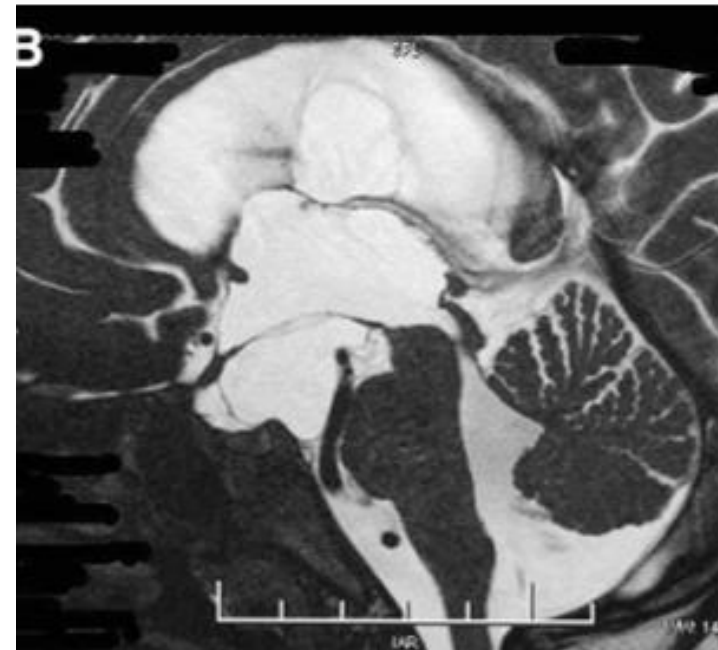


- The differentiation among these 2 types is very important during the surgical approach because the position of the basilar artery changes in each of them.

- Where cystic dilation of the interpeduncular cistern had occurred, the diencephalic membrane would constitute the dome and the mesencephalic membrane the bottom of the cyst.
- The basilar artery bifurcation would remain inside the cyst.

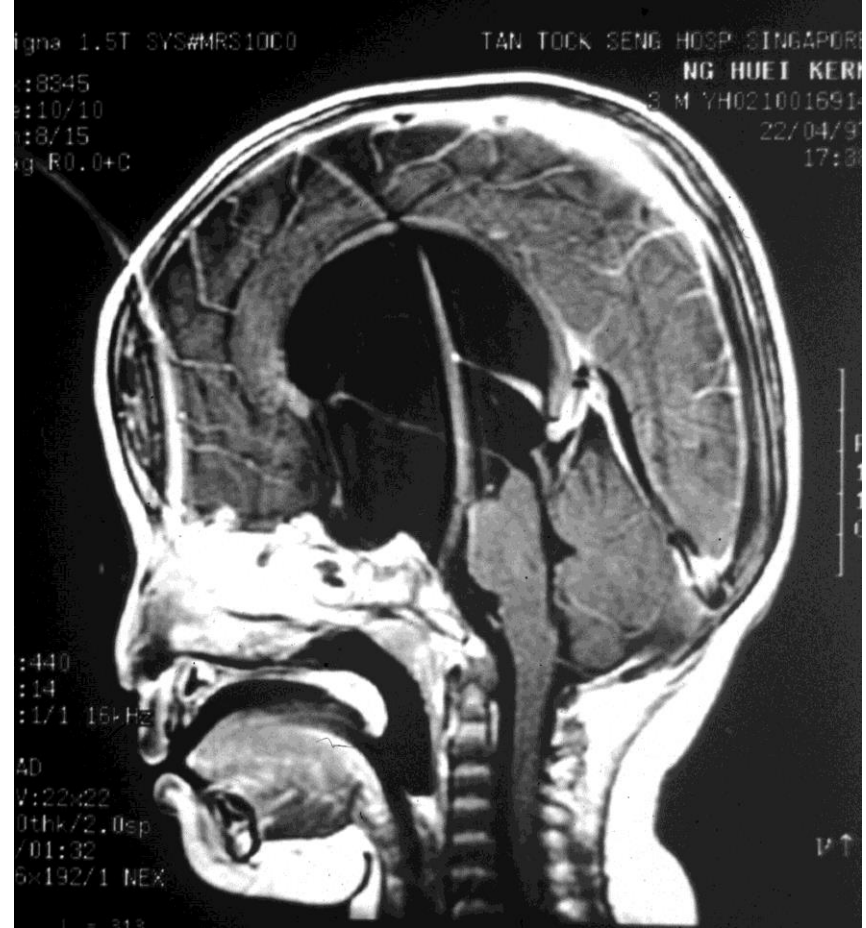
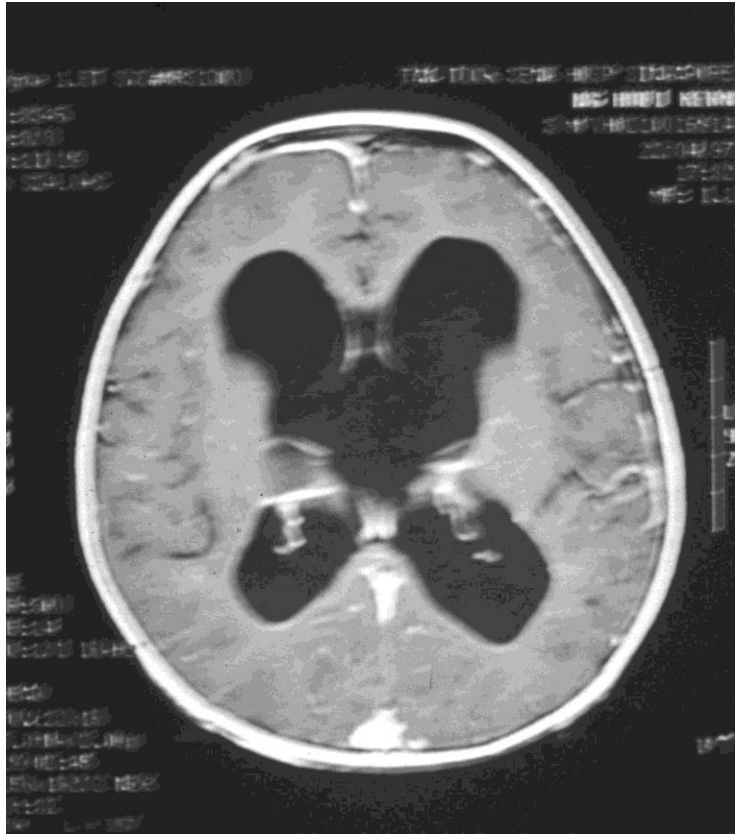


- With the intra-arachnoid cystic lesion of the diencephalic membrane, the interpeduncular cistern would be compressed, leaving the basilar artery bifurcation behind the posterior wall of the cyst



# Treatment of Suprasellar Arachnoid Cysts

- Treated in variety of methods
  - Stereotactic drainage
  - Stereotactic intracavitary injection of radioactive isotopes
  - Cyst-ventricular shunting
  - Open fenestration transcortically, transcallosally, pterional or subfrontal approached
  - Endoscopic fenestration via foramen of Monro



# Suprasellar Arachnoid Cysts- Open approaches

- For transcallosal approach, cyst is often immediately encountered after surgically passing through the corpus callosum; can be difficult if hydrocephalus is absent; hence subfrontal may be safer
- Major difficulty with open fenestration is in the creating more than one opening in the cyst
- Transcallosal approach usually succeeds in fenestrating the cyst to ventricle but subfrontal approach only fenestrates to the basal cisterns
- Transcortical approach risks brain injury and seizure
- Subfrontal approach risks injury to olfactory tracts with low success rate

# Suprasellar Arachnoid Cysts

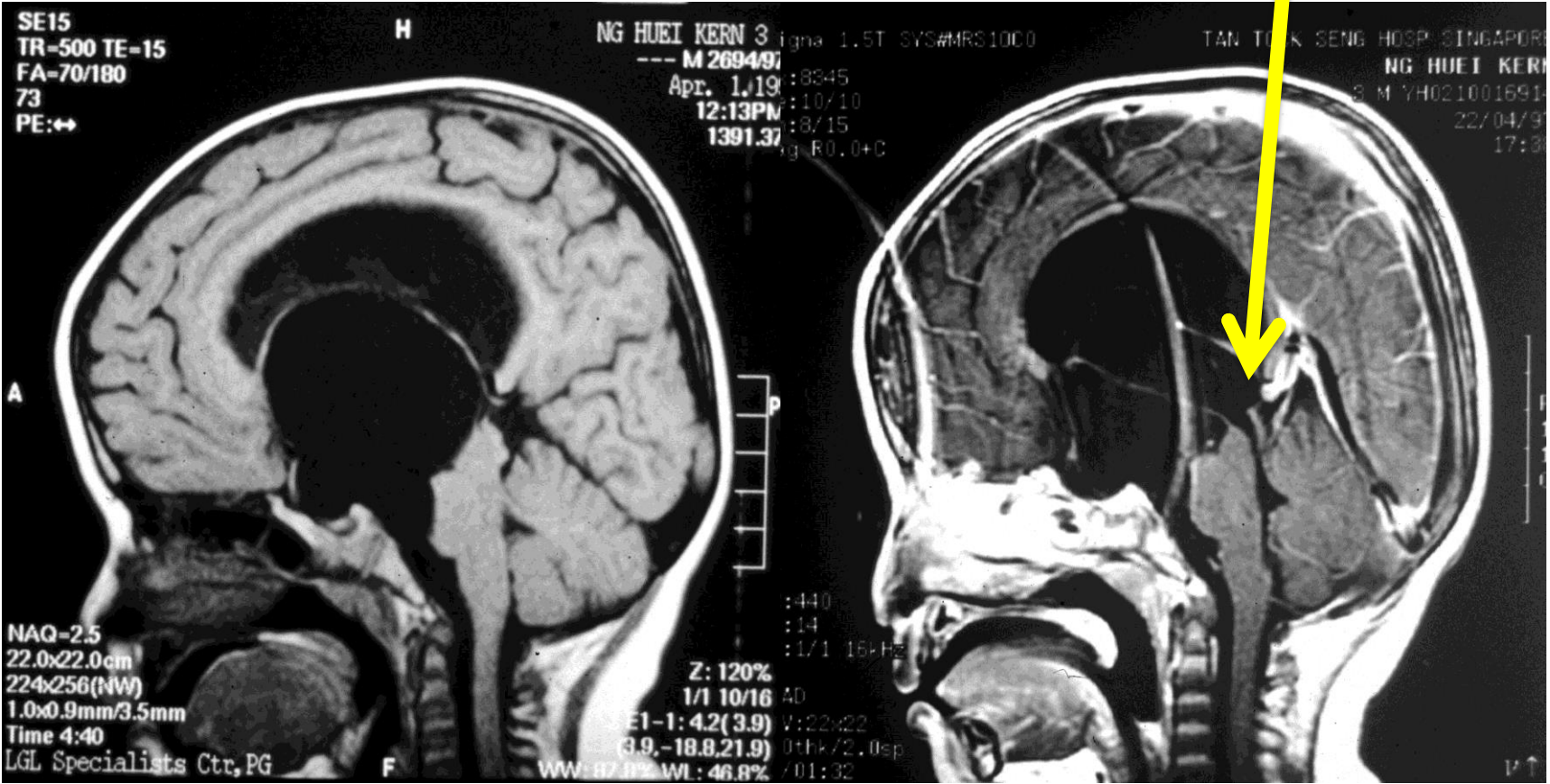
- Shunting
  - Sole ventricular shunting can lead to cyst enlargement in 40% of time
  - Shunting of suprasellar cyst is difficult without fluoroscopic, stereotactic or endoscopic guidance; but generally wise to leave a catheter inside the cyst as an insurance policy after open/endoscopic fenestration

# Endoscopic approaches

- Ventriculo-cystostomy
  - Communicating cyst to the lateral ventricle
- Ventriculo-cysto-cisternostomy
  - Communicating cyst to the lateral ventricle and then performing a third ventriculostomy through the inferior cyst wall (communicating cyst cavity with the pre-pontine cistern)



Aqueduct is now opened

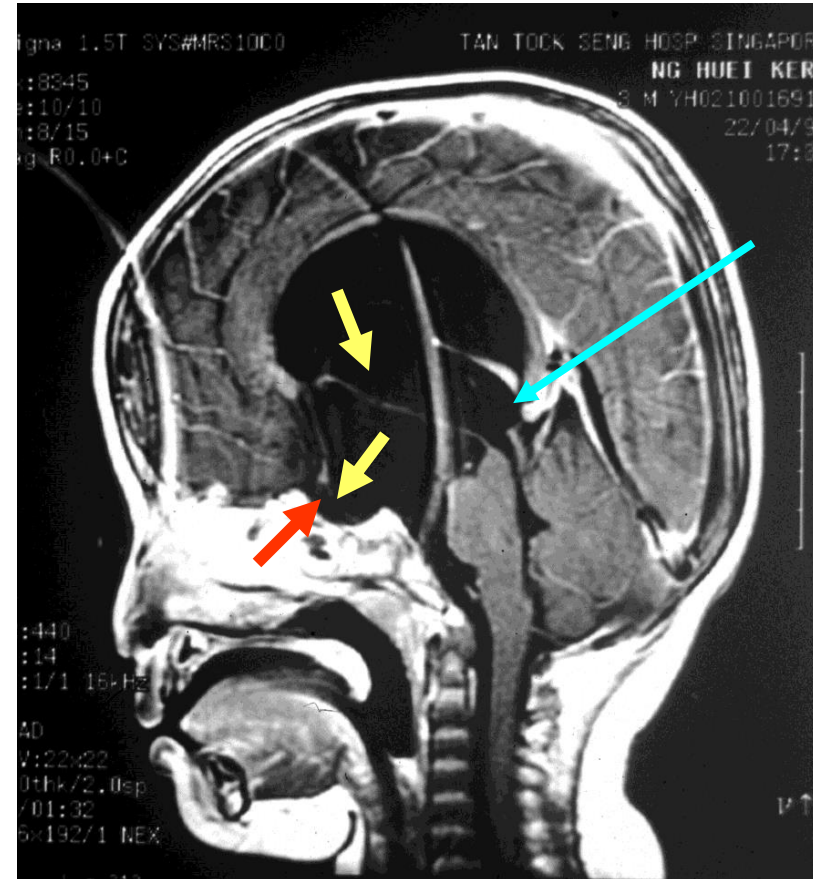


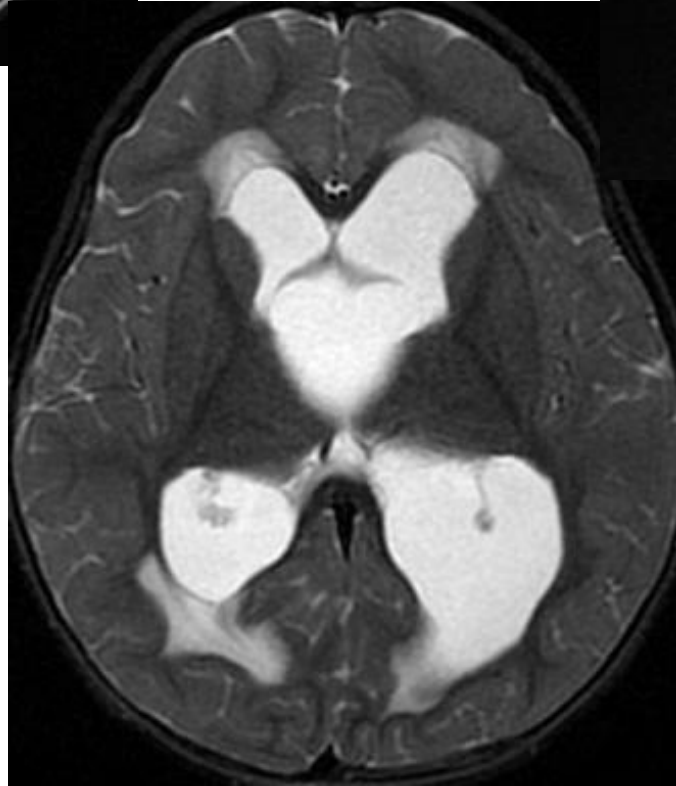
# Ventriculo-cysto-cisternostomy

- Endoscopic fenestration of a suprasellar cyst into both the ventricular system and basal cistern
- is the more effective treatment
- It allows communication with a CSF-containing space even if one fenestration closes
- Decq found endoscopic ventriculo-cystostomy closed in 2 patients with ventriculo-cysto-cisternostomy but opening into the basal cisterns open
- This phenomenon is due to collapse of upper wall of the cyst

# Ventriculo-cysto-cisternostomy

- Fenestrate cyst through Foramen of Monro
- Fenestrate wall of cyst on floor of 3<sup>rd</sup> ventricle
- Fenestrate floor of 3<sup>rd</sup> ventricle (3<sup>rd</sup> ventriculostomy)







# Summary

- Not very common lesion
- Presents with hydrocephalus
- Cyst is a lobulated arachnoid complex, and is composed of 2 distinct arachnoid sheets – the diencephalic membrane and the mesencephalic membrane
- Best treated with ventriculo-cysto-cisternostomy