Suprasellar Arachnoid Cysts

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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 Liliequist 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

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• 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 menencephalic membrane the bottom of the cyst.

• The basilar artery bifurcation would remain inside the cyst.

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• 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 3rd ventricle
- Fenestrate floor of 3rd ventricle (3rd 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