

Evaluation of Posterior Fossa Arachnoid
Cysts with CISS and CINE MRI –
Two cases with intraoperative evidence of
“slit-valve-mechanism” predicted by MRI

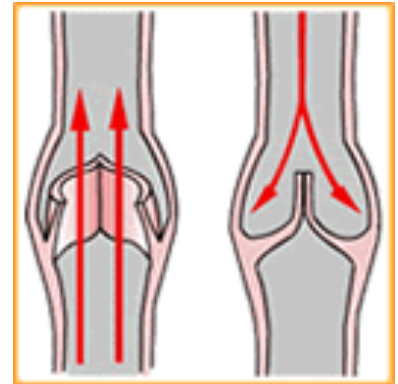
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Multiple Theories of Arachnoid cyst Expansion

“unidirectional ball-valve mechanism”

“one-way-valve mechanism”

“slit-valve-mechanism”



Basaldella, L et al. Causes of arachnoid cyst development and expansion. Neurosurgery focus 2007; 22:E4

Question and Objective

How to image (diagnose)?

Is it clinically relevant?

2 cases with symptomatic *posterior fossa cyst*
presenting with “positional headaches and posterior fossa signs”:

- MRI Suspicion of slit-valve-mechanism
- Intraoperative finding of slit-valve-mechanism
- Clinical improvement after microsurgical cyst fenestration

1 – clinical:

History of Migraines

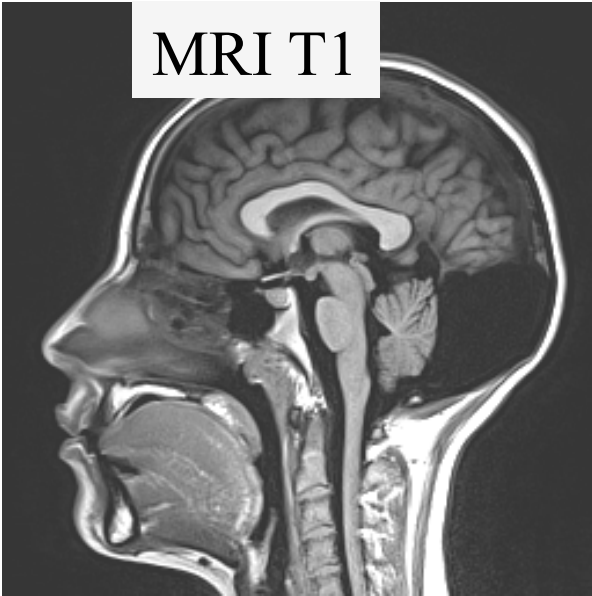
A 16 year old female with a

- ❑ history of juvenile migraine
- ❑ Occipital headaches, unlike her usual headaches,
- ❑ Increasing severity and frequency associated with episodes of vomiting
- ❑ Worsening when lying flat and improved in an upright position.
- ❑ Exam non focal, no evidence of papilledema on fundoscopic exam

➤ ***Neurological Dx: Positional headaches; ? posterior fossa pathology***

1 - imaging

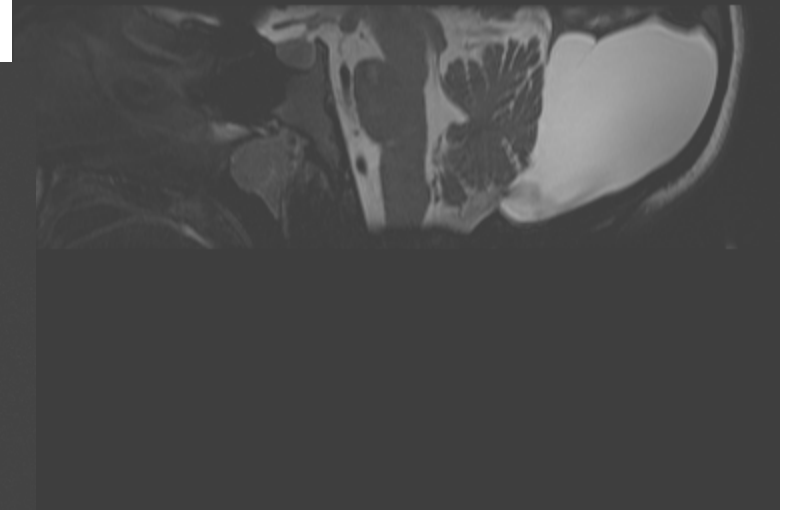
MRI T1



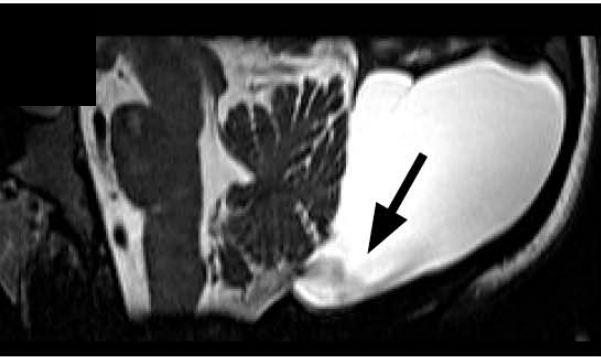
MRI T2



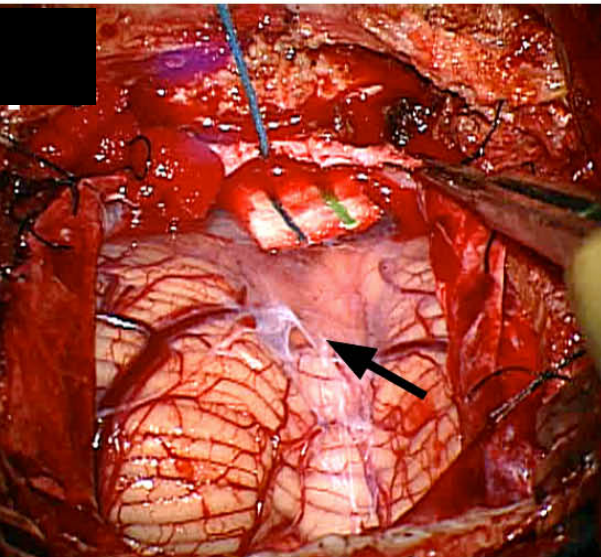
MRI CISS Sequence



1 - intraop



- ❑ After microsurgical resection of the outer cyst membrane, the bottom aspect revealed a natural perforation “into” the cisterna magna, that anatomically matched with the CISS sequence



1 –postop result

- Prolonged recovery
- After 1 months no signs and symptoms and full recovery
- Persistent Migraine



2 – clinical:

History of Concussion

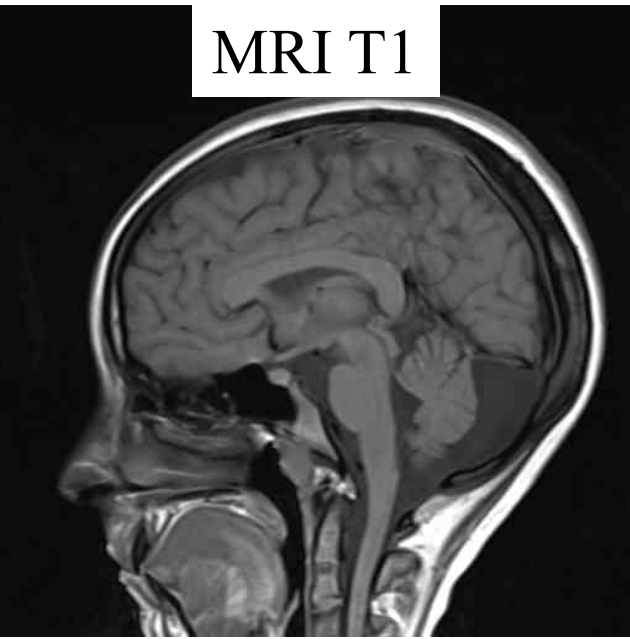
A 16 year old female

- ❑ Concussion 8 months prior (in summer)
- ❑ Incidentally, a posterior fossa arachnoid cyst was found
- ❑ Patient continued of having occipital headaches with „pressure“, nausea, and imbalance (fell a couple of times)
- ❑ Symptoms increased with activity but also after she was lying down for a while.
- ❑ Worsening of her left eye coordination and vision in her left eye (ophthalmology), no papilledema

➤ *Neurological Dx: Postural occipital headaches plus dysconjugate gaze ? Symptomatic posterior fossa arachnoid cyst*

2 - imaging

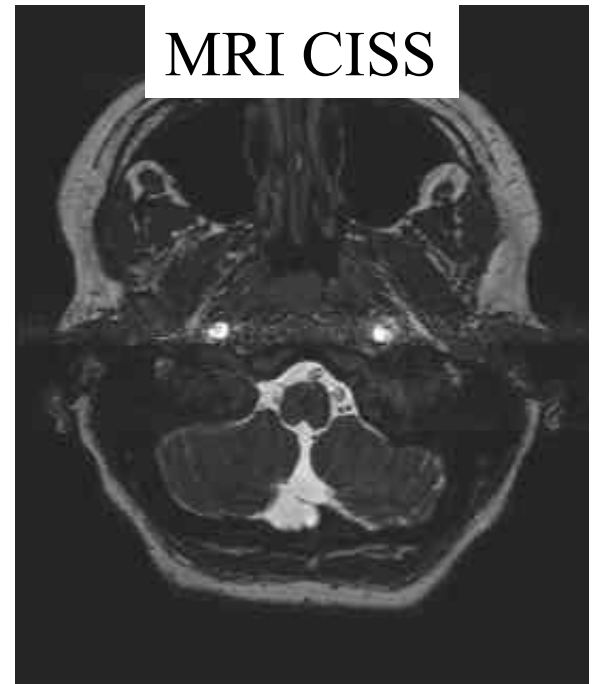
MRI T1



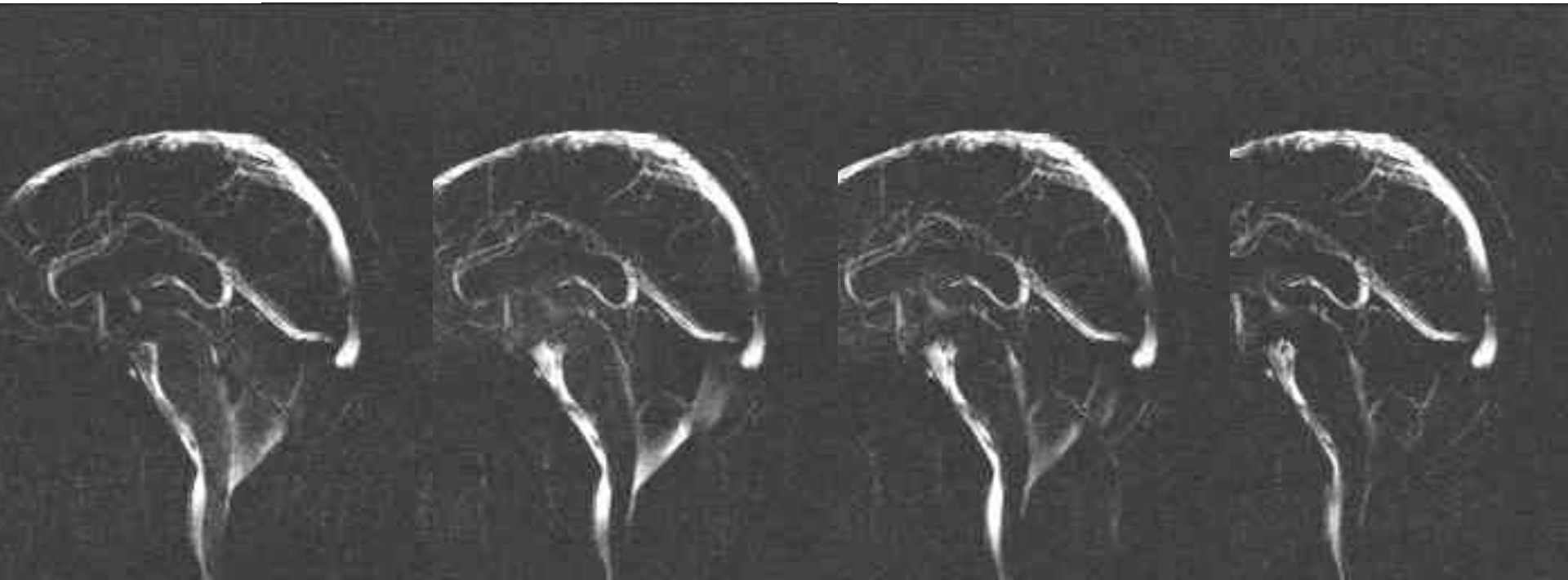
MRI T2



MRI CISS

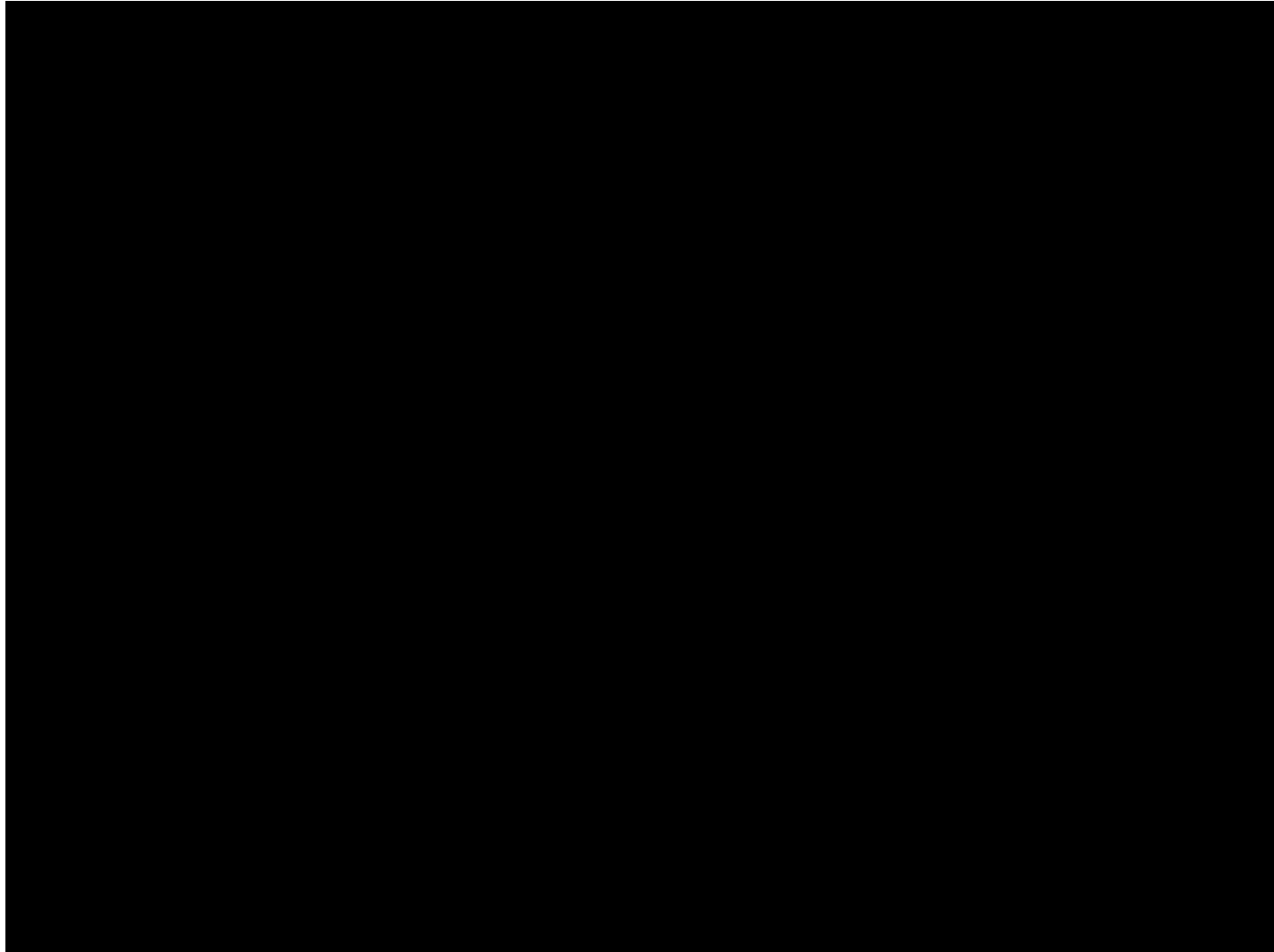


2 – imaging CINE



“CSF phase signal indicative of more influx than outflux”

2 - intraop



2 –postop result

- 3 months post op
- Subjective improvement of vision
- Headaches only at the end of the day when tired
- No post op imaging yet

Conclusion and Discussion

Santamarta, D, Aguas, J and Ferrer, E. The natural history of arachnoid cysts: endoscopic and cine-mode evidence of a slit-valve mechanism. *Minimally Invasive Neurosurgery* 1995; 38: 133-137

Schroeder, HW and Gaab, MR. Endoscopic observation of a slit-valve mechanism in a suprasellar prepontine arachnoid cyst: case report. *Neurosurgery* 1997; 40: 198-200

2 cases presented:

Positional occipital headache + MRI evidence + Intraop evidence

- ✓ How to image (diagnose)? *MRI...*
- ✓ Is it clinically relevant? *YES*
- *MRI predictive test ? Interdisciplinary and multicenter efforts!*