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”

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
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
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
“CSF phase signal indicative of more influx than outflux”
# 2 - intraop
Subjective improvement of vision

Headaches only at the end of the day when tired

No post op imaging yet
Conclusion and Discussion


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!