Audiovestibular Symptoms of Posterior Cranial Fossa Arachnoid Cyst: A Case Report

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Introduction

Arachnoid cysts (AC) are benign cerebrospinal fluid filled sacs located within the arachnoid membrane. They can occur in various locations within the cranial cavity and the majority of them are asymptomatic[1]. This case report discusses the audiovestibular symptoms in a patient diagnosed with a large posterior fossa arachnoid cyst, highlighting the clinical presentation, diagnostics and treatment consideration.

Patient presentation

A 55 years old patient reported gradual onset, right continuous and left intermittent, non-pulsatile, polyphonic, non-intrusive noise. The patient did not report any balance difficulties or vertigo symptoms, except a few occasions of brief unsteadiness a few years ago which were thought to be cardiogenic.

Clinical examination

ENT and Neurological examinations were unremarkable. Neuro-otological examinations indicated right vestibular dysfunction.

Audiovestibular Test Findings

Audiometry showed normal bilateral hearing thresholds, normal middle ear function (Not shown). The Auditory Brainstem Response (ABR-Neurological) demonstrated prolonged wave 4-5 (Fig 1). Vestibular function testing demonstrated reduced caloric response (Fig 2), reduced video head impulse (vHIT) gain (Fig 3) and absent cervical vestibular evoked myogenic potential (cVEMP) in the right side (Fig 4).

Imaging Studies

Magnetic Resonance Imaging (MRI) of the internal auditory meatus (IAM) reported a large arachnoid cyst noted at the right aspect of the posterior cranial fossa with deviation of the brainstem, fourth ventricle and right cerebellar lobe to the left (Figure 5). Anterior displacement of the right vestibulocochlear and right facial nerve and medial displacement of the right trigeminal nerves by the arachnoid cyst.

Conclusion

In this case the audiovestibular dysfunction is caused by the extent of the cyst affecting the cerebellopontine angle structures. The management is guided by symptomatology and in this case the neurosurgical team decided to manage this conservatively.

This case underscores the importance of considering posterior cranial fossa arachnoid cysts in the differential diagnosis of audiovestibular symptoms. Early recognition and appropriate management are crucial in preventing irreversible neurological damage and improving patient outcomes. Compensated vestibular weakness (Figure 6) must be borne in mind to protect from future balance insults.

Ref: Ahmed and Cohen, 2023. *Intracranial Arachnoid Cysts.* Children's Nervous System. Volume 39, pages 2771–2778, (2023)

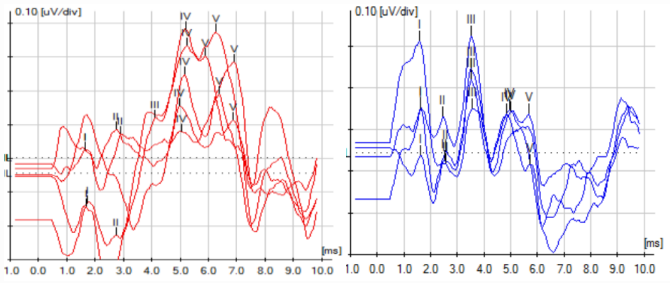

Figure 1, Neurological ABR responses from right ear (right panel, red trace), wave morphology not robust, wave 4-5 delayed latency 1.05ms. Left ear (left panel blue) normal waveform and latencies

Figure 2 right side reduced caloric response (RVR 18%). Red warm, blue cold). Right beating nystagmus 8% stronger than left

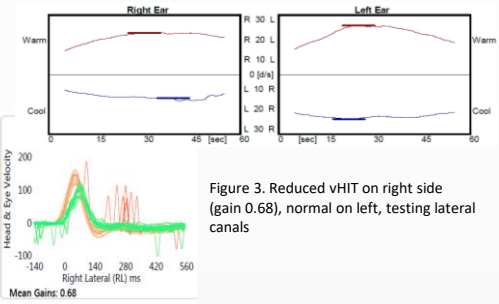

Figure 3. Reduced vHIT on right side (gain 0.68), normal on left, testing lateral canals

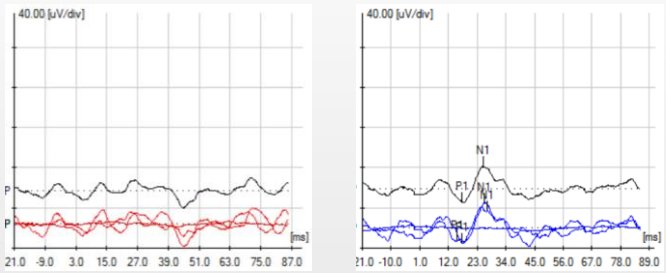

Figure 4. Absent cVEMP (right panel, red trace), inconclusive on left due to small amplitude (left panel, blue trace)

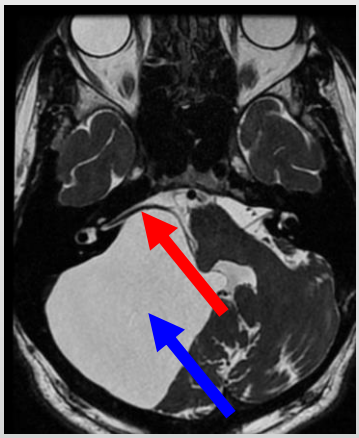

Figure 5. T2 weighted MRI IAMs, large arachnoid cyst, right posterior cranial fossa (Blue arrow), anterior displacement of right vestibulocochlear nerve (red arrow)

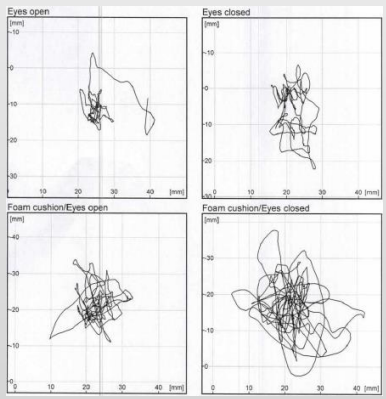

Figure 6 different balance board sensory challenges, patient performed poorly with foam cushion and eyes closed bottom right panel, indicating a compensated vestibular weakness