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Cerebellopontine Angle Meningioma Mimicking Vestibular Schwannoma: A Diagnostic and Therapeutic Challenge

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ABSTRACT

Introduction: Meningiomas of the cerebellopontine angle may occasionally mimic vestibular schwannomas, creating diagnostic ambiguity. We report such a presentation in a patient with long-standing audiovestibular symptoms.

Case presentation: A 47-year-old woman developed progressive left sensorineural hearing loss with tinnitus and intermittent vertigo over three years. Clinical examination was normal. Audiometry and vestibular testing showed left-sided deficits, and MRI revealed an enhancing CPA mass suggestive of a vestibular schwannoma. Surgical exploration later identified the lesion as a meningioma.

Discussion: This case shows how certain CPA meningiomas can reproduce the clinical and radiological profile of a schwannoma, particularly when the mass approaches the internal auditory canal. Such overlap may lead to misclassification and may influence the surgical approach.

Conclusion: CPA meningioma should be considered when evaluating unilateral hearing loss with vestibular dysfunction, especially if imaging features are not fully typical of a schwannoma.

KEYWORDS: CPA tumor, meningioma, vestibular schwannoma, mimicking, hearing loss.

INTRODUCTION

Tumors of the cerebellopontine angle (CPA) are a familiar challenge in neuro-otology. Most of them turn out to be vestibular schwannomas, which represent close to 80–90% of all CPA masses **[1]**. Meningiomas come next in frequency, but they sometimes behave in an unexpected way: a subset may look and even present almost exactly like a vestibular schwannoma. This confusion becomes particularly problematic when a meningioma grows toward the internal auditory canal or enhances in a pattern that is not entirely typical **[2]**.

This overlap is not a trivial issue. The two tumors do not originate from the same structures, nor do they respond the same way surgically. A vestibular schwannoma arises from the vestibular nerve, whereas a meningioma comes from the dura; this difference affects vascularity, adhesiveness, and, ultimately, the surgeon's strategy and expectations for hearing preservation **[3]**. A misdiagnosis can therefore influence everything—from preoperative counseling to intraoperative decisions.

In the present work, we describe a case of a CPA meningioma initially thought to be a vestibular schwannoma and use it to discuss how such diagnostic traps appear in everyday practice and in recent literature.

CASE REPORT

A 47-year-old woman, with no relevant medical history other than a cesarean section three years ago, consulted for a left-sided hearing problem that had been slowly evolving. According to the patient, the first symptoms appeared about three years earlier with a gradually progressive decrease in hearing on the left side. This was accompanied by intermittent tinnitus, described as a constant background noise rather than pulsatile. She denied headaches or any episodes of facial weakness during this period, and her general condition remained stable.

As the months went by, she began experiencing short spells of rotatory vertigo. These episodes were brief, not triggered by changes in position, and occurred in an afebrile context. The vertigo did not significantly impact her daily activities, but its recurrence motivated further evaluation.

On examination, otoscopy was normal bilaterally. There was no spontaneous nystagmus, and facial symmetry was preserved. The remainder of the clinical evaluation was also unremarkable.

Audiometry revealed a **left sensorineural hearing loss**, more pronounced in the mid and high frequencies, whereas the right ear hearing thresholds were within normal limits. Speech discrimination was reduced on the affected side, raising suspicion for a retrocochlear process.

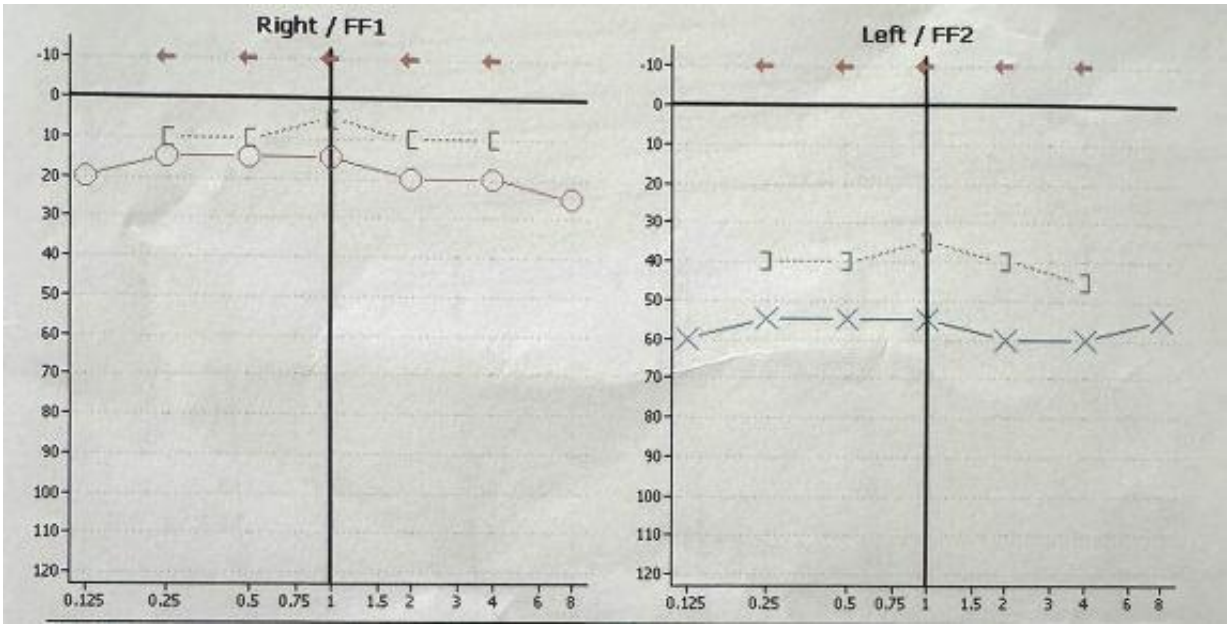

Figure 1: Pure-tone audiometry demonstrating left-sided sensorineural hearing loss with reduced speech discrimination, suggestive of a retrocochlear lesion.

Vestibular assessment showed a **left caloric weakness of 46%**, and the bithermal caloric test confirmed a reduced response on the left without directional preponderance. VHIT demonstrated a decreased VOR gain in the left lateral canal, while the vertical canals and the right side responses remained preserved.

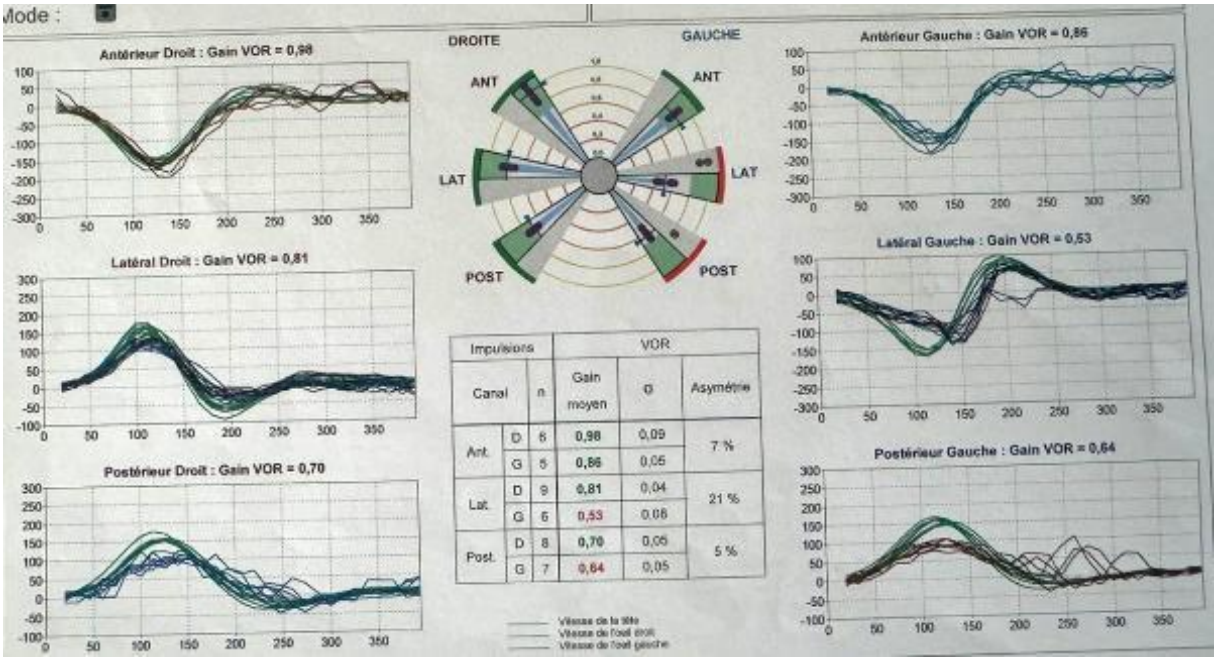

Figure 2: Reduced VOR gain on VHIT in the left lateral canal, consistent with unilateral vestibular hypofunction

A high-resolution CT scan of the temporal bone did not show enlargement of the internal auditory canal or any abnormality of the inner ear. The ossicular chain, cochlea, vestibule, and semicircular canals all appeared normal.

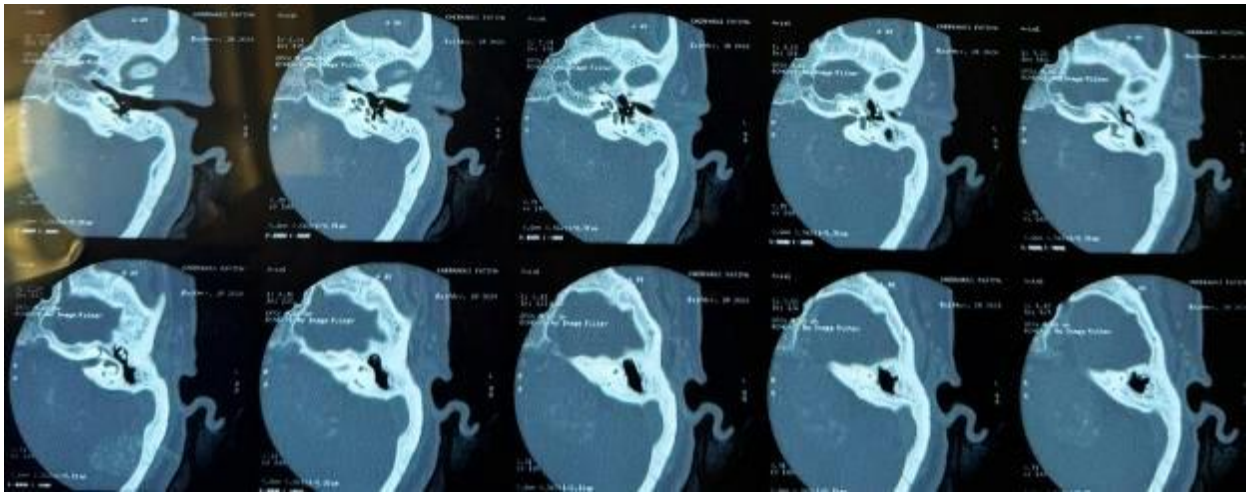

Figure 3: Temporal bone CT scan showing a normal internal auditory canal without enlargement and preserved inner ear structures

MRI of the cerebellopontine angle revealed an enhancing lesion on the left side. Based on its location and enhancement pattern, the radiologist favored the diagnosis of a **vestibular schwannoma**. The mass extended slightly toward the internal auditory canal but without significant widening.

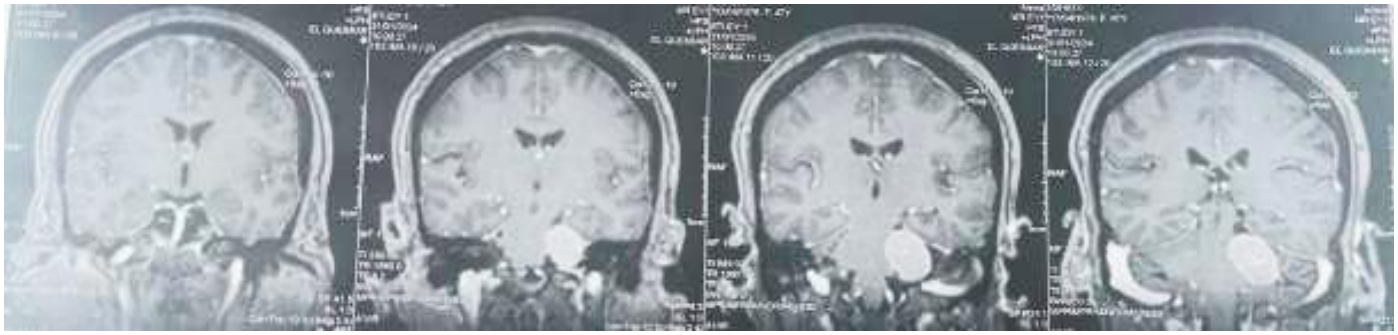

Figure 4: Contrast-enhanced T1-weighted MRI showing a left cerebellopontine angle mass with homogeneous enhancement, slightly extending toward the internal auditory canal without significant enlargement

Given the association of unilateral progressive sensorineural hearing loss, a vestibular deficit, and radiological features in line with CPA tumors, the working diagnosis was a left vestibular schwannoma. However, during surgery, the lesion's appearance and dural attachment were more consistent with a **meningioma**, ultimately confirming the diagnosis.

DISCUSSION

Meningiomas of the cerebellopontine angle (CPA) are considerably less frequent than vestibular schwannomas, but they remain an important differential diagnosis when evaluating a CPA mass. In daily clinical practice, the first diagnosis that usually comes to mind is vestibular schwannoma, mainly because it represents the vast majority of tumors in this location [1]. For that reason, meningiomas—particularly those located close to the internal auditory canal (IAC)—may sometimes be misinterpreted on preoperative imaging. The present case illustrates this diagnostic difficulty.

Clinically, distinguishing between the two lesions can be challenging. Both tumors commonly present with progressive unilateral hearing loss and tinnitus, which were the main symptoms in our patient. Vertigo may also occur, although it is often less prominent in meningiomas. In our case, the vestibular deficit demonstrated by caloric testing and VHIT was consistent with a chronic and slowly progressive vestibular dysfunction. While such findings are more frequently associated with vestibular schwannoma, vestibular hypofunction has also been reported in CPA meningiomas, particularly when the tumor compresses the vestibular nerve or alters nearby labyrinthine structures [2].

Imaging is generally considered helpful for distinguishing between these two entities, although the distinction is not always as clear as expected. Certain radiological features—such as a dural tail, a broad-based dural attachment, or the presence of calcifications—tend to suggest a meningioma. In contrast, enlargement of the internal auditory canal is more typical of vestibular schwannoma. However, several studies have reported that some meningiomas may partially extend into the IAC or mimic a lesion centered on the

canal [2,4]. In our patient, the MRI findings were somewhat equivocal. The lesion showed homogeneous enhancement, but the imaging characteristics were not sufficiently distinctive to confidently exclude a schwannoma, and the initial radiological interpretation favored that diagnosis.

This distinction is not merely theoretical, as it may have practical implications for surgical management. Meningiomas often demonstrate firm attachment to the dura and may adhere to adjacent neurovascular structures. In addition, their vascularity can sometimes make dissection more demanding. Schwannomas, in comparison, are usually well encapsulated. Establishing the most likely diagnosis before surgery can therefore help the surgical team anticipate technical difficulties, adapt the operative strategy, and discuss hearing preservation with the patient more realistically [3,5].

Overall, this case highlights the importance of keeping a broad differential diagnosis when evaluating CPA tumors. Even when the clinical presentation and vestibular findings appear typical for vestibular schwannoma, other possibilities—such as meningioma—should still be considered. Careful correlation between clinical findings and imaging remains essential, particularly when certain radiological features do not perfectly match the expected appearance of a schwannoma.

CONCLUSION

This case highlights how a cerebellopontine angle meningioma can closely imitate the clinical and radiological presentation of a vestibular schwannoma. Although vestibular schwannomas remain by far the most common CPA tumors, the diagnostic overlap is real and may occasionally mislead even experienced clinicians. In our patient, the progressive unilateral hearing loss, vestibular hypofunction, and MRI features were all suggestive of a schwannoma, yet the final diagnosis proved otherwise.

This experience highlights the importance of maintaining a broad differential diagnosis when evaluating CPA lesions, particularly when certain clinical or imaging elements do not align perfectly with the expected profile. Recognizing these atypical presentations is essential, as early and accurate identification of meningioma influences both surgical planning and patient counseling. Ultimately, a careful correlation of symptoms, vestibular findings, and radiological details remains the key to avoiding diagnostic traps in this anatomically complex region.

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