Royal National Throat, Nose and Ear Hospital

University College London Hospitals
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Auditory Processing Disorder in a Patient with a 1.9x0.9cm Cerebellopontine Angle (CPA) Meningioma

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Background

Meningiomas are common generally benign tumours that arise from meningothelial cells of the arachnoid layer. The cerebellopontine angle (CPA) tumours are masses situated in the region between the cerebellum and pons and its location affects the clinical outcome. The most common presenting symptoms of CPA meningiomas are hearing loss, tinnitus, dizziness and imbalance (Kane et al., 2011). A recent case report showed presence of auditory processing disorder in a patient with a cerebellopontine lesion with extension to the right internal auditory canal (Illiadou and Eleftheriadis, 2017). The mass may put pressure on the brainstem structure influencing the transduction of the auditory information through the central auditory pathway.

Purpose

This case is highly educational as it shows the presence of spatial processing disorder and dichotic listening deficit in a patient with a 1.9x0.9cm cerebellopontine angle meningioma.

Case presentation

A 67-year old female music teacher was referred to our Neuro-otology clinic presenting with a two-year history of tinnitus, significant problem with the perception of music and understanding speech in the presence of background noise. She also explained that certain piano notes are distorted. Her MRI scan showed presence of a meningioma at the right cerebellopontine angle. She was referred for auditory processing assessment.

Patient reported hearing difficulties

- Significant problems processing music and speech
- Inability to recognise music and complex chords.
- Distorted pitch/out of tune with familiar and unfamiliar sounds
- Difficulty understanding accented speakers and communication on the phone
- Great difficulty hearing speech in the presence of background noise

General Practitioner 11/2017

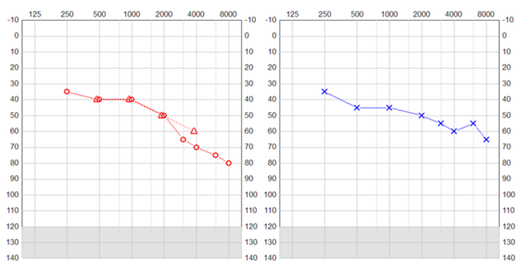
Hearing Aid Centre 02/2018

Audiovestibular medicine consultant 04/2018

APD testing 05/2018

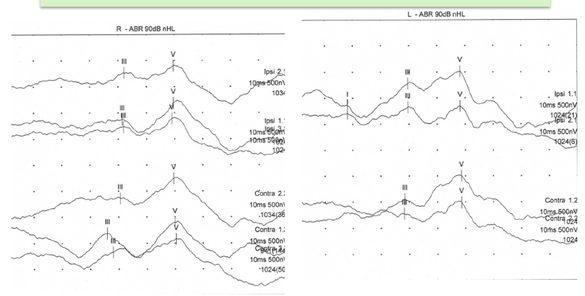
Test Results

Pure Tone Audiogram



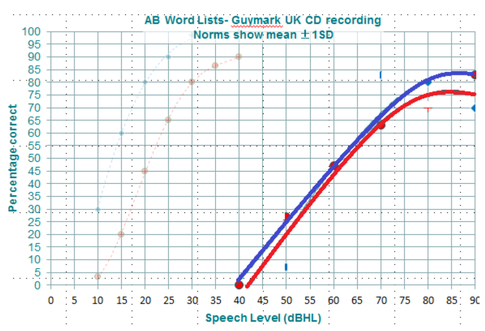
- Bilateral mild to moderate sensorineural hearing loss

Auditory Brainstem Response



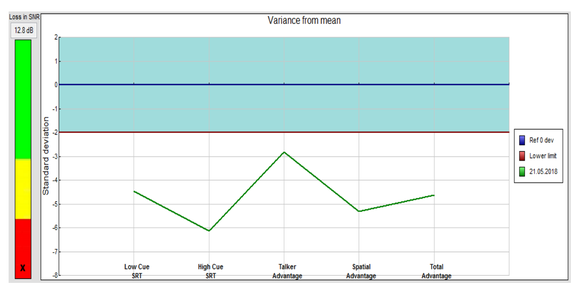
- Right ear: Absent wave I. Delayed absolute latencies wave III and V; Delayed III-V interpeak latencies

Speech Audiometry



- Right ear: rollover index of 31% in the right ear.
- Left ear: rollover index of 12% in the left ear

LiSN-S



- All conditions are outside normal range and the graph shows a spatial processing pattern.

Dichotic Digits

Right ear	Left ear
30/40 – 75%	35/40 – 87.5%

- Both ears outside normative data (normative data >95%).

Otoacoustic Emissions

Right ear	Left ear
Present but reduced	Present but reduced

- DPOAEs were bilaterally present but reduced.

Conclusion

- All audiological tests exhibited deficits strictly limited to the right ear, which was consistent with the patient's presenting complaint.
- This case demonstrates the presence of spatial processing disorder and dichotic listening deficit in the cerebellopontine angle lesions.
- The lesion may disrupts the neural representation of sound and may therefore impair processes contingent upon inter-aural comparison.
- This case provides evidence that evaluation of auditory function should be part of the standard clinical protocol in individuals with cerebellopontine angle lesions.
- It appears the current diagnostic APD test battery is efficient in revealing the lesional causes of central APD.

Reference

1. Kane AJ, Sughrue ME, Rutkowski MJ, Berger MS, McDermott MW, Parsa AT. Clinical and surgical considerations for cerebellopontine angle meningiomas. J Clin Neurosci. 2011 Jun;18(6):755-9.
2. Iliadou VV, Eleftheriadis N. Auditory Processing Disorder as the Sole Manifestation of a Cerebellopontine and Internal Auditory Canal Lesion. J Am Acad Audiol. 2017 Jan;28(1):91-101.