Bilateral Jugular Diverticula - a rare radiological finding

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Introduction

Jugular bulb abnormalities include high riding jugular bulb and jugular bulb diverticulum (JBD), with the latter being very rare. Reports describing symptomatic patients are usually due to a unilateral JBD. We present a case of a 67-year-old patient who was symptomatic and found to have bilateral JBD.

Case Report

A 67-year-old woman was referred to our Emergency Department for sudden onset left-sided sensorineural hearing loss (SNHL). Pure-tone audiometry (Figure 1a) revealed moderate-severe left-sided SNHL across all frequencies. She had normal impedances bilaterally.

She was started on high-dose oral prednisolone and followed up two weeks later with repeat audiogram and magnetic resonance imaging of the brain (MRI-B). On follow-up, the patient reported improvement in her hearing and tinnitus. Her repeat audiogram (Figure 1b) revealed improvement of left hearing threshold levels.

Figure 1: Pre- (a) and post-treatment (b) pure-tone audiograms

MRI-B demonstrated a 6mm area of signal abnormality involving the left petrous temporal bone on T2-weighted imaging (Figure 2). This was thought to be a small area of metabolic bone disease. A cone-beam CT (CB-CT) of the petrous temporal bone was then organised, which revealed bilateral jugular bulb diverticula, with a slight waist on the left (Figure 3).

Figure 2. MRI-B T2-weighted axial slice with 6 mm signal abnormality

The left JBD corresponded to the site of high signal demonstrated on the MRI. The roof of the diverticulum is above the floor of the internal acoustic meatus and basal turn of the cochlea bilaterally (Figure 4).

Figure 3. CB-CT axial slice with bilateral JBDs (red arrows)

There is no jugular bulb's depression on either side (Figure 5). The middle ears are normal with intact bony labyrinths and facial nerve canal. There is no widening of the internal acoustic meatus or vestibular aqueduct.

Her case was discussed at a multidisciplinary meeting. The consensus was for surveillance only. One month post-resolution of her hearing loss, the patient remains well with no symptom recurrence.

Discussion

A JBD is an outpouching of the jugular bulb that tends to extend superiorly, medially, and posteriorly in the petrous temporal bone.2,3 JBD is more common on the left, despite right-sided dominance of dural venous sinuses and jugular vein.1,2,6,4,5 Clinical symptoms may be explained by location of the JBD. Impingement on the vestibular aqueduct can result in vertigo, SNHL and pulsatile tinnitus.1,4,16 Conductive hearing loss may be due to contact with middle ear structures or inner ear dehiscence.4,7,8 Dehiscence of posterior semi-circular canal may cause sound-induced vertigo (Tulio’s phenomenon), pressure-induced pulsatile tinnitus and vertigo.1 However, 50% of patients with radiological evidence of inner ear dehiscence can be asymptomatic.6,10

The best imaging modality to identify a JBD is a high-resolution CT scan. A JBD has smooth edges, is continuous with the jugular bulb and lacks features of bony destruction.1 Due to turbulent or absent flow within the diverticulum, a JBD can be missed by traditional MRI. Contrast CT or MRI may help clarify diagnosis.

Treatment options include conservative management, endovascular embolisation or surgery. The latter two are reserved for those with debilitating symptoms. The prognosis for jugular bulb abnormalities (JBA) is unclear. As the jugular bulb is absent at birth and develops after age of two, JBA are considered acquired.9,10 Hence, it is possible for them to progress in size and cause bony erosion. However, the timeframe for this has yet to be adequately studied.

It remains unclear if our patient’s sudden SNHL and pulsatile tinnitus was due to presence of the JBD alone. Furthermore, we had bilateral JBD, for which we had not expected her symptoms to be bilateral. A possible explanation for this unilateral presentation could be due to greater turbulent flow in the left diverticulum due to its slight waist and potentiated in context of physical exertion (patient was swimming when this occurred).

In the absence of positive signs on clinical examination, the presence of pulsatile tinnitus and related symptoms such as vertigo and hearing loss should prompt clinicians to look for JBA and other vascular aetiologies.

References