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One sided partial hearing loss can be due to a large acoustic neuroma

Neurosurgery

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ABSTRACT

One sided hearing loss can be due to a variety of reasons; one could be sensorineural hearing loss. Though it is rare, most commonly seen presenting symptom of Acoustic Neuroma (AN) (i.e., vestibular schwannoma) is also the hearing loss. AN is a benign tumor; and the commonest tumor at the cerebellopontine angle. At the time of detection of AN, patients are usually present with a variety of symptoms. In this patient, also the first author, we report a large AN only with the partial hearing loss; stressing the importance of investigating every patient present only with one sided partial hearing loss.

Introduction

Estimated 360 million people in the world are suffering from hearing loss; one of the commonest hidden disabilities. The causes of hearing loss can be broadly categorised as (1) sensorineural hearing loss (due to damage to the inner ear or the auditory nerve), (2) conductive (due to blockage or reduction of sound waves passing through the outer or middle ear), or (3) a mixture of the two.

Sensorineural hearing loss may be due to inherited causes (caused by dominant, recessive or sex-linked genes); acquired congenital causes (e.g., maternal rubella, maternal syphilis, cytomegalovirus) or acquired causes after birth. Acquired causes after birth may be due to infections such as meningitis, malaria, cytomegalovirus; iodine deficiency leading to endemic cretinism; excessive noise; ototoxicity; etc.(WHO, 2006).

Commonest presenting symptom of Acoustic Neuroma (AN) (i.e., vestibular schwannoma), is also the hearing loss (Oh & Kim, 2014). AN is a benign tumor, that arise from Schwann cells; account for about 6% of all intracranial tumors and 70–80 % of all cerebellopontine angle (CPA) tumors in adults (Bonneville, Savatovsky, & Chiras, 2007; Chen, Fan, Zheng, Cao, & Wang, 2016; Hoffman, Propp, & McCarthy, 2006). ANs are known to be slow growing or not growing '(Nikolopoulos, Fortnum, ODonoghue, & Baguley, 2010).

The incidence of AN varied from 0.6 to 1.9 per 100,000 population based on study setting, country and race (Babu et al., 2013; Gal, Shinn, & Huang, 2010; Propp, McCarthy, Davis, & Preston-Martin, 2006; Stangerup, Tos, Thomsen, & Caye-Thomasen, 2010; Tos, Stangerup, Cayé-Thomasen, Tos, & Thomsen, 2004). As an example, the overall incidence rate in United States (between year 2004 to 2009) was 1.2 per 100,000 population per year while Caucasian patients had the incidence of 1.3 per 100,000 population per year and African American patients had incidence rate of 0.5 per 100,000 population per year(Babu et al., 2013).

Case report

In July 2016, 42-year-old male, community physician and also the first author of this article, noted for the first time that there is partial hearing loss in left ear while he used the mobile phone. He did not have any other complains such as tinnitus, balance impairment or dizziness, headaches, etc. He failed to identify whether the partial hearing loss was acute or occurred over a period. Pure Tone Audiometry (Figure 1) suggested left sided moderately severe sensorineural hearing loss while the right ear is normal (Pure Tone Audiometry was done One and half month after the first symptom was detected). Within a week, he underwent the magnetic resonance imaging (MRI) and revealed to have a large mass within the left CPA extending into the external auditory meatus suggestive of AN. MRI suggested that the fourth ventricle is shifted towards the right of the mid line. Repeated MRI revealed an AN is with the size of 5.0 cm x 3.9 cm x 3.6 cm (Figure 2). After a week of confirming by two MRIs, neuro navigation guided excision of the CPA tumor was done. Histological analysis confirmed that he was having schwannoma with degenerative changes.

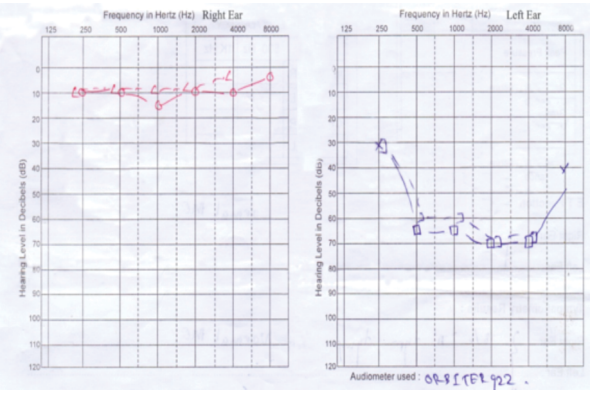


Figure 1: Pure Tone Audiometry results of the patient

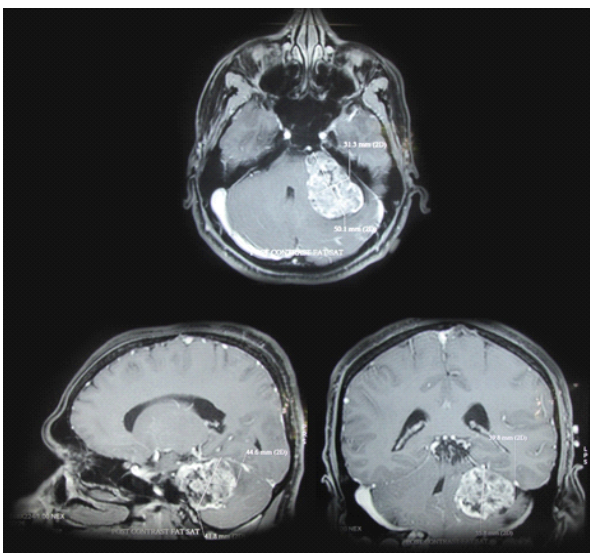


Figure 2: 2nd brain MRI (neuro navigation) images of the patient

Discussion

According to the "Koos Classification" of ANs, tumor of this case comes under the Grade IV (i.e., large category greater than 30 mm) category. This patient was having moderate (Grade 2: 41 - 60 dB) to

severe (Grade 3: 61 – 80 dB) hearing loss of left ear. He does not show other symptoms.

Presenting symptoms and signs of ANs based on several factors such as size at diagnosis, direct tumor compressions, invasion or vascular compromise of the surrounding structures, obstruction to cerebrospinal fluid pathways, etc. (Oh & Kim, 2014). Out of the presenting symptoms of ANs, commonest is the hearing loss. The proportion of patients reported to have hearing loss could vary based on the study population. As an example, based on 50 patients with AN, initial presenting complains of 62% was hearing loss, 24% was vertigo, 4% was tinnitus and 10% was headache. (Ambett, Rupa, & Rajshekhar, 2009). Another study conducted in Malaysia reported that the commonest presenting symptom was hearing loss (81.3%), followed by headache and tinnitus (each 37.5%), ataxia (34.4%) and facial numbness (21.9%)(Lim & Wong, 2013).

This patient reported only the partial hearing loss. Patients with stage 3 or 4 ANs are likely to report more than one symptom. As an example, a study conducted among 87 patients with stage 3 or 4 ANs reported as 93% of the patients reported hearing impairment while other symptoms were tinnitus (56%), balance impairment or dizziness (43%), headaches (10%) and , neuralgia or facial hypoesthesia (7%) (Talfer, Dutertre, Conessa, Desgeorges, & Poncet, 2010). Another study with ANs more than 5cm in size reported that reduced hearing in 94.5%, tinnitus in 25.4%, headache in 70.9%, facial numbness in 27.2 %, facial weakness in 43.6% and ataxia/disequilibrium in 90.9% '(Turel, DSouza, Chacko, & Rajshekhar, 2016).

The degree of hearing loss is not always associated with the tumor size (Pinna, Bento, & Neto, 2012), although the balance disorders are more common with large tumors (Tringali, Dubreuil, Zaouche, & Ferber-Viart, 2008). Headache is not common as the hearing loss, rarely, headache can be presented with intratumoral haemorrhage (Oh & Kim, 2014). Presenting sign of AN can be Sudden Sensorineural Hearing Loss (SSNHL). There were 10 cases diagnosed as having AN, out of 542 cases of SSNHL patients (1.85 %), with a range of 28-57 years(Lin, Gong, Zuo, Zhang, & Zhou, 2015).

Patients with growing and large ANs may leads to serious consequences including progress of hearing loss, calcification of tumor and comparatively more surgical complications (Arístegui Ruiz et al., 2015; Pinna et al., 2012; Zhang, Yu, Qu, & Li, 2012). Usually patients ignore one sided partial hearing loss and rely on the other ear; perhaps will not identify as having a hearing loss. Even if one sided partial hearing loss is detected, it may be neglected, thus proper clinical and surgical management is compromised. Cultural and environmental influence may affect to receive appropriate treatment (Kleinman & Benson, 2006), and associated with perceived competence and self-esteem, etc. (Saunders, Frederick, Silverman, Nielsen, & Laplante-Lévesque, 2016). If people are aware of consequences of partial hearing loss, their health seeking behaviour may improve. If a clinician neglects partial hearing loss of a patient, it may be missing an AN in its early stages putting the patient at risk and reducing the chances of saving the 7th and 8th cranial nerves in surgical intervention at a later stage. Therefore, health seeking behaviour of patient, early hearing screening for partial hearing loss and proper management could considerably affect the quality of life of patient. Every treating primary health care physician as well as those who involve with preventive medicine should educate their clients about the importance of investigating and undertaking the early treatment for partial hearing loss.

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