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Contralateral hearing loss and facial palsy in an operated case of vestibular schwannoma—Case report

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ABSTRACT

INTRODUCTION: Contralateral ear hearing loss (CHL) is an extremely rare but a potentially devastating complication in a patient with already compromised hearing due to a Vestibular schwannoma (VS). Our patient had CHL accompanied by contralateral facial palsy. Our case is only the second case reported in literature to the best of our knowledge.

PRESENTATION OF CASE: A 55-year elderly male presented with right sided sensorineural hearing loss, cerebellar signs and Grade II House & Brackmann (H&B) facial nerve weakness for last1-year. Magnetic resonance imaging (MRI) scan revealed a large right sided vestibular schwannoma (VS) with severe compression of the ipsilateral pons. The pre-operative pure tone audiometry (PTA) documented severe sensory neural hearing loss (SNHL) on the right side along with mild SNHL on the left side. A right retromastoid suboccipital craniotomy was performed and VS was completely excised. The ipsilateral facial nerve was preserved anatomically. On the 4th post-operative day he developed severe pain and tinnitus in left ear. In the next 24-h there were hearing loss and grade II facial nerve paresis. The PTA done on the 5th post-operative day revealed severe SNHL on both sides. He was managed conservatively with steroids and vasodilators. At 6-months of follow-up the left side hearing loss and facial weakness had significantly recovered. The PTA showed significant improvement in the left side SNHL

DISCUSSION: Contralateral hearing disturbance with contralateral facial palsy after acoustic neuroma surgery is extremely rare. The exact etiopathogenesis of this unusual phenomenon is not clear and various theories have been proposed. There is no standard recommendation for treatment of these rare complications and the etiology remains obscure.

CONCLUSION: Hearing loss and facial palsy on the contralateral side after VS surgery is extremely rare. It is imperative that this rare complication should be considered following VS surgery.

1. Introduction

The incidence of post-operative contralateral ear hearing loss from a functional hearing is a rare but a potentially devastating complication in a patient with already compromised hearing due to a vestibular schwannoma (VS). Occurrence of contralateral hearing loss accompanied by contralateral facial palsy is an extremely uncommon complication following VS surgery with the last report published in 1983 [1]. We present this case and share our experience in managing this problem with a brief review of the available literature.

2. Presentation of case

A 55-year old male presented with one- year history of right sided ear hearing loss, occipital headache, vertigo and tinnitus. On examination, he had grade II House & Brackmann (H&B) facial nerve weakness, complete deafness and cerebellar signs on the right side. Pure tone audiometry (PTA) revealed severe right and mild left sided sensorineural hearing loss (SNHL) (Fig. 1a). Magnetic resonance imaging (MRI) scan showed a large $4 \times 3.6 \times 3.5$ cms size vestibular schwannoma with intracanalicular extension (Fig. 1b). He underwent right retromastoid suboccipital craniotomy and the vestibular schwannoma was completely excised and the facial nerve was preserved anatomically in continuity. The immediate postoperative period was uneventful except for uncontrolled hypertension and diabetes which required labetalol and insulin infusions respectively. On the 4th postoperative day he developed severe pain and tinnitus in the contralateral left ear. He over next

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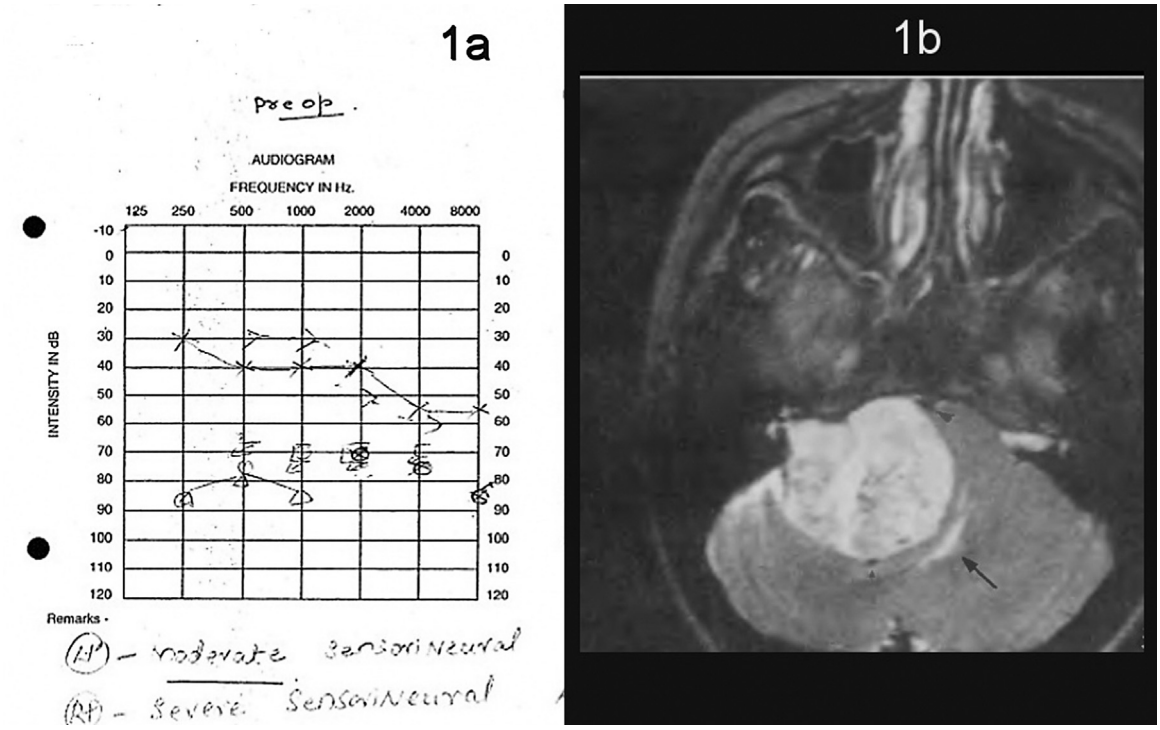

Fig 1. a: Preoperative pure tone audiometry (PTA) showing right ear severe and left ear moderate SNHL.
b: MbRI scan axial T2- weighted sequence showing a large right vestibular schwannoma with extension of the tumor in the internal auditory meatus.

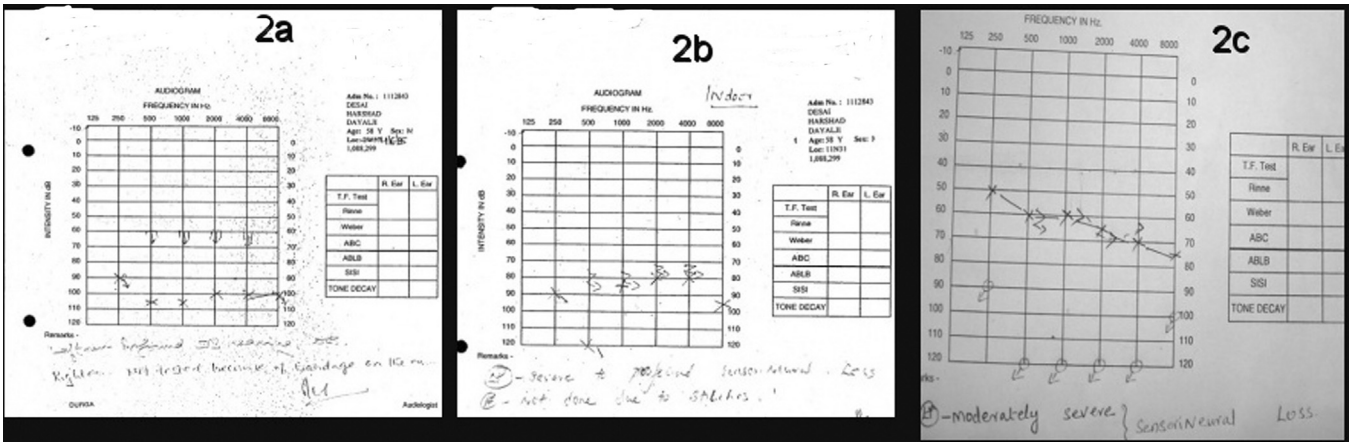

Fig 2. a: Post-operative day 5 PTA showing profound left ear (contra lateral) SNHL.
b: Post-operative day 10 PTA showing improvement in the left side SNHL.
c: PTA done at 6-months follow-up showing significant improvement of the left side SNHL.

24-h was unable to hear and had developed grade III; H & B facial nerve paresis on left side. PTA revealed profound SNHL on the left side in contrast to mild SNHL noted preoperatively (Fig. 2a). A plain and contrast computerized tomography (CT) scan done on the 4th postoperative day revealed complete excision of the vestibular schwannoma. There was no evidence of any hematoma or any other abnormality (Fig. 3). He was treated with Methylprednisolone, Xanthinoyl nicotinate and Pentoxifylline for a period of 3-weeks. His blood pressure and diabetes were very well controlled with medications. At 6-months follow up, his left facial paresis had completely recovered and there was significant improvement of hearing in the left ear. The PTA done during this follow-up visit revealed marked improvement in the hearing on the left side very similar to the preoperative status (Fig. 2b and c).

3. Discussion

Hearing preservation in vestibular schwannoma surgery in itself is a challenge. A rare complication like development of contralateral hearing loss and facial palsy is potentially devastating. Contralateral hearing disturbance after acoustic neuroma surgery is extremely rare and its association with contralateral facial palsy is almost unheard of with the last report in 1983 [1]. Till date, literature review reveals only 14 patients with contralateral hearing loss after VS surgery [1–9].

Literature review suggests that development of these unusual complications show no definite trend. The number of days before the onset of contralateral hearing loss, tumor size, surgical approach and outcome of hearing function are all variable. In gen-

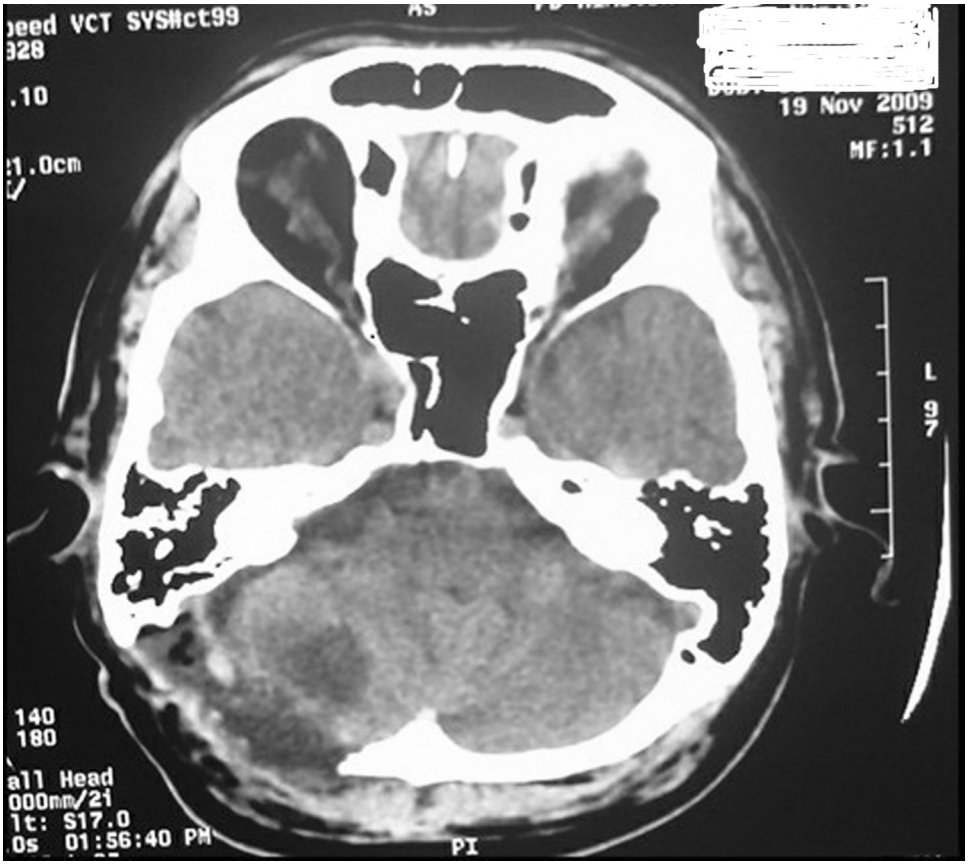

Fig. 3. Postoperative contrast CT scan of the brain showing complete excision of the VS.

eral, recovery of hearing loss is less likely with large vestibular schwannoma and suboccipital approach [8]. This complication has also been reported following other posterior fossa surgeries which include meningioma, epidermoid, chordoma and microvascular decompression for trigeminal neuralgia [6,8].

The exact etiopathogenesis of this unusual phenomenon is not clear and various theories have been proposed. The most popular being excessive loss of cerebrospinal fluid (CSF) during surgery precipitating a contralateral hearing loss [6,8]. Normally the perilymph and endolymph CSF pressures are equal, sudden fall in CSF pressure due to excessive loss is transmitted to the perilymph via the cochlear aqueduct. This in turn generates a compensatory expansion of the endolymph, mimicking endolymphatic hydrops [6,8]. The hearing loss thus caused can get normalize once the CSF pressure is restored without excluding a possibility of permanent loss [6,7]. The degree of patency of the cochlear aqueduct and the amount of CSF loss are also important factors with respect to the degree of hearing loss [10]. In the setting of a large tumor as was noted in our case their might be distortion of the contralateral vestibulocochlear and facial nerves and fall in CSF pressure further precipitate a shift of neural structures causing stretching of the cranial nerves. All these factors cause neural damage and the loss incurred can often be permanent [8].

The second most accepted hypothesis is thrombosis or vasospasm of the contralateral anterior inferior cerebellar artery branches to the facial and vestibulocochlear nerves leading to hearing loss and facial paresis as was found in our patient [1,2,7]. The other contributory factors could be long hours of surgery, intra operative hypotension and bleeding that can aggravate the vasospasm. The importance of maintaining normal blood pressure during VS surgery to preserve auditory function is emphasized [9]. Uncontrolled blood pressure, diabetes and sympathetic over activity can also contribute to the vascular hypothesis. House et al. discussed the possibility that surgical manipulation and injury to the inner ear can sensitized the immunocompetent cells to previously unseen inner ear antigens. This antigen reaction leads to contralateral inner ear dysfunction. The other etiologies proposed include drill noise, meningitis, ototoxicity, elevated intra tympanic pressure, general anesthesia and hemodialysis [5–8].

There is no standard recommendation for treatment of these rare complications and the etiology remains obscure [8]. In our patient we used a cocktail regimen of high dose steroids with vasodilators. The patient fortunately showed improvement in both the parameters to almost preoperative status. Steroid therapy has been used in almost all the reported patients without any definitive evidence and with variable results. Some recommend urgent administration of high-dose steroids and hyperbaric oxygen therapy [8]. Cochlear implant is also recommended in some reported cases when the hearing loss failed to recover [7,8].

4. Conclusion

Contralateral hearing loss and facial palsy after vestibular schwannoma surgery are extremely rare, with variable rates of recovery postoperatively. The etiopathogenesis remains obscure and the optimal treatment is uncertain. Further studies need to determine the causes. However an entity like this should always be kept in our mind as a rare complication of VS surgery.

Conflicts of interest

None.

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We have not taken any help or funding from any institution or organization.

Ethical approval

N.A.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Author contribution

Abhijit G. Warade: data collection, data analysis or interpretation, writing the paper.

Ketan I. Desai: study concept or design, writing the paper.

Registration of research studies

N.A.

Guarantor

Ketan I. Desai.

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