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

Abhijit Warade (Junior Consultant) a, Pawan Chawla a, Anshu Warade a, Ketan Desai (Consultant) b, c

a Department of Neurosurgery, P.D. Hinduja National Hospital & MRC, Mahim, Mumbai 400016, India
b Department of Neurosurgery, P.D. Hinduja National Hospital & MRC, Mahim, Mumbai 16, India

ARTICLE INFO

Article history:
Received 16 September 2016
Received in revised form 7 October 2016
Accepted 11 October 2016
Available online 17 October 2016

Keywords:
Case report
Contralateral ear hearing loss
Contralateral facial palsy
Post-operative
Vestibular schwannoma

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 last 1-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.

© 2016 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

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 × 3.6 × 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
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-
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 meningoia, 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 overactivity 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.
Source of funding

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.

References

[1] J. de Keyser, M. Bruyland, P. Demol, R. Klaes, G. Ehinger. Sudden hearing loss and facial palsy at the contralateral side following acoustic tumor removal. J. Neurol. Neurosurg. Psychiatry 46 (1983) 687.
[2] G.I. Chovanes, W.A. Buchheit, Bilateral hearing loss after unilateral removal of an acoustic neuroma by the suboccipital approach: case report, Neurosurgery 19 (1986) 452–453.
[3] J.D. Clemis, P.G. Mastricola, M. Shuler-Vogler, Sudden hearing loss in the contralateral ear in postoperative acoustic tumor: three case reports, Laryngoscope 92 (1982) 76–79.
[4] R.H. Deeb, J.P. Rock, M.D. Seidman, Contralateral hearing loss after vestibular schwannoma excision: a rare complication of neurotologic surgery, Ear Nose Throat J. 94 (1) (2015), 28,30–31.
[5] K. Harada, A. Komatsuzaki, H. Takahashi, T. Nomura, T. Tanino, M. Yamamoto, M. Oda, Acute hearing loss in the contralateral ear after acoustic tumor removal, Nihon Jibinkoka Gakkai Kaiho 93 (1990) 1864–1868.
[6] L.R. Lustig, R.K. Jackler, D.A. Chen, Contralateral hearing loss after neurotologic surgery, Otolaryngol. Head Neck Surg. 113 (1995) 276–282.
[7] C. Plans, A. Torres, E. Ferran, A. Aparicio, J.J. Acebes, Contralateral hearing loss after vestibular schwannoma surgery: case report, Neurosurgery 61 (2007) E878.
[8] T. Shuto, S. Matsunaga, J. Suenaga, Contralateral hearing disturbance following posterior fossa surgery – case report, Neurol. Med. Chir. (Tokyo) 51 (2011) 434–437.
[9] S. Togashi, J. Maruya, C. Nerome, K. Nishimaki, H. Kimura, T. Minakawa, Contralateral hearing loss after acoustic neuroma surgery, J. Clin. Neurosci. 21 (5) (2014) 863–865.
[10] A. Walsted, Effects of cerebrospinal fluid loss on hearing, Acta Otolaryngol. Suppl. 543 (2000) 95–98.

Open Access

This article is published Open Access at sciencedirect.com. It is distributed under the IJSCR Supplemental terms and conditions, which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.