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Infralabyrinthine Approach to Vestibular Neurectomy in Meniere's Disease

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The infralabyrinthine approach to vestibular neurectomy was performed in 9 patients with unilateral Meniere's disease. According to the AAO (1972) criteria, 7 of 9 cases were graded as class B and the remaining 2 cases as class C. Otherwise, according to the AAO-HNS (1985) criteria, 6 patients who could be followed over 2 years were all graded as 'complete' at the vertigo control. The compensation of the spontaneous vestibular signs was rapid in the first 2 postoperative weeks, though an occasional imbalance on movement persisted even 3 years after the operation. No specific caloric reaction was elicited in any patient after warm or cold water irrigation of the operated side in any postoperative period. There have been no serious complications except a delayed facial palsy that appeared in one case one week after surgery. This approach offers access to the vestibular nerve with minimal risk and morbidity. *Key words:* Meniere's disease, vestibular neurectomy, surgical approach, clinical results.

INTRODUCTION

Treatment of the patient with severe attack of vertigo, not responding to standard medical and surgical treatment, requires vestibular neurectomy. One would like to gain access to the vestibular nerve with minimal risk and without causing injury or morbidity, and then relieve the vertigo and preserve hearing.

A new surgical approach to the internal auditory canal (IAC), the infralabyrinthine approach, has been developed by Vernick (1) in 1990. This approach affords exposure of at least the medial half of the internal auditory canal while remaining extradural and extralabyrinthine. The dissection can proceed far laterally in the IAC to separate the cochlear and vestibular nerve divisions.

In the present study, we evaluated postoperative clinical results and vestibular functions.

MATERIALS AND METHODS

Nine patients with unilateral Meniere's disease, 6 males and 3 females, have undergone infralabyrinthine vestibular neurectomy between 1990 and 1994 (Table). Their ages ranged between 29 and 69 years (mean 51.7 years). Patient no. 2 has undergone vestibular and cochlear nerve section to relieve tinnitus. Patient 5 underwent endolymphatic-mastoid shunt surgery 2 years before the neurectomy.

The surgical approach was a slight modification of the procedure reported by Vernick (1). In brief, after radical mastoidectomy to expose the mastoid tip far posterior-inferiorly, bone dissection was carried out inferiorly along the posterior fossa dura to identify the jugular bulb and the endolymphatic sac and duct. The posterior semicircular canal (PSC) was

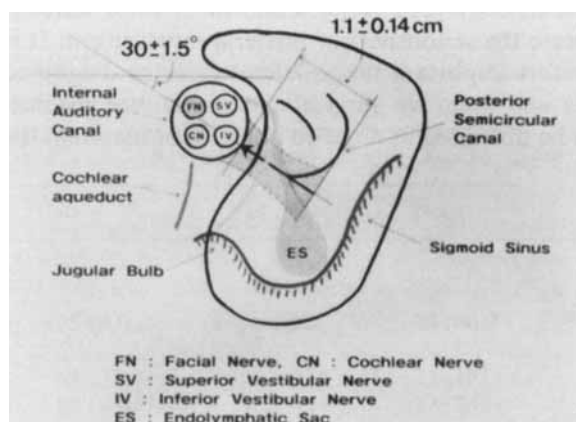


Fig. 1. Schematic drawing of the surgical approach. Shaded area indicates the bone removal to expose the internal auditory canal.

blue-lined. Bone was then removed from the sigmoid sinus and posterior fossa dura to allow for depression of the sigmoid sinus. Bone medial and inferior to the PSC, above the jugular bulb and below the endolymphatic duct, was then removed. Upon carrying the dissection anteriorly and medially, the inferior border of the IAC was encountered (Fig. 1). The canal could then be opened approximately 4 mm in diameter to expose the VIII cranial nerve. Nerve monitoring from the cochlear and facial nerve was carried out with ABR and simultaneous recording of facial myography and vibration. Nerve sectioning was started on inferior vestibular nerve and followed the superior vestibular nerve. The IAC was made water tight with temporalis fascia, using fibrin glue. The mastoid was then packed with abdominal fat.

Table I. Clinical profiles and postoperative results of nine cases of Meniere's disease (1990–94)

AAO-HNS										
Patient	Age	Sex	Onset	Bouts	Post-op	Tinnitus	AAOO	vertigo	hearing	
1	TI	59	F	3y	1/M	3y3m	Reduced	B	Complete	Unchanged
2	TN	69	M	5y	2/M	3y2m	Reduced	C	Complete	Worse
3	KT	52	F	2y	1/M	3y	Unchanged	B	Complete	Unchanged
4	II	48	M	2y	2/M	2y6m	None	B	Complete	Unchanged
5	SI	63	M	4y	1/M	2y3m	Reduced	B	Complete	Unchanged
6	MY	47	F	3y	2/M	2y	Reduced	B	Complete	Unchanged
7	NT	60	M	6y	3/M	8m	Unchanged	C		
8	OT	38	M	5y	2/M	4m	Reduced	B		
9	TN	29	M	5y	4/M	1m	Reduced	B		

Bouts: the number of bouts per month, post-op: postoperative years and months

RESULTS

The table shows our clinical results. The patients in this series have been graded postoperatively according to the AAOO (2) criteria. Using the most recent data available, 7 of 9 cases were graded as class B, 2 cases as class C, while none were graded class A or D. Hearing changes after neurectomy in each case are shown in Fig. 2.

Otherwise, according to the AAO-HNS (3) criteria, 6 patients who could be followed for over 2 years were all graded as 'complete' at the vertigo control. Hearing was unchanged in 5 of 6 cases, except in patient 2 who was completely deaf after surgery due to the procedure of cochlear-vestibular nerve section.

Tinnitus was reduced in 6 of 9 cases after the neurectomy and its reduced intensity was constant thereafter. Patient 4 had no tinnitus either pre- or postoperatively.

Spontaneous nystagmus directed toward the non-operated side was present in all cases after the opera-

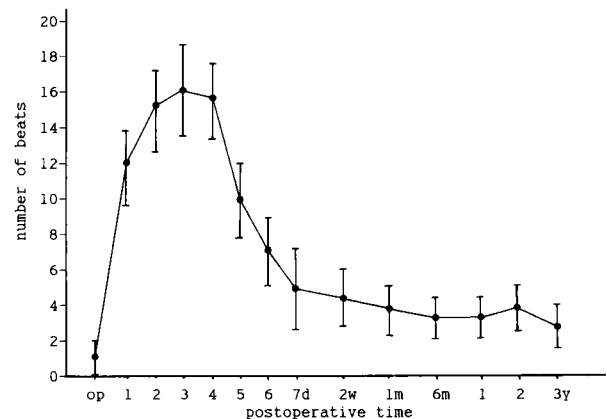


Fig. 3. Progression of the frequency of the spontaneous nystagmus following vestibular neurectomy. Data presented indicate the number of beats per 10 seconds (mean \pm SD).

tion. The frequency of the spontaneous nystagmus peaked with an average of $\bar{x} = 16$ beats per 10 sec on the third postoperative day and reduced a value of $\bar{x} = 5$ beats per 10 sec during the first postoperative week (Fig. 3).

Positional and head-shaking nystagmus directed toward the non-operated side were also present in all cases after surgery. The evolution of the intensity was identical to that of the spontaneous nystagmus.

No specific caloric reaction was obtained in any of the 9 patients after warm or cold water irrigation of the operated side in any postoperative period.

The progression of the subjective sensations of disequilibrium experienced by the patients following vestibular neurectomy is shown in Fig. 4. The subjective sensations were classified into two groups: 1) a continuous imbalance at rest, and 2) an occasional imbalance under the conditions of rapid movement. The continuous imbalance persisted in all cases for 3 days after the surgery, but disappeared within 2 weeks. However, the occasional imbalance was

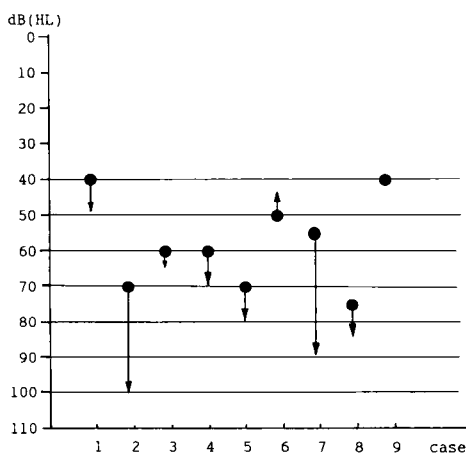


Fig. 2. Postoperative hearing changes represented by the pure-tone average in each case at the time of the latest measurement. ●, preoperative hearing level.

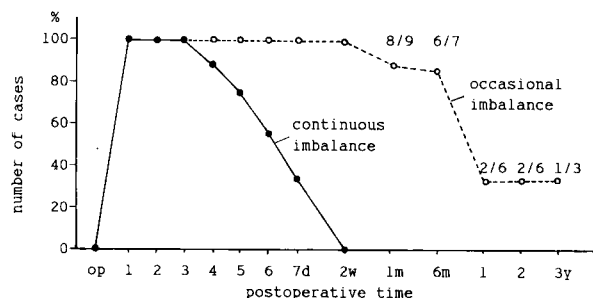


Fig. 4. Progression of the subjective sensations of imbalance experienced by the patient following vestibular neurectomy. 100% indicates 15 patients. The number of patients/the total followed is represented on the graph of an occasional imbalance after one month.

present in all cases until the end of the second postoperative week and still observed in one of 3 cases followed for 3 years, despite already stabilized under the static conditions.

There have been no serious complications except in patient 8, where a delayed facial palsy occurred one week after the surgery, though the patient recovered completely within 10 days after conservative medical treatment.

DISCUSSION

Patients with unilateral Meniere's disease, failing a standard medical treatment and endolymphatic shunt surgery, are candidates for vestibular neurectomy. So far there are five published approaches to the internal auditory canal: via the middle fossa (4), the posterior fossa (5), the retro-labyrinthine approach (6), the retrosigmoid approach (7), and a combined retrolab-retrosigmoid approach (8). Each allows exposure of the cochlear and vestibular nerves and each has its own unique set of limitations and complications. Of these procedures, the combined retrolab-retrosigmoid approach has been 93% successful in either the control of vertigo or the preservation of hearing. However, it causes postoperative headaches in 10% that may persist for months (8).

Infralabyrinthine vestibular neurectomy has been successful in all of our 9 patients presenting for the control of vertigo. Hearing was preserved within 10 dB in 7 of 9 patients (78%). The compensatory process taking place in the vestibular system following unilateral vestibular neurectomy evolves differently over time, depending on the changes in the spontaneous vestibular signs and in the subjective sensation of disequilibrium experienced by the patients. In fact, despite already stabilized minimal spontaneous vestibular signs, some patients complain of a disturbing imbalance after the first postoperative

week. Fish (9) has reported that the process of vestibular compensation occurring after unilateral vestibular neurectomy presented with two phases: 1) an acute phase (lasting for one month after surgery) was characterized by the rapid but incomplete regeneration of the resting activity of the homolateral vestibular nuclei and by a strong central inhibition of the contralateral vestibular nuclei, and 2) a chronic phase (lasting from one month to three years) denoted by a reduction in the central inhibition accompanied by increased activity (recruitment) of the homolateral vestibular nuclei during caloric stimulation.

No intraoperative problems have been encountered in any of the cases presented. However, the limited number of patients does not allow comparison of the efficacy of this approach versus the other approaches to the internal auditory canal.

The infralabyrinthine approach offers several distinct advantages. The procedure is extracranial, precluding any damage to the labyrinth. The lateral exposure of the IAC permits easy separation of the cochlear and vestibular nerves and avoids vascular injury, as vessels located in the canal laterally have fewer variations, in contrast to those in the porus acousticus (10).

However, there are a couple of technical difficulties stemming from anatomical variations such as high jugular bulb, forward positioned sigmoid sinus and poor pneumatization of infralabyrinthine space (11, 12). The approach can be difficult, but easily overcome by removal of extra bone behind the sigmoid sinus and by greater depression of the posterior fossa dura. A CT scan should be performed in all cases prior to surgery.

This operation is a modification of common mastoidectomy and is not difficult for the otologist who has an accurate knowledge of the anatomy and much training in temporal bone dissection.

ACKNOWLEDGEMENTS

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REFERENCES

1. Vernick DM. Infralabyrinthine approach to the internal auditory canal. *Otolaryngol Head Neck Surg* 1990; 102: 307-13.
2. Alford BR. Meniere's disease: criteria for diagnosis and evaluation of therapy for reporting. *Trans Am Acad Ophthalmol Otolaryngol* 1972; 76: 1462-4.
3. Pearson BW, Brackmann DE. Committee on hearing and equilibrium guidelines for reporting treatment results in Meniere's disease. *Otolaryngol Head Neck Surg* 1985; 93: 579-81.

4. Garcia-Ibanez E, Garcia-Ibanez JL. Middle fossa vestibular neurectomy: a report of 373 cases. *Otolaryngol Head Neck Surg* 1980; 88: 486–90.
5. Green RE. Surgical treatment of vertigo and follow-up on Walterdandy's cases. *Clin Neurosurg* 1958; 6: 141–52.
6. Silverstein H, Norell H. Retrolabyrinthine surgery: a direct approach to the cerebellopontine angle. *Otolaryngol Head Neck Surg* 1980; 88: 462–9.
7. Silverstein H, Norell H, Haberkamp T. A comparison of retrosigmoid IAC, retrolabyrinthine, and middle fossa vestibular neurectomy for treatment of vertigo. *Laryngoscope* 1987; 97: 165–73.
8. Silverstein H, Norell H, Smouha E, Jones R. Combined retrolab-retrosigmoid vestibular neurectomy. An evolution in approach. In: Nadol Jr JB, ed. *Meniere's disease*. Amsterdam: Kugler & Ghedini Publications, 1989: 509–16.
9. Fish U. The vestibular response following unilateral vestibular neurectomy. *Acta Otolaryngol (Stockh)* 1973; 76: 229–38.
10. Kim HN, Kim YH, Park IY, Kim GR, Chung IH. Variability of the surgical anatomy of the neurovascular complex of the cerebellopontine angle. *Ann Otol Rhinol Laryngol* 1990; 99: 288–96.
11. Tomoda K, Tsuta Y, Uekawa Y, Suzuka Y, Hosoda Y, Kumazawa T. Surgical experiences of infralabyrinthine vestibular neurectomy. *Otol Jpn* 1991; 1: 9–13.
12. Tomoda K, Suzuka Y, Kubo N, Sato K, Yamashita T, Kumazawa T. Surgical anatomy for infralabyrinthine approach to the internal auditory canal. *Acta Otolaryngol (Stockh)* 1993; Suppl 500: 35–8.

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