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Management of childhood cholesteatoma

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Abstract

We report a retrospective study of 54 children with 57 involved ears who underwent surgery for cholesteatoma before their sixteenth birthdays. The majority of these underwent open cavity operations (modified radical mastoidectomy, radical mastoidectomy or atticotomy). The incidence of residual disease was only 6 per cent and overall 70 per cent of ears have been free of chronic discharge. The post-operative hearing thresholds were disappointingly low, though overall no worse than those recorded before surgery. The mean post-operative hearing level for the group was 39 dB and the mean air-bone gap was 29 dB. Open cavity surgery is the method of choice for childhood cholesteatoma, mainly because of the low incidence of residual disease.

Introduction

Cholesteatoma can be classified as either congenital or acquired, but this approach is difficult to apply clinically. For this reason Tos (1988) has proposed an alternative classification, based on otoscopic findings. The disease is divided into two main types, namely attic cholesteatoma and that arising from retractions of the pars tensa. This latter type is further divided into lesions of the posterosuperior quadrant of the drum (marginal disease) and those of the central portion. We propose adding a fourth category to this system, so that lesions occurring behind an intact tympanic membrane can be included. This expanded scheme is represented diagrammatically in Fig. 1. Lesions occurring within the temporal bone, for example at the petrous apex, cannot be included, as they cannot be diagnosed on otoscopy. Nonetheless, we find this classification of significant clinical value.

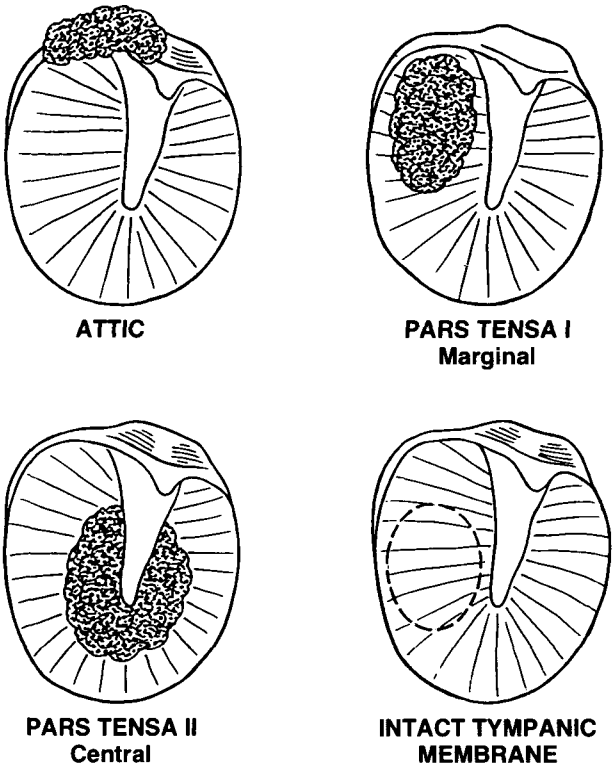

FIG. 1
Otoscopic classification of cholesteatoma.

Cholesteatoma occurring in childhood is often said to be more aggressive than that seen in adults. Palva *et al.* (1977) studied the extent of cholesteatomas at surgery in children and adults. They reported evidence of 'more rapid and expansive growth', but a lower incidence of lateral semicircular canal fistula in the paediatric group. In children with cholesteatoma, the mastoid process tends to be better pneumatized than in adults with the disease (Palva *et al.*, 1977). This means that when the disease is treated by an open cavity technique, a large cavity which is difficult to manage may result. It is therefore not surprising that most of the published series available describe the use of the closed, or canal wall up, technique (Sheehy, 1978; Glasscock *et al.*, 1981; Charachon and Gratacap, 1985; Sanna *et al.*, 1988). Glasscock *et al.* (1981) compared the incidence of residual cholesteatoma in adults and children. In a series in which the overwhelming majority of patients underwent intact canal wall surgery, the rate was 23 per cent in children as

TABLE I
CLASSIFICATION OF DISEASE ON THE BASIS OF CLINICAL AND OPERATIVE FINDINGS

Disease type	Number of ears
Attic	30
Tensa type 1	13
Tensa type 2	8
Intact drum	5
Unclassified	1

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TABLE II
TYPES OF OPERATION PERFORMED

Operation	Numbers of operations				
	Attic	Tensa 1	Tensa 2	Intact TM	Total
Modified radical mastoidectomy	17	7	1	1	27*
Radical mastoidectomy	6	4	3	0	13
Atticotomy	5	2	1	3	11
Intact canal wall mastoidectomy	3	0	0	0	3
Drum excision + Myringoplasty	0	0	3	1	4
Tympanotomy + Excision	0	0	2	0	2

*Includes one unclassified case.

TABLE III
MEAN PRE- AND POST-OPERATIVE AIR CONDUCTION (AC) THRESHOLDS AND AIR-BONE GAPS IN CHILDREN UNDERGOING OPEN CAVITY OPERATIONS

Gaps operation	Mean AC thresholds		Mean air-bone gap	
	Pre-op (range)	Post-op (range)	Pre-op (range)	Post-op (range)
Modified radical mastoidectomy	37 (8–68)	38 (10–88)	29 (2–52)	29 (12–53)
Radical mastoidectomy	44 (20–63)	46 (25–73)	31 (10–47)	32 (20–55)
Atticotomy	38 (22–60)	34 (17–58)	28 (10–43)	28 (8–50)
Whole group	39 (8–68)	39 (10–88)	29 (2–52)	29 (8–55)

compared to 15 per cent in adults. In the series reported by Sheehy (1978), the corresponding figures were 51 per cent in children and 30 per cent for adults. These findings, together with the technical demands of intact canal wall (ICW) surgery in extensive disease has lead many surgeons to favour the open technique. This paper presents the experience of paediatric cholesteatoma in the Tayside region of Scotland over a 10-year period, with particular emphasis on the results of open cavity operations.

Method

We have carried out a retrospective study of all cases of cholesteatoma in children under the age of 16 who underwent surgical treatment in the Tayside region of Scotland between 1976 and 1986. The cases have been classified using the scheme described above and the outcome of treatment has been assessed. Particular attention has been paid to the incidence of residual disease, the frequency of post-operative aural discharge and the pre- and post-operative hearing levels. Mean air conduction thresholds and mean air bone gaps have been calculated using the three frequencies (500 Hz, 1 KHz and 2 KHz).

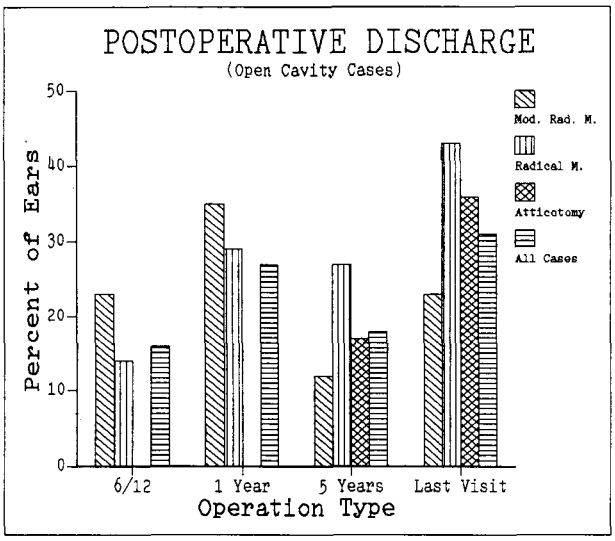

FIG. 2
Incidence of post-operative discharge in patients undergoing open cavity operations. Mod. Rad. M. = modified radical mastoidectomy; Radical M. = Radical mastoidectomy.

Results

A total of 54 children with 57 involved ears underwent surgery for cholesteatoma during the study period (ages 4–15 years, mean = 12 years; 34 boys and 20 girls). The numbers of affected ears for each of the four types of disease are shown in Table I. The numbers of each type of operation performed are shown in Table II. Three children underwent operations on both ears during the study period. Three children had second operations on the same ear during this time. One of these had an intact canal wall mastoidectomy as the first procedure, while the second had a drum excision and myringoplasty and the third had a tympanotomy and excision as the initial operation. All three had open cavity-operations subsequently. The other two children who had intact canal wall operations have both had modified radical conversions performed, but the revision operations took place after 1986. Of the 51 patients who underwent open cavity operations, 16 had grafting of their tympanic membranes with temporalis fascia at the time of their primary surgery. Nine had temporalis fascia grafts placed in the mastoid bowl, one had grafting with periosteum and three had Palva flap obliterations. Only one child had an ossicular reconstruction, the malleus head being placed on the stapes. The frequency of occurrence of post-operative discharge in patients undergoing open cavity operations is presented in Fig. 2. The results are presented at six months, one year and five years. However, not all patients were followed for five years; the condition of the relevant ear at the most recently recorded outpatient visit is therefore also shown. The mean follow-up period was 57 months for modified radical mastoidectomy cases, 48 months for radical mastoidectomy, 56 months for atticotomy and 50 months for the whole group. Mean air conduction thresholds and air-bone gaps both pre- and post-operatively for patients under-

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going open cavity operations are presented in Table III. The mean post-operative air-bone gaps were less than 20 dB in only nine ears. Only three of the patients who had open cavity surgery have been operated for removal of residual cholesteatoma (6 per cent). In two cases small pearls were subsequently excised and in one of these a second pearl was removed later. In the third case there was persistence of attic disease following an atticotomy, and a modified radical mastoidectomy had to be performed. This patient is now disease free.

Discussion

Open cavity operations in children appear to be less likely to be complicated by residual disease than intact canal wall operations. There is, however, a price to be paid for this in terms of post-operative discharge and poor hearing. While the operations in the present series did not make the hearing worse, they did not improve it either. The poor post-operative hearing levels were therefore mainly due to the fact that most of the children had significant conductive hearing losses pre-operatively. This is acceptable for children with unilateral disease, but those with both ears affected were left with a significant hearing problem. One solution to this is to perform middle ear reconstructions on these cases, either at the time of primary surgery or later. Geurrier (1988) reported a series of 42 ears treated in this way. Of these, 34 had post-operative air-bone gaps of 10 dB or better. The principal author's current policy is to perform a second stage middle ear reconstruction, provided the stapes footplate is found to be mobile at the initial operation and the cochlear function is good encough for a satisfactory hearing result to be anticipated. Good results have been obtained in these cases when the stapes arch is intact, but when it is absent they have been disappointing.

Overall approximately 70 per cent of ears were free of discharge when last seen. This compares favourably with previously reported results for discharge rates in open cavity cases (Mills, 1988). This figure might have been further reduced if primary obliterations with the Palva flap had been carried out more often, as advocated by Charachon and Gratacap (1985).

It is our opinion that overall open cavity surgery offers the most satisfactory results when treating childhood cholesteatoma. ICW mastoidectomy has a place in selected cases with limited disease, but should not be considered the procedure of choice.

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