

## Treatment of tympanic membrane retraction pockets by excision. A prospective study

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### Abstract

The treatment of tympanic membrane retraction pockets by simple excision is described in 66 ears in 50 patients. After one operation 65 per cent of the retraction pockets were successfully treated (mean follow up 14.1 months). Persisting perforations occurred in five patients after one excision. Retrotympanic cholesteatoma was found in one patient, after two retraction pocket excision operations. The number of myringotomies with grommet insertion and the presence of bilateral disease does not predict the outcome of the procedure. Simple excision should be considered in the first instance, rather than reinforcement tympanoplasty using temporalis fascia or cartilage graft, in the treatment of tympanic membrane retraction pockets.

### Introduction

Tympanic membrane retraction pockets are a recognized sequel of chronic otitis media with effusion. Inflammatory changes result in destruction of the lamina propria and the negative middle ear pressure causes retraction of the weakened segment (Wells and Michaels, 1983; Yoon *et al.*, 1990). The retracted membrane may adhere to the promontory and become draped over the incudostapedial joint leading to destruction of the long process of the incus. The loss of tympanic membrane efficiency and the effects on the ossicular chain are likely to cause a conductive hearing loss. It is also probable that retraction pockets progress to cholesteatoma formation in a minority of cases (Wolfman and Chole, 1986; Wells and Michaels, 1991).

It is hoped that the production of a tympanic perforation by excision of the retraction pocket and ventilation of the middle ear with a grommet in the remaining tympanic membrane will allow spontaneous tympanic membrane repair with maintenance of a well ventilated middle ear cleft.

Potential complications of this hypothesis include persistent perforation, recurrence of the retraction and the development of cholesteatoma behind the reformed tympanic membrane, from squamous remnants left in the middle ear during removal of the retraction pocket.

A study was therefore conducted to determine the effectiveness of excision of tympanic membrane retraction pockets in the management of tympanic membrane atrophy with retraction.

### Method

Fifty consecutive patients with tympanic membrane retraction pockets progressing in depth and severity were included in the study. The patients, or their parents, were

fully informed of the potential benefits and complications of the procedure.

The number of previous myringotomies and grommet insertions performed in the affected ear, prior to retraction excision, were noted. The retracted segment was excised and where possible a Shah mini-grommet inserted into the tympanic membrane remnant. Post-operative healing of the tympanic membrane was monitored and any persistent perforations or further retraction pockets which developed were noted. Patients with recurrent retractions were considered for repeat excision of the retracted segment.

### Results

Retraction pockets were excised in 50 patients (27 male: 23 female). Bilateral retractions were present in 16 patients (6 male: 10 female) and a total of 66 ears (32 left: 34 right) were operated upon as a primary procedure. The average age at time of operation was 11.23 years (range 3.25–57.66 years).

The results are shown in Figure 1. Operative photographs are shown in Figures 2 & 3.

There are currently five post-operative perforations after this primary procedure, although, in two cases, the follow-up time is still only one month.

Retraction pockets recurred in 20 patients (9 male: 11 female). There were 12 recurrences in the 34 patients with unilateral disease. Bilateral recurrence occurred in three patients (1 male: 2 female) and a further five patients in this group had a unilateral recurrence. Thus in a total of 23 ears (13 left: 10 right) the procedure failed to remove the retraction, an overall recurrence rate of 34.8 per cent. Post-operative follow-up has been for a mean of 14.1 months (range 1–51 months). Failures were noted on average 10.5 months after operation (range 3–28 months).

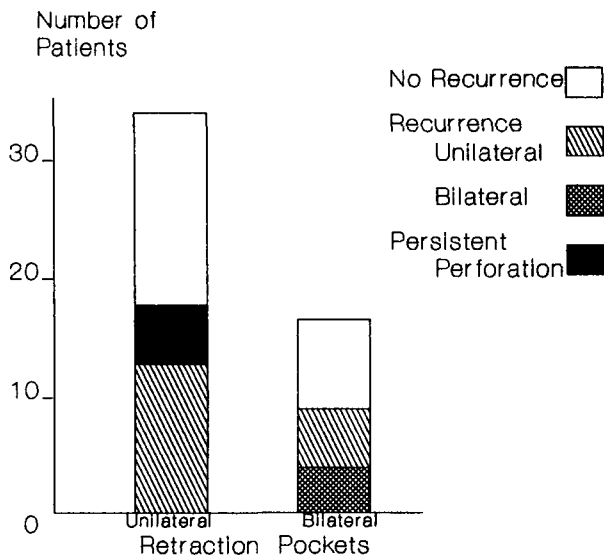


FIG. 1

Results of simple excision of tympanic membrane retraction pockets.

The average age of the patients who developed a retraction recurrence was 8.52 years (range 3.25–16 years). This does not differ significantly from the average age of the patients who did not develop a recurrence, mean 12.54 years (range 3.91–57.66) 2 sample t test ( $t = 1.68$ ;  $p = 0.1$  n.s.)

Recurrence of the retraction pocket was no more likely in patients with unilateral disease than in those with bilateral disease Table I ( $\chi^2$  with Yates correction = 0.46 n.s.).

The number of previous myringotomies had no influence on success rate with regard to recurrence of retraction pockets (Fig. 4). (Wilcoxon rank sum test,  $z = 0.32$ ;  $p = 0.374$  n.s.)

A second excision operation has been performed in 13 patients (5 male: 8 female). Two patients (1 male: 1 female) had both ears operated upon and a total of 15 ears (9 left: 6 right) had a second operation. The average age at the time of second operation was 9.99 years (range 6.4–16.3 years).

The results of the second operation are shown in Figure 5.

Post-operative follow-up after the second operation has been for 8.3 months (range 1–21 months). In this group there has been no further recurrence of the retraction pocket. However there have been complications in four ears in three patients, all female. There are three perforations, one patient has bilateral perforations, and one patient had three cholesteatomatous pearls adjacent to the incostapedial joint behind an intact tympanic membrane. These pearls were successfully removed at tympanotomy.

### Discussion

Tympanic membrane retraction pockets are a common clinical condition. Comparative animal studies have suggested that there is no inherent underlying tympanic membrane feature which predisposes the human tympanic membrane to develop retraction pockets (Chole and Kodama 1989) and their development is frequently asso-



FIG. 2a

Pre-operative retractions pocket (left ear).

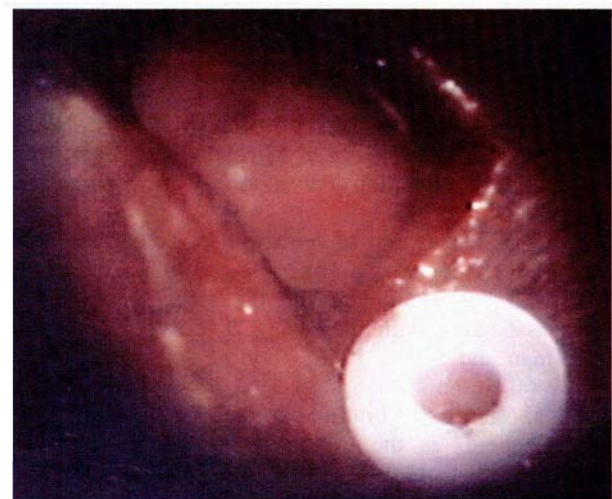


FIG. 2b

Operative view post excision of retraction.



FIG. 2c

Six weeks post operation healed tympanic membrane.



FIG. 3a

Pre-operative grossly retracted tympanic membrane (left ear).



FIG. 3b

Operative view after retraction excision.

ciated with otitis media with effusion (Magnusson 1981; Yoon *et al.*, 1990; Wells and Michaels, 1991) and Eustachian tube dysfunction (Palva *et al.*, 1987; Steinbach *et al.*, 1988).

The size and extent of retraction pockets have been classified (Sadé *et al.*, 1982; Tos, 1982; Charachon, 1988) and there is an increasing prevalence of cholesteatoma associated with increasing severity of retraction (Wolfman and Chole, 1986; Yoon *et al.*, 1990).

Several authors have suggested tympanoplasty procedures, often incorporating cartilage for tympanic graft reinforcement, as the treatment for severe retraction pockets (Levinson, 1987; Sadé, 1987; Roulleau, 1988; Robinson, 1989; Adkins, 1990). However, the presence of the opaque cartilaginous segment in the tympanic membrane can prevent early identification of retrotympa-

nic epithelial pearls developing from squamous elements remaining after incomplete removal of the retraction.

This study suggests that simple excision of the tympanic membrane retraction pocket is a successful method of preventing adherence of the membrane to the ossicular chain, or medial wall of the middle ear cleft. The procedure also arrests the development of acquired cholesteatoma within the retraction pocket in 65 per cent of patients at the first attempt. The procedure is less extensive than a tympanoplasty but at the same time does not preclude a subsequent tympanoplasty procedure if a persistent perforation develops. In addition, while both methods of treating unstable retraction pockets have the potential for leaving squamous remnants in the middle ear cleft these can be more readily identified through the normal tympanic membrane which tends to develop after simple excision.

It should be recognized that not all retraction pockets are unstable, some appear to be self-cleansing and do not harbour squamous debris and it can be argued that excision of all the retraction pockets in this study might not have been necessary as some of the retraction pockets would not have developed cholesteatomas. Unfortunately there is currently no method of determining which ears will develop cholesteatoma and in all the ears in the study the retraction pockets were seen to be increasing in severity and/or size—all retractions were Charachon stage 2 or 3 (Charachon, 1988).



FIG. 3c

Five weeks post operation healed tympanic membrane.

TABLE I

2X2 CONTINGENCY TABLE COMPARING SUCCESS OF SIMPLE EXCISION BY LATEROALLY OF POCKET  $\chi^2$  WITH YATES CORRECTION = 0.46 N.S.

	Successful retraction excision		
	Yes	No	
Patients with unilateral retraction pockets	22	12	34
Patients with bilateral retraction pockets	8	8	16
	30	20	50

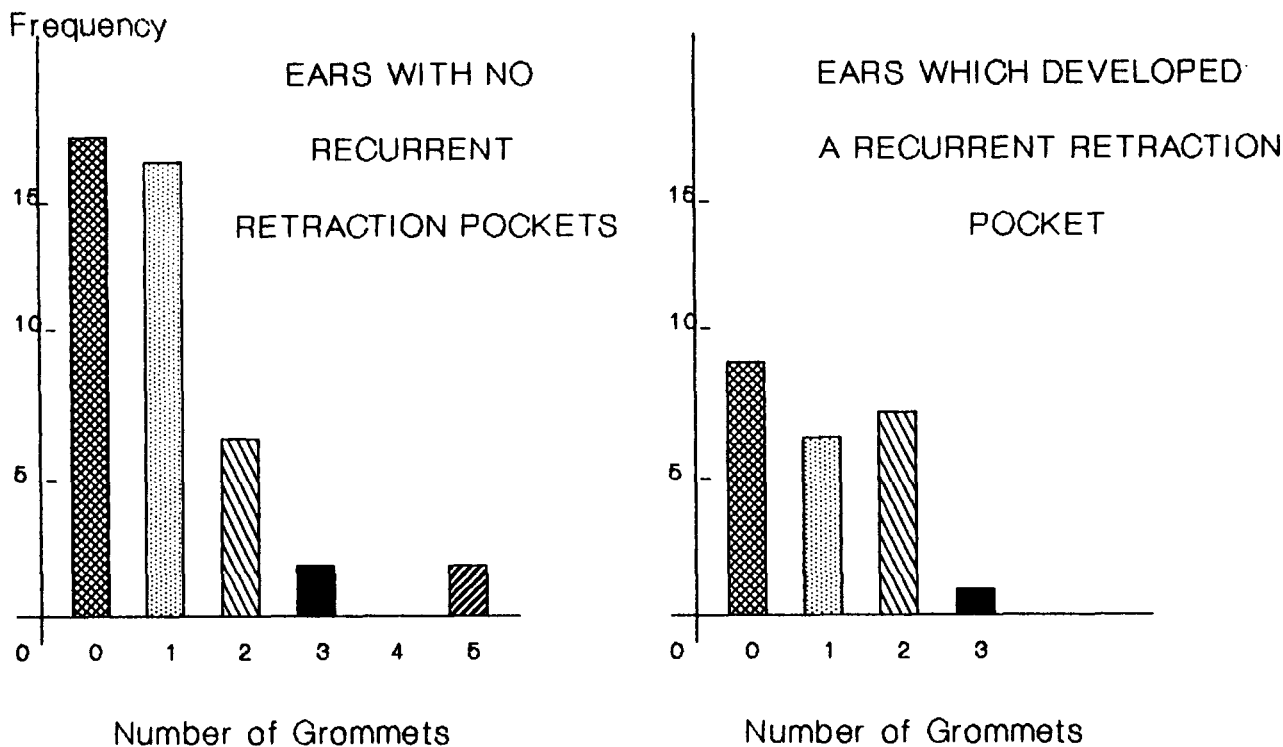


FIG. 4  
Number of grommets inserted in ears.

It could be supposed that the presence of bilateral retraction pockets might indicate more severe pathology when compared with patients with only a unilateral retraction. However, the difference in recurrence rates between the two groups is not significant and indicates that the presence of bilateral disease is not an indicator of disease severity, or a predictor of the likely success of surgery.

The incidence of myringotomy and grommet insertion prior to retraction pocket excision could possibly have affected the development of the retraction pocket. However, the number of patients having grommets, and the number of grommets inserted, are the same for both suc-

cessful and failure groups. The reason why some of the ears developed further retraction pockets is not known.

Clinically the incidence of otitis media declines with age and it is conceivable that retraction pocket recurrence would be more likely to occur in the younger patients after retraction excision. However this study does not confirm this impression.

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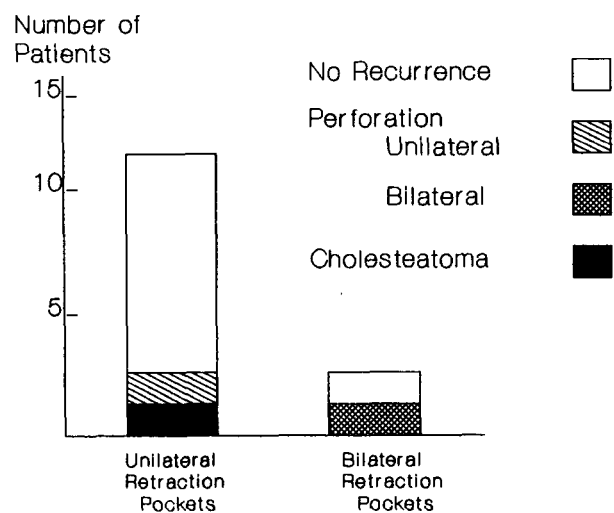


FIG. 5

Results of simple excision of recurrent tympanic membrane retraction pockets.

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