

## Factors associated with recurrence of cholesteatoma

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### Abstract

After a mean follow-up period of 7.3 years, a recurrence was found in 43 (12.3 per cent) out of 349 consecutive patients undergoing surgical treatment for acquired cholesteatoma. The great majority of residual cholesteatomas detected in the 'second-look' operations arose from the oval window area. Chronic otorrhoea and a reperforation were the most common signs of late recurrences. In eight ears a recurrent cholesteatoma developed from a retraction pocket. The recurrence rate was higher in children than in adults. The type of surgical technique had no significant effect on recurrence rate. Recurrences were more frequent in pre-operatively discharging ears than in dry ears. Some suggestions have been made to improve the results of surgery for cholesteatoma.

**Key words:** Otitis media, suppurative; Cholesteatoma; Mastoid, surgery

### Introduction

The primary goal of surgery for cholesteatomatous chronic otitis media is to eradicate the disease and to prevent its recurrence. Still, most reported incidences of cholesteatoma recurrence are high, varying from seven per cent up to 50 per cent (Edelstein and Parisier, 1989). Recurrence of cholesteatoma after surgery can arise in two ways: residual cholesteatoma is defined as a disease that grows back from a cholesteatoma remnant left at a previous operation. Recurrent cholesteatoma usually develops from deep retraction created either by the tympanic membrane or the reconstructed ear canal. Regardless of the origin, persistent cholesteatoma is a serious complication because of its high morbidity. The purpose of this study was to analyse factors that might influence recurrence of cholesteatoma.

### Materials and methods

The study population comprised 349 patients undergoing surgical treatment for cholesteatomatous chronic otitis media in the Department of Otolaryngology, University Hospital of Kuopio, Kuopio, Finland, between January 1976 and December 1990. Only primary operations were included. The great majority (324 or 93 per cent) of the operations were one-stage procedures, 25 patients (seven per cent) were subjected to a planned 'second-look' operation 10 to 14 months later.

After surgery, every patient was regularly checked on an out-patient basis. Ninety-eight per cent of the patients had follow-up of at least three years and 81

per cent had five years or more, the mean follow-up period being 7.3 years.

Chi-square test was used for statistical analysis of the results.

### Results

Residual cholesteatomas were detected in 14 out of 25 planned second stage operations. The majority (11 or 79 per cent) of these residual cholesteatomas were found in the oval window area, in two of these ears there was an additional cholesteatoma, situated in the hypotympanum in one case and in the tubal orifice region in the other. In two patients a residual cholesteatoma was found in the sinus tympani and in one patient in the epitympanum. All these residual cholesteatomas were small and easily removed.

During follow-up, cholesteatoma recurrence was observed in 29 (8.3 per cent) out of the 349 patients. In one patient a white mass was seen behind the intact reconstructed tympanic membrane two years after the primary operation and a residual cholesteatoma was removed from the posterior part of the tympanum in a revision operation. In 14 patients a reperforation developed post-operatively (within five years), a recurrence was suspected on microscopic otoscopy and confirmed at revision surgery. Seven of these residual cholesteatomas were confined to the tympanum and/or attic, the remaining seven extended to the mastoid cavity.

In eight patients a retraction pocket developed and they were regularly checked at the out-patient clinic until eventually (three to 11 years, on average 7.6 years after the primary operation) the ears

TABLE I  
RECURRENCE RATE IN DIFFERENT AGE GROUPS

Age at the time of the primary operation (years)	Number of ears	Number of recurrences	Recurrence rate (%)
<16	43	11	25.6
16-30	62	8	12.9
31-45	117	18	15.4
46-60	95	6	6.3
>60	32	—	0

became infected and revision surgery revealed a manifest cholesteatoma in all of them.

Finally, there were six patients in whom the follow-up visits had been discontinued because the operated ears had remained symptomless. These patients were again referred to our department nine to 12 years (on average 10.7 years) after the primary operation because of long-standing purulent discharge from the ear operated on. At revision, a recurrence in the attic region was found in all of them, extending to the mastoid cavity in four cases. In one of these patients the recurrent cholesteatoma had caused a fistula in the lateral semicircular canal (not reported at the primary operation).

The recurrence rate in child patients was 25.6 per cent compared to 10.5 per cent for adults, the difference being significant ( $p < 0.01$ ). Recurrence rates were lowest in the oldest age groups (Table I).

A recurrence developed in 33 (15.2 per cent) out of 217 pre-operatively discharging or moist ears and in 10 (7.6 per cent) out of 132 dry ears, the difference being significant ( $p < 0.05$ ).

As can be seen in Table II, there were no statistically significant differences between the various surgical techniques regarding recurrence rate.

Large cholesteatomas had higher recurrence rates than small ones (Table III). An intact ossicular chain was preserved in 54 ears and a recurrence was observed in five (9.3 per cent) of them. A recurrence developed in three (10.7 per cent) of 28 ears in which an intact ossicular chain was disrupted and reconstructed.

The recurrence rate was 18.8 per cent (13 out of 69) in operations performed by residents-in-training (under supervision of the Faculty staff) and 10.7 per cent (30 out of 280) in operations undertaken by senior surgeons; the difference was not significant ( $p > 0.05$ ).

## Discussion

A planned 'second-look' operation about one year after the eradicating operation has been considered necessary especially after canal wall-up mastoidectomy.

In the present series, a planned second stage procedure was only used in ears in which total removal of the cholesteatoma was uncertain, regardless of type of primary operation. This study showed that most residual cholesteatomas arose from the oval window area where the removal of the disease is difficult for obvious reasons. It seems reasonable to conclude that a 'second-look' operation should always be considered when cholesteatoma involves the oval window. Another region difficult to clean is the sinus tympani where the disease may grow medial to the vertical portion of the facial nerve, an area that is difficult to view. The inspection of the sinus tympani can be improved by the use of side-viewing rigid endoscopes, as recently described by Yung (1994).

Mercke (1986) stated that a one-year interval between the two operations is suitable because in this time period the residual cholesteatoma can develop sufficiently to become identifiable without becoming large enough to be a threat to the patient. The results of the present study support this impression.

Recurrent cholesteatoma developing from a retraction pocket has been found to be a frequent complication after a canal wall-up mastoidectomy (Sade, 1993) but the current study revealed this condition was also a problem after canal wall-down mastoidectomy with simultaneous tympanoplasty. To prevent this complication, it is important to establish a ventilation route from the anterior mesotympanum through the anterior epitympanic space into the epitympanum, as pointed out by Todd *et al.* (1994). Unfortunately, many patients with acquired cholesteatoma suffer from persistent eustachian tube dysfunction, which may lead to the development of recurrent cholesteatoma. We have tried to prevent formation of retraction pockets towards the mastoid by obliterating the aditus with a musculoperiosteal flap and/or cortical bone but this method seems not to be sufficient in all cases.

Generally, cholesteatoma recurrence has been found to appear more frequently after canal wall-up mastoidectomy than after canal wall-down

TABLE II  
RECURRENCE RATE ACCORDING TO TYPE OF THE PRIMARY OPERATION

Type of operation	Number of ears	Number of recurrences	Recurrence rate (%)
Canal wall-down mastoidectomy with tympanoplasty and cavity obliteration	272	36	13.2
Canal wall-down mastoidectomy with open cavity	9	—	0
Canal wall-up mastoidectomy with tympanoplasty	29	4	13.8
Atticotomy with tympanoplasty	11	—	0
Tympanoplasty alone	28	3	10.7

TABLE III  
RECURRENCE RATE CORRELATED TO THE EXTENSION OF CHOLESTEATOMA

Localization of cholesteatoma	Number of ears	Number of recurrences	Recurrence rate (%)
Tympanum and/or attic	183	15	8.2
Extending to antrum	134	23	17.2
Filling the entire mastoid	32	5	15.6

procedures (Cody and McDonald, 1984; Mercke, 1986; Quaranta *et al.*, 1988). In the present series, there was no significant difference in that respect between these two surgical techniques. From this result, however, no conclusions can be drawn, because the canal wall-up technique was only used in selected cases with a small cholesteatoma confined to the tympanic cavity or epitympanum. All large cholesteatomas (extending to the aditus) were treated using canal wall-down mastoidectomy. In view of this treatment policy, the observed recurrence rate (13.8 per cent) after canal wall-up mastoidectomy should be considered as rather high and reflects the difficulty of complete removal of the disease from the tympanic cavity and epitympanum without removing the posterior meatal wall.

Cholesteatoma recurrence was observed to appear more frequently in ears which were discharging at the time of surgery than in dry ears. This finding emphasizes the importance of careful pre-operative conservative treatment of chronically draining ears.

Somewhat surprisingly, there was no difference in the recurrence rate for ears in which an intact ossicular chain was preserved and ears in which it was disrupted. With the exception of some small cholesteatomas, for complete eradication of the disease it usually is necessary to separate the incudostapedial joint, remove the incus and at least the malleus head and, at a later stage of the operation, reconstruct the sound conducting mechanism on the stapes.

Cholesteatoma recurrence rate in child patients was higher than in adults. This finding was in agreement with some earlier investigations (Glasscock *et al.*, 1981; Sanna *et al.*, 1984). Most otologists, including the present author, think that cholesteatoma in children is more aggressive than in adults and tends to form bud-like extensions into the surrounding tissues making total removal of the disease difficult. In contrast, Parisier *et al.* (1988) have stated that cholesteatoma has similar behaviour in children and in adults. At all events, it seems reasonable to consider two-stage procedures in all child patients.

The results of this study showed that cholestea-

toma recurrence can develop surprisingly late i.e. up to 12 years after surgical treatment. This finding stresses the importance of a sufficiently long, preferably life-long, follow-up of these patients. Also, when reporting results after cholesteatoma surgery, a sufficiently long post-operative time should be required.

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