

Main Articles

Changes in the clinical presentation of chronic otitis media from the 1970s to the 1990s

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Abstract

Clinical features of 1123 patients with chronic otitis media referred to a Finnish university hospital for surgical treatment over a 20-year period were analyzed. The number of patients declined by 48 per cent from the period 1976–1985 to 1986–1995. The decline was evident in all age groups but the proportion of children increased significantly from 14 per cent in 1976–1985 to 20 per cent in 1986–1995. A male predominance was noted with the exception of patients with sequelae of otitis in whom the sex distribution was equal. In cholesteatomatous ears, no significant change occurred in the type or size of cholesteatomas or in the incidence of ossicular destruction. Likewise, no significant change was noted in the size of perforations or in the incidence of ossicular destruction in patients with dry eardrum perforations. However, hearing levels of patients treated 1976–1985 were significantly worse than those of patients 1986–1995. Severe complications caused by the disease were rare during both periods.

Key words: Otitis media; Cholesteatoma; Mastoid, surgery

Introduction

During the recent decades the incidence of chronic otitis media has dramatically declined in the developed countries due to improvements in housing, hygiene and antimicrobial chemotherapy. Yet, the study by Browning and Gatehouse (1992) revealed that 2.6 per cent of 2708 British adults had evidence of inactive chronic otitis media and 1.5 per cent had active disease. One could assume that, today, patients with chronic otitis media seek treatment earlier than in previous decades and are subjected to surgical treatment at an earlier stage of the disease and, therefore, for example destruction of the ossicles might be a more uncommon finding and the size of cholesteatomas smaller than earlier. In addition, it would be interesting to note whether any change has taken place in the age of patients at the time of diagnosis. The purpose of this retrospective study was to examine possible changes in the clinical features of chronic otitis media over a 20-year period.

Materials and methods

North Savo county, which is situated in eastern Finland, has a population of 256 000 that has remained fairly constant since the early 1970s. Department of

Otolaryngology, University Hospital of Kuopio, is the only hospital offering surgical treatment of chronic otitis media for residents of the county.

Medical charts of all patients who had been referred for surgical treatment for chronic otitis media or its sequelae between 1976–1995 were checked. Patients who had been operated on before 1976 were excluded from the study, i.e. patients referred for revision surgery were not included. Patients with bilateral disease were recorded as separate cases.

The patients were divided into two groups, those operated on between 1976–1985 (group 1) and 1986–1995 (group 2). Both groups were again subdivided into four groups, as follows: (1) those with cholesteatoma, (2) those with suppurative otitis media without cholesteatoma (subjected to tympanomastoidectomy or cortical mastoidectomy), (3) those with dry perforations of the tympanic membrane (undergoing myringoplasty or tympanoplasty without mastoidectomy), and (4) patients with intact tympanic membranes subjected to tympanoplasty (ossiculoplasty) for conductive hearing loss attributable to otitis media.

The condition of the ossicular chain and the type and size of the cholesteatoma were recorded as found at surgery. Hearing level was defined as the

TABLE I
AGE AND SEX DISTRIBUTION OF PATIENTS WITH CHRONIC OTTIS MEDIA

Age (years)	Group 1 (n = 741)		Group 2 (n = 382)	
	n	(%)	n	(%)
< 16	107	(14.4)	78	(20.4)
16 - 39	294	(39.7)	128	(33.5)
40 - 59	262	(35.4)	132	(34.6)
≥ 60	78	(10.5)	44	(11.5)
Mean (yrs)	38.0		38.0	
Female	313	(42.2)	172	(45.0)
Male	428	(57.8)	210	(55.0)

mean air conduction threshold of frequencies 0.5, 1 and 2 kHz. Statistical analyses were made using the Chi-squared test and Mann-Whitney U test. Statistical significance was determined to be at $p < 0.05$.

Results

There were 741 patients operated on between 1976-1985 (group 1) and 382 patients operated on between 1986-1995 (group 2), demonstrating a decline of 48 per cent. The decline was evident in all age groups but the proportion of children (under the age of 16 years) in group 2 was significantly ($p < 0.05$) higher than in group 1 (Table I). A male preponderance was noted in both groups, 58 per cent of group 1 patients and 55 per cent of group 2 patients were males.

As can be seen in Table II, severe complications caused by the disease were rare during both periods and the incidences showed no significant change. Two of the three patients with cerebral abscess died.

Staphylococcus aureus was cultured in group 2 significantly ($p < 0.05$) more often than in group 1 whereas polyinfection was significantly ($p < 0.001$) more common in group 1, otherwise bacteriological findings showed no significant differences between groups (Table III).

The number of patients with cholesteatomatous ear disease decreased by 48 per cent from 283 patients in group 1 to 148 patients in group 2. The proportion of child patients was 17 per cent in group 2, slightly but not significantly higher than in group 1 (13 per cent). Sixty-four per cent of group 1 patients and 66 per cent of group 2 patients were males.

One hundred and thirty (46 per cent) patients with cholesteatoma in group 1 and 65 (44 per cent) patients in group 2 had attic cholesteatomas. There was no significant difference in the size of cholesteatomas between group 1 and group 2 (Table IV).

TABLE II
COMPLICATIONS CAUSED BY CHRONIC OTTIS MEDIA

	Group 1 (n = 741)		Group 2 (n = 382)	
	n	(%)	n	(%)
Totally deaf ear	20	(2.7)	12	(3.1)
Labyrinthine fistula	13	(1.8)	4	(1.0)
Facial palsy	4	(0.5)	3	(0.8)
Meningitis	1	(0.1)	-	
Cerebral abscess	1	(0.1)	2	(0.5)

TABLE III
BACTERIOLOGICAL FINDINGS

	Group 1 (n = 741)		Group 2 (n = 382)	
	n	(%)	n	(%)
<i>Pseudomonas aeruginosa</i>	59	(8.0)	29	(7.6)
<i>Staphylococcus aureus</i>	53	(7.2)	42	(11.0)
<i>Proteus</i> spp.	19	(2.7)	8	(2.1)
Other bacteria or polyinfection	116	(15.6)	31	(8.1)
No growth	46	(6.2)	32	(8.4)
No information	22	(3.0)	10	(2.6)
Dry ear	426	(57.5)	230	(60.2)

At surgery, an intact ossicular chain was found in 25 per cent (72/283) of group 1 patients with cholesteatoma and in 29 per cent (43/148) of those of group 2, the difference being non-significant. Hearing levels of patients of group 1 were significantly ($p = 0.0008$) worse than those of group 2 (Table V). Likewise, air-bone gaps of group 1 were significantly ($p = 0.0000$) greater than those of group 2. Hearing levels of child patients (under the age of 16 years) were significantly better than those of adult patients, both in group 1 ($p = 0.0029$) and in group 2 ($p = 0.0146$).

The number of patients with chronic suppurative otitis media without cholesteatoma declined by 56 per cent from the period of 1976-1985 (145 patients) to 1986-1995 (64 patients). The proportion of male patients was 65 per cent in group 1 and 52 per cent in group 2. At surgery, an intact ossicular chain was found in 101 (70 per cent) patients of group 1 and in 47 (73 per cent) patients of group 2.

The number of patients with dry tympanic membrane perforations undergoing myringoplasty or tympanoplasty decreased by 45 per cent from 291 patients in group 1 to 161 patients in group 2. In group 2 the proportion of child patients was 22 per cent, significantly ($p < 0.01$) higher than the 13 per cent in group 1. Sex distribution was quite equal, 51 per cent of patients in group 1 and 48 per cent in group 2 were males.

Thirty-six per cent of patients in group 1 and 32 per cent in group 2 had perforations involving more than half of the surface area of the tympanic membrane; the difference between groups was not significant. As can be seen in Table VI, destruction or fixation of ossicles was not significantly more frequent in group 1 than in group 2. However, hearing levels and air-bone gaps of group 1 were significantly ($p = 0.000$) worse than those of group 2 (Table VII). Hearing levels of child patients (under the age of 16 years) were significantly better than those of adult patients, both in group 1 ($p = 0.0000$) and in group 2 ($p = 0.0000$).

TABLE IV
SIZE OF CHOLESTEATOMAS

	Group 1		Group 2	
	n	(%)	n	(%)
Extension of cholesteatoma				
Tympanum and/or attic only	151	(53.4)	83	(56.1)
Extending to the antrum	105	(37.1)	53	(35.8)
Filling the entire mastoid	27	(9.5)	12	(8.1)

TABLE V
HEARING LEVELS AND AIR-BONE GAPS (0.5–2 KHZ) OF PATIENTS
WITH CHOLESTEATOMA

	Group 1 (n = 266)		Group 2 (n = 136)	
	n	(%)	n	(%)
<i>Hearing level (dB)</i>				
< 30	49	(18.4)	40	(29.4)
30 – 59	150	(56.4)	75	(55.1)
≥ 60	67	(25.2)	21	(15.4)
Median (dB)	47.0		39.0	
<i>Air-bone gap (dB)</i>				
0 – 20	67	(25.2)	51	(37.5)
21 – 30	75	(28.2)	42	(30.9)
> 30	124	(46.6)	43	(31.6)
Median (dB)	30.0		25.0	

Finally, there were 22 patients with intact tympanic membranes in group 1 and nine patients in group 2 who were subjected to ossiculoplasty, demonstrating a decline of 59 per cent. Findings at surgery are shown in Table VIII.

Discussion

As expected, a remarkable (48 per cent) decline in the number of patients with chronic otitis media referred to surgical treatment was noted from the period of 1976–1985 to 1986–1995. Chronic otitis media usually is a consequence of acute otitis media and, therefore, the observed decline in the incidence may reflect an improvement in the treatment of acute otitis media, considering that during recent decades the incidence of acute otitis media has not decreased in Finland, possibly even slightly increased (Puhakka, 1991).

In agreement with some earlier studies (Wetmore *et al.*, 1987; Edelstein *et al.*, 1988; Merchant *et al.*, 1997), a considerable male predominance was found, which was most remarkable among patients with cholesteatoma. Boys are more prone to acute otitis media than girls (Alho *et al.*, 1990; Stenström and Ingvarsson, 1997), which may explain the male predominance. On the other hand, in patients with sequelae of otitis media the sex distribution was equal, which may reflect the fact that women are more willing to seek medical treatment than men.

The size of cholesteatomas showed no decreasing trend over time. The diagnosis of cholesteatoma is often difficult, at least in the hands of general practitioners, which may lead to delay in detection. In this respect, little improvement seems to have

TABLE VI
CONDITION OF THE OSSICULAR CHAIN IN EARS WITH DRY TYMPANIC
MEMBRANE PERFORATIONS

	Group 1 (n = 291)		Group 2 (161)	
	n	(%)	n	(%)
Ossicular chain				
Intact, mobile	248	(85.2)	144	(89.4)
Intact, ankylosis of the malleus and/or incus	5	(1.7)	1	(0.6)
Broken				
– stapes intact	32	(11.0)	16	(9.9)
– footplate only	6	(2.1)	–	

TABLE VII
HEARING LEVELS AND AIR-BONE GAPS (0.5–2 KHZ) OF PATIENTS
WITH DRY TYMPANIC MEMBRANE PERFORATIONS

	Group 1 (n = 287)		Group 2 (n = 156)	
	n	(%)	n	(%)
<i>Hearing level (dB)</i>				
< 30	103	(35.9)	90	(57.7)
30 – 59	166	(57.8)	56	(35.9)
≥ 60	18	(6.3)	10	(6.4)
Median (dB)	34.0		27.0	
<i>Air-bone gap (dB)</i>				
0 – 20	106	(36.9)	105	(67.3)
21 – 30	106	(36.9)	33	(21.1)
> 30	75	(26.1)	18	(11.5)
Median (dB)	23.0		17.0	

occurred during recent decades. Obviously, the GPs should be encouraged to refer patients with discharging ears to otologists at an earlier stage of the disease.

Among patients with dry tympanic membrane perforations undergoing myringoplasty or tympanoplasty the proportion of children (under the age of 16 years) during the period of 1986–1995 was significantly higher than 1976–1985. Obviously, sequelae of otitis media are currently treated at younger age than earlier. The increase in the proportion of child patients may partly explain why the hearing levels of patients treated between 1986–1995 were significantly better than those of patients treated between 1976–1985; hearing thresholds of paediatric patients were found to be better than those of adult patients. Air-bone gaps of patients treated between 1976–1985 were significantly greater than those of patients treated between 1986–1995 indicating that the latter patients had less severe pathological changes in the tympanic mucosa than the former patients, even though there were no significant differences in the size of tympanic membrane perforations or in the incidences of ossicular destruction. The duration of the disease before referral was not studied (because this information was poorly recorded in many cases), but it is possible that patients treated between 1986–1995 had a shorter history of disease than those treated between 1976–1985; chronic ears with a shorter duration of disease usually have less severe tympanic pathology than ears with a longer duration of disease.

The number of patients with complications caused by chronic otitis media was quite low in the present study population. This may be related to the fact that approximately 60 per cent of patients had dry ears at presentation. During the study period the incidence

TABLE VIII
FINDINGS IN EARS WITH INTACT TYMPANIC MEMBRANES UNDERGOING OSSICULOPLASTY

	Group 1 (n = 22)		Group 2 (n = 9)	
	n	(%)	n	(%)
Erosion of the incus	17	(77)	4	(44)
Erosion of the stapes	3	(14)	4	(44)
Ankylosis of the malleus and/or incus	2	(9)	1	(11)

of intracranial infections caused by the disease was very low but these disorders are still encountered and their mortality, in spite of adequate antibiotic and neurosurgical treatment, remains high. Therefore, prevention of these severe complications continues to be the main objective of early diagnosis and surgical treatment of chronic otitis media.

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