

Managing Chronic Otitis Media with Cholesteatoma Report Of 223 Patients Seen In a 5-Year Period

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ABSTRACT

Background: To assess the clinical features, diagnosis, and treatment of patients having chronic otitis media (COM) with cholesteatoma seen in the ENT/Head and Neck Surgery Clinic at the University Clinical Center, Prishtina, Kosovo.

Method: A systematic review of the medical records of all patients admitted to the ENT clinic having COM with cholesteatoma between January 1999 and December 2003.

Results: During this period, 223 patients suffering from COM with cholesteatoma underwent surgical treatment. There were 123 (55%) male and 100 (45%) female patients. Their mean age was 30.7 years, ranging from youngest patient (7-year-old girl) to oldest (73-year-old lady). Thirty-three patients developed complications: 17 patients extracranial complications (EC) and 16 intracranial complications (IC). Leading pathogens in this series were *Proteus mirabilis* in 52% of cases, *Proteus vulgaris* in 14% and *Staphylococcus aureus* in 12%. All patients underwent surgical treatment: 10 patients (4.5%) a canal-wall up (CWU) procedure and 213 (95.5%) a canal-wall down (CWD) procedure. No deaths occurred in this series.

Conclusion: Because of possibility of developing life-threatening complications, patients with COM with cholesteatoma must diagnosed in time and followed as soon as possible to the center that performs ear surgery, as only adequate treatment option for these patients.

Keywords: chronic otitis media, cholesteatoma, complications, surgical treatment

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INTRODUCTION

Chronic otitis media (COM), which represents the terminal stage of the disease continuum of otitis media, is characterized by irreversible changes in the middle ear. COM can be classified into tubotympanic and atticointral disease, and the latter is usually associated with the presence of cholesteatoma. Once established in the middle ear, mastoid, or petrous bone, cholesteatoma is a

destructive lesion that gradually expands and destroys the adjacent structures, leading to complications. The pathogenesis is diverse, with different pathways leading to the same destructive lesion. Suppurative COM as chronic and long standing infection of the middle ear cleft is presented by aural discharge with variable degree of hearing loss. Some times the course of the disease is so much progressive that it may produce irreversible local destruction of middle ear cleft mucosa and underlying bone. This bony destruction may lead to serious extra and intra cranial complications.

In a population with poor access to medical care, however, patients with COM will often neglect their otological complaints for months, even years, before developing a complication. These complications form a wide spectrum of clinical entities, ranging from ossicular discontinuity to brain abscess. Although extracranial complications are more common, intracranial complications are more serious and may be life-threatening.

The surgical management of cholesteatoma has undergone tremendous advances during the past four decades. Now we are in a position to achieve dry ear and improvement of functional hearing in majority of patients. This is all due to untiring efforts of outstanding otologists throughout the world, and the use of advanced surgical equipments, operative microscope and micro drill. In addition, development of many broad-spectrum antibiotics has helped to control resistant infection. Rehabilitation of the tympanomastoid cavity is important to achieve a long-standing trouble free cavity and good functional hearing level.

The goal of this study was to assess the incidence of COM with cholesteatoma, their clinical features, diagnostic, complications and therapeutic procedures in patients seen at the ENT/Head and Neck Surgery Clinic, University Clinical Center, in Prishtina, Kosovo, between 1999 and 2003.

PATIENTS AND METHODS

We reviewed the clinical records of patients diagnosed as having COM with cholesteatoma and treated at the ENT/Head and Neck Surgery Clinic, University Clinical Center, Prishtina, Kosovo from January 1999 through December 2003. The diagnosis of complication of COM with cholesteatoma was established by experienced otolaryngologists based on the clinical examination, otomicroscopy, and radiology examinations, and was confirmed at surgery. Cases with COM without an intraoperative finding of cholesteatoma were excluded from the study.

The demographic data included the sex and age. Signs and symptoms on admission, white blood count (WBC), erythrocyte sedimentation rate (ESR), and the results of middle ear aspirate culture obtained on admission were also recorded. In all cases with a suspected complication, X-rays of the mastoid were performed, and occasionally, computed tomography (CT) of the temporal bone, brain, and neck. The surgical procedures were recorded, and materials were harvested for pathology confirmation.

With regard to patient consent, since our institution lacks an institutional review board, we obtained written permission from the clinic director to conduct research on this topic. In addition, every patient admitted to the clinic must sign a consent form giving permission to conduct all diagnostic and therapeutic procedures, including the publication of images or other medical records.

RESULTS

In total, 223 cases of COM with cholesteatoma were observed during the 5-year period from January 1999 to December 2003. Of these patients, 123 were male (55%) and 100 were female (45%). As is shown in Table 1, in 1999, only 16 patients with cholesteatoma were seen; the reported incidence of 0.8 per 100,000 for that year is not the true incidence because the war in Kosovo had caused half of the population to flee.

Table I Distribution of the patients with cholesteatoma by year, gender, and approximate incidence

Year	Male	Female	Total	Incidence (100,000/year)
1999	9	7	16	0.8
2000	32	20	52	2.6
2001	25	24	49	2.4
2002	28	24	52	2.6
2003	29	25	54	2.7
Total	123 (55%)	100 (45%)	223 (100%)	

Table II Age distribution of the patients having COM with cholesteatoma and those having complications of COM with cholesteatoma

Age (years)	COM with cholesteatoma		Complications of COM with cholesteatoma	
	N	%	N	%
1-10	14	6.27	2	6
11-20	62	27.8	12	37
21-30	54	24.2	3	9
31-40	35	15.7	6	18
41-50	33	14.8	5	15
51-60	20	9	3	9
61-70	4	1.8	1	3
71-80	1	0.44	1	3
Total	223	100	33	100

The true incidence of cholesteatoma in Kosovo is between 2.4 and 2.7 cases per 100,000 annually.

The mean age of the patients with complications was 30.7 years, ranging from 7 to 73 years. As shown in Table II, the single highest number of patients with cholesteatoma was in the 11–20-year-old group (227.8%), and 37% of the patients with complications of cholesteatoma belonged to this age group.

Complications of COM with cholesteatoma developed in 33 of the 223 (14.8%) patients as shown in table . Extracranial complications have been seen in 17 patients (51.5%) and intracranial complications in 16 patients (48.5%).

Table IV shows the EC complications: subperiosteal mastoid abscesses have been seen in 5 cases (29.4%), facial nerve palsy in 3 cases (17.6%), labyrinthine fistula in 3 cases, etc.

Table III Complications of COM with cholesteatoma during the 5-year period 1999–2003

Complications	Nr.	%
Extracranial complications (EC)	17	51.5
Intracranial Complications (IC)	16	48.5
Total	33	100%

Table IV Types of complications of EC complications COM with cholesteatoma during the 5-year period 1999–2003

Extracranial complications	n	%
Subperiosteal mastoid abscess	5	29.4
Facial nerve palsy	3	17.6
Labyrinthine fistula	3	17.6
Acute mastoiditis	2	11.8
Bezolds abscess	2	11.8
Diffuse labyrinthitis	1	5.8
Facial canal denudation	1	5.8
Total	17	100

Table V Types of complications of IC complications COM with cholesteatoma during the 5-year period 1999–2003

Intracranial complications	n	%
Acute meningitis	6	37.5
Perisigmoid sinus abscess	5	31.2
Subdural abscess	4	25
Sigmoid sinus thrombosis	1	6.2
Total	16	100

Table VI. Microbiological test results of the draining ears in patients having COM with cholesteatoma.

Microorganism isolated	n	%
<i>Proteus mirabilis</i>	75	51.7
<i>Proteus vulgaris</i>	20	13.8
<i>Staphylococcus aureus</i>	18	12.4
<i>Pseudomonas auriginosa</i>	6	4
<i>Streptococcus coagulans</i>	6	4
<i>Staphylococcus epidermidis</i>	5	3.44
<i>Alcaligenes faecalis</i>	5	3.44
<i>Streptococcus β-haemolyticus</i>	3	2
<i>Escherichia coli</i>	2	1.37
<i>Proteus retgeri</i>	2	1.37
<i>Citrobacter</i>	1	0.68
<i>Klebsiella spp.</i>	1	0.68
<i>Enterococcus</i>	1	0.68
Total	145	100%

Table VII. Surgical procedures used in patients having COM with cholesteatoma

Surgical procedure	n	%
Canal-wall up techniques		
Tympanoplasty	4	1.8
Mastoidectomy and tympanoplasty	3	1.3
Atticoantrotomy and tympanoplasty	3	1.3
Canal-wall down techniques		
Tympanoplasty in open technique (TOT)	68	30.5
Conservative radical operation	35	15.7
Radical operation (RO)	37	16.6
RO with cavum reconstruction	31	13.9
RO with sinus and dura denudation	36	16.4
Radical reoperation (revision)	6	2.7
Total	223	100

IC complications of Com with cholesteatoma are shown in table V. Otogenic meningitis was presented in 6 cases (37.5%), perisigmoid sinus abscess in 5 (31.2%) and subdural abscesses in 4 cases (25%).

The diagnostic procedures for cholesteatoma were standard: history, clinical examination, otomicroscopy, microbiological examination, audiologic evaluation, and radiology procedures (X-rays of the mastoid process in all cases and CT as required) complemented by the intraoperative findings and biopsy of the harvested pathology materials. A microbiological examination of the suppurative drainage from patients with COM was performed in all cases, and the results were positive in 145 (65%), as shown in table VI.

In all cases when cholesteatoma is suspected, microsurgery is planned. As shown in Table VII, the most often performed surgical procedure was the canal-wall down technique in 95.5% of the cases. Cholesteatoma recurred in only 2.7% of the cases. The most often performed modification of the open technique was tympanoplasty in open technique (TOT) in 30.5% of all cases. In this series, no death casualty was recorded.

DISCUSSION

A cholesteatoma is an epithelium-lined sac containing mainly cellular debris in which cholesterol crystals are generally present. Cholesteatomas are benign; they occur mainly in the middle ear and mastoid region and destroy the surrounding structures by exerting pressure on them. The annual incidence of cholesteatoma was about 3 per 100,000 in children and 9.2 per 100,000 in adult Caucasian inhabitants of Finland and Denmark.⁸

In our series, the approximate calculated incidence was between 2.4 and 2.7. A possible reason for this low incidence is the flow of patients to other regional medical centers, although the ENT clinic in Prishtina is the only tertiary medical institution that practices otosurgery.

Complications of COM with cholesteatoma are intracranial (IC) and intratemporal or extracranial (EC). Meningitis is the most common complication in the IC group, while mastoid abscess occurs most commonly in the EC group⁸. A delay in the diagnosis and treatment of complications secondary to cholesteatoma can lead to increased morbidity and mortality⁹. Saffer *et al.*¹⁰ reported that although the incidence of complications due to otitis has decreased in recent decades, they still pose a challenge for the clinician because of the insidious manner of presentation, which is usually hidden by the indiscriminate use of antibiotics. They presented a case with lateral sinus thrombophlebitis and Bezold's abscess, which resulted in a favorable outcome treated surgically together with prolonged intravenous antibiotic therapy¹¹. Brain abscess is the second most common intracranial complication of middle ear infections after meningitis, with an overall mortality rate of 29%¹². Ludman reported epidural abscess as being the most common of all intracranial complications arising from middle ear infections¹³. In our series of 33 patients with 35 complications, intracranial complications were seen in 16 cases (48.5%), whereas extracranial complications were observed in 17 cases (51.5%).

The diagnosis of COM with cholesteatoma, especially the complications of cholesteatoma, demands a high index of suspicion. Every general practitioner must recognize the signs of threatening complications in order to refer the patient to a medical institution that performs ear surgery. The indispensable imaging studies are plain X-rays of the mastoid process, although these have been widely replaced by CT and magnetic resonance imaging (MRI). Vanden Abeele *et al.* concluded that at present, MRI is not a valid alternative to a second-look surgical intervention¹⁴. In our series, all patients underwent X-rays of the mastoids; CT could not be performed routinely in Kosovo during the study period due to the shortage of equipment and experts. From ear swabs sent to the microbiology lab, the pathogen isolated most often was

Proteus mirabilis, which was detected in 51.7% of the swabs.

The treatment of COM with cholesteatoma is surgical. Radical mastoidectomy is the method most widely applied in patients with COM, especially in those with complications, whereas for acute otitis media, myringotomy and tympanostomy tubes are also options¹⁵. Osma *et al.* reported that the use of the canal-wall down technique in patients with otogenic complications reduces the need for a repeat operation and is a safe surgical method of preventing recurrent complications¹⁶. Other studies have also concluded that surgical treatment is the keystone to eradicating the pathological process, and that medical treatment with antibiotics must be chosen in accordance with the microbiological test results^{17,18}.

In our university ENT clinic, the only tertiary medical institution in the country that performs middle ear surgery, we apply the basic principles for treating COM with cholesteatoma. We prefer the canal-wall down technique: in our series of 223 patients with cholesteatoma, only 10 (4.5%) underwent canal-wall up techniques. In 95.5%, an open technique was performed, which depended of the spread of the cholesteatoma. From all the modification of the canal-wall down technique, tympanoplasty in open technique (TOT) was the procedure most frequently performed (30.5% of all cases). Patients with brain abscesses were referred to the Neurosurgery Department for the appropriate surgical procedure, than patients with meningitis are treated successfully in the Infective Disease Clinic. No fatal outcomes were recorded in this series of patients.

CONCLUSIONS

Because of possibility of developing life-threatening complications, patients with COM with cholesteatoma must diagnosed in time and followed as soon as possible to the center that performs ear surgery, as only adequate treatment option for these patients. Therefore, a high index of suspicion and modern imaging diagnostic procedures are required. In addition, the need for proper health education on hygienic conditions can reduce the incidence of otitis media as a whole.

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