

## The complications of chronic otitis media: report of 93 cases

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### Abstract

The aim of this study was to investigate the incidence, mortality and morbidity of complications due to chronic otitis media (COM). During the nine-year period 1990–1999, 2890 cases of COM were reviewed, 93 (3.22 per cent) having 57 (1.97 per cent) intracranial complications (IC) and 39 (1.35 per cent) extracranial complications (EC). In three patients more than one complication was observed. Meningitis and brain abscess were common in the IC group. Subperiosteal abscess (mastoid and Bezold's abscess) was a common complication in the EC group. Cholesteatoma and granulation/polyp in the middle ear/mastoid were the major findings in both groups. Fifteen patients died from IC. Overall, the mortality rate was 16.1 per cent in all patients having complications, and in patients with IC it was 26.3 per cent. In all of the patients with complications, the morbidity rate was 11.8 per cent. Our study supports the finding that meningitis and brain abscess are the common complications of COM and the main reason for mortality.

**Key words:** Otitis media, suppurative; Complications

### Introduction

Chronic otitis media (COM) is a potentially serious disease because of its complications. Modern chemotherapy has made otitic complications increasingly infrequent, but they are still encountered and early recognition of the clinical patterns associated with them results in far more effective treatment. Complications in chronic ear disease usually follow an acute exacerbation of infection.<sup>1,2</sup> Most are particularly common in conjunction with cholesteatoma. This has created a much more difficult therapeutic problem because the underlying otitic disease must be effectively eliminated to prevent recurrence of the complication.<sup>2</sup>

In the progression of a middle-ear infection to an intracranial complication, spread may result from preformed pathways, haematogenously, and as a direct extension from the middle ear or mastoid.<sup>1</sup> Mortality and morbidity have been completely altered with the advent of antibiotic therapy. The overall fatality rate with IC has fallen from 35 per cent in the pre-antibiotic era to five per cent.<sup>2</sup>

The aim of this study was to investigate the incidence, mortality and morbidity of complications due to COM, which is still a major health problem in our region.

### Materials and methods

We studied the clinical records of patients with COM admitted to the Department of Otolaryngology of

the Medical Faculty, the University of Dicle, Diyarbakir, Turkey, between January 1990 and March 1999. Patients were diagnosed as having otitis media with complications. The charts of these patients were reviewed for history, age, sex, duration of ear disease, clinical findings and investigations, and treatments.

Based on popular usage, the complications of suppurative otitis media in our study were classified into two major categories: intracranial (IC) and extracranial (EC). IC were meningitis, brain abscess (cerebral or cerebellar), extradural abscess and sinus thrombosis; EC were subperiosteal abscess (mastoid and Bezold's), labyrinthitis and facial paralysis.

For patients admitted to otolaryngological units the physicians from the departments of neurosurgery, infectious disease and ophthalmology were called when the patient showed neurological signs, and temporal and cranial CT scans were obtained.

In all patients appropriate antibiotic treatment was used. Steroids were given to reduce oedema in patients with brain abscess or facial nerve paralysis.

Patients with intracranial abscess underwent surgical interventions such as temporoparietal craniotomy, or burrhole aspiration with or without craniotomy. Primary mastoid surgery was carried out in patients without neurological signs. In some cases simultaneous otological and neurosurgical interventions were used.

TABLE I  
CLINICAL SYMPTOMS IN PATIENTS WITH COMPLICATIONS

Symptoms	Number of patients
Otorrhoea	93
Headache	69
Fever	65
Decreased hearing	57
Otalgia	31
Postauricular swelling	25
Vertigo	7
Facial weakness	5

Patients with meningitis were initially treated in the department of clinical microbiology and infectious diseases, and then mastoidectomy was carried out.

### Results

From the records of 2890 cases, 93 patients with complications were identified, 57 (1.97 per cent) intracranial and 39 (1.35 per cent) extracranial. Three out of 93 patients had more than one complication. So, the prevalence of complications in our study was 3.2 per cent. The male/female ratio was 2/1. The average age of patients with complications was 16.4 years (range 7–49 years) and 58 per cent were under the age of 20.

The average duration of chronic otitis media was 7.3 years (range 1–25 years). The common clinical symptoms were otorrhoea and headache (Table I).

In the IC group meningitis was the most common complication, occurring in 41 patients (71.9 per cent). Brain abscess was the second most common complication in the IC group (17.5 per cent) (Figure 1). Of the 10 cases of brain abscess, nine occurred in the temporal lobe and one in the cerebellum. In the EC group mastoid abscess was the most common complication, found in 25 patients (64.1 per cent) (Figure 2). The distributions of the two types of complication are shown in Tables II and III.

For the intracranial group, morbidity occurred in seven cases (12.2 per cent). These were as follows: homonymous hemianopsia 1, profound deafness 3, diplopia 1, epilepsy 1, hemiparesis 1, cerebellar ataxia 1, and one patient had two morbidities. Four patients with EC suffered from the sequelae of the disease: two had complete facial paralysis and two had profound deafness from purulent labyrinthitis. This figure gave a morbidity rate of 10.2 per cent.

In our study 15 patients died from IC, one from cerebritis, two from brain abscess and 12 from meningitis. The overall mortality rate was 16.1 per cent. The mortality rate for patients with IC was 26.3 per cent.

TABLE II  
DISTRIBUTION OF INTRACRANIAL COMPLICATIONS

Complications	Number of patients (n = 57)	%
Meningitis	41	71.9
Brain abscess	10	17.5
Extradural abscess	4	7
Lateral sinus thrombosis	1	1.8
Cerebritis	1	1.8

TABLE III  
DISTRIBUTION OF THE EXTRACRANIAL COMPLICATIONS

Complications	Number of patients (n = 39)	%
Mastoid abscess	25	64.1
Labyrinthitis	5	12.8
Facial nerve paralysis	5	12.8
Bezold's abscess	4	10.3

Twelve patients (12.9 per cent) who died from meningitis did not have mastoidectomy performed. The other 81 patients had radical mastoidectomy (RM), simple mastoidectomy (SM) or modified radical mastoidectomy (MRM) in 55 (59.1 per cent), 20 (21.5 per cent) and six (6.5 per cent) cases, respectively. All of the patients with facial nerve paralysis had facial nerve decompression carried out.

The major operative findings in the middle ear and mastoid were cholesteatoma in 78.5 per cent with or without granulation tissue and granulation and/or polyp in 21.5 per cent.

### Discussion

Despite an overall decline in the incidence of complications of otitis media severe complications still exist, with a high mortality.<sup>3–6</sup> The advent of high-resolution CT scanning and the proper use of antibiotics have significantly reduced both morbidity and mortality in otitis media.<sup>7</sup> Prior to the antibiotic era IC had occurred in 2.3 per cent of cases: with antibiotics and new surgical techniques these have been greatly reduced, to 0.15–0.04 per cent.<sup>8,9</sup>

Kangsanarak *et al.*<sup>8</sup> reported that the prevalence of complications was 0.69 per cent in all patients with suppurative otitis media. Samuel *et al.*<sup>6</sup> found 0.13 per cent of EC complications, and Palva *et al.*<sup>9</sup> found only 0.04 per cent of IC complications. In our study the prevalence of complication was 3.2 per cent, showing that there has been no decline in the prevalence of complications with COM in our region.

Samuel *et al.*<sup>6</sup> reported that IC occurred frequently in children and young adults (74 per cent). In our study, 58 per cent of patients were under the age of 20.

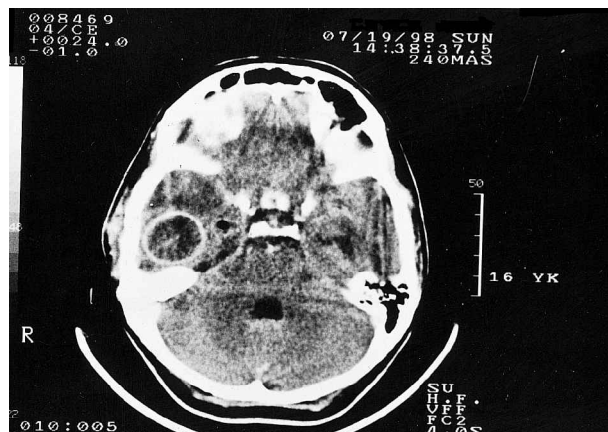


FIG. 1

CT imaging of a patient with brain abscess.

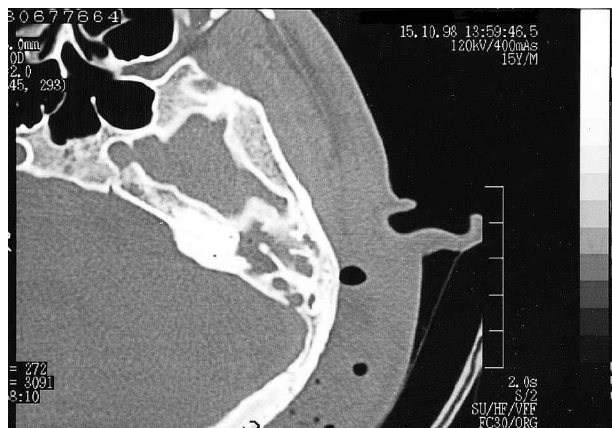


FIG. 2

CT imaging of a patient with mastoid abscess.

Meningitis is the most common IC.<sup>3,6</sup> In previous studies its incidence varied from 34 to 77 per cent<sup>6,8</sup> in our study the rate was 42.7 per cent. Neck stiffness and headache are the most important signs of meningitis. The laboratory diagnosis was based on CSF findings and a positive bacterial culture. Because of the high occurrence of multiple complications, a CT scan was recommended in every case to exclude coexisting IC. The mortality rate for meningitis has been reduced from 80 to 22 per cent<sup>1</sup> and has been reported at between eight and 36 per cent.<sup>6,8,10</sup> Our mortality rate from meningitis was 29.3 per cent, which is still high.

Brain abscess is by far the most serious of otogenic complications, and therefore requires prompt diagnosis and treatment.<sup>11</sup> The temporal lobe is the most frequently involved, followed by the cerebellum.<sup>12</sup> Rupa and Raman<sup>13</sup> indicated that brain abscess was the most frequent IC (57.4 per cent); in our group it was the second most common. All the cases presented were diagnosed by clinical examination and cranial CT scan, and in all of our patients the abscess was caused by COM with cholesteatoma. So, a direct extension from the middle ear was considered to be the main mechanism in our patients. Two deaths (20 per cent) from brain abscess were recorded in our series. In previous studies the mortality rate was reported to be between 3.8 and 50 per cent.<sup>6,8,14-17</sup>

Lateral sinus thrombosis may result either from direct spread of infection from the mastoid, or from thrombophlebitis of the small veins of the middle ear.<sup>6</sup> The rate of lateral sinus thrombosis was reported at between 17.4 and 19 per cent,<sup>6,8</sup> and the mortality ratio was 10 per cent.<sup>6</sup> In our group there was one patient (1.7 per cent) with lateral sinus thrombosis. The diagnosis was confirmed by CT and RM was done, with sinus exploration.

Extradural abscess was diagnosed in four patients (seven per cent). Local tenderness and headache were the most important symptom and sign. The diagnosis was made on clinical examination and CT scan. The incidence of the extradural abscess in patients with IC was reported to be from 16 to 22 per

cent.<sup>6,8</sup> In our patients with IC the rate of extradural abscess was seven per cent, and no patient died from this complication.

Mastoid abscess was the most common complication in the EC group. Rupa and Raman's study<sup>13</sup> mastoid abscess occurred in more than half of the patients with complications. The pathogenesis of a subperiosteal abscess in an ear with cholesteatoma could be due to blockage of the aditus by cholesteatoma in the antrum and the rest of the mastoid air cells.<sup>18</sup> In these patients abscess drainage was performed, followed by surgical intervention at the earliest possible moment. In addition to abscess drainage patients with subperiosteal abscess had RM, MRM or SM in 51.7, 17.2 and 31.1 per cent of cases, respectively.

Facial paralysis was the second most common complication in EC. In such cases urgent mastoidectomy should be carried out, with facial nerve decompression, regardless of whether the paralysis was due to direct extension of cholesteatoma, granulations, or toxic effects upon the nerve itself.<sup>8</sup> Patients with facial nerve paralysis were given systemic steroids for three weeks, in addition to antibiotic treatment. Of five patients with facial nerve paralysis three had RM and two had SM: all underwent facial nerve decompression. Kangsanarak *et al.*<sup>8</sup> reported that facial nerve paralysis was the most common complication (0.26 per cent) in patients with COM. The recovery rate was reported to be 70 per cent.<sup>8,19</sup> In our study facial nerve function recovered completely in 60 per cent of cases.

Labyrinthitis was found in five patients, all of whom were given antibiotic treatment before mastoidectomy.

Multiple parenteral antibiotics and hydration therapy for 48–72 hours before any surgical intervention are important to control the infective process and improve the patient's general condition.<sup>3,20</sup> In our study broad-spectrum antibiotics were given to all patients, the regimen being changed according to culture and sensitivity.

RM or MRM should be performed in cases which will prove hard to follow up post-operatively, and also in the presence of suspected irreversible pathological change, e.g. cholesteatoma or severe granulation, with poor eustachian tube function.<sup>8</sup> We performed RM, SM and MRM in 55 (59.1 per cent), 20 (21.5 per cent) and six (6.5 per cent) cases respectively. The majority of our patients come from remote rural areas, and so we performed RM in 55; this procedure is safe and the patients can be followed easily after treatment.

The major operative findings in the middle ear and mastoid were cholesteatoma in 78.5 per cent, with or without granulation tissue; and granulation and/or polyp in 21.5 per cent. Cholesteatoma was reported in 42–96 per cent.<sup>6,8,21</sup> Panda *et al.*<sup>22</sup> reported that granulation tissue was seen in significant numbers of the group with complications at surgery. However, cholesteatoma is still a main risk factor for severe complications.

Mortality in the IC group has been reported to be between 14 and 32.6 per cent.<sup>6,8,21</sup> In our study mortality in this group was 26.3 per cent. The morbidity rate is reported to be between 11.6 and 27.9 per cent.<sup>8,21</sup> In all of our patients with complications the morbidity rate was 11.8 per cent. Our mortality and morbidity rates are still high, reflecting late diagnosis and treatment because of patients presenting late to the clinic.

## Conclusion

Recent literature indicates that the complications of chronic otitis media have been decreasing. However, even with the advent of modern and more powerful antimicrobials and aggressive surgical eradication of disease, morbidity and mortality are still high. The complications of COM still occur as common diseases in our region. Therefore, it should not be forgotten that the most important tools in making an early diagnosis are a careful history and physical examination. In COM the presenting features may be subtle and include headache, fever, nausea, vomiting, personality changes and signs of increased intracranial pressure, as well as focal neurological deficits. A delay in the diagnosis and treatment of IC of otitis media can lead to increased morbidity and mortality.

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