



Complicated Suppurative Otitis Media Presented To Sohag University Hospital

Mahmood A. Hamed¹, Doaa Mohamed Gad¹, Hanan Said², Ramadan Hashem Sayed¹

1. Otorhinolaryngology Department, Faculty of Medicine, Sohag University, Sohag, Egypt

2. Resident at ORL Department, Sohag Teaching Hospital, Sohag, Egypt.

Abstract:

Objectives: Acute and chronic suppurative otitis media are relatively frequent conditions that require cautious management due to the potential for life-threatening consequences and high morbidity and mortality, especially in developing nations with low socioeconomic levels. In this work, we aimed to study complicated cases of suppurative otitis media whether acute or chronic types in our locality.

Patients and Methods: This is a cross-sectional study that was carried out on 53 patients with different clinical forms of complications due to acute and chronic suppurative otitis media admitted to the ENT department at Sohag University Hospital within the duration between April 2017 and April 2020.

Results: We had 17 patients (32.1%) presented with an acute form of suppurative otitis media, and 36 (67.9%) presented with the chronic form. Forty-seven patients (88.7%) presented with extracranial complications, 4 patients (7.5%) presented with intracranial complications, and two patients (3.8%) presented with both extra and intracranial complications. Mastoid complications were the commonest and recorded in 40 cases (75.5%), followed by LMN facial palsy in 9 cases (17%), brain abscess in 4 cases (7.5%), lateral sinus thrombophlebitis in 2 cases (3.8%), labyrinthine fistula in 2 cases (3.8%), and lastly labyrinthitis in 1 patient (1.9%). More than one complication was reported in 8 cases.

Conclusions: Otitis media and its complications remain a significant medical problem in a developing country like Egypt (particularly Upper Egypt). Early and proper management is essential to minimize morbidity and mortality.

Keywords: Otitis Media, Complicated, Facial palsy, Mastoid abscess, Mastoiditis.

Introduction

Otitis media is a collective term for several inflammatory and infectious conditions that affect the middle ear cleft. It has variable subtypes, clinical presentations, available treatments, and associated sequelae. These include otitis media with effusion (OME), chronic suppurative otitis media (CSOM), and acute suppurative otitis media (ASOM).

1

It frequently develops as a result of viral pathogens of the upper respiratory tract, which lead to Eustachian tube dysfunction and microbial colonization of the middle ear and nasopharynx.²

The fatality rate from otitis media complications was estimated to reach 80% in the pre-antibiotic period.³ Survival rates were improved up to 50% since the use of sulfonamides, and

further to 80% with the use of penicillin.⁴

Potential risk factors include male gender, younger age, low socioeconomic level, overcrowding, parental or sibling history of OM, recurrent upper respiratory tract infections, shorter duration of breastfeeding, snoring, passive smoking, and nasal allergy.⁵

Otorrhoea and hearing loss are the most typical signs of CSOM. Aural discharge may impair quality of life and might be continuous or intermittent.⁶

SOM complications can either be extracranial or intracranial. Extracranial complications are further divided into temporal and extratemporal. Temporal complications include mastoid abscess, mastoiditis, facial palsy, labyrinthitis, and extratemporal complications include zygomatic abscess, Bezold's abscess, meatal abscess, retropharyngeal and parapharyngeal abscess.⁷

Intracranial complications include brain abscess, subdural abscess, extradural abscess, lateral sinus thrombophlebitis, otitic hydrocephalus, and meningitis.⁷

Management of CSOM is a troublesome medical issue. Lack of health education in developing nations and unusual presentations may lead to improper diagnosis and treatment, which could have a significant detrimental effect on morbidity and death. Therefore, it's critical to spot early-stage risk factors and work to mitigate them.⁸ So, our study aimed to evaluate complicated cases of suppurative otitis media whether acute or chronic types in our region, with the discussion of their epidemiologic aspects, management, and outcomes.

Patients and methods:

The study was carried out after being approved by the local Ethics Committee of the Faculty of Medicine, Sohag University, Sohag, Egypt.

Informed written consent was obtained from all patients or their guardians. The study was conducted according to the Helsinki declaration standards as revised in 2013.

We included patients, who presented with complicated suppurative otitis media within the duration between April 2017 and April 2020. The period between April 2017 and the end of Mars 2019 was retrospective, while between April 2019 and April 2020 was a prospective one.

A detailed history was obtained from the patients and/or their guardians including age, sex, locality, complaint, and its onset, course, duration, history of present illness, previous treatment, history of ear infection, trauma, surgery, and family history of similar condition.

Complete general and thorough ENT examinations were done, with special concern on ear examination including inspection for detection of postauricular swelling, mastoid fistula, palpation for detection of tenderness on mastoid process, otoscopic examination for detection of tympanic membrane characters, ear discharge, aural polyp, cholesteatoma, office test for vestibular assessment, and neurological examination for detection of increased intracranial tension manifestations, cranial nerve examination, and Glasgow coma scale.

Full laboratory investigations, radiologic, audiological assessment, and electrophysiologic testing for those with facial n. palsy was performed to detect each complication.

Operative management was tailored according to the underlying pathology and operative findings were recorded with special emphasis on cholesteatoma, granulation tissue, polyp, and bone

erosion, state of ossicles, facial nerve integrity, and evidence of complications.

Statistical analysis

Continuous variables were presented as mean \pm standard deviation (SD). Categorical factors were presented as frequencies and percentages. A Probability value (P-value) less than 0.05 was considered significant. All analyses were carried out by SPSS version 23.

Results

We had 53 patients, their ages ranged from 3 months to 75 years old (mean \pm SD= 19 \pm 17.99 years). Twenty-eight (52.8%) of them were males and 25 (47.2%) were females; 21 patients (39.6%) were adults and 32 (60.4%) were children (up to 16 years old), as illustrated in (Table 1).

Table (1): Demographic data of the studied patients.

Age (Years):	
(Range) Mean \pm SD	(0.3-75) 19 \pm 17.99
Age group: n (%)	
Child	32 (60%)
Adult	21 (40%)
Gender: n (%)	
Male	28 (52.8%)
Female	25 (47.2%)

As regards clinical presentations of OM, 17 patients (32.10%) were presented with ASOM, and 36 patients (67.9%) were presented with CSOM. Among those with CSOM, 26 patients (72.2%) had cholesteatoma and 10 patients (27.8%) were non-cholesteatomatous. The Cholesteatoma group was exclusively from the acquired type (100%). The left ear was involved in nineteen patients (35.8%) whereas the

right ear was involved in 13 patients (24.5%) and both ears were involved in 21 patients (39.7%) (Table 2).

Table (2): Clinical presentation of otitis media.

Concerning OM complications, 47 patients (88.7%) were presented with

Type of otitis media: n (%)	
Acute	17 (32.1%)
Chronic	36 (67.9%)
Cholesteatomatous	26 (49%)
Non-cholesteatomatous	10 (18.9%)
Laterality: n (%)	
Left	19 (35.8%)
Right	13 (24.5%)
Bilateral	21 (39.7%)

extracranial complications (ECC), 4 patients (7.5%) were presented with intracranial complications (ICC), and 2 patients (3.8%) presented with both ECC & ICC. Mastoid complications were the most commonest including mastoid abscess in 18 cases (34%), mastoiditis in 7 cases (13.2%), antral abscess in 7 cases (13.2%), meatomastoid fistula in 5 cases (9.4%) and mastoid fistula in 3 cases (5.7%). The next complication was facial palsy in 9 cases (17%); followed by brain abscesses (temporal lobe & cerebellar) in 4 cases (7.6%), 3 temporal and one cerebellar then lateral sinus thrombophlebitis in 2 cases (3.8%), labyrinthine fistula in 2 cases (3.8%), and lastly labyrinthitis in one case (1.9%) as illustrated in (Table 3).

As regards surgical management of OM, 31 (58.5%) of patients subjected to canal wall down (CWD), 3 (7.5%) of patients subjected to intact canal wall (ICW), 3 (7.5%) of patients subjected to cortical mastoidectomy, 16 (30.2%) of patients subjected to myringotomy, as illustrated in (Table 4).

Table (3): Clinical presentation of otitis media complications.

Classification of complications: n (%)	
Extracranial complications (ECC)	47 (88.7%)
Intracranial complications (ICC)	4 (7.5%)
Both ECC and ICC	2 (3.8%)
Type of complications: n (%)	
Mastoid abscess	18 (34%)
Facial palsy	9 (17%)
Mastoiditis	7 (13.2%)
Antral abscess	7 (13.2%)
Meatomastoid fistula	5 (9.4%)
Brain abscess	3 (5.7%)
Mastoid fistula	3 (5.7%)
Labyrinthine fistula	2 (3.8%)
Lateral sinus thrombosis	2 (3.8%)
Cerebellar abscess	1 (1.9%)
Labyrinthitis	1 (1.9%)

Table (4): Surgical management of otitis media.

Surgical management: n (%)	
Canal wall down (CWD)	31 (58.5%)
Intact canal wall (ICW)	3 (5.7%)
Cortical Mastoidectomy	3 (5.7%)
Myringotomy	16 (30.2%)

Discussion :

The incidence of otitis media complications varies greatly among communities based on the level of health care and socioeconomic conditions as well.⁹ In this study, we evaluated complicated cases of SOM in our tertiary health institute to identify the most significant causes and risk factors for this issue in our region (Upper Egypt).

As regard the patients' age, the majority of our patients (60.40%) were children and young adults. These results were following many other studies which reported a higher incidence of complications in the younger age groups.^{3,4,10-14}

This was primarily attributed to the immaturity of the Eustachian tube, low

immunity, the aggressive nature of childhood cholesteatoma, the pneumatization pattern of the pediatric temporal bone, which makes it easier for cholesteatoma to spread, and lastly high levels of inflammatory markers in pediatric cholesteatoma.¹⁵

In our study, there was a slight male predominance (53%). This finding matched a study done by Sharma and his colleagues.¹⁶ On a total of 45 patients with complicated CSOM, and found that male to female ratio was 3:2. The complicated CSOM group demonstrated a larger male preponderance, with a male: female ratio of 2.4:1, as opposed to 1.8:1 in the uncomplicated group, according to **Vikram et al.'s**¹¹ findings in a different study. Furthermore, numerous researchers have similar results.^{4, 10, 13}

These findings could be explained by the fact that males seemed to have a higher prevalence of otologic complications in comparison to females, due to the ignorance about the seriousness of the problem and a lesser tendency for seeking medical advice in males.^{9, 17}

In our study, the majority of patients (36 = 67.9%) were presented with CSOM [26 of them (49%) have had cholesteatoma whereas 10 of them (18.9%) were non-cholesteatomatous]. On the other hand, 17 patients (32.1%) were presented with ASOM.

The lower incidence of complications in ASOM than in chronic form might be due to the use of antibiotics and the routine vaccination against *Haemophilus influenza* and *Streptococcus pneumoniae*.³

Cholesteatoma was the most frequent surgical finding in the middle ear and mastoid cavity for both extra-cranial and intracranial complications in many previous studies.^{4,10,13}

In our study, most of the patients 47 (88.7%) were presented with extra-

cranial complications, 4 (7.5%) presented with intracranial complications, and 2 (3.8%) with both extra and intra-cranial complications. These findings were matching with many other publications.¹⁸⁻²²

The availability of more potent antibiotics that are targeted against the most prevalent gram-negative bacteria for CSOM, such as *Pseudomonas aeruginosa*, *Proteus spp.*, and *Klebsiella spp.*, and better infection control measures are likely to be responsible for the recent decrease in the incidence of life-threatening complications, such as cerebral abscesses and meningitis.^{20, 22} Other factors attributed are the widespread use of high-resolution imaging and the improvement in microsurgical techniques.¹⁸

In our series, medical treatment was offered in the form of broad-spectrum antibiotics which cross the blood-brain barrier, analgesics, antipyretics, corticosteroids, and antivertiginous medication according to each condition and as preparation for operative intervention .

In our study, mastoid abscess was the commonest complication (34%).

This comes with many other studies from developing countries that still have subperiosteal mastoid abscesses and other extra-temporal abscesses among the commonest extracranial complications of CSOM.^{4, 14, 19, 22, 23}

The fact that such abscesses are clinically diagnosed may help to explain this. Additionally, due to recent advancements in temporal bone imaging, where high-resolution computed tomography (CT scan) has nearly entirely replaced conventional plain mastoid X-Ray, such cases are diagnosed effectively.²⁴ In comparison to the conventional plain mastoid radiograph, the CT scan imaging has not only increased the likelihood of detecting evidence of the spread of

infection beyond the middle ear but also to has been shown to be more sensitive in detecting bone erosion of cholesteatoma and other accompanying middle ear diseases like granulations and polyps, which are known to be risk factors for persistent otorrhea.^{25, 26}

Facial nerve paralysis was the second most common complication from otitis media in our study. The frequency of facial paralysis in different studies ranged from 0.16% to 2.62%.¹⁰

A further study by Smith and Danner²⁷ found that while facial palsy caused by chronic otitis media developed slowly and had a worse prognosis, facial palsy caused by acute otitis media occurred abruptly, was incomplete, and had a favorable recovery. The incidence of acute otitis media episodes and facial palsy both decreased with the administration of antibiotics. With the use of intravenous antibiotics and the placement of a breathing tube, 80% of patients with facial palsy brought on by acute otitis media recover.²⁸

In our study, brain abscess; a dangerous complication, was the most frequent intracranial complication, making up 50% of all intracranial complications. Similarly to this, **Dongol et al.**³ stated that the most typical intracranial complication in their investigation was a brain abscess. According to **Kangsanarak et al.**¹³ and **Osma et al.**⁴, the mortality rate from brain abscess was 33% and 20% respectively. There was no mortality in our study from brain abscess. The correct management of such a situation necessitates the involvement of a multidisciplinary team that includes an otorhinolaryngologist, a neurosurgeon, a critical care physician, an anesthesiologist, a radiologist, and an ophthalmologist. To lower mortality and its consequences, early treatment is essential. After the patient's condition

improves with intravenous antibiotics, surgical intervention is recommended.³

Our study might have some limitations such as a small sample size a relatively short period of the study and follow-up, and finally absence of a control group. However, to overcome this problem and authenticate our results, we included both retro and prospective parts with no difference between both categories. We recommend confirmation of our results by further studies with high-quality randomized controlled trials, a long period of study, and follow-up and selection of different ethnic groups.

Conclusion:

Our study shows that; Otitis media complications remain a significant pathology in our locality (Upper Egypt) despite modern antibiotics therapy. Additionally, the incidence of complications due to chronic otitis media with cholesteatoma is higher compared to that of acute otitis media and chronic otitis media without cholesteatoma. Moreover, extracranial complications are much more common compared to intracranial complications. Finally, factors such as younger age and male gender were associated with increased incidence of otitis media complications.

Funding support: Our study did not receive any funding support.

Conflicts of interest: No conflict of interest.

Reference:

1. Atkinson H, Wallis S, Coatesworth AP. Acute otitis media. *Postgrad Med.* 2015;127(4):386–90.
2. Abrahams SW, Labbok MH. Breastfeeding and otitis media: A review of recent evidence. *Curr Allergy Asthma Rep.* 2011;11(6):508–12.
3. Dongol K, Rayamajhi P, Gurung U. Complications of Acute and Chronic Otitis Media in a Tertiary Referral Center in Nepal. *Turk Arch Otorhinolaryngol.* 2020;58(4): 234-40.
4. Osma U, Cureoglu S, Hosoglu S. The complications of chronic otitis media: report of 93 cases. *J Laryngol Otol* 2000;114(2):97–100.
5. Sophia A, Isaac R, Rebekah G, Brahmadathan K, Rupa V. Risk factors for otitis media among preschool, rural Indian children. *Int J Pediatr Otorhinolaryngol* 2010;74(6):677-83.
6. Orji F. A survey of the burden of management of chronic suppurative otitis media in a developing country. *Annals of Medical and Health Sciences Research* 2013;4(3):598-601.
7. Parmar BD, Jha S, Sinha V, Chaudhury N, Dave G. A study of complications of chronic suppurative otitis media at tertiary care hospital. *Int J Otorhinolaryngol Head Neck Surg* 2020;6:330-5.
8. Migirov L, Duvdevani S, Kronenberg J: Otogenic intracranial complications: a review of 28 cases. *Acta Otolaryngol* 2005; 125: 819–822.
9. Dubey SP, Larawin V. Complications of chronic suppurative otitis media and their management. *Laryngoscope* 2007;117:264–7.
10. Yorgancilar E, Yildirim M, Gun R, et al. Complications of chronic suppurative otitis media: a retrospective review. *Eur Arch Otorhinolaryngol.* 2013;270:69–76.
11. Vikram B K, Khaja N, Udayashankar S G, et al. Clinico-epidemiological study of complicated and uncomplicated chronic suppurative otitis media. *The Journal of Laryngology & Otology.* 2008;122:442–446.
12. Mostafa BE, El Fiky LM, El Sharnouby MM. Complications of suppurative otitis media: still a problem in the 21st century. *ORL J Otorhinolaryngol Relat Spec* 2009;71(2):87–92.

13. Kangsanarak J, Navacharoen N, Foonant S, et al. Intracranial complications of suppurative otitis media: 13 years' experience Am J Otol. 1995; 16(1):104–109.
14. Mustafa A, Heta A, Kastrati B, Dreshaj S. Complications of chronic otitis media with cholesteatoma during a 10-year period in Kosovo. Eur Arch Otorhinolaryngol 2008;265(12):1477–82.
15. Hellier WPL. Chronic otitis media. Watkinson JC, Clarke RW, editors. Scott-Brown's Otorhinolaryngology Head & Neck Surgery. 8th ed. Vol 2. Roca Raton: CRC Press. 2018; p.155–64.
16. Sharma N, Jaiswal AA, Banerjee PK, et al. Complications of Chronic Suppurative Otitis Media and Their Management: A Single Institution 12 Years Experience. Indian J Otolaryngol Head Neck Surg 2015; 67(4):353–360.
17. Singh BM, Maharaj TJ. Radical mastoidectomy: its place in otitic intracranial complications. J Laryngol Otol 1993;107(12):1113–18.
18. Wu JF, Jin Z, Yang JM, et al. Extracranial and intracranial complications of otitis media: 22-year clinical experience and analysis. Acta Otolaryngol 2012; 132: 261-5.
19. Orji FT, Ukaegbe O, Jidefor Alex-Okoro J, et al. The changing epidemiological and complications profile of chronic suppurative otitis media in a developing country after two decades Eur Arch Otorhinolaryngol 2016;273(9):2461-6.
20. Gandhi BS, Agarwal AK. Clinical profile of patients with complications following otitis media. Indian J Otolaryngol Head Neck Surg. 2001;53:11–13.
21. Lin YS, Lin LC, Lee FP, et al. The prevalence of chronic otitis media and its complications rates in teenagers and adults. Otolaryngol Head Neck Surg 2009; 140:165–170.
22. Ami M, Zakaria Z, See GB, et al. Mastoid abscess in acute and chronic otitis media. Malaysian J Med Sci 2010; 17:44–50.
23. Wahid FI, Khan A, Khan IA. Complications of chronic suppurative otitis media: challenge for a developing country. Kulak Burun Bogaz Ihtis Derg 2014; 24(5):265–270.
24. Yildirim-Baylan M, Ozmen C, Gun R, et al. An evaluation of preoperative computed tomography on patients with chronic otitis media. Indian J Otolaryngol Head Neck Surg 2012; 64:67–70.
25. Ologe FE, Nwawolo CC. Prevalence of chronic suppurative otitis media (CSOM) among school children in a rural community in Nigeria. Niger Postgrad Med J 2002; 9:63–66.
26. Razek AAA, Ghonim MR, Ashraf B. Computed tomography staging of middle ear cholesteatoma. Pol J Radiol 2015;80:328–333.
27. Smith JA, Danner CJ. Complications of chronic otitis media and cholesteatoma. Otolaryngol Clin North Am 2006; 39: 1237-55.
28. Rea PA, Ronan N. Acute otitis media. Watkinson JC, Clarke RW, editors. Scott-Brown's Otorhinolaryngology Head & Neck Surgery. 8th ed. Vol 2. Roca Raton: CRC Press. 2018; p. 137-54.