DOI: https://doi.org/10.53350/pjmhs22165461

ORIGINAL ARTICLE

Evaluation of Complications and Management of Chronic Suppurative Otitis Media: A Retrospective Study

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ABSTRACT

Aim: To evaluate multiple clinical complications and management of chronic suppurative otitis media

Study design: A retrospective study

Place and Duration: This study was conducted at Jinnah Post Graduate Medical Centre Karachi Pakistan from June 2020 to June 2021.

Methodology All patients of chronic suppurative otitis media with intra or extra cranial complications who were admitted to the ENT Department were included in this study. Clinical data, related complications, care, and follow-up were all analyzed. In all patients, pure tone audiometry was used to assess their hearing. Every patient had a high-resolution computer tomography (HRCT) temporal bone scan and all other relevant investigations including aural pus swab for culture and sensitivity done . Every patient with CSOM-related intracranial problems had a Magnetic Resonance Imaging (MRI) brain scan.

Results: During the trial of 280 individuals, 42 patients with CSOM complications were observed. A total of 19 of them had intracranial complications, while 23 had extra cranial complications. The youngest patient was five years old, while the oldest was 58 years. The majority of the cases were observed in 11 to 20 years age groups**.** Only 6 of the 42 individuals had bilateral CSOM, whereas the remaining 36 had unilateral CSOM.

Conclusions: CSOM-related problems are still widespread, despite the availability of broad spectrum antibiotics. Patients should be given higher doses of intravenous antibiotics (that breach the blood-brain barrier) followed by mastoid surgery. Early detection of concomitant intracranial complications using HRCT and MRI and adequate antibiotic treatment, abscess drainage, and mastoid surgery as soon as possible are all essential to prevent mortality from CSOM complications.

Keywords: Acute otitis media, CSOM, intravenous antibiotics, intracranial complication, extracranial complication.

INTRODUCTION

Chronic suppurative otitis media (CSOM) is a prevalent and frequently difficult-to-treat illness in underdeveloped countries. (1) CSOM produces recurrent or persistent ear discharge (otorrhea) through a rupture in the tympanic membrane. Hearing loss, disability, and poor academic performance are frequent symptoms of CSOM. (2) In certain cases, especially in impoverished nations, it can result in deadly cerebral infections and severe mastoiditis. It affects as many as 46% of children in underdeveloped nations, and it is more prevalent among children from low-income families. CSOM is still a major health issue in Pakistan. Although its prevalence is rapidly diminishing, the study is still needed in developed and developing nations. (3) The origin and pathophysiology of CSOM play a role in the disease's high prevalence. Infection, anatomical or physiological defects, environment, allergy, or patient variables such as immunity, gender, and others are all affecting factors. (4) Poor hygiene and nutrition, overcrowding, and chronic infectious diseases are all risk factors, as are frequent episodes of respiratory tract infections and acute otitis media, and traumatic tympanic membrane rupture, as well as factors underlying resource-limited living conditions. (5) Most of these patients arrive late to tertiary institutions due to poor health-seeking behavior and a lack of ENT specialists in basic health care. The most prevalent cause of avoidable hearing loss has been identified as chronic suppurative otitis media. Many investigations have indicated Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, Klebsiella pneumonia, and Proteus mirabilis as the most prevalent isolates causing CSOM. (6)

Despite the availability of antibiotics, several problems might arise. Acute otitis media (AOM) consequences in the pre-antibiotic era and CSOM were quite prevalent, resulting in a high death rate. (7) Despite an initial decrease in CSOM complications due to increased antibiotic use, the rates are continuously rising. CSOM is still a significant condition, especially in underdeveloped countries, and its complications are still life-threatening. (8) Extra cranial and intracranial complications of CSOM are recognized. Intra cranial complications may include Extradural abscess, subdural abscess, brain abscess (temporal lobe and cerebellum) ,sigmoid and lateral sinus thrombosis and thrombophlebitis , meningitis and otitic hydrocephalus. Further extracranial complications are categorized into intra-temporal and extra-temporal. Facial nerve paralysis, labyrinthitis, mastoid abscess, mastoiditis, and petrositis are intra-temporal complications. In contrast, extra-temporal complications include Bezold's abscess, Citelli's abscess, zygomatic abscess, meatal (Luc's) abscess, postauricular abscess , post aural fistulae , Para pharyngeal, and retropharyngeal abscess . (9) Pathways of complications for intracranial and extracranial may include retrograde thrombophlebitis, bony erosions, natural foramina and deficiencies (preformed pathways) ,surgical traumatic defects, enzymatic destruction and hematogenous spread. Complications develop due to high virulence of the organism, low patient resistance, insufficient antibiotic treatment of acute middle ear and mastoid infection, the existence of the chronic systemic disease, and antibiotic resistance of organisms, which is becoming more prevalent these days. (10) The possibilities of having extra cranial or intracranial complications are increased much more when there is a lack of awareness and knowledge. If CSOM complications are not diagnosed and treated correctly, they might be fatal. (11)

The current study aimed to evaluate different clinical manifestations and treatment options for CSOM-related problems.

METHODOLOGY

The present retrospective study included all CSOM patients hospitalized in the ENT Department with intracranial or extra cranial complications. Permission was taken from the ethical review committee of the institute. All patients were subjected to a thorough clinical examination including otoscopy, tuning fork tests with relevant examination along with microscopic examination of ear. Patients of either age or gender who had an ear discharge for > 3 months and had any one or more extra cranial or intracranial problems were included in the study. In all patients, pure tone audiometry was used to assess their hearing. Aural swab for pus culture and sensitivity was also sent. Every patient had a high-resolution computer tomography (HRCT) temporal bone scan and

all other relevant investigations. Every patient with CSOM-related intracranial problems had a Magnetic Resonance Imaging (MRI) brain scan. Exclusion criteria included those patients who refused to participate in the trial, pregnant women. Patients with a postaural/subperiosteal abscess or another type of abscess that required immediate surgery and drainage, and patients with cerebellar abscess, extradural abscess, temporal lobe abscess, and perisinus abscess, urgent abscess drainage done and patient was put on broad spectrum IV antibiotics followed by culture oriented antibiotics , and mastoid surgery were performed. In the cases of intracranial complications neurosurgical inputs were taken and appropriate multi-disciplinary treatment guidelines were followed. Depending on the disease extent, complication types, the posterosuperior canal wall erosion, and other intra-operative observations, a canal wall up or canal wall down mastoidectomy was performed. SPSS version 21 was used to analyze the data. Data were summarized using frequency tables.

RESULTS

We found that, out of 280 patients, 42 were diagnosed with CSOM complications, consisting of 23 males and 19 females. The youngest patient was five years old, while the oldest was 58 years. The majority of the cases were observed in 11 to 20 years age group (As shown in Table 1). Only 6 of the 42 individuals had bilateral CSOM, whereas the remaining 36 had unilateral CSOM.

The majority of the patients had CSOM symptoms such as ear discharge and decreased hearing, and these symptoms had been present from childhood. Out of 42 patients, almost 97.6% showed fever, 76.1% had a headache, 42% had vertigo, 50% had vomiting, and 33.3% had altered consciousness. Post auricular fistula was present in 2.3%, and post auricular swelling was seen in 59.5% of patients. Meningeal signs were observed in 8 (19%) patients, as shown in Table 2.

In the present investigation, the most prevalent intracranial consequence was meningitis. The cerebellar abscess was the second most common intracranial consequence. Not a single death occurred in our study .Morbidity was observed in 8 patients with substantial hearing loss and persistent facial paralysis. The most common extra cranial complication was reported to be a post auricular abscess.

Multiple complications were observed in the present investigation in patients with CSOM. A single intracranial problem was observed in one patient, whereas, in 2 patients, two intracranial issues were observed simultaneously. In nineteen patients one extra cranial complication was noted, while > 1 extra cranial complication was noted in seven cases. However, combination types of complications were noted in thirteen cases (As seen in Table 3).

There was severe mixed hearing loss in 15 individuals, profound hearing loss in 8 patients, and varying degrees of conductive hearing loss in the other 19 patients. During the perioperative time, granulations/polyps were found in 18 difficult CSOM, while cholesteatoma was observed in the remaining 24 cases. In 18 patients with various sub periosteal abscesses, incision and drainage were performed first, followed by definitive mastoid surgery after 5-7 days of IV antibiotic broad spectrum treatment. In 18 individuals, canal wall down mastoidectomy was performed, whereas the remaining 23 patients had canal wall up mastoidectomy/Combine approach tympanoplasty CAT (Cortical mastoidectomy with anterior tympanotomy and posterior tympanotomy).

Table 1: Description of cases among age groups

Age group (Years)	Female	Male	Total
0-10	4	5	9
11-20	3	9	12
21-30	6	5	11
31-40	2	3	5
41-50	2	1	3
51-60	2	0	2

Table 2: Descriptions of clinical features observed in patients with CSOM

Clinical Features	Number	Percentage
Fever	41	97.6
Vomiting	21	50
Headache	32	76.1
Facial weakness	5	11.9
Vertigo	18	42.8
Post auricular fistula	1	2.3
Post auricular swelling	25	59.5
Nystagmus	13	30.9
Altered consciousness	14	33.3
Meningeal Sign	8	19
Other symptoms	36	85.7

Table 3: Description of complication proportion in CSOM patients.

	Number	Percentage
Single ICC	1	2.3
> 1 ICC	2	4.7
Single ECC	19	45.2
> 1 ECC	7	16.6
Combined	13	30.9

Table 4: Description of occurrence of CSOM intracranial complications.

Intracranial complication	Number
Cerebellar abscess	2
Meningitis	8
Extradural abscess	2
Otic hydrocephalus	1
Perisinus abscess	1
Sigmoid/lateral sinus Thrombophlebitis	2
Temporal lobe Abscess	3

DISCUSSION

This study was aimed to learn about the complications and management of CSOM patients admitted to the Department of ENT. The study comprised 42 patients with CSOM, 23 of whom were male (54.8%) and 19 of whom were female (45.2%). Similar results were observed in Bento et al. (2006), and Hussain et al. (2005) (12, 13) Majority of the complications in cases observed were from the age group of 11-30 years. Other studies reported a similar presentation of complications in younger patients. (1, 14) The child's limited communication, the nature of the condition, non-culture specific use of antibiotics, and late referrals to ENT experts are all major factors for delayed diagnosis in children.

CSOM is classified according to nature of disease mainly into two categories namely mucosal type and squamosal type, mostly complications are found to be associated with squamosal variant of disease. Hallmark of squamosal variety is cholesteatoma. If cholesteatoma is found with complications then mastoidectomy should be performed as soon as possible. Mostly patients have chronic ear drainage, decreased hearing, fever, and post-aural swelling as presenting symptoms. The most typical clinical symptoms are post auricular swelling with pain and other local ear problems. Patients in this study had the most common symptoms of otorrhea, headache, and fever, similar to prior findings. (15-17) Mortality and morbidity of CSOM-related problems reduced with early diagnosis and by educating physicians about these severe symptoms and clinical signs leading to complications.

A total of 19 patients had one extra cranial complication in the present investigation, whereas 7 cases had more than one extra cranial complication. However, combined complications were observed in 13 patients. The most prevalent intracranial complication was meningitis (9 cases), followed by temporal lobe abscess (3 cases). Meningitis was the most common clinical complication reported in our study. Other studies have reported similar findings. (12, 18) Whereas Nerve et al. (2019) showed in their study that 60.8% of cases have brain abscess, followed by meningitis observed in 30.4% of cases. (19) Yorgancalar et al. (2015) observed lateral sinus thrombophlebitis as the major complication. (20)

This study's most prevalent intracranial abscess was a cerebellar abscess, followed by temporal lobe, extradural, and perisinus abscesses. Perisigmoid sinus abscess was more prevalent intracranial abscess, according to multiple research, followed by cerebellar, epidural, temporal lobe, and occipital abscesses. (21) Although the prevalence of CSOM has decreased in the modern era of antibiotics, this condition remains a significant public health issue in underdeveloped nations such as Pakistan. Many of the contributing elements that cause CSOM still exist in our community to a large extent. Furthermore, there is a lack of public understanding regarding the disease's natural history, the accompanying morbidity and death, and a low priority is given to the disease; to counter this, masses should be given more community awareness regarding this disease. (22)

The practitioner should be cautious of the risk of multiple complications in patients. To prevent overlooking various problems, all patients must have a thorough history taken and proper clinical examination. Antibiotics can sometimes disguise the signs and symptoms of problems. Ahadiah TH et. al (2020) has pointed out in his paper that most multiple pathologies are extradural in nature frequently facial weakness with extra-temporal abscesses. (23)

Recently, focus of researchers have shifted to newer frontier in management of CSOM, that is, understanding the microbial differences in various cases of disease and their manifested complication. Microbial difference and culture can point to which complication is likely to occur in patient. (24) Gene-Microbe Interactions showing predisposition to otitis media is being studied, Mittal R et al. described that the microbiome has been linked to the development of otitis media, owing to its functions as an immunomodulator and a competitor against invading microorganisms in search of resources and space. A lot of studies have found that people with otitis media have a different microbiome makeup. When invading pathogens threaten stability, effective communication between host commensals and host immune cells is critical for both reducing inflammatory cascades and boosting immune responses against invading pathogens. The microbiome's composition and integrity are thus important in disease progression. (25)

Decreased hearing left after CSOM can be conductive or sensorineural type. Hearing aids are prescribed to counter the former, with more options such as reconstruction of ossicles to bio-adaptable implants. (26) Recent research is suggesting there is a definitive role of Cochlear implant in addressing sensorineural type of deafness left behind by CSOM, but precluding factor is incomplete resolution of disease. (27)

CONCLUSION

In underdeveloped countries like Pakistan, life-threatening consequences of CSOM continue to occur in the modern antibiotic era. Inappropriate antibiotic treatment might result in disguised symptoms, leading to a delay in diagnosis. All clinicians should be aware of the dangerous clinical signs of complicated CSOM for early recognition and referral. Early detection of concomitant intracranial complications using HRCT and MRI and adequate antibiotic treatment, abscess drainage, and mastoid surgery as soon as possible are all essential to prevent mortality from CSOM complications.

Funding source: None

Conflict of interest: None

Permission: The ethical review committee approved the study of the institute.

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