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Otogenic complications of otitis media: experience at tertiary care hospital

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Abstract:

Objective: To determine the prevalence rates of intracranial and extracranial otogenic complications of otitis media.

Materials & methods: In this retrospective study conducted between January 2012 and December 2014, 41 cases of extracranial and intracranial complications of chronic suppurative otitis media (CSOM) were included. The analyses included clinical and surgical findings and overall management strategy of the patients who had CSOM complications.

Results: Mastoid abscess with or without sinus was the most common extracranial complication, occurring in 20 (48.7%) patients. This was followed by otitis externa in 17 (41.46%), mastoiditis in 15 (36.5%), facial palsy in 5(16.66%) and Bezold's abscess in 2 (2.1%). Brain abscess was the most common intracranial complication, being found in 6 (14.63%) cases, followed by meningitis in 2 (4.87%) and sigmoid sinus thrombosis in 2 (4.87%) cases. Surgery in addition to antibiotic therapy was the basis of the treatment for these conditions.

Conclusion: Although the complications rarely cause mortality, early diagnosis and prompt surgical treatment are important in order to reduce the morbidity.

Keywords: Otitis media, intracranial complications, extracranial complications

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Introduction:

Chronic suppurative otitis media (CSOM) is defined as the inflammation of middle ear cleft of more than 12 weeks duration.[1] CSOM is a dangerous disease due to its complications, which may be life threatening in some cases, particulary if neglected.[2] Nowadays, with the widespread availability of antibiotics, the complication rates from otitis media have reduced, but remain a significant problem in third world countries.[3] There are different avenues for developing complications of otitis media. The most ominous among these is the extension of infection to the brain. The inflammation and infection may be transmitted from middle ear to the mastoid apparatus, by heamatogenous spread or by direct extension. The clinical presentation of the complications depends upon the direction and extent of infection. Complications of CSOM are broadly classified into two types: extracranial and intracranial. Extracranial complications denote spread of the infection to the confines of the temporal bone. The examples of extracranial complications are mastoiditis, facial nerve paralysis, and mastoid abscess formation. Intracranial complications are denoted when the disease spreads beyond the temporal bone to the intracranial cavity. The examples of intracranial complications are meningitis, cerebral abscess, sigmoid sinus thrombosis, and otitic hydrocephalus. Complications of CSOM are more common in those cases combined with cholesteatoma and granulation tissue.[4] Complications from CSOM (with or without choles-

teatoma) occur because of both aerobic and anaerobic bacteria; most commonly Pseudomonas aeruginosa, Klebsiella and Proteus organisms.[5,6] The present study reports our experience with the clinical presentation of intracranial and extracranial complications and outcome of various otological surgical procedures in an effort to provide guidance for effective management of these complications.

Material and methods:

This descriptive study was conducted at the Department of ear nose throat (ENT), Head and Neck surgery, Dow University of Health Sciences (DUHS), Civil Hospital, Karachi, from January 2012 to December 2014. A written informed consent containing terms about inclusion in study, benefits and risks involved, was obtained from each patient. All admitted cases of intra and extracranial complications due to CSOM of any age and gender were included. Cases of complications due to acute suppurative otitis media and previously operated cases were excluded from the study. A thorough history was taken and detailed general physical examination, ENT and systemic examination was carried out and recorded on a proforma. Routine baseline investigations were done. Pure tone audiogram, X-ray mastoid where needed, computerized tomography (CT) scan/magnetic resonance imaging (MRI) of brain where needed and CT temporal bone were done in all patients. Every patient was put on intravenous broad spectrum antibiotics on admission. Patients with intracranial complications were treated first by the neurosurgery department and then shifted back to our unit. All of our patients presented with persistent disease and recurrent foul smelling otorrhoea. Radical or modified radical mastoidectomy was done in all cases. Age in years and gender, demographic and independent variables were analyzed.

The data was analyzed using SPSS version 10.0 as mean ±standard deviation (SD) or as frequencies and ratios, depending on the variables. These patients have then been studied further at each follow up at regular intervals of 6 months.

Results:

A total of 41 patients with both intracranial and extracranial complications due to CSOM were included in the study. The mean age of the patients was 25.43±9.67 years (range: 5-50 years). Females 25 (61%) out-numbered males 16 (39%) with a female to male ratio of 1.5:1 (Fig:1). Otorrhoea, found in 41(100%) and decreased hearing, in 41(100%) patients, were the most common symptoms (Table:1). Nausea and vomiting was also the most common general sign of intracranial complications. Of 30 extracranial complications, 5 (16.66%) patients were in the first decade of life, 13 (43.33%) in second, 8 (26.66%) in third, and 4 (13.33%) in fourth decade. The clinical features in extracranial cases were otorrhea in 30 (44.3%), headache in 10 (20.6%), facial palsy in 5 (16.66%), postauricular sinus or absecess in 20 (66.66%) patients. Otoscopic findings were marginal perforation in 30 (100%), cholesteatoma in 30 (100%) and granulation and/or polyp in 20 (66.66%) patients. Most common extracranial complication was mastoid abscess with or without postaural sinus, found in 20(48.7%) patients. This was followed by otitis externa 17(41.46%), mastoiditis 15(36.5%), facial palsy in 5 (16.66%) and Bezold's abscess in 2 (2.1%) patients (Table:2). All patients underwent surgical treatment. All 30 (100%) patients underwent canal wall down (CWD) mastoidectomy. The surgical findings were cholesteatoma in 30 (100%) cases. Granulation tissue and/or polyp tissue was found in 20 (66.66%) cases. 5 (16.66%) patients with facial palsy had destruction or dehiscence in the bone covering the facial nerve. Facial canal dehiscence was observed in the tympanic portion in 4 (80%), and in the mastoid portion in 1(20%). Of the 11 patients with intracranial complications, 30% belonged to the >20 years age group, while 70% belonged to the 10-20 years age group. Commonest findings on otological examination of intracranial cases were external auditory canal granulations, cholesteatomatous flakes in attic and mesotympanum. Brain abscess 14.63% was the commonest intracranial complication, followed by meningitis 4.87%, sigmoid sinus thrombosis 2.43% and cerebritis

in 2.43% cases (Table: 3).

Table 1: *Presenting complaints of patient*

SNo	Symptoms	No	%
1	Ottorrehea	41	100
2	Fever	20	48.7
3	Decreased Hearing	41	100
4	Headache Earache	20	48.7
5	Vomiting	8	19.51

Table 2: *Extracranial Complications*

SNo	Extracranial complication	No.	%
1	Mastoid abscess with or without sinus	20	48.7
2	Facial Nerve Paralysis	5	16.66
3	Otitis Externa	17	41.46
4	Mastoiditis	15	36.5
5	Bezold's Abscess	2	2.1

Table:3 Intracranial Complications

SNo	Intracranial complication	No	%
1	Brain Abscess	6	14.63
2	Meningitis	2	4.87
3	Sigmoidsinus thrombosis	1	2.43
4	Cereberitis	1	2.43

Discussion:

The frequency of complications in CSOM has declined dramatically with the widespeard availability of effective antibiotics, especially in developed countries. However, the situation is still pathetic in developing countries, especially in underpreviliged groups of people, where access to healthcare is a challenge. The complications can involve persons of all ages and both genders. In our study, the mean age of patients is quite young and majority of cases were found in <40 years age group. In fact, CSOM is a disease of children, adolescents and young adults and complications are also more common in this age group. The disease was interesting more common in females in our study. This is in contrast to a number of previous studies, where male predominance was noted. Among the complications, extracranial complications were more common as compared with intracranial complications.

Regarding the management of the complications, parenteral antibiotics were given preoperatively to all patients in this study. The parenteral antibiotics help in controlling the infection process before definitive surgical procedure. Cholesteatoma is a major surgical finding in complicated CSOM.[7] Granulations play a major role in the intracranial spread of the disease than the cholestetoma.[8] Mastoid abscess, a destructive bacterial infection of the mastoid bone and air cell system, is relatively uncommon today since the advent of modern antibiotics. However, it remains a potentially serious condition because of the complications that can lead to intracranial sequelae. Even though subperiosteal abscess is the most frequent complication of acute mastoiditis, it is a rare complication in adults. In most of the studies, mastoid abscess was found as the most common extracranial complication[9]. In Kumar et al. study, mastoid abscess was seen in 44.8% of the cases and subperiosteal abscess in 29.6%.[10] Mastoid abscess with or without subperiosteal abscess was observed in 39% of patients in this study, which is almost concordant with the previous study. Facial paralysis in CSOM causes changes in mucous membrane of middle ear, manifested by edema and infiltration with chronic inflammatory cells. Progressive spreading of these inflammatory changes causes osteitis, which provokes invasion and bone destruction of inner ear, durae or facial canal and development of palsy. On the other side, it is commonly considered that facial palsy appears with cholesteatoma of middle ear. Cholesteatoma directly destroys bones and provokes inflammation and also makes compression on nerve itself. CSOM causing facial nerve paralysis is most frequently due to cholesteatoma. Kim et al. found facial palsy in 1.33%.[11] Hossain et al reported facial palsy in 3%.[12] In our study, facial palsy was found to be in 16.66% cases which is comparable to that reported by Mustafa et al., as 16.48%.[13] Facial nerve palsy secondary to CSOM should be treated surgically. In this study, all patients underwent CWD mastoidectomy Four patients with facial palsy had bony destruction or dehiscence of the facial canal. Facial canal destruction was observed in tympanic portion in 4, mastoid portion in 1 case. Chan et al.,[14] and

Yetiser et al.,[15] has also found same features in their series. In all 5 patients with facial palsy who underwent surgical treatment, cholesteatomas were encountered during the surgery. The commonest intracranial complication encountered in this study was brain abscess, found in 14.63% of cases, followed by meningitis in 4.87% and lateral sinus thrombosis in 2.43% of cases. This is comparable to the study of Datta et al.,[16]. In contrast, in the study by Yorgancilar et al.,[17] meningitis was found in 9% of cases and brain abscess in 6.5% cases. Beside this, in the later series, the lateral sinus thrombosis was found in 19.5% of cases, being the most common intracranial complication. Same results were reported by Yagiz et al.[18] Memon et al., found subdural abscess as the most common intracranial complication.[19] In our series, brain abscess was common because of late referrals and delay in early diagnosis. Brown et al., reported that cholesteatoma and were the major risk factors for severe intracranial complications.[20] Similarly, we had found cholesteatoma and granulations in all cases with intracranial complications. Primary lesions, most of which were found to be of dangerous type of CSOM, were further managed at a second sitting after ensuring complete resolution of complicating pathology by radical mastoidectomy.

Conclusion:

In conclusion, despite the overall decreased frequency as a result of increased health care services, CSOM can still cause complications. Prompt diagnosis and both medical and surgical treatments are necessary to decrease the morbidity. Mastoiditis is the most common extracranial complication and brain abscess is the most common intracranial complication of CSOM in our setting

Role and contribution of authods:

Dr. Zeba Ahmed: Major contribution to conception and design of work, major part in collecting the data and final approval of the version to be published. The corresponding author takes primary responsibility for communication with the journal during the manuscript submission, peer review, and publication process, and ensures that all the journal's administrative requirements

Dr. Tarique Zahid (CO author): data collector and also analysed the data

Dr. Danish ur Rahim(CO author): data collector and drafted the work revised it critically for important intellectual content

Role and contribution of authors:

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Conflict of interest: None

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