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A study on Clinico-Epidemiological Profile of Intracranial Complication of CSOM and their Management

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Abstract

Aim and Objectives: The present research was undertaken to study the current clinical and epidemiological profile of patients with intracranial complication of CSOM, management and outcome of the treatment. **Methods:** This study was conducted on 25 cases of intracranial complication of CSOM, at Tertiary referral centre and medical institute in Mumbai, over a period of 20 months. Each case was assessed for following parameters: sex, age groups, socioeconomic strata, clinical presentation, diagnosis, therapeutic procedures and its outcome.

Results: Overall incidence of intracranial complications was found to be 0.7%. Mean age of the patients was 16.20 years. There was a male preponderance (76%), with most of the patients (56.0%) belonging to the age group of 10–19 years. Patients presented with complaints of fever (100%), otorrhoea (100%), headache (92%), vomiting (76%), decreased hearing (72%), altered sensorium (64%) and convulsions (52%). Brain abscess was the most common complication (36%), followed by sinus thrombosis seen in 28% and meningitis was observed in 16% of cases. 20 % of patients had multiple intracranial complications. Surgical intervention was required in all cases, with a morbidity of 12%. There was no mortality in our study.

Conclusion: Intracranial complications of CSOM remain a serious and potentially life-threatening condition, particularly in resource-limited settings. Early diagnosis, prompt initiation of antibiotics, and timely surgical intervention are crucial for improving outcomes.

Keywords: Chronic suppurative otitis media (CSOM), Intracranial complication, Otorrhoea, Brain abscess, Sigmoid sinus thrombectomy

Introduction

Chronic suppurative otitis media (CSOM) of unsafe nature is a common entity which is curable and not associated with complications when treated in early stages. When unattended it gives rise to various serious complications such as intracranial and extracranial (intratemporal). Nevertheless, very little has changed as to their pathogenesis [1,2]. The presence of offensive otorrhea and headache with intermittent fever should alert the clinician to the possibility of underlying intracranial complications. A careful history and physical examination is important in diagnosing these complications [3]. In developing countries, this condition is still a matter of grave concern.

In some cases of chronic suppurative otitis media (CSOM) where the ear might be regarded as safe, it may develop intracranial complications including brain abscess [4]. Brain abscess was the first complication of the otitis media to be recognised and the first one to be treated by surgery [5]. In fact, the commonest cause of the abscesses in the temporal and cerebellar region is ear infections [6]. It heads the list of intracranial complications in many case studies [7] and in other series it is superseded only by meningitis [8]. With the introduction of antibiotics, sophisticated imaging techniques and new more refined surgical techniques, intracranial complication rates have been reduced to 0.04–0.15% [9]. Treatment of these complications requires close collaboration between

the general physician, otolaryngologist, neurosurgeon, radiologist and microbiologist.

Despite the advent of antibiotics and immunizations in the last century, complications of otitis media remain quite frequent, especially in developing countries, having high morbidity and mortality rates, and pose a challenge to the otorhinolaryngologist. The present study primarily aims to study the current clinical and epidemiological profile of patients with intracranial complication of chronic suppurative otitis media (CSOM), management and outcome of the treatment.

Material and Methods

After obtaining Institutional Ethical Committee approval and written informed consent from patients or parents, this prospective observational study was carried out in 25 cases of intracranial complication of CSOM, at a tertiary referral centre and medical institute in Mumbai, over a period of 20 months. This hospital mainly caters to the population of lower-socioeconomic status, with the majority of cases visiting it as a referral centre, after receiving primary or secondary care. The study included patients with clinical features of intracranial complications of CSOM and willingness to participate in the study, with availability of informed consent. Immune-compromised patients and patients not willing to participate in the study were excluded from the study.

A pre-designed, semi-structured case record form was used to collect detailed demographic and clinical history of each case, numbered consecutively, along with detailed investigations and medical interventions. Apart from baseline investigations, all cases were evaluated in detail with radiological imaging to confirm diagnosis. After initial stabilization, further surgical treatment was planned accordingly.

Each case was assessed for following parameters: sex, age groups, socioeconomic strata, clinical presentation, diagnostic viz. radiological features, intraoperative otological findings, endocranial localization of complication, therapeutic procedures (otosurgical treatment) and its outcome. Individual case data were analyzed using standard statistical techniques.

Observation and Results

Patients diagnosed as having Intracranial complication of CSOM were started with a combination of intravenous antibiotics, likely a third generation cephalosporin, with gentamicin and metronidazole. Anticonvulsant was used in the study population only if there was previous history of convulsions, in patients having convulsions during the course of illness and in cases with intracranial abscess. A neurological and ophthalmological assessment was made on priority basis for complete evaluation of neurological status and fundus examination respectively. None of our patients underwent preoperative audiological evaluation.

Of the 25 cases, 19 (76%) were males and 6 (24%) were females, showing a male preponderance. A higher incidence of complications was found in the younger age group, as most of the participants belong to 10–19 years (56.0%) followed by the age group 1–9 years (24%), (Table 1). Mean age of the patients were 16.20 years ± 10.36. Most of the participants were from poor socioeconomic status (as per Prasad's classification), 24% of the cases belonged to class 4 and 76% of the cases belonged to class 5.

Table 1: Age-wise distribution among cases

Age (yr)	No.	Percentage
< 10	6	24.0%
10 to 19	14	56.0%
20 to 29	4	16.0%
30 to 39	0	0%
40 to 49	0	0%
50 to 60	1	4.0%

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Total	25	100.0%

Table 2 shows the presenting complaints of the patients. All patients in the study presented with fever and otorrhoea followed by headache, vomiting, decreased hearing, altered sensorium and convulsions. The study revealed Cholesteatoma in 96%, with non-cholesteatoma in 4%.

Table 2: Distribution of Clinical features among cases

Clinical feature	**No.**	**Percentage**
Fever	25	100%
Otorrhea	25	100%
Headache	23	92.0%
Vomiting	19	76.0%
Decreased hearing	18	72.0%
Altered sensorium	16	64.0%
Convulsions	13	52.0%
Giddiness	6	24.0%

Of the 4320 patients of unsafe chronic suppurative otitis media, who attended our institution during the study period, intracranial complications were seen in only 25 patients. Thus overall incidence of intracranial complications was found to be 0.7%. Table 3 shows the various intracranial complications seen in our study.

Table 3: Distribution among the cases based on Neuroimaging

	Variables			**No (%)**
Intracranial complications (Isolated)	a. Meningitis			4 (16%)
	b. Brain Abscess	i. Cerebellar	4	9 (36%)
		ii. Temporal	5	
		iii. Parieto-occipital	0	
	c. Subdural Empyema			0
	d. Sinus thrombosis			7 (28%)
	e. Ottic hydrocephalus			0

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Multiple Intracranial complications (combined)	Meningitis + Temporal abscess + Ottic hydrocephalus	1 (4%)
	Meningitis + Cerebellar abscess + Ottic hydrocephalus	1 (4%)
	Parieto-occipital abscess + subdural empyema	1 (4%)
	Parieto-occipital abscess + sinus thrombosis	1 (4%)
	Temporal abscess + sinus thrombosis	1 (4%)
Total		**25 (100%)**

With regards to surgical procedures, 7 (28%) patients underwent Transmastoid Sinus thrombectomy with Modified Radical Mastoidectomy (MRM); 9 (36%) patients underwent Transcranial drainage with Interval Modified Radical Mastoidectomy (Interval MRM), 4 (16%) patients underwent Transmatoid drainage with Modified Radical Mastoidectomy (MRM); 4 (16%) patients underwent only Interval Modified Radical Mastoidectomy (Interval MRM); whereas 1 (4%) patient underwent Transmastoid drainage with Sinus thrombectomy and Modified Radical Mastoidectomy (MRM).

Discussion

Chronic suppurative otitis media (CSOM) remains a significant health concern. Despite the advent of antibiotics and advanced imaging techniques, intracranial complications of chronic suppurative otitis media (CSOM) continue to pose a serious threat with regards to high morbidity and mortality, particularly in regions where access to healthcare and early intervention is often limited. The present study attempted to analyze 25 cases with intracranial complications of CSOM, with regards to their clinical profile, management and outcomes.

In our study, 76% of the cases were men, suggestive of a male preponderance. consistent with previous studies [10-12]. The youngest patient was 6 years old and the eldest was 60 years. The majority of patients with intracranial complications of CSOM were in the 10–19 years age group (56%), followed by the 1–9 years age group (24%). Our data correlated with previous studies, identifying children and adolescents as the most vulnerable populations for CSOM and its complications [10-12]. CSOM is highly prevalent with overcrowding, poor hygiene, frequent upper respiratory tract infections and inadequate nutrition. However, lack of education, negligence towards disease, poor access to health care system and non-affordability of treatment measures are some of the reasons responsible for its predominance in lower socioeconomic strata [13,14,15]. In present study, intracranial complications were more common in patients from lower socioeconomic strata, i.e. class 4 and class 5 (24% and 76% respectively).

The most common presenting symptoms in our study were fever and otorrhea (100%), followed by headache (92%), vomiting (76%), and decreased hearing (72%). These findings are consistent with previous reports, where fever and otorrhea are often the initial signs of CSOM, while headache and vomiting are indicative of intracranial complications such as meningitis or brain abscess [16]. Altered sensorium (64%) and convulsions (52%) were also observed, particularly in patients with brain abscess or meningitis, underscoring the need for prompt neurological evaluation in such cases. Cholesteatoma was present in 96% of the cases. Cholesteatoma is a well-known risk factor for intracranial complications due to its erosive nature and ability to spread infection to adjacent structures, including the brain and meninges [17].

The overall incidence of intracranial complications in our study was 0.7%, which is consistent with recent studies that have shown a decline in such complications due to improved diagnostics and

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therapeutic interventions [9]. Brain abscess was the most common complication (36%), with temporal lobe abscesses being more frequent than cerebellar abscesses. This is in line with previous studies, where the temporal lobe is often the primary site of infection due to its proximity to the middle ear [3]. Meningitis was observed in 16% of cases, while sinus thrombosis was present in 28%. Sinus thrombosis, particularly lateral sinus thrombosis, is a well-documented complication of CSOM and is often associated with severe systemic symptoms such as high fever and headache. 20 % patients had multiple intracranial complications with variable combinations of meningitis and brain abscess accompanied by sinus thrombosis, subdural empyema or otitic hydrocephalus, which was comparable with other studies [18].

The management of intracranial complications of CSOM requires a multidisciplinary approach. In our study, all patients were initially stabilized with intravenous antibiotics. Surgical intervention was required in all cases, with the most common procedures being transmastoid sinus thrombectomy with transcranial drainage with interval modified radical mastoidectomy (36%) and transmastoid sinus thrombectomy with modified radical mastoidectomy (28%). These findings are consistent with current guidelines, which recommend surgical drainage of abscesses and mastoidectomy to control the primary source of infection . The use of interval mastoidectomy in some cases reflects the need for staged surgery in critically ill patients who require initial stabilization before definitive treatment [4,5,19].

We had a morbidity of 12% (Three) patients. Postoperative facial nerve palsy was seen in only 1 patient. The complication was recognised immediately intraoperatively and facial decompression was done in the same sitting to decrease morbidity. One patient had persistent vertigo which resolved after 3 months and one patient had hemiparesis postoperatively which improved after 1 month of medical treatment and physiotherapy. There was no mortality in our study.

Our study has a few limitations. The sample size was relatively small, which may limit the generalizability of the findings. Also, the lack of preoperative audiological evaluation is a notable limitation, as hearing loss is a significant morbidity associated with CSOM and its complications.

Conclusion:

Intracranial complications of CSOM remain a serious and potentially life-threatening condition, particularly in resource-limited settings. Early diagnosis, prompt initiation of antibiotics, and timely surgical intervention are crucial for improving outcomes. Our study highlights the importance of a multidisciplinary approach in managing these complex cases and underscores the need for increased awareness and access to healthcare in vulnerable populations. Further research with larger sample sizes and long-term follow-up is needed to better understand the risk factors and optimal management strategies for intracranial complications of CSOM.

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