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# Intracranial complications of CSOM in pediatric patients: A persisting problem in developing countries



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## ABSTRACT

**Background:** Intracranial complications (ICC) of chronic suppurative otitis media (CSOM) occur even in the antibiotic era. These complications are commonly seen in pediatric patients due to poor hygiene and low immunity. They are more prevalent in developing countries due to illiteracy, low socioeconomic status and lack of access to health care facilities.

**Objective:** To study the incidence, clinical profile, treatment and outcome of pediatric patients presenting with intracranial complications of chronic suppurative otitis media.

**Methods:** A retrospective analysis of intracranial complications of CSOM in pediatric patients was conducted over a period of 15 years at a tertiary level institute. Data regarding age, sex, clinical presentation, laboratory and radiological investigations, management, duration of hospitalization, and outcomes were recorded.

**Results:** There were 142 patients, in the pediatric age group, diagnosed as having intracranial complications due to chronic otitis media during the study period. There was a decline in the incidence of ICC of CSOM. The most frequent intracranial complication seen was brain abscess (58.5%). All patients were administered intravenous antibiotics for 4–6 weeks and underwent canal wall down mastoidectomy. Neurosurgical intervention was considered in the required patients. The case fatality rate in our study was 2.8% (4 patients).

**Conclusion:** Otogenic intracranial complications can be fatal if not managed appropriately and timely. Broad spectrum intravenous antibiotics are usually required for 4–6 weeks with or without neurosurgical intervention and mastoid exploration. A high index of suspicion is required in all patients presenting with danger symptoms.

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## 1. Introduction

The recent advances in immunization and antibiotics have led to a dramatic decline in the incidence of chronic suppurative otitis media (CSOM) as well as its complications. After the introduction of antimicrobial agents, there has been a reduction in the incidence of intracranial complications of otitis media from 4% to 0.24%, and mortality from 25% to 8% [1–3]. Despite this overall decline, life threatening complications of CSOM still persist. This is particularly common in developing countries due to poverty, ignorance, and lack of health care facilities. Also, emerging bacterial resistance to antibiotics have been implicated in the increasing incidence of complications in some cases.

The purpose of this study is to report the incidence, clinical features and management of intracranial complications of CSOM in pediatric patients at a tertiary level institute. This study was undertaken as there is paucity of literature on the intracranial complications of CSOM in pediatric patients, particularly from this part of the world.

## 2. Methods

A retrospective analysis of intracranial complications of CSOM in pediatric patients was conducted over a period of 15 years, from 2001 to 2015, at Maulana Azad Medical College and Lok Nayak Hospital, New Delhi, India. Patients were evaluated with respect to the clinical, radiological and laboratory findings. Data regarding age, sex, clinical presentation, laboratory and radiological investigations, management, duration of hospitalization, and outcomes were recorded. The number of cases of ICC occurring every 5

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years were recorded and the incidence compared.

In this study, all the patients underwent detailed ENT and neurological examination. Pure tone audiometry (PTA) was done in all the cases. All patients underwent high resolution computed tomography (HRCT) temporal bone with contrast enhanced computed tomography of brain. Magnetic resonance imaging (MRI) of brain and venography was done in the required cases. Neurology/Neurosurgery opinion was sought in all the cases and surgical intervention was carried out in the required cases. Mastoid exploration was done in all the patients, either along with neurosurgical intervention or after resolution of the intracranial complication. All the patients received a combination of broad spectrum antibiotics.

### 3. Results

There were 142 patients, in the pediatric age group, diagnosed as having intracranial complications due to chronic otitis media during the study period (Table 1). The age ranged from 3 to 20 years with an average of 13.8 years. The most common age group affected was 10–15 years. There were 85 (60%) males and 57 (40%) females. Majority of the patients (65%) belonged to low socioeconomic class. Prior to presentation with complication, only 22% patients had consulted a specialist for treatment of CSOM and had received antibiotics, systemic or topical. There was a decline in the incidence of ICC of CSOM over a period of 15 years in our study (Fig. 1).

The most common presentation was ear discharge followed by hearing loss, headache, fever, vestibular symptoms, neck stiffness and seizures. Evidence of atticointral disease was seen in all the patients. The other common signs were papilloedema, meningeal signs and cerebellar signs. The most frequent intracranial complication seen was brain abscess (temporal lobe and cerebellar abscess), which accounted for 58.5% of the complications. This was

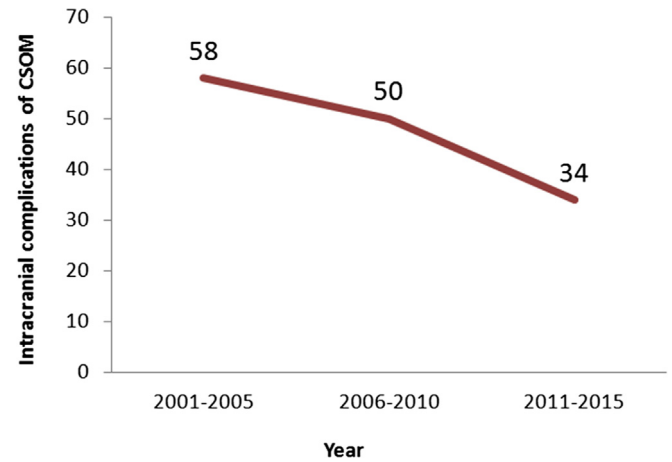


Fig. 1. Graph showing a decline the incidence of ICC of CSOM in our study.

followed by meningitis, lateral sinus thrombosis and extradural abscess. Multiple complications were seen in 11 patients (7.8%).

#### 3.1. Brain abscess

Among the 83 patients with brain abscess, 44 had temporal lobe abscess and 39 had cerebellar abscess. All brain abscesses were on the same side as the ear disease. Of 83 cases, there were 50 males and 33 females. Age incidence ranged from 5 to 20 years with an average of 14.4 years. The main presenting systemic symptoms were headache and fever. Other complaints included seizures, neck stiffness and gait instability. Diagnosis of brain abscess was made on CT/MRI brain. The size of abscess ranged from 1.5 to 5.0 cm, with a mean of 3.2 cm. All patients were started on broad spectrum intravenous antibiotics. The antibiotic regimen administered was intravenous vancomycin, ceftriaxone and metronidazole. Conservative management with broad spectrum intravenous antibiotics for 4–6 weeks was carried out in 53 patients. These patients responded clinically or radiologically to medical treatment. Neurosurgical drainage of the abscess was required in 30 patients. It was carried out in patients not responding clinically or radiologically to treatment, in expanding abscess with mass effect despite medical therapy and in abscess with potential to rupture into ventricles. All of the patients underwent modified radical mastoidectomy during the course of the therapy.

#### 3.2. Meningitis

Meningitis accounted for 24.6% (35 cases) of the intracranial complications in our study. The age ranged from 3 to 19 years with an average of 12.6 years. The main systemic complaints were fever, headache and neck stiffness. Diagnosis was made based on clinical signs of meningitis, lumbar puncture and MRI brain. All patients were managed conservatively with intravenous broad spectrum antibiotics. After resolution of meningitis, all the patients underwent modified radical mastoidectomy.

#### 3.3. Lateral sinus thrombosis

Nine patients had lateral sinus thrombosis. The average age of these patients was 14.3 years. Presenting symptoms included ear discharge, hearing loss, fever, neck stiffness, nausea/vomiting. Diagnosis was based on MRI brain and venography. The location of the thrombosis in all of these patients was in the sigmoid sinus ipsilateral to the side of ear infection. All the patients were

Table 1  
Clinical features of patients in our study.

	Number	Percentage
Age (in years)		
>5	4	2.8%
5–10	43	30.3%
10–15	59	41.6%
15–20	36	25.3%
Total	142	100%
Sex		
Male	85	60%
Female	57	40%
Symptoms		
Ear discharge	142	100%
Hearing loss	136	95.8%
Headache	130	91.5%
Fever	87	61.3%
Vestibular symptoms	38	26.7%
Neck stiffness	31	21.8%
Seizures	26	18.3%
SIGNS		
Atticoantral disease	142	100%
Papilloedema	36	25.4%
Meningeal signs	31	21.8%
Facial palsy	18	12.7%
Nystagmus	9	6.3%
Cerebellar signs	25	17.6%
Intracranial Complication		
Cerebellar abscess	39	27.5%
Temporal lobe abscess	44	31%
Meningitis	35	24.6%
Lateral sinus thrombosis	9	6.3%
Extradural abscess	4	2.8%
Multiple complications	11	7.8%

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