



Case Report

Chronic Suppurative Otitis Media leading to cerebellar brain abscess, still a problem in 21st century: A case report

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A B S T R A C T

Introduction and importance: Chronic suppurative otitis media (CSOM) is a chronic inflammation of the middle ear associated with tympanic membrane rupture and purulent discharge for at least 6 weeks. Owing to the proper use and easy availability of antibiotics, these types of cases are rare in developed regions, but they are still occasionally seen in the developing world with poor hygiene and a lack of availability of antibiotics and immunizations.

Case presentation: Patient presented with complaints of headache, yellow-colored discharge from ear, fever and vomiting. The patient's Glasgow Coma Scale (GCS) was 12/15, neck stiffness and positive Kernig's sign, horizontal nystagmus and exaggerated deep tendon reflexes. Positive CSF findings and Magnetic Resonance Imaging showing right sided cerebellar abscesses, led to the diagnosis of right-sided CSOM leading to cerebellar brain abscess. Patient was treated with anti-pyretics, intravenous mannitol, IV and topical antibiotics and IV-dexamethasone. Abscess evacuation was performed in neurosurgery department while mastoidectomy was performed in ENT department. Patient's condition improved quickly and was discharged with regular follow-up.

Discussion: CSOM is a long-standing middle ear infection, associated with ear discharge and permanent perforation of the tympanic membrane. Divided into two main types, a) Tubo tympanic b) Atticoantral. CSOM occasionally presents with severe intracranial complications, especially in developing countries.

Conclusion: CSOM is a chronic inflammation of the middle ear. Without early and effective management, it can lead to serious intracranial complications. So, diagnosis of complications like cerebellar abscess should be on the differential while dealing with patients with CSOM in developing countries.

1. Introduction

CSOM is chronic inflammation of the middle ear associated with tympanic membrane perforation and chronic purulent discharge [1]. Commonly, a patient is diagnosed with CSOM after the ear discharge has lasted at least 6 weeks [2]. About 31 million cases of CSOM are reported annually, which coincides with an incidence rate of 4.76% [3]. A review of epidemiology indicates a major predilection toward resource poor settings for this disorder, its prevalence being <1% in the United States [2] and 7.8% in India, however, economic conditions are not the only factor to fully explain this disparity. Crowded living conditions, limited healthcare and antibiotic access, smoke exposure at home, limited hygiene and nutrition, among other factors, also play a contributing role.

WHO designates a prevalence of more than 4% to be a critical public health problem [4,5]. Although exact countrywide data on prevalence is not available for Pakistan, being a resource-poor country, the prevalence of CSOM in Pakistan is likely high. A number of studies have identified bacteriologic prevalence and complication rate in the cases of CSOM

that presented to hospitals in Pakistan [6,7]. From 1978 to 1990, a study reported, a total of 0.36% of patients developed intracranial complications and with a mortality rate of 18.4% [8].

In this case report, we present the case of a 28-year-old male who presented with CSOM complicated with intra-cerebellar abscess and meningoencephalitis following traumatic brain injury. These medical complications are rarely observed in developed countries. But they are still encountered in resource-poor countries where patients mostly present when complications have been developed, so clinicians should keep in mind when working in these type of settings. Also, future researches should strive to explore the causes and prevalence of deadly intracranial complications of CSOM in developing countries. This case report has been written according to the SCARE guidelines [9].

2. Case Presentation

Our case portrays a 28-year-old male, normotensive, normoglycemic, patient with history of recurrent ear infection for 10 years and road

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traffic accident two weeks back, presented in emergency with complaint of headache for 10 days that was initially moderate but progressed to severe in intensity, mostly at back, worsening with exposure to light, associated with vertigo, double vision and lack of sleep. Headache was associated with vomiting for two days, four to five episodes per day, non-projectile, non-bilious, and without any blood. Patient also complained of intermittent fever for two days, which was high grade, peaked at 104F, associated with rigors and chills relieved by medications and cold sponging. It was associated with neck stiffness, yellow-colored discharge from the right ear, and gradually increasing altered sensorium.

On examination, the patient's Glasgow Coma Scale (GCS) was 12/15. Signs of meningeal irritation were positive (neck stiffness and kernig's sign). Patient had horizontal nystagmus and exaggerated deep tendon reflexes while fundoscopy was normal. Relevant physical examination findings are summarized in [Table 1](#).

Magnetic Resonance Imaging (MRI) showed right sided otomastoiditis with adjacent intraparenchymal cerebellar abscesses. No evidence of sinus venous thrombosis was seen. The MRI is given below in [Fig. 1](#).

Based on the physical examination findings, laboratory reports and imaging scans, a final diagnosis of right-sided chronic suppurative otitis media leading to cerebellar brain abscess was made.

In the medicine ward, initial supportive treatment of patients started using anti-pyretics, intravenous (IV) mannitol, IV and topical antibiotics and IV dexamethasone. Patient's condition improved, and was shifted to neurosurgery department for evacuation of abscess. After evacuation of the abscess, patient was shifted to Ear-Nose-Throat (ENT) department where mastoidectomy was performed to stop recurrence of otitis media. The patient was discharged with regular follow-up.

3. Discussion

CSOM is a long-standing middle ear infection, associated with ear discharge and permanent perforation of the tympanic membrane. The perforation is permanent because the edges of the perforation are lined

Table 1
Summary of physical examination.

Targeted system	Findings
1 General Physical Examination	<ul style="list-style-type: none"> Blood pressure = 125/85 mmHg Temperature = 102 F Pulse rate = 106/min Respiratory rate = 18/min Spo2 = 98% at room air Finger stick glucose = 135mg/dl Inflammation of external auditory canal with yellow color discharge present in right ear canal
2 Central Nervous System	<ul style="list-style-type: none"> Patient was drowsy, not oriented in time, place and person GCS of 12/15 Neck stiffness + Kernig's sign positive Horizontal Nystagmus Positive on lateral gaze in both eyes Exaggerated deep tendon reflexes Gait and other cerebellar sign could not be assessed. Pupils were bilaterally equal, reactive to light. Tone of muscles was normal in both side of limbs. Planters were bilateral down going. Sensory system and all cranial nerves could not be assessed Fundoscopy normal
3 Gastrointestinal System	No significant findings related to case
4 Cardiovascular system	No significant findings related to case
5 Musculoskeletal System	<ul style="list-style-type: none"> No swelling of joints or stiffness. No redness or tenderness

Based on the examination, meningoenophthalitis, space occupying lesion or acute-on-chronic traumatic brain injury were suspected. Labs reports were ordered to confirm the diagnosis. Complete blood count report is given in [Table 2](#).

Table 2
Complete blood count.

Test	Value
1 Hemoglobin	12 gm/dl
2 Hematocrit	35.8%
3 Red Blood Cells count	3.98×10^6 /UL
4 Mean corpuscular volume	89.9 fl
5 Total leukocyte count	12.2×10^3 /μL
6 Lymphocytes	3.3%
7 Monocytes	41.5%

Cerebrospinal fluid examination showed high lactate dehydrogenase, high proteins, low glucose and positive cytology. These findings are presented in [Table 3](#).

Table 3
Cerebrospinal fluid (CSF) analysis.

CSF Test	Value
1 Appearance	Clear Watery
2 Volume	2.0 ml
3 Lactate	55 U/L (raised)
4 dehydrogenase	
4 Glucose	31 mg/dl (decreased)
5 Proteins	135 mg/dl (increased)
6 Red blood cells	5000 cells/mm3
7 White blood cells	40 cells/mm3
8 Neutrophils	90%
9 Lymphocytes	10%
10 Cytology	A proteinaceous background against which numerous RBCs, few neutrophils and occasional lymphocytes are seen.
11 Gram/ZN/Fluorescent stain	No micro-organism or Acid Fast Bacilli seen in smear examined

by squamous epithelium so that prevents natural closure of the perforation. The drainage lasts more than 12 weeks. It begins with the irritation and subsequent inflammation caused by an aerobic bacterial infection [10] of the middle ear mucosa. Inflammatory response creates mucosal edema and increased middle ear discharge eventually leading to tympanic membrane perforation. It is divided into two types: a) Tubo tympanic b) Atticoantral Tubotympanic type is a relatively safe or benign type. It involves anteroinferior portion of the middle ear cleft and is associated with a central perforation. The risk of serious complications is minor [11].

Atticoantral type is a dangerous type. It involves posterosuperior part of the cleft including the attic, antrum and the mastoid. It is associated with a peripheral or a marginal perforation. The risk of complications is high. Among extra cranial complications, the auricular sinus (25%) was the most common. Subperiosteal abscess 18%, and meningitis 10% were relatively common intracranial complications [12].

Our patient presented with occipital headache, vomiting, a very high-grade fever (104F) associated with signs and symptoms of meningitis (neck stiffness, Kernig's sign positive) (4) 8–10 days after a motor vehicle accident. He reported a 10-year history of recurrent ear infections. CBC, CSF analysis and lumbar puncture were ordered along with an MRI of the head. The labs pointed towards the diagnosis of meningoencephalitis and the imaging showed a focal area of cerebellar necrosis surrounded by membrane. Mastoiditis was also visible. So, we concluded that right-sided chronic suppurative otitis media led to formation of cerebellar abscess in this patient [13,14].

This is a unique case in which an asymptomatic person with a very long history of otitis media had developed a cerebellar abscess which was incidentally discovered after a motor vehicle accident because he developed symptoms of a cerebellar abscess. These types of cases are still occasionally seen in the developing world in people with poor hygiene and lack of availability of antibiotics and immunizations. It can be absolutely fatal if not treated promptly and therefore, any danger signs pertaining to long-standing otitis media should be investigated with

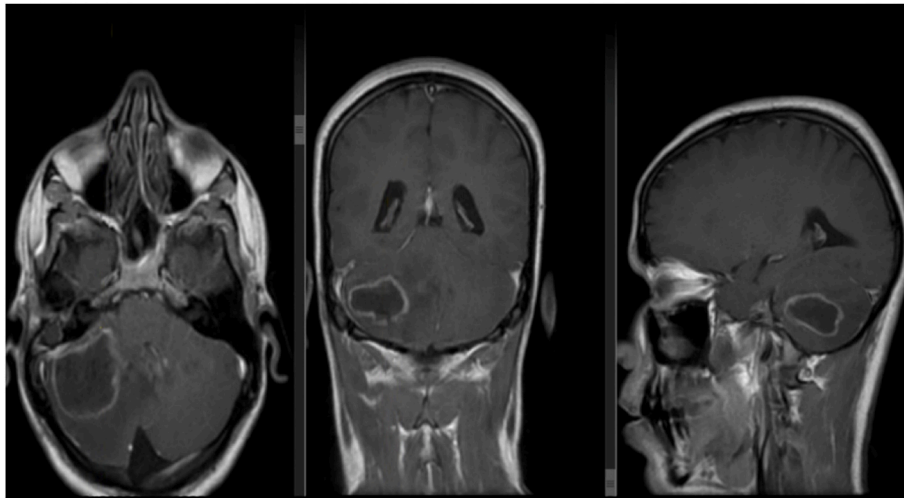


Fig. 1. MRI scan.

brain imaging to rule out its lethal complications [15]. Further research is needed to address the problems and possible solutions of how to decrease the incidence of CSOM complications in developing countries.

4. Conclusion

Chronic suppurative otitis media is a common diagnosis worldwide. Our case describes a young male patient who has been suffering from CSOM for the past 10 years now presented with signs of cerebellar abscess and meningeal irritation. He was diagnosed based on the symptoms and imaging tests; treated with antibiotics, steroids, abscess evacuation and mastoidectomy. Due to the lack of awareness, easy availability of medical treatment; these types of cases are still present in developing countries.

Ethical approval

Not required as we have acquired consent from the patient.

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Author contribution

All authors contributed towards data analysis, drafting and revising the paper, gave final approval of the version to be published and agree to be accountable for all aspects of the work.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Research registration

1. Name of the registry:
2. Unique identifying number or registration ID:
3. Hyperlink to your specific registration (must be publicly accessible and will be checked):

Guarantor

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Provenance and peer review

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Declaration of competing interest

None.

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