

Uncommon complications of Otitis media in a tertiary center: A Case Series

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Background: *The aim is to report cases of unusual and infrequent complication of otitis media in North-central Nigeria, as well as evaluate their outcome. We present 7 case reports of patients with unusual complications from otitis media in our setting.*

Case 1: *A fifteen year old Yoruba girl presented at the Accident and emergency of our hospital with a 2 week history of left sided ear ache, 10 day history of left sided ear discharge and 3 day history of jaw and neck stiffness. There was a positive history of use of 'Turari' locally prepared perfume and application of an ear drop from a local chemist. Caregiver said patient was fully immunized. Examination revealed a young girl, conscious and alert, not pale, anicteric with stiff neck, positive and rigid joints on movement.*

Case 2: *An 8 year old Yoruba girl presented first to the eye clinic with 2 days history of swelling of the right eye, associated pain, reduction in vision and eyelid swelling without eye discharge or itch. There was a of purulent ear discharge 8 days prior to eye symptoms. No history of trauma was obtained. Examination revealed proptosis with zygomatic abscess extending to the post-auricular. She had incision and drainage with systemic and topical antibiotics for ear dressing. Outcome was uneventful.*

Conclusion: *The unusual complication of otitis media still occurs in our environment usually due to late presentation and contamination of wound. Prevention is still the best option.*

Keywords: Otitis Media, Complications, Otogenic Tetanus, Ophthalmic, Proptosis

Introduction

Otitis media is a generic term¹ and includes the acute otitis media, chronic otitis media, otitis media with effusion also referred to as non-suppurative otitis media¹. It is defined as the presence of infection or inflammation in the middle ear cleft, which could be through the eustachian tube to the middle ear proper and the mastoid air cells. It could be acute, subacute or chronic depending on the duration of infection which could be within 3 weeks, 3-8 weeks or more than 8 weeks respectively^{2,3}. Chronic suppurative otitis media (CSOM) is defined as a disease condition of non-healing perforation of the tympanic membrane associated with chronic inflammatory changes of the muco-periosteum of the middle ear cleft with or without mucoid or mucopurulent otorrhea of more than three months duration. CSOM is a childhood disease and the commonest ailment seen by otorhinolaryngologists in Nigeria^{4,5}. Antibiotics have produced an overall decline in the frequency of complications of otitis media relative to the preantibiotic era.

However, severe complications still occur and may be associated with high mortality⁶ and this is most common in developing countries and in certain high risk populations in developed nations⁷. These complications are classified into intracranial and extracranial complications. Extracranial complication can be further divided into intratemporal and extra temporal complications such as facial nerve paralysis, subperiosteal abscess (mastoid and Bezold's abscess) labyrinthitis, post auricular fistula and hearing loss^{8,9} while otitic meningitis, brain abscess, cerebellar abscess, perisinus abscess, lateral sinus thrombosis and extra dural abscess^{7,10} were common intracranial complication. Multiple complications existed simultaneously in many patients^{7,10}. Brain abscess, extradural abscess, otitic meningitis and lateral sinus thrombosis are the major causes of mortality^{7,9,10} in patients with intracranial complication of otitis media. Complications like tetanus, ruptured globe, peri-orbital oedema, proptosis, chemosis, orbital abscess and external ophthalmoplegia following chronic otitis media are not very common in literature and may be difficult to manage when the patients present late

or are inadequately treated. The management of some of this complication requires multi specialist care such as Ear, Nose and Throat (ENT) surgeons, ophthalmologist and neuro-surgeon to reduce the morbidity and mortality.

In this article, we managed 7 cases of otitis media with uncommon complications. Five had tetanus and two had orbital complications. All were in the paediatric age group and their ages ranged from 10 months to 15 years. The risk factors for otitis media were low socioeconomic status, overcrowding, history of trauma to the ear, improperly managed acute suppurative otitis media and recurrent upper respiratory tract infection. There were 3 Males (42.9%) and 4 Females (57.1%). All the patients had poor socioeconomic background. The aim of this article is to report the seven cases of the unusual complications of otitis media in our center.

Case 1

A fifteen year old Yoruba girl presented at the Accident and emergency unit of our hospital with a 2 weeks history of left sided ear ache, ear discharge 3 days after the onset of ear pain and history of neck stiffness 3 days before presentation. There was associated low grade fever. There was no hearing loss, tinnitus or vertigo. (Turari is a foreign body), no history of trauma to the ear, no nasal discharge or nasal obstruction prior to presentation no epistaxis. Following the onset of ear pain mother applied a locally prepared perfume (Turari) with little relief and was also taken to a nearby chemist (Local drug shop) where injections were given (names unknown) and syringing of the same ear was done with hydrogen peroxide (H_2O_2). Three days after the onset of pain mucopurulent discharge was noticed which persisted and subsequent neck stiffness. Patient is a product of polygamous family setting with low socioeconomic status, resides with the mother along with three other sibling in a rented room apartment. No family history of similar problem. Positive history of exposure to smoke, no previous wound or injury to any other parts of the body. Examination revealed a young girl who was conscious and alert, afebrile anicteric, and no provocative spasm.

Ear examination revealed purulent discharge from the left ear with polypoid swelling in the external auditory canal, no facial nerve palsy. Right ear appeared Normal. The oral cavity showed moderate to severe trismus, the throat was not properly visualized in view of the trismus. Nasal examination was essentially normal

Musculoskeletal system assessment revealed spasm of the neck and jaw.

An assessment of otogenic tetanus secondary to left recurrent acute otitis media was made. She was co-managed with the paediatric team. She had lumbar puncture done and Cerebrospinal fluid assessment was negative for meningitis. Patient had Full blood count, electrolyte and urea with creatinine, ear discharge for microscopy culture and sensitivity (MCS), and urine MCS done and with systemic antibiotic, systemic decongestant, sedatives, antitetanus serum and toxoids and analgesic with aural toileting and dressing with steroid based antibiotic ear drop. The recovery was uneventful.

Case 2

An 8 year old Yoruba boy presented to the eye clinic with 2 days history of swelling of the right eye, associated pain, reduction in vision and eyelid swelling without eye discharge, no history of trauma to the eye, no eye itch, no history of foreign body insertion. There was an antecedent history of persistent right sided ear discharge of 8 days duration which has been recurrent for the past 9 months there was associated history of fever, reduced hearing and swelling around the ear. No nasal, pharyngeal or neck symptoms either in the recent past or at present. Patient is a product of low socioeconomic background as father is an artisan, mother is a petty trader and both live in a 2 room apartment long with three other children. In view of the swelling around the ear which preceded the eye swelling and history of chronic ear discharge she was referred to the ENT surgeon. Patient was presenting to the otolaryngologist for the first time with this complication.

Examination findings revealed an acute ill-looking patient, febrile to touch, not pale and anicteric with right discrete, tender submandibular and cervical lymphadenopathy. Ocular examination revealed an obvious proptosis of the right eye (non-axial) with lid oedema visual acuity of 6/18 and 6/6 in the right and left eyes respectively. There was chemosis of both eyes but cornea was clear, pupil round and reactive. There was restriction of ocular motility bilaterally but right eye more than the left eye. Ear examination revealed normal pinna bilaterally with patent external auditory canal on the left and purulent discharge on the right external auditory canal. A central perforation of right tympanic membrane with active mucopurulent discharge was seen after suctioning of the aural discharge. There was evidence of conductive hearing loss on the right but no evidence of facial nerve palsy bilaterally.

The nasal and throat examinations were normal

An assessment of orbital cellulitis to rule out orbital abscess secondary to complicated otitis media was made and patient was admitted and placed on intravenous Ceftriazone. However due to financial constraints this was not regular. The patient was noticed to developed imminent cavernous sinus thrombosis with involvement of the (L) eye. The Neurosurgeons were invited and cranial CT was requested but still due to financial incapability this could not be done and antibiotic changed to ciprofloxacin which was made available by both the patients relative and the managing team. The antibiotic became more regular and the condition of the patient improved with the left eye swelling and vision improving, except the right orbital abscess that was aspirated under USS guidance and sent for microscopy, culture and sensitivity with *Pseudomonas aeruginosa* identified. Incision and drainage done with improvement in vision and continued improvement with reduction in right proptosis and right ear discharge observed. The systemic antibiotic was changed to oral; we subsequently discharged after 21 days on admission.

Case 3

A 10-months old female child was seen in the ENT clinic as a case of referral from the paediatric clinic on account of left ear discharge, preauricular swelling, post-auricular and orbital swelling. No preceeding history of trauma, no previous eye discharge, eye itch, or eye swelling. The ear discharge was preceded by ear discomfort, positive history of breastfeeding while lying down and also positive history of ear cleaning usually by the mother after bathing every morning. Patient was co- managed with the ophthalmologist and also had drainage of post auricular abscess and preauricular collections under local anesthesia with systemic antibiotics, topical steroid containing antibiotic ear and eye drops and eye ointment were also applied. Patient did well post operatively, she was discharged home and followup has been uneventful.

Case 4

A 5-years old male child was admitted via the ENT clinic on account of bilateral ear discharge of 6month duration reduced hearing, fever, restlessness and neck pain. Child was observed to have developed bilateral ear discharge starting from the right ear and subsequently involving the left ear with associated history of reduced hearing in which parents have to shout before child could respond. Following the onset of the ear discharge local concoction were applied to both ears. Two weeks after the application child was said to have developed fever, restlessness with occasional difficulty in swallowing and subsequent difficulty in opening the mouth. There was also associated neck pain and stiffness however lumbar puncture done by the paediatric unit showed clear CSF and no organisms were seen on microscopy. Patient was managed in an isolated room on antibiotics, analgesic and antitetanus serum and toxoid with improved clinical condition. He was subsequently discharged home and follow up has been uneventful.

Case 5

A 7-years old male pupil was admitted into the paediatric ward on account of generalized body spasm, fever, neck stiffness and jaw lock. Patient had lumbar puncture done which was negative and was

managed as a case of tetanus however the focus was still not found. He was however noticed to have a left foul smelling ear discharge with associated post auricular swelling. Ear swab MCS revealed pseudomonas aeruginosa contaminants and also clostridium tetani was identified. He was managed as a case of otogenic tetanus; the chronic ear discharge was conservatively managed as patient could not afford surgical treatment with closure of the central perforation with topical aural wick dressing, systemic antibiotics, muscle relaxant, antitetanus serum and toxoid.

Table 1. Summary of Complications from Otitis Media. .

Cases	Sex	Age	Complication(s)	Presenting features
1	Female	15years	Tetanus	Left sided ear ache, ear discharge 3days after the onset of ear pain and history of neck stiffness
2	Male	8years	Zygomatic abscess extending to the post-auricular region	History of swelling of the right eye, associated pain, reduction in vision and eyelid swelling without eye discharge
3	Female	10months	Zygomatic abscess extending to the post-auricular region	Left ear discharge, preauricular swelling, post-auricular and orbital swelling
4	Male	5years	Otogenic tetanus	Bilateral ear discharge of 6month duration, reduced hearing, fever, restlessness and neck pain
5	Male	7years	Otogenic tetanus	Generalized body spasm, fever, neck stiffness and jaw lock and Left ear discharge.
6	Female	1year	Otogenic tetanus	Bilateral ear discharge, facial spasm, lock jaw
7	Female	3years	Otogenic tetanus	Right ear discharge, preauricular swelling and post-auricular

Complications	
Zygomatic abscess extending to the post-auricular region	- Otorrhea, otalgia, fever, blurred vision, diplopia, ophthalmoplegia.
8yrs/male	- Otorrhea, otalgia, fever, blurred vision, diplopia, ophthalmoplegia.
10months/female	
<u>Tetanus</u>	- Fever, ear discharge, trismus, neck stiffness, generalized body spasm, body pains, use of local saint or perfume made with some component from dung, use of hydrogen peroxide, use of ear drop. No any other focus of wound/infection seen
5yr/male	
7yr/male	
1yr/female	
3yrs/female	
15yrs/female	

Case 6

A 1-year old female Fulani child was admitted at the emergency paediatric unit with 3-months history of recurrent bilateral ear discharge and occasional bleed from the right ear. Examination revealed a right aural mass with blackish offensive debris covering the mass with purulent discharge. Two days after admission child was observed to have seizure with spasm of the facial and jaw muscles. No other focus of infection was found. He was managed with antitetanus regimen of serum and toxoid, antibiotics and analgesic. Also had aural dressing with steroid based antibiotic ear drop and decongestant. Patient did well and was discharged 14 days after admission. Follow up has been uneventful.

Case 7

A 3-years old female who presented with right ear discharge, preauricular and post-auricular swellings. No preceding history of trauma was reported. The ear discharge was preceded by ear discomfort, positive history of force feeding in recumbent position and also positive history of ear cleaning usually by the mother after bathing every morning. Patient had drainage of post auricular abscess and preauricular collections under local anesthesia with systemic antibiotics, topical steroid containing antibiotic ear drops. Patient did well post operatively, she was discharged home and follow up has been uneventful.

Discussion

Chronic otitis media, still pose a great challenge in developing countries, despite its reduced incidence in the developed world since the advent of antibiotics in the 1930s and 1940s. There is decline not only the incidence but also the complications^{10,11}. The story is however different in the developing countries as the disease present in the advanced stage leading to difficulty in management and subsequently higher morbidity and mortality. The overall incidence of all complications of otitis media had decreased since the advent of effective antimicrobial treatment. A high index of suspicion is necessary in order to diagnose a complication of otitis media because the clinical picture may be subtle. The persistence or recurrence of acute infection within 2 weeks of treatment may suggest impending complication. Patients with sub acute or chronic otitis media are more likely to present with complications.

Acute otitis media however is the most common cause of meningitis^{9,10} which may suggest an anatomic abnormality such as Mondini's malformation. A Mondini's deformity is specific type of inner ear dysplasia, which may present as a spontaneous perilymphatic fistula due to a stapes foot plate deficiency. This anatomic abnormality may predispose the patient to recurrent meningitis and profound sensorineural hearing loss. Children are more likely to have this complication from acute otitis media, whereas adults often have these complications as a result of chronic ear discharge¹².

Otitis media presenting with complication is common in developing countries including Nigeria. Many patients present quite late in the course of their disease, and when they present complication may be quite serious. Intracranial complications secondary to otitis media can be caused by direct extension, preformed pathways or haematogenous spread¹⁵. The most common intracranial complication is meningitis, followed by extradural abscess, brain abscess and lateral sinus thrombosis^{13,14}. Among the extracranial complications, acute mastoiditis represents over 50% in most series and facial nerve palsy represents the second most common extracranial complication of otitis media⁹. Although the etiology is unknown, possible mechanisms include direct inflammatory effect, exposure to toxins and Ischaemia^{16,17}. Other extracranial complication that are commonly seen included labyrinthitis, and Bezold's Abscess. The abscess spreads from the destruction of the mastoid cortex medially along the digastric ridge to present as a neck mass between the digastric and sternocleidomastoid muscle¹⁸.

A review of 1,400 patients presenting with otitis media by Pollock et al¹⁹ showed that only 7% of the patients had ophthalmic complications, such as papilledema, Horner syndrome, and proptosis¹⁹. In our study the ophthalmic complications seen were periorbital edema, proptosis, chemosis, preseptal abscess, orbital abscess, and external ophthalmoplegia. Our review shows that the patients with ophthalmic complications also have extracranial and intracranial complications like zygomatic abscess, Bezold abscess, cavernous sinus thrombosis and posterior auricular abscess. It is not uncommon to have multiple complications with otitis media.

Tetanus was first described in Egypt over 3000 years ago and was evident throughout the ancient world. Tetanus is caused by the action of a potent neurotoxin, tetanospasmin, which is produced during the growth of *Clostridium tetani*. This infection is frequently fatal, can be prevented by immunization with tetanus toxoid²⁰. Since the introduction of vaccination with tetanus toxoid in the 1940s, tetanus has become a rare disease in the United States²⁰. Tetanus usually occurs where facilities for ventilation are limited thus its occurrence in the ear discharge is not disputable when there is contamination of an ear canal wound by the bacteria spores although it is rare with paucity of publication especially in tropical Africa on this mode of infection²¹. Akinbohun and Ijebuola²¹ documented 25 cases of otogenic tetanus over a 5 year period at UCH Ibadan. In this study we managed five patients with a history of ear discharge without any other apparent wound site, who also had tetanus, as a complication.

The spores of the causative organism are usually introduced into the body through wounds, cuts, or burns, but in this study, the mode of inoculation might be when the locally prepared perfume (turari) was applied or the use of local concoction. This is usually made from plant and animal product which might have been contaminated during processing. The incubation period for tetanus is variable, ranging from a few days to 3 weeks between the inoculation of spores and the initial clinical manifestations. Because the spores cannot germinate until oxygen is depleted, such focal anaerobic conditions are most likely to occur in wounds with tissue necrosis and foreign bodies. In the index case, it was during the tissue necrosis as evident by mucopurulent ear discharge. The presence of other organisms may also enhance the growth of spores into their vegetative forms. The longer incubation periods are usually related to injury sites further away from the central nervous system, while centrally located cephalic wounds such as the ear may produce symptoms after shorter periods¹⁹ as seen in the index case presented. Another possible mechanism of inoculation is through contamination by dirty cloth, fingers or other objects inserted into the ear. One of the patients in this study had a history of applying local perfume (Turari) to the discharging ear, which might have been the source of the infection.

Otogenic tetanus is a disease that is preventable by immunization²⁰. Otogenic tetanus is more common among children that are less than 6 years of age which is similar to what we found in this study. A female preponderance in this study is in consonance with other previous reports¹⁹. Since most cases of tetanus are seen first by the paediatrician or family physician, they should be familiar with this potential source and there should be increased awareness among health professionals.

Conclusion

- Otitis media complication is still with us in the developing world like Nigeria.
- Early recognition, adequate management through a good referral system to the specialist, public health education for early presentation, avoidance of self medication and immunization will go a long way to reduce the morbidity and mortality from this preventable and avoidable problem.

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