 DOI:https://doi.org/10.52206/jsmc.2022.12.4.608 OPEN ACCESS

Intracranial Complications of Otitis Media - The Menace of Discharging Ears in Children.

Saeed Khan, Adnan, Khurshid Anwar, Allah Noor, Muhammad Arif, Saira Nizam

ABSTRACT

Background: In developing nations, otitis media is widespread among people of low socioeconomic backgrounds. Chronic otitis media is a potentially fatal condition due to its consequences. Gradualbone erosion in chronic otitis media leads to serious intracranial complication.

Objective: The objective of this study was to determine the frequency of intracranial complications of otitis media in children.

Material and Methods: This was a prospective, descriptive & cross-sectional study conducted at the Department of ENT -----from 1st October 2018 to 30th September 2019 on 120 patients to determine the frequency of intracranial complications of otitis media in children. Children with ages ranging from 1 to 14 years were included in the study. Patients with suspicion of intracranial complications were admitted to ward for management and investigated. The types of complications occurring were noted to determine their frequencies.

Results: A total of 120 children were included in the study. The male to female ratio was 3:2. Patients with age range of 3 and 5 years was the commonest group presenting with intracranial complications constituting 30.8% of all. Brain abscess was the commonest complication observed in 13(10.8%) of patients.

Conclusion: Intracranial complication of chronic otitis media is common clinical problem faced by ENT surgeon affecting children of 3 to 5 years age, predominantly brain abscess.

Keywords: Frequency, Intracranial Complications, Otitis Media, Children, BrainAbscess.

This article may be cited as: Khan S, Adnan, Anwar K, Noor A, Arif M, Nizam S. Intracranial Complications of Otitis Media - The Menace of Discharging Ears in Children. J Saidu Med Coll Swat 2022;12(4):179-83.

INTRODUCTION

Chronic otitis media (COM) is a long-term disorder that can result in substantial damage and long-term consequences include hearing loss and discharge. Children and newborns are most at risk of developing otitis media, with a mean incidence of 6 to 36 months and a lower average of 4 to 7 years.[1,2] The prevalence of COM varies by region; even in industrialized countries such as the United Kingdom, the condition has an average frequency of 0.6 to 1.1 percent. Inadequate living circumstances, overcrowding, poor cleanliness, and hunger are socioeconomic variables that contribute to the widespread occurrence of COM in third-world nations.[2] Chronic suppurative otitis media has been a prominent cause of middle ear illness since prehistoric times.[3-5] Bone erosion is a known consequence of this kind, and it can affect both intracranial and extracranial structures.[6] Intracranial complications occur in 2.3 to 4% of all the cases suffering from CSOM. In recent years, The frequency of intracranial CSOM problems has decreased considerably with the introduction of modern diagnostic tools, new surgical techniques and broad spectrum antimicrobials. The prevalence of these complications has dropped to 0.15- 0.04% & mortality has decreased from 25-8%. However, this is stilla high rate of mortality.[7-10] The most common intracranial consequences include cerebral abscess, meningitis, lateral sinus thrombophlebitis and extradural abscess.[11, 12]

The purpose of this study is to determine the frequency of intracranial complications in our institute and determine the magnitude of these life-threatening complications. Moreover, it will help to create awareness among the clinician and patients about the problem to enable them to treat the complications efficiently and promptly.

MATERIAL AND METHODS

Ethical approval for the study was obtained from institutional Reasearch Board vide HMC/IRB/146 dated September 2018. Consent for inclusion in the study was obtained from parents. This prospective, descriptive and cross-sectional study at the Department of ENT, Hayatabad Medical Complex, Peshawar from 1st October, 2018 to 30th September, 2019. Sample size computed was 120, by using online sample size calculator.(OpenEpi: Sample Size for X-Sectional, Cohort, andClinical Trials, taking confidence interval of 95% and the margin of error of 5%. A total of 120 children aging between 1 to 14 years who presented to ENT department with foul smelling ear discharge, fever and earache were included in the study. Patients with ear conditions

Department of ENT, MTI Hayatabad Medical Complex Peshawar.

Correspondence: Dr. Adnan
Department of ENT, MTI Hayatabad Medical Complex Peshawar.
Email: istogna@yahoo.com

Received: May 21th, 2021 Accepted: December 19th, 2022

like malignant otitis externa, trauma and autological tumors confirmed with Clinico-radiological techniques were excluded from the study. Consecutive non-probability sampling was used as a sampling approach. Upon arrival, detailed history was obtained regarding the onset of symptoms, duration of discharge, fever, nature of ear discharge. Associated symptoms like headaches, visual disturbances, vomiting, abnormal gait, ringing in the ear, vertigo and presence of convulsions were enquired into. Tympanic membrane was examined for integrity and the presence of retraction pockets, cholesteatoma & the site and number of perforations was noted. Kernig and Brudzinsky signs were elicited. Ear swab was obtained for culture and sensitivity. Baseline investigations such as special smear, renal function tests, serum electrolytes, coagulation profile and liver function tests were sent to assess the general status of child and determine their fitness for subsequent surgical procedure that may be required. Children with suspicion of having developed intracranial complications like meningitis, lateral sinus thrombophlebitis, extra- & subdural abscesses, encephalitis, brain abscess or otitic hydrocephalus were admitted to ward and started on systemic antibiotics in consultation with paediatrician till the availability of culture report. Fundoscopy was carried out by ophthalmologist to look for raused intracranial pressure. Imaging studies such as CT and MRI brain and temporal bones was carried out in those who were admitted to ward to determine the extent and type of intracranial complication. Diagnosed cases of meningitis and encephalitis were referred to the care of physician for stabilization. Intracranial abscesses were drained by neurosurgeon with burr hole craniotomy or aspiration. Patients with lateral sinus thrombophlebitis were treated with radical mastoidectomy and removal of thrombus through the same approach. Hearing assessment through pure tone audiometry was carried out only if the patients were stable or after the complications were treated.

All information was recorded ona predesigned proforma and was analysed using SPSS (version 25). Mean ± Standarddeviation (SD) were computed for Quantitative data and frequencies and percentages for the occurrence of meningitis, lateral sinus thrombophlebitis, extra- & subdural abscesses, encephalitis, brain abscess or otitic hydrocephalus were calculated.

RESULTS

A total of 120 children were included in the study. The male to female ratio was 3:2. Patients with age range of 3 and 5 years was the commonest group presenting with intracranial complications constituting 37 (30.8%) of all. The age and gender distributions are shown in Fig 1 and Table 1 respectively. Altered sensorium was the commonest symptoms in those suspected of having intracranial complications. The details of symptoms are shown in Fig 2. Overall 29 (24.16%) of patients presented with intracranial complications. Brain abscess was the commonest complication observed in 13(10.8%) of patients. The detail of the observed complications has been depicted in Table 2.

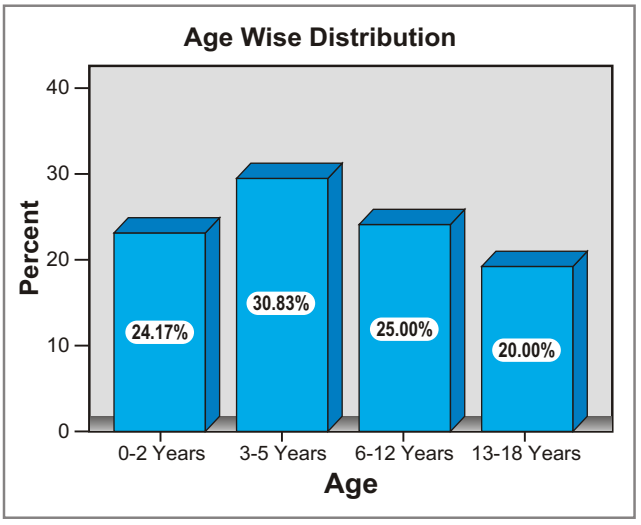


Figure 1.
Age-wise distribution of patients (n=120).

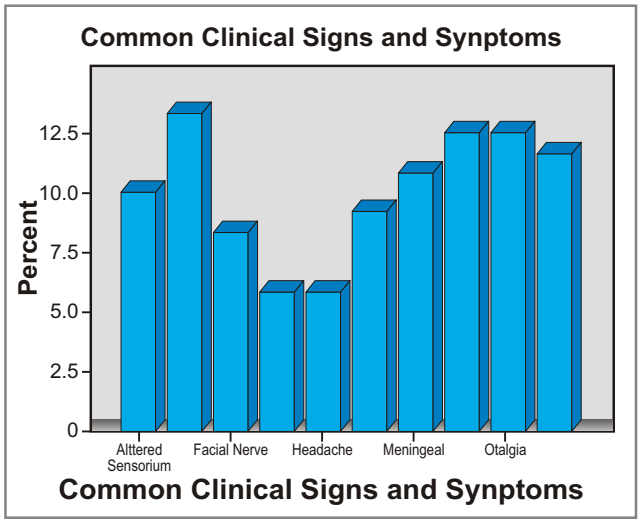


Figure 02
Common Clinical Features(n=120)

Table 01. Gender wise Distribution(n=120)

Gender wise Distribution			
		Frequency	Percent
Valid	Male	46	38.3
	Female	74	61.7
	Total	120	100.0

Table 02. Frequency of Intracranial Complications(n=120)

Meningitis			
		Frequency	Percent
Valid	Yes	11	9.2
	No	109	90.8
	Total	120	100.0
Brain Abscess			
		Frequency	Percent
Valid	Yes	13	10.8
	No	107	89.2
	Total	120	100.0
Lateral Sinus Thrombosis			
		Frequency	Percent
Valid	Yes	5	4.2
	No	115	95.8
	Total	120	100.0

DISCUSSION

Otitis media complications can cause a variety of morbidities and can even be fatal. In the pre-antibiotic period, mortality from otitis media complications was known to be as high as 80%. Survival rates were reported to improve by up to 50% with the addition of sulphonamides, and by up to 80% with the addition of penicillin. The use of antibiotics was observed to reduce the incidence of cerebral complications of otitis media from 2.3 percent to 0.04 percent.[14] The typical age range of problematic patients in our series was 3-5 years, compared to 4-7 years in other research. 13 In our study, males have a greater prevalence of problems than females. The most common reason for this is a lack of understanding of the significance of chronic and occasionally severe ear discharge.[15]

In our study, the most common intracranial complications were brain abscesses (10.4%). Neeta et al found that the most common IC problems were brain abscesses (10.4%).[16] Because of the large cholesteatoma, brain abscess is the most prevalent complication of Intra Cranial complication in our cohort. The most prevalent diagnosis was temporal abscess. In comparison to other series, timely intervention with assistance from our hospital's neurosurgery department and effective antibiotic therapy resulted in 0% death.

In their research, Dubey Sp et al determined that meningitis was the most prevalent clinical condition as a result of CSOM. Meningitis was the second most prevalent disease in this age range (9.2 percent) in our study.[17] Meningitis and brain

abscess were frequent problems found in the U Osma study. [18] Lateral sinus thrombosis was detected in 4.2 percent of individuals and was the third most frequent intracranial consequence. Lateral sinus thrombosis accounts for 17% to 19% of intracranial problems. Because of the widespread use of antibiotics, the previously reported traditional clinical appearance is now uncommon. To determine the patency of the venous sinuses, magnetic resonance venography should be performed. There were three cases of lateral sinus thrombosis from chronic otitis media with cholesteatoma in research done by Kripa Dongol et al, and all of them coexisted with additional complications such as facial palsy, cerebellar abscess and meningitis, mastoiditis, and temporal lobe abscess. [19] Despite the fact that it appeared as a single problem in our study. In our study, there was no mortality from lateral sinus thrombosis compared to prior studies. This is because patients arrived early and local practitioners received enough intravenous / oral antibiotics.[20]

Out of 120 cases, the average duration of otorrhoea was 3-5 years. Fever 5.8 percent was the most common indication and symptom. Meningeal headaches accounted for 10.8 percent of all headaches. 12.5 percent Otalgia and 10% Alttered Sensorium.

We urge that all patients with headache, fever, or neck stiffness have an appropriate assessment and therapy as soon as possible.

The etiological aetiology of middle ear infection is quite well represented by otorrhoea-isolated species. As in previous investigations, the most prevalent species in our collection are Proteus mirabilis, Pseudomonas aeruginosa, and Staphylococcus.[21,22]

To manage the infectious process and improve the patient's overall health, hydration therapy and repeated doses of parenteral antibiotics are required 4872 hours prior to surgery. Antibiotics based on an aural swab culture tolerance test and after consulting with our doctor were critical in getting positive outcomes.

Due to severe cholesteatoma and chances, there won't be enough follow-up after surgery. In this study we conducted canal wall down mastoidectomy in all instances. Most patients were from adjacent villages with poor economic situations, making them impossible to undertake second surgery.

In our case, ear surgery was performed as a follow-up procedure 4872 hours after life-threatening problems had been addressed and medical therapy had been administered. 710 days after medical therapy for non-life-threatening problems, saving surgery time and eliminating anesthesia risks.

CONCLUSION

The involvement of intracranial structures is a common complication in children aging 3-5 years. Brain abscess is the predominant complications. Imaging studies such as CT and MRI are useful adjuncts for diagnosing these complications. The attending physician should bear in mind the possibility of occurrence of these complications while examining a child with ear discharge.

REFERENCES

1. Schilder AG, Chonmaitree T, Cripps AW, Rosenfeld RM, Casselbrant ML, Haggard MP, et al. Otitis media. Nat Rev Dis Primers 2016;2:160-63.
2. Ghadersohi S, Young NM, Smith-Bronstein V. Management of acute complicated mastoiditis at an urban, tertiary care pediatric hospital. Laryngoscope 2017;127(10):2321-7.
3. Lasminingrum L, Purwanto B, Sudiro M, Mutmainnah A.The association of iron deficiency anemia on chronic suppurative otitis media in children: A case-control study. Ann Med Surg (Lond) 2021;72:103-105.doi:10.1016/j.amsu.2021.103-105.
4. Orji FT, Ukaegbe O, Alex-Okoro J, Ofoegbu VC, Okorafor IJ. The changing epidemiological and complications profile of chronic suppurative otitis media in a developing country after two decades. Eur Arch Otorhinolaryngol 2016;273(9):2461-6. doi:10.1007/s00405-015-3840-1.
5. Prasad R, Biswas J, Singh K, Mishra OP, Singh A. Clinical Profile and Outcome of Brain Abscess in Children from a Tertiary Care Hospital in Eastern Uttar Pradesh. Ann Indian Acad Neurol 2020;23(3):303-307.doi:10.4103/aian.AIAN42519.
6. Mittal R, Debs LH, Patel AP, Nguyen D, Blackwelder P, Yan D, et al. Otopathogenic Staphylococcus aureus Invades Human Middle Ear Epithelial Cells Primarily through Cholesterol Dependent Pathway. Sci Rep 2019;9(1):10777.doi:10.1038/s41598-019 47079-7.
7. Rea PA, Ronan N.Acute otitis media. Watkinson JC, Clarke RW, editors. Scott-Brown's Otorhinolaryngology Head & Neck Surgery CRC. In Roca Raton. 2018;8(2):137-54.
8. Rathbun TA, Mallin R. Middle ear disease in a prehistoric Iranian population. Bulletin of the New York Academy of Medicine 2011;531:901-5.
9. Hameed A, Ahmad M, Amjad M, Shakeel A, Rizvi A. Ossicular defects in cholesteatomatous chronic suppurative otitis media. Pak Postgraduate Med J 2009;9:35-7.

10. Sharma N, Jaiswal AA, Banerjee PK, Kumar A. Complications of Chronic Suppurative Otitis Media and Their Management: A Single Institution 12 Years Experience. Indian J Otolaryngol Head Neck Surg 2015; 67(4): 353-360. PMCID: PMC4678280. doi:10.1007/s12070-015-0836-5.
11. Shawabka MA, Haidar H, Larem A, Aboul-Mahmood Z, Alsaadi A, et al. Acute otitis media- an update. J Otolaryngol ENT Res 2017;8(2):472-6.DOI:10.15406/joentr.2017.08.00252.
12. Penido N, BorinA, Iha LCN. intracranial complications of otitis media: 15 years of experience in 33 Patients. Otolaryngol Head Neck Surg 2015;132:37-42.
13. Dean AG, Sullivan KM, Soe MM. OpenEpi: Open Source Epidemiologic Statistics for Public Health, Version.www.OpenEpi.com,updated 2013/04/06.
14. Kangsanarak J, Fooanant S, Ruckphaopunt K. Extracranial and intracranial complications of suppurative otitis media; report of 102 cases. J Laryngol Otol 2011;107(11):999-1004.
15. Kørvel-Hanquist A, Koch A, Niclasen J, Dammeye J, Lous J, Olsen SF, et al. Risk factors of early otitis media in the Danish National Birth Cohort. PLoS One 2016;11(11):e0166465. doi:10.1371/journal.pone.0166465
16. Sharma N, Jaiswal AA, Banerjee PK, Garg AK. Complications of Chronic Suppurative Otitis Media and Their Management: A Single Institution 12 Years' Experience. Indian Journal of Otolaryngology and Head & Neck Surgery 2015;67:353-360
17. Dubey SP, Larawin V. Complications of chronic suppurative otitis media and their management. Laryngoscope 2007;117(2):264-267.
18. Osma U, Cureoglu S, Hosoglu S. The complications of chronic otitis media: report of 93 cases. J Laryngol Otol 2010;114(02):97-100.
19. Dongol K, Rayamajhi P, Gurung U. Complications of Acute and Chronic Otitis Media in a Tertiary Referral Center in Nepal. Turk Arch Otorhinolaryngol 2020; 58(4):234-40
20. Syms MJ, Tsai PD, Holtel MR. Management of lateral sinus thrombosis. Laryngoscope 2010;109(10):1616-20.
21. Kutluhan A, Kiriş M, Yurttaş V, Kiroğlu AF, Unal O. When can lateral sinus thrombosis be treated conservatively? J Otolaryngol 2014;33(2):107-10.
22. Kangsanarak J, Navacharoen N, Fooanant S, Ruckphaopunt K. Intracranial complications of suppurative otitis media: 13 years' experience. Am J Otol 2011;16(1):104-9.

DATA SHARING STATEMENT: The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

CONFLICT OF INTEREST: Authors declared no conflict of interest.
GRANTED SUPPORT AND FINANCIAL DISCLOSURE: Nil

AUTHOR'S CONTRIBUTION
The following authors full fill authorship criteria as per ICMJE guidelines;

Khan S, Muhammad A:	Idea conception, data acquisition, final approval, agreed to be accountable for all the work.
Anwar K, Noor A:	Design of the work, drafting the work, critical rivision, final approval, agreed to be accountable for all the work.
Arif M:	Data analysis, drafting of the work, final approval, agreed to be accountable for all the work.
Nizam S:	Data interpretation, critical revision, final approval, agreed to be accountable for all the work.