

STUDY OF 100 CASES OF CHRONIC SUPPURATIVE OTITIS MEDIA TO FIND OUT THE NEED OF MASTOID EXPLORATIONGaurav Kataria¹, Baldev Singh², Sanjeev Bhagat³, Aditi Saxena⁴, Manjit Singh⁵, Jaspreet Kaur⁶**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: BACKGROUND: Chronic suppurative otitis media (CSOM) is the chronic inflammation of the middle ear cleft and mastoid cavity which presents with recurrent ear discharge. Mastoid exploration is required to remove the bone destroying cholesteatoma, to exenterate the infected mastoid air cells and to remove the infected and hypertrophied middle ear mucosa. Mastoid exploration is needed for unsafe CSOM with or without complications, safe CSOM with blocked aditus and not responding to conservative treatment. **AIMS AND OBJECTIVES:** To evaluate history, clinical features, clinical examination including otoscopic and microscope and radiological investigations to find out the need of mastoid exploration. **MATERIAL AND METHODS:** In this study 100 patients of CSOM were included without any due consideration for a particular type of CSOM, particular age or sex. Patients with history of traumatic perforation, hearing loss without ear discharge were excluded. Detailed history, clinical examination, routine and special investigations were done. Then by evaluating history, clinical features, clinical examination and investigations, we had find out the need of mastoid exploration. **OBSERVATIONS:** Majority of patients were males (56%) with a male female ratio of 1.27. Highest incidence of CSOM was found in 3rd decade (27%) and 63% patients were in 0-30 years age group. Majority of patients (72%) were from rural background and were farmers. Otorrhoea was found in all patients and decreased hearing in 87% patients. Most of the tympanic membrane perforations were central or total (89%) and attic or marginal were only 11%. Clinically safe disease was found in 89% patients and unsafe in 11%. Lytic lesions on CT scan were found in 11%. Good response to conservative treatment was seen in 81% patients. Mastoid exploration was required in all unsafe cases and in 8 safe disease cases, so total 19% cases required mastoid exploration. **CONCLUSION:** It was concluded that all cases of unsafe disease and medically non responding cases of safe disease with blocked aditus and faulty ventilation required mastoid exploration. Improvement of socioeconomic status of people, early recognition and treatment of CSOM can reduce the number of cases and complications, thus decreasing the requirement of mastoid exploration.

KEYWORDS: Chronic suppurative otitis media, tympanic membrane, perforation, otorrhoea, cholesteatoma, aditus, antrum, attic, mastoid exploration.

INTRODUCTION: Chronic suppurative otitis media (CSOM) is the chronic inflammation of the middle ear cleft and mastoid cavity which presents with recurrent ear discharge or otorrhoea through tympanic membrane perforation.¹ The disease usually begins in childhood as a spontaneous tympanic membrane perforation due to acute infection of the middle ear known as acute otitis media, or as a sequelae of less severe forms of otitis media.² CSOM is one of the most common ear diseases in many of the developing countries including India. Childhood acute otitis media and otitis media with effusion can both cause long term changes of the tympanic membrane.³

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The tympanic membrane is perforated in CSOM, if this is central perforation it is usually safe and marginal perforation is usually unsafe. Safe or unsafe depends mainly on the presence of cholesteatoma and granulation tissue.⁴

In a study, it is stated that the difference between these two types is dependent on the embryonic pattern of development. Chronic infection in ciliated columnar epithelium seldom, if ever, involves the mucosa, whereas infection in the flat pavement epithelium of the attic and antrum is associated with erosion of the underlying bone.⁵

Because of strategic location of tympanomastoid compartment, separated from the middle and posterior cranial fossa by the thinnest of bony partitions, otitis media has the potential for intracranial extension. So, a clear understanding of the pathology of otitis media is important for the otorhinolaryngologist to be able to distinguish between infection that can be controlled by antibiotics and those that require surgical intervention.⁶

The multifactorial nature of otitis media must be stressed. Inadequate antibiotic treatment, frequent upper respiratory tract infections and nasal diseases are related to the development of CSOM.⁷⁻⁹ Poor living conditions with poor access to medical care also predisposes to CSOM.¹⁰ Poor housing, hygiene and nutrition are associated with high prevalence rates. Bottle feeding, passive exposure to smoking and a family history of otitis media are some of the risk factors for otitis media.¹¹⁻¹⁴

These risk factors probably favor the development of CSOM by weakening the immunological factors, increasing the inoculum, and thus encouraging early infections.¹⁵ The most common bacterial isolate of CSOM is *Pseudomonas aeruginosa*. Other isolates include aerobic organisms such as enteric gram negative bacilli, *Staphylococcus aureus*, *Klebsiella pneumoniae*. Anaerobic isolates associated with malodorous otorrhoea include *Peptostreptococcus* and *Bacteroides* species.^{16,17}

Mastoid exploration is needed for atticointral type of CSOM, safe CSOM with blocked aditus and not responding to conservative treatment, complicated CSOM, coalescent or masked mastoiditis and subperiosteal abscess. This study was undertaken to evaluate history, clinical features, clinical examination including examination under microscope and radiological investigations of 100 patients of CSOM to find out the need of mastoid exploration.

MATERIAL AND METHODS: In this study 100 patients of CSOM were included without any due consideration for a particular type of CSOM, particular age or sex group. Patients with history of ear discharge less than 12 weeks, patients with traumatic perforation of tympanic membrane, patients with prior history of temporal bone trauma and hearing loss without history of ear discharge were excluded. Detailed history, clinical examination including examination under microscope, routine investigations and special investigations including pure tone audiometry, X-ray nose and paranasal sinus, X-ray both mastoids and high resolution tomography scan of both mastoids were done.

Then by evaluating history, clinical features, clinical examination and investigations including radiological investigations, we had find out the need of mastoid exploration. All the patients with unsafe atticointral type of disease and cholesteatoma were included for mastoid exploration. Patients with safe type of disease but not responding to conservative management and having continuous ear discharge, wet and oedematous mucosa even after treatment and having blocked aditus were also included for mastoid exploration.

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OBSERVATIONS: A total of 100 patients of CSOM were included in this study.

Sex	No. of patients (%)
Male	56 (56.0%)
Female	44 (44.0%)
Total	100

TABLE 1: Sex distribution of patients (n=100)

Among 100 patients, males were 56% and females were 44% with male female ratio of 1.27:1.

Age (years)	No. Of patients (%)
0-10	17 (17.0%)
11-20	19 (19.0%)
21-30	27 (27.0%)
31-40	13 (13.0%)
41-50	10 (10.0%)
51-60	08 (8.0%)
>60	06 (6.0%)
Total	100

TABLE 2: Age distribution of patients (n=100)

Age range was between 4 years to 64 years. Highest incidence of CSOM was found in third decade (27%) and formed about 1/4 of total cases followed by second decade (19%). Majority of patients (40%) were in age group 21-40.

Out of 100 patients 72% patients were from rural background and 28% were from urban background with a rural urban ratio of 3:1. Majority of patients were farmers (33%) by occupation, followed by laborers (18%), shopkeepers (15%), housewives (14%) and students (12%).

Symptom	No. Of patients (%)
Otorrhoea	100(100.0%)
Diminished hearing	87 (87.0%)
URI	19 (19.0%)
Itching	11 (11.0%)
Tinnitus	08 (8.0%)
Pain in the ear	06 (6.0%)
Vertigo	05 (5.0%)

TABLE 3: Symptomatology of patients (n=100)

Otorrhoea was a constant feature among all patients. Diminished hearing was noted in about 4/5 patients. Vertigo was found in 5% patients.

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The duration of ear discharge was 2-5 years in 37% patients followed by 0-1 year in 24%, 6-10 years in 19%, 11-20 years in 16% and duration was more than 20 years in 4% patients. Unilateral involvement was found in 76% patients and bilateral in 24% patients. In unilateral involvement left side was more commonly involved than right side. Discharge was mucopurulent in 53% patients, mucoid in 28% patients, purulent in 12% patients and blood tinged in 7% patients. Discharge was foul smelling in 10% patients and odorless in 90% patients.

Site of perforation	No. of patients (%)
Antero inferior	26 (26.0%)
Postero inferior	21 (21.0%)
Inferior	17 (17.0%)
Subtotal	12 (12.0%)
Anterior	06 (6.0%)
Postero superior marginal	06 (6.0%)
Posterior	05 (5.0%)
Attic	05 (5.0%)
Total perforation	02 (2.0%)
Total	100

TABLE 4: Site of perforation (n=100)

Most common site of perforation was found antero-inferior quadrant (26%) followed by postero-inferior quadrant (21%), inferior quadrant (17%), subtotal (12%), postero-superior marginal (6%), attic (5%) and total in 2%.

Type of hearing loss (dB)	No. of patients (%)
Normal/ No loss	12 (12.0%)
Mild conductive (26-40)	43 (43.0%)
Moderate conductive (41-55)	26 (26.0%)
Moderately severe conductive (56-70)	05 (5.0%)
Severe Conductive (71-91)	04 (4.0%)
Profound (>91)	02 (2.0%)
Sensorineural	03 (3.0%)
Mixed	05 (5.0%)
Total	100

TABLE 5: Hearing loss on pure tone audiometry (n=100)

Majority of patients were having mild conductive hearing loss (43%), followed by moderate conductive hearing loss (26%). Mixed hearing loss was found in 5% patients and sensorineural hearing loss was found in 3% patients. Hearing was found normal in 12% patients.

On culture and sensitivity 66% patients had cultures positive for bacteria only, 3% patients had cultures positive for fungus only, 2% cultures positive for both bacteria and fungus. No organism was found in 29% cultures. On X-ray both mastoid 51% patients had sclerosed mastoids, 21% patients had well pneumatised mastoids.

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Condition of ear	No. of patients (%)
Safe disease without cholesteatoma	89 (89.0%)
Unsafe disease with cholesteatoma	11 (11.0%)
Total	100

TABLE 6: Nature of disease

On basis of history, clinical features and radiology, 89% patients were found to have safe type of disease and 11% patients were found to have unsafe type of disease.

All these 11% unsafe disease patients and later on 8% safe disease patients were undergone computed tomography scan of temporal bone.

CT scan findings	No. of patients (%)
Ossicular erosion	11 (11.0%)
Cholesteatoma	11 (11.0%)
Soft tissue density material blocking the aditus and extending to antrum	19 (19.0%)
Erosion of lateral attic wall	08 (8.0%)
Lytic lesion in mastoid	11 (11.0%)

TABLE 7: Computed tomography scan findings (n=19)

Soft tissue density material blocking the aditus and extending to antrum was found in all 19 patients. Erosion of lateral attic wall was found in 8 patients. Lytic lesion in mastoid bone was found in 11 patients. Erosion of ossicles was found in 11 patients, out of these 11, incus was found eroded in 8 patients, malleus in 6 patients and stapes was found eroded in 5 patients.

Response to conservative treatment	No. of patients (%)
Safe dry ear	81 (89.0%)
Safe wet ear	08 (8.0%)
Unsafe wet ear	11 (11.0%)
Total	100

TABLE 8: Response to conservative treatment (n=100)

Conservative medical treatment with broad spectrum antibiotics was given to all patients, which was later on changed as per culture and sensitivity report. Good response (dry ear) to medical treatment was seen in 81% patients and no response (wet ear) was seen in 19% patients.

Type of disease	Total no. of cases	No. of cases required mastoid exploration (%)
Safe	89	08 (8.99%)
Unsafe	11	11 (100%)
Total	100	19 (19.0%)

TABLE 9: Requirement of mastoid exploration (n=100)

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All 11 patients with unsafe disease and 8 patients with safe disease with no response to conservative medical management required mastoid exploration to exenterate the infected mastoid air cells, to widen the aditus for proper ventilation, to clear the middle ear infection and hypertrophied mucosa.

So, out of 100 patients, total 19 patients (19%) required mastoid exploration. (Table-9) Complications were found in 4% patients. Mastoid abscess was found in 2% patients and facial nerve palsy in 1% patients and meningitis also in 1% patients. Associated risk factors found were sinusitis (22%), deviated nasal septum (21%), upper respiratory tract infections (19%), nasal allergy (19%), adenoid hypertrophy (11%), chronic tonsillitis (9%) and tuberculosis (3%).

DISCUSSION: Otitis media can present itself in different forms because of large variations in the nature of the disease. This could range from silent otitis media with clinically undetectable middle ear pathology to late stage intracranial life threatening complications like meningitis, brain abscess etc. It is a recognized cause of hearing impairment. CSOM associated with cholesteatoma and complications always require mastoid exploration.

In safe type of CSOM with continuous discharging ear, it is better to do tympanoplasty with mastoid exploration. The aim of mastoid exploration are to exenterate the infected mastoid air cells, to widen the aditus for better ventilation and to clear the middle ear of infections and hypertrophied mucosa.

A total of 100 patients were included in our study. In our study, 56% patients were males and 44% were females with a male female ratio of 1.27:1. Our study result coincides with results of Baig et al¹⁸, Neogi et al¹⁹, Shrestha et al,²⁰ Islam et al,²¹ Salman et al,²² Sachdeva et al²³ and Okafor²⁴ with male predominance. In our study majority of patients (27%) were in 21-30 years age group followed by 19% in second decade.

Total 63% patients were in 0-30 years of age group. Our study results coincides with study of Baig et al¹⁸ with 68% patients in 0-30 years age group, Memon et al²⁵ with 70% patients in 0-30 years age group, Islam et al²¹ with 72% patients in 0-30 years age group. Berron²⁶ found highest incidence in 21-30 years age group. So our study correlates with study of Berron²⁶ and Kalpana et al.²⁷ In our study 72% patients were from rural area and 28% were from urban area. Socio-demographic distribution of our study correlates with study of Baig et al,¹⁸ Islam et al,²¹ Okafor,²⁴ Memon et al²⁵ and Berron²⁶ with majority of patients from rural background.

So, poor socio-economic status and rural background were the major factors, associated with CSOM. Socio-demographic distribution affects the pattern of disease. Majority of patients were farmers (33%), laborers (18%), shopkeepers (15%) and housewives (14%). This constituted about 80% of total patients. High incidence in laborers and farmers and shopkeepers can be explained on the fact that they work outside and in crowded places.

Otorrhoea was present in all patients at the time of presentation, deafness in 87%, itching in 11%, otalgia in 6% and vertigo in 5% patients. Our study coincides with study of Varshney et al²⁸, Salman et al²² and Memon et al²⁵ with almost all the cases present with ear discharge. In our study majority of patients had history of 2-5 years duration of ear discharge (37%) and 0-1 year (24%). So our study coincides with study of Varshney et al²⁸ and Memon et al²⁵ in terms of duration of discharge.

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In our study, 76% patients had unilateral involvement and 24% had bilateral involvement. So our study correlates with study of Adhikari et al,²⁹ Adoga et al³⁰ and Saini et al³¹ with majority of cases having unilateral involvement. Majority of patients (89%) in our study had central or total perforation and 11% had marginal or attic perforation. Our study coincides with study of Memon et al²⁵ with majority of central perforations.

Majority (66%) of cultures were positive only for bacteria and 3% cultures were positive only for fungus. Our study coincides with study of Harvinder et al³² with 69% cultures positive only for bacteria and 6% cultures positive only for fungus. On microscopic examination cholesteatoma was found in 9% patients and in 5% cases cholesteatoma was present with granulations. Mucosal oedema was found in 56% and hypertrophied mucosa in 28%.

Our study coincides with study of Baig et al¹⁸ and Memon et al²⁵ with 10.63% and 11.5% patients having cholesteatoma respectively. So, on basis of history, clinical examination and examination under microscope 11% patients were found to have unsafe disease and 89% cases had safe type of disease. All the patients with unsafe disease (11%) and complications were prepared for mastoid exploration. All patients with safe disease were given conservative medical treatment to make the ear dry. Out of these 89 patients, 81 patients had dry ear after conservative treatment for 1-2 weeks but 8 patients had wet ear.

The reason for this continuous discharge was the presence of focus of infection in the mastoid area and blocked aditus and faulty ventilation due to soft tissue density material. All these 8 patients and 11 patients with unsafe disease were undergone computed tomography scan of mastoid. All patients had soft tissue density material present in middle ear extending to antrum and blocking the aditus. Erosion of lateral attic wall was found in 8% patients.

In 11% patients features of bone destruction were present. Our study coincides with study of Baig et al,¹⁸ Memon et al.²⁵ In our study 4% patients had complications. Mastoid abscess was found in 2%, meningitis in 1% and facial nerve palsy in 1% patients. Our study coincides with study of Baig et al,¹⁸ Memon et al²⁵ and Tshering et al³³ with prevalence of complications 7%, 6.4% and 6% respectively. In our study, it was found that 89% patients had safe disease and 11% patients had unsafe disease.

Our study coincides with study of Memon et al,²⁵ Baig et al,¹⁸ Kabir et al,³⁴ Adhikari et al²⁹ and Thornton et al³⁵ with 88.5%, 89.375%, 90%, 82.2% and 88.9% patients with safe disease respectively and 11.5%, 10.625%, 10%, 17.8% and 11.1% patients with unsafe disease respectively. In our study all the patients with unsafe disease (11%) and patients with clinically safe disease but not responding to medical treatment (8%) required mastoid exploration. Our study coincides with study of Baig et al¹⁸ and Memon et al²⁵ with 25% and 27.5% patients required mastoid exploration respectively. In our study decreased requirement of mastoid exploration was due to early recognition and treatment of disease.

The important socio-demographic risk factors associated with CSOM in our study were lower socio-economic class, smoking, unhygienic ear cleaning practices and over-crowding. The important clinical risk factors associated were deviated nasal septum, upper respiratory tract infections, nasal allergy, sinusitis, chronic tonsillitis and adenoid hypertrophy. Our study coincides with Bluestone et al,³⁶ Sachdeva et al²³ and Lasisi et al³⁷ in association with these risk factors.

CONCLUSION: Presence of cholesteatoma was the most important feature in association with aural polyps and granulations, likely to lead the complications of CSOM. Mastoid exploration is required to remove the bone destroying cholesteatoma, to exenterate the infected mastoid air cells and to remove the infected and hypertrophied middle ear mucosa.

The complication rate in this study was lesser than that observed in other studies, but still higher as compared to developed countries. Due to earlier and effective use of antibiotics complication rate is now decreasing. It was concluded that all cases of unsafe atticofacial disease and medically non responding cases of safe disease with blocked aditus and faulty ventilation required mastoid exploration.

Socio-demographic factors mainly associated with CSOM were poor socioeconomic status, rural background, over-crowding and unhygienic ear cleaning practices. Clinical risk factors mainly associated with CSOM were sinusitis, deviated nasal septum, tonsillitis, upper respiratory tract infections and adenoid hypertrophy.

Improvement of socioeconomic status of people, early recognition and treatment of CSOM can reduce the number of cases and complications of the disease thus decreasing the requirement of mastoid exploration.

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