

## A Retrospective Study Clinical Investigation of Active Squamosal Chronic Otitis Media

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Conflict of interest: Nil

### Abstract

**Aim:** A clinical investigation of active squamosal chronic otitis media.

**Material and Methods:** This retrospective study was conducted in the Department of ENT, IGIMS, Patna, Bihar, India from May 2017 to April 2018, with 50 patients between age group 10 to 50 years with active squamosal type of chronic suppurative otitis media who were selected from outpatient department in otorhinolaryngology department. All patients fitting into the definition of active squamosal COM and fulfilling the inclusion criteria were taken into the study. Clinical diagnosis was established using detailed ENT examination. Oto microscopic examination of the ear was done to improve upon our clinical findings. Audiological assessment was done by pure tone audiometry to know the type and degree of hearing loss.

**Results:** Most common presentation was of foul smelling otorrhea in 40 patients, reduced hearing in 40 patients. 8 patients presented with vertigo and 2 presented with facial nerve paresis. Most common otoscopic finding was pf posterior- superior retraction pocket in 26 patients. The most common ossicle found eroded on HRCT temporal bone was that of incus only (56%) followed by erosion of incus and malleus (36%). After clinical and radiological assessment 30 patients were posted for canal wall down mastoidectomy. Most of the patients presented with cholesteatoma in epitympanum (52%). Most common ossicle found eroded intraoperatively was incus (64%). There were near equal presentation of patients with mild, moderate and moderately severe conductive hearing loss.

**Conclusion:** The most common otoscopic finding is presence of retraction pocket in posterior-superior portion of pars tense and attic retraction. The common audiometric finding is of a conductive hearing loss which gradually improved post operatively, following up at 6 weeks subsequently. Tympan mastoid exploration is the ideal treatment in management of cholesteatoma and depending on the extent of disease can either be canal wall up mastoidectomy or canal wall down mastoidectomy, which may be undertaken with oculoplastic to improve post-operative hearing outcome ultimately leading to a better quality of life.

**Keywords:** Cholesteatoma, Active squamosal disease, Tympan mastoid exploration, Retraction pocket

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### Introduction

Active squamosal chronic otitis media (ASCOM), a type of chronic otitis media, is characterized by persistent infection and inflammation of the middle ear, typically involving the presence of a cholesteatoma. Cholesteatomas are abnormal, noncancerous skin growths that can develop in the middle ear and mastoid, often leading to severe complications if left untreated. Understanding the aetiology, pathophysiology, clinical manifestations, and management strategies of ASCOM is crucial for effective treatment and prevention of its associated morbidity. ASCOM usually arises from chronic Eustachian tube dysfunction, which leads to negative pressure in the middle ear and subsequent retraction of the tympanic membrane. Over time, this retracted pocket accumulates keratin debris, forming a cholesteatoma. The presence of

cholesteatomas is a hallmark of ASCOM and significantly contributes to its chronic and recurrent nature. These lesions can erode ossicles, mastoid air cells, and even extend into the inner ear, leading to complications such as hearing loss, vertigo, and facial nerve paralysis. [1-3] Patients with ASCOM often present with otorrhea (persistent ear discharge), conductive hearing loss, and a history of recurrent ear infections. The otoscopic examination may reveal a retracted tympanic membrane, often with a visible cholesteatoma or granulation tissue. Advanced cases may show signs of complications like labyrinthitis, facial palsy, or intracranial infections. Audiometric evaluation typically demonstrates conductive hearing loss, although mixed or sensorineural hearing loss can occur if inner ear structures are involved. [4,5] The diagnosis

of ASCOM primarily relies on clinical examination and imaging studies. High-resolution computed tomography (HRCT) of the temporal bone is the imaging modality of choice, providing detailed visualization of the cholesteatoma, the extent of bony erosion, and the involvement of surrounding structures. Magnetic resonance imaging (MRI) can be useful in assessing the extent of soft tissue involvement and differentiating cholesteatoma from other middle ear pathologies. The management of ASCOM is predominantly surgical. The primary goal of surgery is to eradicate the disease, create a dry ear, and, if possible, preserve or restore hearing. Common surgical approaches include canal wall up (CWU) and canal wall down (CWD) mastoidectomy. CWU procedures aim to maintain the normal anatomy of the ear canal, while CWD procedures involve removing the posterior ear canal wall, which may be necessary in extensive or recurrent cases. [6,7]

### Material and Methods

This retrospective study was conducted in the Department of ENT, IGIMS, PATNA, Bihar, India from May 2017 to April 2018 with 50 patients between age group 10 to 50 years with active squamosal type of chronic suppurative otitis media who were selected from outpatient department in otorhinolaryngology department. All patients fitting into the definition of active squamosal COM and fulfilling the inclusion criteria were taken into the study.

Cases presenting with retraction pocket in attic and posterior-superior quadrant of pars tense with active squamosal disease and patients ranged from 10 to 50 years presenting with active squamosal COM were included in the study. Patients with age less than 10 years and more than 50 years, patients with

congenital cholesteatoma, past history of ear surgery, and mucosal COM and adhesive otitis media were excluded from the study.

Clinical diagnosis was established using detailed ENT examination. Oto microscopic examination of the ear was done to improve upon our clinical findings. Audiological assessment was done by pure tone audiometry to know the type and degree of hearing loss.

Routine blood test and urine tests was done. X-ray mastoid (B/L Schuller's view) was taken for all the cases and HRCT temporal bone was done for all patients. Based on all this the patient was planned either for canal wall up mastoidectomy or canal wall down mastoidectomy after pre-anaesthetic fitness under general anaesthesia.

### Results

The proportion of patients in the age group of 30-40 years was significantly higher than other age group. Most common presentation was of foul smelling otorrhea in 40 patients, reduced hearing in 40 patients. 8 patients presented with vertigo and 2 presented with facial nerve paresis. Most common otoscopic finding was pf posterior- superior retraction pocket in 26 patients. The most common ossicle found eroded on HRCT temporal bone was that of incus only (56%) followed by erosion of incus and malleus (36%). After clinical and radiological assessment 30 patients were posted for canal wall down mastoidectomy. Most of the patients presented with cholesteatoma in epitympanum (52%). Most common ossicle found eroded intraoperatively was incus (64%). There were near equal presentation of patients with mild, moderate and moderately severe conductive hearing loss.

**Table 1: Age of presentation.**

Age (years)	Number	Percentage
15 -25	11	22
25-40	28	56
40-50	11	22

**Table 2: Presenting symptoms of patients.**

Symptoms	Total number
Foul smelling otorrhoea	40
Reduced hearing	40
Earache	8
Tinnitus	26
Vertigo	8
Facial weakness	2

**Table 3: Presenting signs of patients.**

Signs	Total number	Percentage
Attic retraction	22	44
Postero superior retraction	26	52
Aural polyps	2	4
Postero-superior retraction with facial palsy	2	4
Attic retraction with nystagmus	4	8

**Table 4: HRCT temporal bone findings.**

Erosion of ossicles	Number
Incus only	26
Incus+malleus	18
Incus+stapes	6
Erosion of tegmen plate	4
Dehiscence of fallopian canal	2
Erosion of Sinus plate	4
Erosion of lateral semi-circular canal	2

**Table 5: Type of surgery undertaken.**

Type of mastoidectomy	Number
Canal wall down mastoidectomy	20
Canal wall up mastoidectomy	30

**Table 6: Extent of cholesteatoma.**

Extent of cholestatoma	Number
Antrum	12
Epitympanum	26
Antrum with epitympanum	12

**Table 7: Status of ossicles.**

Status of ossicles	Intact	Eroded
Malleus	24	26
Incus	18	32
Stapes	40	10

**Table 8: Degree of hearing loss.**

Degree of hearing loss	Number
Mild hearing loss	14
Moderate hearing loss	16
Moderately severe hearing loss	18

**Table 9: Type of hearing loss.**

Type	Number
Conductive	28
Mixed	22

## Discussion

This study was conducted with the aim of clinical assessment of cholesteatoma in active squamosal COM. The population under study was scrutinized by following protocol of inclusion and exclusion criteria, with the result obtained in the study elaborated in the text. The maximum number of patients in our study was in the age group of 25 to 40 years with the youngest being 15 years and the eldest being 48 years, mostly belonging to low socioeconomic status. When we compare this to a study done by Khan et al, the average age in their study was between 11-20 years, slightly lower than

average age in my study. This difference was probably due to the fact that our study did not include patients presenting with congenital cholesteatoma. The total number of ear in the study was 50 out of which 30 were male and 20 were female. Male to female ratio was 3:2. In a similar study done by Khan the male to female ratio was 2.33:1. [8] The ratio from the said study roughly corresponds to my study. Thus we can safely conclude that there is no gender preponderance in patients presenting with cholesteatoma.

In our study, incidents of cholesteatoma was same for both right and left ears. the chief presenting

complaint of patients presenting with cholesteatoma in squamosal COM includes foul smelling otorrhea in 40 patients, reduced hearing in 40 patients, otalgia in eight patients, tinnitus in 26 patients, vertigo in eight patients, an facial weakness in two patients. The quality of life was impaired due to the symptoms. On otoscopy 48 patients presented with retraction pockets out of which 26 had retraction of posterior superior aspect of pars tensa and 22 presented with attic retraction. Two patients presented with aural polyp. In a similar study conducted by Shwetha et al, pars flaccid cholesteatoma was found in 45.5% of the patients whereas 33.3% patients had pars tense cholesteatoma. On clinical examination two patients presented with facial nerve paresis and four patients presented with nystagmus. Thus In total six patients presented with complication of cholesteatoma in our study. When we compare this do a similar study done by Shwetha et al, 21% patients were diagnosed with complication of cholesteatoma. [9] Cholesteatoma in squamosal COM is diagnosed clinically with an otoscopic Examination of the ear followed by an oto microscopic examination to improve upon the findings for the selection of correct treatment modality. Tympanic membrane retraction, whether in pars tense or pars flaccid, presence of cholesteatoma flakes, status of this scutum may be seen through the oto microscope. Pure tone audiometry what's conducted in all patients who participated in the study, since PTA being an important indicator evaluating the hearing at initial presentation and hearing outcome after treatment. PTA was conducted pre operatively and six weeks after surgery. It must be noted that all patients had some amount of reduced hearing as was evident on PTA, however only 40 patients had reduced hearing as a chief complaint, that being 80% of all the patients. Out of total of 50 patients 28 patients had conductive type of hearing loss while 22 presented with mixed hearing loss. In patients presenting with conductive hearing loss, 14 presented with mild hearing loss, 16 presented with moderate hearing loss while 18 presented with moderately severe hearing loss. In comparing this to a similar study conducted by Khan et al, 19.9% patients had mild conductive deafness, 74.47% had moderate conductive deafness and 6.38% had severe conductive deafness. [9] All the patients were investigated with high resolution computed tomography off temporal bone two understand the extent of disease, status of the ossicles, status of the fallopian canal, status of the tegmen tympani and the presence of any fistula. Out of 50 patients, 26 patients presented with erosion of long process of incus. 18 patients presented with erosion of long process of incus and handle of malleus while six patients presented with erosion of incus and stapes superstructure. Erosion of tegmen was found in four patients where is erosion of fallopian canal was

found in two patients. Sinus plate erosion was seen in four patients whereas erosion of lateral semicircular canal was seen in two patients in HRCT temporal bone. In a similar study conducted by Gaurano et al 92% patients had erosion of the ossicles with erosion of long process of incus seen in 48% patients, erosion of facial canal seen in 86%, and 75% presented with erosion of tegmen wall. [10] In a study conducted by Shah et al in Surat, on 30 patients for role of HRCT temporal bone in pre-operative evaluation of cholesteatoma, erosion of long process/body of incus was seen in 85.7% of cases whereas that of malleus was found to be in 45.7% of the cases. Stapes superstructure was found to be eroded in 31.4% of the cases. [11] Thus we can safely conclude that long process of incus was the most common ossicle found eroded on HRCT temporal bone and it forms an important modality in management of active squamosal COM.

Considering the above symptoms and clinical findings patients were diagnosed to have actives, squamosal COM. They were planned for mastoid surgery under general anaesthesia after getting preanesthetic evaluation done. Out of the total 50 patient 20 underwent canal wall down mastoidectomy while 30 patients underwent intact canal wall mastoidectomy. Intra operatively, the extent of cholesteatoma, status of ossicles and status of fallopian canal was assessed. Careful exploration was done to look for any fistula in the lateral semicircular canal. Cholesteatoma was found extending into the epitympanum only in 26 patients while in 12 patients cholesteatoma wall extending into the antrum. 12 patients presented with cholesteatoma extending into the epitympanum and the antrum. Intra operatively, the most common ossicle found eroded was incus with long process of incus being the most common part. It was found to be eroded in 32 patients. Malleus was eroded in 26 patients while stapes superstructure was found to be eroded in 10 patients. Fallopian canal dehiscence leading to exposure of the facial nerve was found in 16 patients. In a study conducted by Chan et al to assess facial nerve dehiscence at mastoidectomy in cholesteatoma, it was found out that 28.7% of the patients presented with facial nerve dehiscence and tympanic segment being the most common involved segment in 81.8% patients. [12] In case of two patients presenting with facial nerve paresis, canal wall down mastoidectomy was performed and facial nerve decompression was done from the geniculate ganglion up to the stylomastoid foramen. Facial nerve was found intact throughout the course. In two patients who presented with lateral semicircular canal fistula, intraoperatively it was found that they had type 1 lateral semicircular canal fistula i.e. with an intact endosteum. LSCC fistula closure was done using surdille flap. Patients were discharged on postoperative day 7 after suture removal and with appropriate antibiotic cover and ask to follow up

after six weeks at which time the year was examined for uptake of graft and status of the cavity. PT was also conducted for these patients at six weeks postoperatively. Five patients who underwent canal wall down mastoidectomy presented with a discharging mastoid cavity. They were subsequently asked to follow up every two weeks during which thorough cleaning of the mastoid cavity along with its inspection carried out. In long term follow-up of these patients the mastoid cavity was adequately healed and thus became dry. Postoperative hearing of patients conducted at six weeks showed significant reduction in airborne gap in patients presented with conductive hearing loss. In 14 patients who had presented with mild hearing loss, there was significant reduction in the airborne gap up to 10 decibels. Those patients presenting with moderate hearing loss that is 16 patients the reduction in airborne gap what's found to be around 20 to 25 decibels while those presenting with moderately severe hearing loss that is 18 patients the reduction in airborne gap was found to be around 30 to 40 decibels. In patients presenting with mixed hearing loss there were significant reductions seen in the conductive component. In long term follow up of patients presenting with facial nerve palsy, significant improvement was found in their muscular function and tone.

### Conclusion

Primary acquired cholesteatoma is the disease which can present in any age group with no gender preponderance with predilection for presentation in low socio-economic status. The presenting complaints of squamosal COM includes foul smelling otorrhoea, reduced hearing, otalgia, and complicated cases may present with vertigo and facial weakness. The most common otoscopic finding is presence of retraction pocket in posterior-superior portion of pars tense and attic retraction. The common audiometric finding is of a conductive hearing loss which gradually improved post operatively, following up at 6 weeks subsequently. Tympan mastoid exploration is the ideal treatment in management of cholesteatoma and depending on the extent of disease can either be canal wall up mastoidectomy or canal wall down mastoidectomy, which may be undertaken with oculoplastic to improve post-operative hearing outcome ultimately leading to a better quality of life.

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