INTRODUCTION

The term cholesteatoma is a misnomer as it does not contain cholesterol crystals and is not a tumor. Until 1838, as Müller coined the term cholesteatoma, nothing new appeared in medical publications[1]. Tynynbe mentioned the similarity between the squamae of what he called "Molluscum Contagiosum" and the stratum corneum in 1850, not yet knowing how to explain the presence of epidermis in the middle ear [2]. Normally middle ear cleft is lined by ciliated columnar epithelium in the anterior and inferior part, cuboidal epithelium in middle and pavement in attic. Middle ear cleft is nowhere lined by stratified squamous epithelium and the presence of this epithelium is coined as the term cholesteatoma."SKIN IN THE WRONG PLACE". The genesis of cholesteatoma is a matter of debate. Any theory regarding this should explain the reason for the presence of squamous epithelium in the middle ear. Cholesteatomas are classified as congenital or acquired; acquired cholesteatomas are subdivided into primary (attic retraction) or secondary [3]. Cholesteatoma has a keratinized stratified squamous epithelium named cholesteatoma matrix. It also presents as a connective tissue, containing collagen fibers, fibrocytes and inflammatory cells, named perimatrix which in most of the cases is in contact with squamous or ciliated cylindrical cells, and remains from the original middle ear mucoosa. Some authors [4] describe the perimatrix as the most peripheral portion of the cholesteatoma, comprising granulation tissue or inflammatory subepithelial connective tissue, with lymphocytes, histocytes and neutrophils. The perimatrix appears as an inflammatory network that involves the cholesteatoma. Sprekelsen BM et al. [5] stated that the matrix and perimatrix, in normal or pathological tissues, are formed by type IV collagen, tenascin, fibronectin, and metalloproteinase (MMP).

DISCUSSION

A basic knowledge of the anatomy of the middle ear provides the basis for understanding the disease progression and concepts of surgical management. Attic is the portion that lies above the level of the squamae of what he called "Molluscum Contagiosum" and the stratum corneum in 1850, not yet knowing how to explain the presence of epidermis in the middle ear [2]. Normally middle ear cleft is lined by ciliated columnar epithelium in the anterior and inferior part, cuboidal epithelium in middle and pavement in attic. Middle ear cleft is nowhere lined by stratified squamous epithelium and the presence of this epithelium is coined as the term cholesteatoma. "SKIN IN THE WRONG PLACE". The genesis of cholesteatoma is a matter of debate. Any theory regarding this should explain the reason for the presence of squamous epithelium in the middle ear. Cholesteatomas are classified as congenital or acquired; acquired cholesteatomas are subdivided into primary (attic retraction) or secondary [3]. Cholesteatoma has a keratinized stratified squamous epithelium named cholesteatoma matrix. It also presents as a connective tissue, containing collagen fibers, fibrocytes and inflammatory cells, named perimatrix which in most of the cases is in contact with squamous or ciliated cylindrical cells, and remains from the original middle ear mucoosa. Some authors [4] describe the perimatrix as the most peripheral portion of the cholesteatoma, comprising granulation tissue or inflammatory subepithelial connective tissue, with lymphocytes, histocytes and neutrophils. The perimatrix appears as an inflammatory network that involves the cholesteatoma. Sprekelsen BM et al. [5] stated that the matrix and perimatrix, in normal or pathological tissues, are formed by type IV collagen, tenascin, fibronectin, and metalloproteinase (MMP).
Cholesteatoma is considered dangerous as it spreads or invades adjacent structures by several ways. Cholesteatoma also has late presentation due to its scanty discharge. The patient does not appreciate it at an early stage until it becomes foul smelling or blood stained. It is also one of the reasons for complications as the patient is unaware of it in many cases. The growth of cholesteatoma on the angio genesis in the perimatrix connective tissue. Angiogenesis enables and supports the sustained migration of keratinocytes into the middle ear cavity [6]. The most important mode of spread is by bone erosion. The enzymatic activity at the margin of the cholesteatoma enhances osteoclastic activity, which greatly increases the speed of bone erosion. These osteolytic enzymes appear to increase when a cholesteatoma becomes infected[7]. The presence of bacteria may provide a critical link between the cholesteatoma and the host, which prevents the cholesteatoma epithelium from continuing specific differentiation programs and returning to a quiescent state in which it becomes minimally proliferative, non-migratory, and non-invasive [8]. Cholesteatoma can also spread by progressive thrombophlebitis through Haversian venous channels near the infected site such as lateral sinus through normal anatomical pathway - oval window, round window, into the internal auditory meatus, cochlear aqueduct, vestibular aqueduct, or through the facial canal and foot plate that was not removed at the initial surgical procedure due to fear of damage to the same. Recurrent cholesteatoma sac is confined to the attic with normal hearing. It is possible to remove the disease process while preserving any hearing. Surgery under General Anaesthesia. An informed culture and sensitivity. In some cases, CT scan was done to study the further implications of cholesteatoma and its sequelae and also the outcomes of different surgical procedures used in each case depending on its clinical presentation. 26 (n=26, 86.7%) patients underwent Modified Radical Mastoidectomy and 2 (n=2, 6.7%) patients Atticoantrostomy. The mode of surgery was decided depending on the extent of the disease, which was assessed pre operatively, and the complications. The hidden areas were visualised with angled endoscopes and the disease was cleared. Post operatively, patients were put on broad spectrum antibiotics, anti inflammatory and anti histamines. External canal packs and sutures were removed on the 7th post op day. Patients were regularly followed every week for 6 weeks.

RESULTS AND OBSERVATION
Almost all the patients had purulent, scanty malodorous foul smelling and persistent ear discharge with hard of hearing of varying duration. 4 patients (n=4, 13.3%) presented with fever, headache, mastoid tenderness and swelling behind the ear. 14 patients (n=14, 46%) presented with attic perforation surrounded by white debris which is nothing but cholesteatoma. 4 patients (n=4, 13.3%) presented with posteriorosseous marginal and attic granulation,(n=8,26.8%) 8 patients presented with granulation at attic region with cholesteatoma. Such type of granulation is an important sign suggesting deep seated disease with mucosal changes and necrosis of bone and possibly the presence of cholesteatoma. 4 patients (n=4, 13.3%) presented with polyp in the external auditory canal. 23 patients (n=23, 76.7%) had conductive deafness, 4 patients (n=4, 13.3%) had mixed deafness and 3 patients...
(n=3, 10%) had dead ear. The commonest age group was between 11-30 years. The youngest was 5 years and the oldest was 40 years. Intra cranial complications are common in younger age group. Males were commonly affected (n=7, 66%) than females (n=3, 33%). The left ear was more commonly affected (n=13, 43%) than the right ear (n=12, 40%). Both ears were involved in 17% (n=5) of cases and single ear was involved in 83% (n=25) of cases.

Otorrhoea and deafness were the main presentation in all the cases followed by subperiosteal abscess (n=3, 10%), facial nerve palsy (n=2, 6.6%) and headache, vomiting, fever and ear pain (n=4, 13.3%) (Figure 1). Of the 30 patients, 9 (n=9, 30%) were having complications. 4 (n=4, 13.3%) patients were having intracranial complications. Sub periosteal abscess was the commonest extracranial complication (n=3, 10%) followed by facial nerve palsy in 2 cases (n=2, 6.7%) (Figure 2). One of the patient presented with Gradenigo’s Syndrome (Retro orbital pain, ear discharge, diplopia) (Figure 3) with evidence of petrositis in CT scan. (Figure 4)

The common type of hearing loss is conductive hearing loss (n=23, 76.7%), 4 patients had mixed loss (n=4, 13.3%) and 3 had dead ear (n=3, 10%). Attic perforation with cholesteatoma was the commonest ear finding in 14 cases (n=14, 46.8%), followed by attic granulations in 8 cases (n=8, 26.6%). All patients were given aural toileting and the discharge was sent for culture and sensitivity as antibiotic resistance is a major problem post operatively. In a study 87% of the K. pneumoniae isolates showed resistance to all the three third generation cephalosporin antibiotics and this resistance to all the three was found to coexist with resistance to other antibiotics[13]. Another study done in Doha Qatar, showed that all gram negative bacilli were sensitive to Amikacin and resistance of Gram Negative Bacilli to Gentamicin was 20%.[14]. In our study the commonest organisms frequently found in cultures was Proteus, Pseudomonas and Staphylococci and all were susceptible to Cephalosporins ,Aminoglycosides . The commonest X-Ray mastoids finding were sclerosed in 24 patients (n=24, 80%) followed by cavity in the antrum was seen in 6 patients (n=6, 20%). 1 case showed cavity in the sinodural angle. (Figure 5)

All the 30 patients had cholesteatoma as a Per operative finding. 14 patients had granulation (n=14, 46.8%), 3 had cortical erosion (n=3, 10%), 1 had posterior canal wall erosion (n=1, 3.3%), 1 had perisinus abscess (n=1, 3.3%). Tegmen erosion was seen in all 4 cases who presented with intracranial complications (n=4, 13.3%) (Figure 6). Out of 4 patients with intracranial complication 1 had cerebellar abscess (Figure 7).
Out of the 2 patients who presented with facial palsy 1 had dehiscent Fallopian Canal with cholesteatoma causing pressure on the horizontal part of the facial nerve and another had erosion of the Fallopian canal at the level of second genu.

Most of the patients had undergone a Modified Radical Mastoidectomy (n=26, 86.7%) out of which 3 underwent the inside out type (n=3, 11.5%). 2 patients had undergone Atticoantrostomy (n=2, 6.7%) followed by 1 patient undergoing Marginectomy (n=1, 3.3%) and 1 patient undergoing Radical Mastoidectomy with obliteration of cavity (n=1, 3.3%) (Table 1). Complications were dealt with simultaneously depending on the extent of the disease.

Table 1: Surgical Procedure

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radical mastoidectomy with obliteration</td>
<td>1</td>
<td>3.3</td>
</tr>
<tr>
<td>Marginectomy</td>
<td>1</td>
<td>3.3</td>
</tr>
<tr>
<td>C.A.T</td>
<td>2</td>
<td>6.7</td>
</tr>
<tr>
<td>M.R.M</td>
<td>26</td>
<td>86.7</td>
</tr>
<tr>
<td>Inside out</td>
<td>3</td>
<td>11.5</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100</td>
</tr>
</tbody>
</table>

25 patients had no post operative complications (n=25, 83.5%). 2 presented with gaping of the postaural wound (n=2, 6.6%) followed by another 2 presenting with mental stenosis (n=2, 6.6%) and 1 patient developed facial nerve paresis (n=1, 3.3%). Secondary suturing was done in both the cases of wound gaping. Facial nerve weakness recovered over a period of 1 month with physiotherapy, electrical stimulation and steroids. On following up the post operative patients it was observed that 10 patients developed dry ear (n=10, 33.3%) followed by 6 patients having dry ear with better hearing (n=6, 20%). 6 patients however presented with recurrence of dry ear (n=6, 20%). 8 patients (n=8, 26.7%) did not turn up for follow up. (Figure 8)

CONCLUSION

Chronic suppurative otitis media with cholesteatoma is an alarming finding for many ENT surgeons in view of the late presentation, higher incidence of complications and more recurrence inspite of good surgical clearance. But nowadays with newer surgical modalities and advanced technologies we are able to give a better outcome for the patient with less morbidity. The angled endoscopes help in visualizing hidden areas very precisely and clear all diseased air cells upto petrous apex. Further newer methods are being tried out everyday like lining the cavity with graft and reconstructing the posterior canal wall preventing cavity problems.

ACKNOWLEDGEMENT

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REFERENCES


