A study of surgical management of chronic suppurative otitis media with cholesteatoma and its outcome

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Abstract

Objective Aim of this study is evaluation of course of improvement of surgically treated cases of chronic suppurative otitis media (CSOM) with cholesteatoma; it includes hearing status, condition of mastoid cavity, study of different, natural and surgical condition and recurrence of disease within the study period.

Design It is a prospective study.

Settings This study was conducted in a premiere government hospital in Kolkata between May 2007 to April 2008.

Patients Total 40 patients between age group of 6–70 years were included in the present study which includes 19 males and 21 females.

Intervention Surgical interventions were done in all the cases. Different types of mastoidectomy with or without tympanoplasty was done according to extent of disease process.

Outcome Audiometrically documentable hearing improvement occurred in 35% cases ($p = 14$), in rest of the ears hearing status remained unaltered. At the end of 6 months follow up 92.5% ($p = 14$) in rest ($p = 37$) operated ears become completely dry. Five percent cases ($p = 2$) presented with facial paralysis; among them one patient improved completely and another patient improved from grade V to grade III facial paralysis. No patient developed any post operative intracranial complications and recurrence

of cholesteatoma not found in 6 months follow up. Meatal stenosis developed in 5% cases ($p = 2$) at the end of 6 months.

Conclusion Surgery is mainstay of treatment in CSOM with cholesteatoma. Eradication of disease, prevention of complication, maintenance and restoration of hearing, and giving the patient a non-discharging ear are main aim of treatment.

Keywords Cholesteatoma · Chronic suppurative otitis media

Introduction

Papillar cholesteatoma represents the presence of non-neoplastic accumulation of keratinizing stratified squamous epithelium along with desquamated keratin debris in the tympanic cavity and/or mastoid. Once the squamous epithelium reaches these areas from its origin in the external auditory canal or tympanic membrane, a locally invasive and destructive process typically ensues. The rate of progression of the disease is usually insidious. Surgery is the treatment. The goals of surgical management include the eradication of disease, restoration of hearing, and to the extent possible, maintenance or restoration of normal anatomic configuration [3]. There is no single surgical treatment of choice for aural cholesteatoma. The extent of cholesteatoma, the amount of preoperative destruction, mastoid pneumatization guide the surgeon in choosing the type of operation for a particular ear – which may range from simple extraction of cholesteatoma to radical mastoidectomy [6].

Aims and objectives

Chronic suppurative otitis media (CSOM) with cholesteatoma is a major cause of morbidity and deafness.

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In India the incidence of CSOM with cholesteatoma and complications are very high.

In this regard purposes of the present study are evaluation of:

- Hearing status both at preoperative and postoperative stage.
- Status of mastoid cavity in postoperative stage.
- Presence or absence of facial nerve paralysis.
- Intracranial complications – monitoring and management.
- Incidence of post aural fistula.
- Development of recurrent cholesteatoma.
- Incidence of postoperative meatal stenosis.

Materials and methods

The present study entitled “A study of Surgical Management of CSOM with cholesteatoma and its outcome” was carried out in Department of ENT, IPGME&R/SSKM Hospital, Kolkata over a period of 1 year from May 2007 to April 2008.

All cases of CSOM with cholesteatoma were selected among the patients attended ENT OPD of IPGME&R/SSKM Hospital. Total 40 patients (19 males, 21 females) between 6–70 years of age were included in the present study. The selected cases had limited cholesteatoma (attic perforation, postero-superior marginal perforation) to extensive cholesteatoma and aural polyp, post aural fistula. Some cases had features of intracranial complications. All patients were subjected to detailed history taking, through clinical examination and preoperative investigation and recorded in a preformed performa. Surgery was done in all the cases. After discharge patients were advised to report in the OPD at the end of 1, 3 and 6 months. During these postoperative visits patients were examined with special reference to the following points a) Condition of post-operative mastoid cavity b) any discharge from operated ear; if present - its character c) hearing status d) facial nerve paralysis present - or not; if present – whether it is improving with time? e) development of meatal stenosis f) development of perichondritis g) any subsequent complications h) development of post aural fistula in post-operative phase i) any recurrence of disease or not etc. all these observations were noted in a tabulated form and analyzed later.

Result and analysis

In the present study we had chosen 40 patients from ENT OPD of IPGME&R/SSKM Hospital. After operation patients underwent follow up and results of observation and tabulated as followed.

Sex ratio in this study is approximately Male:Female

1:1 (Male–19, Female–21). Most of the patients were in the age group 11–20 years (37.5%) and 21–30 years (35%); pediatric age group (1–10 years) contributed a significant 20% case burden.

Majority (60%) patients were from low socioeconomic strata; 35% patients came from middle and lower middle class families and only 5% represented upper class families.

In this cohort (Figs 1–3) of 40 patients, 15 patients (37.5%) presented with limited cholesteatoma; 19 patients (47.5%) presented with extensive cholesteatoma, among these 19 patients one patient had facial paralysis, 3 cases had post aural fistula, 5 cases had feature of intracranial complications, rest six patients (15%) presented with aural polyp along with extensive disease and among them one patient had facial paralysis, 2 cases has post aural fistula and one patient had otogenic brain abscess. So overall two patients (5%) facial paralysis, five patients (12.5%) had post aural fistula and six patients (15%) had intracranial complications; in total 32.5% patients presented with different preoperative complication.

Fig. 1 Pars tensa retraction

Fig. 2 Congenital cholesteatoma

Fig. 3 CT scan showing cholesteatoma

Regarding preoperative hearing status moderate (41–55 db) hearing loss was found in 57.5% ($p = 23$). 12.5% patients ($p = 5$) had severe to very severe (56–70 db and above) hearing loss. Thirty percent ($p = 12$) had only mild (26–40 db) hearing loss.

The entire patient underwent surgery. Canal wall down mastoidectomy done in 62.5% ($p = 25$) patients, in whom there were extensive cholesteatoma, aural polyp, postaural fistula, facial nerve paralysis and features of intracranial complications. Temporalis fascia free graft layed down in mastoid cavities in 17 cases, except the cases with facial nerve paralysis ($p = 2$) and intracranial complications ($p = 6$). Neurosurgical opinion was sought for cases

with intracranial complications (6 cases). Among them two patients first operated otogenic brain abscess; these two patients first operated under care of neurosurgery department and brain abscess were drained by burr-hole technique. In all these 6 cases mastoidectomy was performed after patients neurologically stable. Atticotomy with attic reconstruction and tympanoplasty was done in 5 cases (12.5%). Atticoantrostomy with posterior canal wall reconstruction and tympanoplasty was done in 7 cases (17.5%) and cortical mastoidectomy and tympanoplasty was done in 3 cases (7.5%).

Regarding the postoperative assessment of mastoid cavity it is seen that at the end of 1 month 20% (5 cases) of mastoid cavity became dry among the 25 cases of canal wall down mastoid cavities. At the end of 3–6 months, 80% and 92% mastoid cavities became completely dry respectively. At the end of 6 months any 8% mastoid cavities remained wet.

In preoperative stage 2 cases presented with facial nerve paralysis 1 more case of transient facial palsy occurred in postoperative period due to local anesthetic infiltration which improved rapidly. Among the two preoperative cases of facial nerve palsy 1 case improved within 2 weeks of surgery with steroid administration. Once case of facial palsy did not improve completely in 6 months follow up period.

Meatoplasty done in all the cases of canal wall down mastoidectomies (25 cases). At the end of 6 months 2 cases found to have meatal stenosis. (Eight percent) perichondritis occurred in 1 case with post aural fistula which improved within 5 days with oral antibiotics.

Five patients presented with post aural fistula before operation and all of them were repaired during surgery. At the end of 1 month a small fistula developed in 1 case which remained present at 3 months follow up. Mastoid cavity of that case was dry. That fistula was closed with simple stitches after freshening of margin.

One case of failed tympanoplasty found in 3 and 6 minutes follow up, operation done in that case was attico-antrostomy with canal wall reconstruction and tympanoplasty. As the ear remained dry, disease was cleaned and patient refused further surgery. Conservative approach was taken in that case and patient concealed for further follow up.

No case of residual or recurrent cholesteatoma was found in upto 6 months follow up.

Puretone audiometry was done in every cases before operation and and after 6 months following surgery out of total 40 cases 30% had mild (26–40 db), 57.5% had moderate (41–55 db) and 12.5% had severe, and very severe (56–70 dB and above) hearing loss before operation. When postoperative audiometry was performed after 6 months following surgery it is found that hearing threshold became normal (<25 db) in 15% patients. And 32.5%, 42.5% and 10% patients had mild, moderate and severe hearing loss (Table 1, Fig. 4).

Table 1 Number of patients having dry, wet and debris at 1, 3 and 6 months

Nature of mastoidectomy	Condition of operated ear								
	1 month			3 months			6 months		
	Dry	Wet	Debri	Dry	Wet	Debri	Dry	Wet	Debri
A. Canal wall down mastoidectomy + meatoplasty	5	2	00	1	85	2	1	92	4
1. With temporalis fascia grafting of tympano mastoid cavity (17 cases)	5	1	20	1	51	1	1	50	2
2. Without temporalis fascia grafting of tympano mastoid cavity (8 cases)	0	8	0	3	4	1	4	2	2
B. Canal wall up mastoidectomy + tympanoplasty (15 cases)	1	23	0	14	1	0	1	21	2
1. Atticotomy and attic reconstruction + tympanoplasty (5 cases)	4	1	0	5	0	0	4	0	1
2. Atticoantrostomy and posterior canal wall reconstruction + tympanoplasty (5 cases)	5	2	0	6	1	0	5	1	1
3. Cortical mastoidectomy + tympanoplasty (3 cases)	3	0	0	3	0	0	3	0	0
	1	2	30	3	26	2	3	13	6

Number of patients having dry, wet and debris at 1, 3 and 6 months

Discussion

In this study it is found that maximum number of patients were in the age group of 11–20 years (37.5%) followed by 21–30 years age group (35%). There were large number (20%) patients from pediatric (1–10 years) age group. So inference can be drawn that number of patients begin to reduce after 30 years of age.

There is no male or female predilection for CSOM with cholesteatoma. Male and female ratio is approximately 1:1 in the present study and it corroborates with other studies in this aspect.

It has been found that 60% of the patients in our series belong to lower socioeconomic class (Family income < = 1500 rupees/months), 35% belong to lower middle class (family income between 1500–6000 rupees). As people from lower economic class live in crowded rooms with poor and unhygienic living condition so they suffer from recurrent upper respiratory tract infection giving rise to chronic ear problems and it is further compounded by pond bathing. Another factor is that cost of surgery in government run hospital is nominal compared to private run hospital and sometimes it takes time to get admitted. Due to this reason high income group goes to private hospitals.

In our study 13 patients (32.5%) presented with different, preoperative complications. Among them intracranial complication was commonest 4, (6 cases) [3 cases of meningitis and 3 cases of otogenic brain abscess], followed by post aural fistula (5 cases) and facial paralysis (2 cases).

In all the cases, surgery was done through post aural route canal wall down mastoidectomy was done in 25 cases (62.5%) in whom there was extensive cholesteatoma, aural polyps, facial paralysis and intracranial complications. Tympanomastoid cavity grafting done with temporalis fascia free graft in 17 cases (42.5%). In cases with facial palsy (2 cases) and cases associated with intracranial complications (6 cases) no grafting was done. Fifteen patients presented with limited disease and mastoidectomy and tympanoplasty was done in 5 (12.5%) cases, atticotomy with posterior canal wall reconstruction and tympanoplasty in 7 (17.5%) cases. So, overall canal wall down mastoidectomy was done in 15 (37.5%) cases [1, 2, 5].

Advantage of canal wall down mastoidectomy is that

it offers excellent control of cholesteatoma. The main disadvantage of canal wall down mastoidectomy is that it creates a cavity that is more prone to infections and the patient is required to take precaution to keep it dry. Advantage of canal wall up mastoidectomy is that the basic normal anatomy of middle ear is maintained and patient need not to take extra precaution to keep ear dry. Major disadvantage is that higher chance of recurrence of cholesteatoma. Later so regular follow up is required and patient may require second look surgery.

No operation can be successful unless the goals are not kept, clearly in mind. If the patient has had extensive cholesteatoma or patient wishes to avoid future operation or unable to return follow up in future; then canal wall down mastoidectomy is safer and preferred. Some intraoperative findings favors canal wall down technique; a) Involvement of sinus tympani b) cholesteatoma Sac medial to ossicles, c) CSOM with intracranial complications, facial palsy, d) large defect in posterior canal wall that is difficult to repair e) surgeon not satisfied about, complete disease clearance.

In India patients do not want second look surgery and follow up is poor; that is why canal wall up procedure is done only cases with limited cholesteatoma.

Regarding the hearing assessment, in preoperative audiometry 30% (12 cases) had mild hearing loss, 57.5% (23 cases) had moderate hearing loss, 12.5% (5 cases) presented with severe or very severe hearing loss. Pure tone audiometry was done in every patients at 6 months follow up, and significant hearing improvement found in 35% (14 cases) patients, in rest of the patients hearing remained as it was before surgery. Improvement of hearing attributed to tympanoplasty and ossiculoplasty [7] (Table 2).

Assessment of mastoid cavity was done at the end of 1, 3 and 6 months. At the end of 3rd months 85% ears become dry and canal wall down mastoid cavities became well epithelized and of the end of 6th months 92.5% (37 cases) ear became completely dry. Only three ears remained wet. At the end of 6 months among them 2 cases were non-grafted modified radical mastoidectomy cavities with narrow meatoplasty opening and 1 case was atticotomy with failed tympanoplasty. At the end of 3rd and 6th months 5% and 15% cavities were failed with debris and wax respectively. This explains the need for suction clearance

Table 2 Expression of preoperative and postoperative complications

Postoperative complications	Immediate	At 1 month	At 3 months	At 6 months
Facial paralysis	3	1	1	1
Meatal stenosis	Nil	0	1	2
Perichondritis	1	0	0	0
Postaural fistula	0	1	1	0
Failed tympanoplasty	0	0	1	1
Recurrent cholesteatoma	0	0	0	0

of mastoid cavity after canal wall down mastoidectomy at a periodic interval.

Regarding facial nerve status in this series, two patients presented with facial palsy preoperatively. Among them one patient had House-Brackman grade III paralysis and another patient had House-Brackman grade 5 paralysis. The grade III case improved completely within 48 hours of surgery with parenteral steroid injection. But the grade 5 cases improved up to grade III but did not improved beyond that even with parenteral and oral steroid till 6 months. The case of transient grade II facial paralysis developed immediate postoperative stage probably due to faulty infiltration of local anesthetic injections; which improved within 2 hours postoperatively.

No patient developed any intracranial complications in postoperative stage or during follow up period. In this present study no case of recurrent cholesteatoma was found upto 6 months postoperative period. As the duration of follow up was short development of recurrent cholesteatoma can not be over ruled in long term period. In different studies recurrent cholesteatoma was found in 5–13% cases (Table 3).

Table 3 Comparison of preoperative and postoperative hearing status

Hearing status	Preoperative	Postoperative
Normal	0	6
Mild hearing loss	12	13
Moderate hearing loss	23	17
Severe hearing loss	5	4

Conclusion

The pathogenesis of cholesteatoma has not been precisely

defined, but the essential element is the presence of keratinizing stratified squamous epithelium in the middle ear and mastoid. There are important, anatomic considerations in the management of cholesteatoma and tubal function plays a prominent role in the successful surgical treatment of the chronic ear disease. Eradication of disease is the primary surgical goal, followed by maintenance or restoration of hearing. There is no universally accepted surgical strategy for the management of cholesteatoma. The surgeon must be vigilant for complication of cholesteatoma, some of which may be extremely serious and potentially life threatening. Cholesteatoma is a chronic disease with a high rate of recidivism and require diligent long term follow up [3].

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