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Original Research Article

Evaluation of single stage tympanomastoid surgery in unsafe chronic suppurative otitis media in Kashmiri population: a cross sectional study

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ABSTRACT

Background: Chronic suppurative otitis media (CSOM) is typically a persistent disease insidious in ONSET, affecting the mucoperiosteal lining of middle ear cleft, often capable of causing severe destruction and irreversible sequelae and manifests clinically with hearing impairment and discharge. Successful management of unsafe CSOM has posed challenge before otolaryngologists for ages.
Methods: The prospective study is based on 40 patients of unsafe CSOM who were managed and followed up in the post graduate department of otorhinolaryngology and head and neck surgery of Government medical college Srinagar with relevant data was recorded on the proforma.
Results: All the patients who underwent single stage tympanomastoid surgery with or without ossicular chain reconstruction had no evidence of recurrent disease at follow up with 82.5% were below the age of 40, of which 40% were between 21 to 30 years. Males were more involved than females (1.2:1), also CT scan findings were co related with intra operative findings during our study.
Conclusions: In conclusion a perfectly performed canal wall down mastoidectomy with tympanoplasty with us without ossiculoplasty in same sitting give good and acceptable post-operative results as far as the hearing improvement and dry and safe ear is concerned.

Keywords: Tympanomastoidectomy, Cholesteatoma, High-resolution computed tomography temporal bone, Canal wall up, Canal wall down

INTRODUCTION

Chronic suppurative otitis media (CSOM) is typically a ONSET, affecting the mucoperiosteal lining of middle ear cleft, often capable of causing severe destruction and irreversible sequelae and manifests clinically with hearing impairment and discharge.[1] Due to anatomical location of the inflammatory process within the middle ear cleft and close relationship with various structure viz facial nerve, labyrinth, brain and sigmoid sinus, it can lead to serious intracranial and extra cranial complications.[2] The development and appropriate use of antibiotics have led to decrease in these potentially devastating complications.[3] These complications are particularly attributed to unsafe variety of CSOM cholesteatoma.[1]

CSOM is divided into two types.[4] Tubotympanic (safe type), atticoantral (unsafe type). Presently pathological definitions are increasingly being used in the preference to anatomical ones.[5]

The term cholesteatoma is the presence of keratinizing squamous epithelium in the middle ear cleft.[6] Successful

management of unsafe CSOM has posed challenge before otolaryngologists for ages. Radical and modified radical mastoidectomies has been used to treat cholesteatoma. presently canal wall down and canal wall up together with tympanoplasties and ossicular chain reconstruction are being performed all over.[7] The goal of chronic ear surgery is to create dry, safe ear and restore as much hearing as possible.[8] Those cases in which adequate removal of disease can be achieved, a single stage procedure is preferred.[9]

Aims and objective

To evaluate number of cases of safe ear following single stage tympanomastoid surgery for unsafe CSOM. To correlate high-resolution computed tomography (HRCT) scan findings with operative findings. To evaluate recurrent rates of canal wall down (CWD) verses canal wall up (CWU) procedure in patients undergoing single stage tympanomastoid surgery. To evaluate post-operative complications in patients undergoing single stage tympanomastoid surgery.

METHODS

Procedure

This prospective study was conducted in the Department of ENT and HNS Government Medical College Srinagar for a period of two and half years from June 2005 to December 2007 included 40 patients with unsafe CSOM to evaluate single stage tympanomatoid surgery in unsafe CSOM.

Ethical approval

The study was approved by the Institutional Ethics Committee.

Statistical analysis

Data was entered in microsoft excel and analysed in excel and presented as frequency and descriptive.

RESULTS

Table 1 shows that series of cases majority 33 (82.5%) patients were aged less than 30 years. The mean ±SD age of patients was 23.50±4.25 year ranging from 3 to 50 years. The youngest being 3 years old and the oldest 50 years old.

Table 2, shows that soft tissue density suggestive of cholesteatoma was seen in 37 (92.5%) patients. Ossicular chain missing completely in 11 (27.5%) patients. CT scan revealed tegmen plate eroded in 9 patients and sinus plate erosion in 5 and facial canal dehiscent in 7 patients. CT scan showed lateral semi-circular canal fistula in 3 (7.5%) patients.

Table 1: Age wise distribution of patients (n=40).

Age (in years)	No of cases	Percentage
0-10	8	20.0
10-20	9	22.5
21 -30	16	40.0
31-40	5	12.5
41-50	2	5.0
Total	40	100

Table 2: HRCT scan findings (n=40).

Findings	No of cases	Percentage
Middle ear: cholesteatoma cleft	37	92.5
Ossicular chain		
Absent: except stapes foot plate	11	27.5
Malleus: intact	20	50.0
Eroded	5	12.5
Not visualized	4	10.0
Incus: intact	15	37.5
Eroded	12	30.0
Not visualized	2	5.0
Stapes: intact	13	32.5
Eroded	6	15.0
Not visualized	10	25.0
Tegmen plate eroded	9	22.5
Sigmoid dural plate eroded	5	12.5
Facial canal dehiscence	7	17.5
Labyrinthine fistula	3	7.5

Table 3: Surgical approaches employed (n=40).

Approach	No. of cases	Percentage
Post aural	33	82.5
End aural	7	17.5
Total	40	100

Table 4: Tympanomastoidectomy procedures undertaken (n=40).

Procedure	No. of cases	%
SSTM (CWD) with OCR	21	52.5
TM (OCD) without OCR	5	12.5
SSTM (CWU) with OCR	8	20.0
TM (CWU) without OCR	3	7.5
CWD converted into CWU		
SSTM with cavity obliteration	1	2.5
SSTM with canal wall re-construction	2	5.0
Total	40	100

SSTM-single stage tympanomastoidectomy.

Table 3, shows that 33 (82.5%) patients were subjected to post aural approach. In 7 patients end aural approach was employed. With post aural approach, graft harvesting was easy, while as end aural approach was more cosmetic and gave no post-operative hypoesthesia's.

Table 4, shows that all patients underwent surgical exploration 21 (52.5%) patients underwent SSTM (CWD) with ossicular reconstruction. TM (CWD) procedure without OCR was performed in 5 patients. SSTM (CWU) with OCR was undertaken in 8 patients, while 3 patients underwent TM (CWU) without OCR.

Table 5: Surgical findings (n= 40).

Findings	No. of cases	Percentage
Middle ear: cholesteatoma	19	47.5
Cleft		
Cholesteatoma with granulations	17	42.5
Cholesteatoma with polyps	4	10
Ossicular chain		
Absent, except stapes foot plate	12	30.0
Malleus: intact	21	52.5
Eroded	7	17.5
Incus: intact	16	40.0
Eroded	12	30.0
Stapes: intact	15	37.5
Eroded	13	32.5
Tegmen plate eroded	10	25.0
Sigmoid dural plate eroded	6	15.0
Facial canal dehiscence	8	20.0
Labyrinthine fistula	3	7.5

Table 5, shows that all the cases had cholesteatoma of which 50% had grade 4 cholesteatoma followed by cholesteatoma limited to posterior epitympanum, posterior mesotympanum and anterior epitympanum. Cholesteatoma alone was seen in 19 patients and with granulations in 17. Ossicles were found to be absent in 12 patients. Tegmen plate at operation was seen eroded in 10 and sigmoid sinus eroded in 6 and facial canal dehiscent in 8. Lateral canal fistula in 3 patients.

Table 6, shows malleus was not picked up in 4 patients while as incus and stapes were not picked up by CT scan in 2 and 10 patients respectively. Cholesteatoma was suspected on CT scan as soft tissue density with erosion of middle ear cleft boundaries and ossicles. This was confirmed at surgery too. Hence CT scan was compliment to diagnosis of cholesteatoma.

Table 6: Comparison of CT findings with surgical findings.

Findings	Surgery	CT	Percentage	P value
Middle ear: cholesto-ma cleft	40	37	92.5	0.077
Ossicular chain				
Absent, except stapes foot plate	12	11	91.6	0.805
Malleus: intact	21	20	95.2	0.823
Eroded	7	5	57.0	0.531
Not visualized	-	4		
Incus: intact	16	15	93.75	0.818
Eroded	12	12	100.0	-
Not visualized	-	2		
Stapes: intact	15	13	86.6	0.639
Eroded	13	6	46.2	0.066
Not visualized	-	10		
Tegmen plate eroded	9		90.0	0.793
Sigmoid dural plate eroded	5		83.3	0.745
Facial canal dehiscence	7		87.5	0.775
Labyrinth -ine fistula	3		100.0	-

Statistically a non-significant difference was observed in comparison of CT findings with surgical findings. All the p vales were above 0.05 (p>0.05).

Table 7: Post-operative complications.

Complications	No. of cases	percentage
Cavity infections/crusts	5	12.5
Wound infections	4	10.0
Worsening of hearing	-	-
Residual perforation	2	5.0
Canal stenosis	-	-
Facial paresis	3	7.5
Transient vertigo	4	10.0
Perichondritis	2	5.0

Table 7, shows various complications during this study including cavity infections/crusts in 5, wound infection was seen in 4 while 2 patients developed residual perforation. Temporary facial paresis in 3 patients which responded to steroids with complete recovery in 2 months.

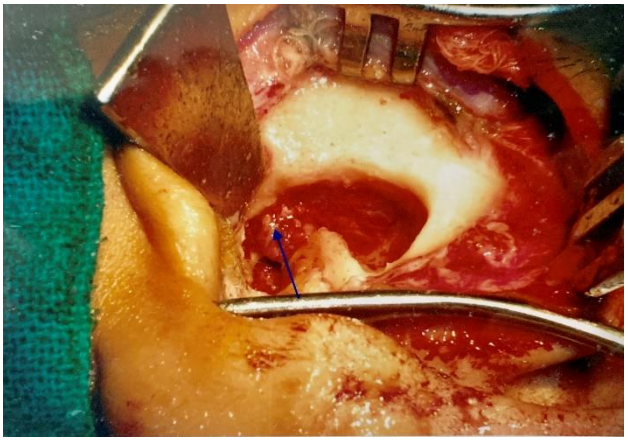

Figure 1: Peroperative photograph of CWD tympanomastoidectomy showing cholesteatoma.

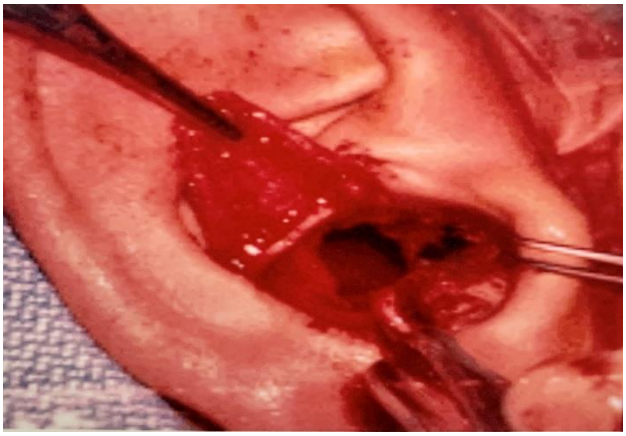

Figure 2: Peroperative photograph showing performance of conchomeatoplasty.

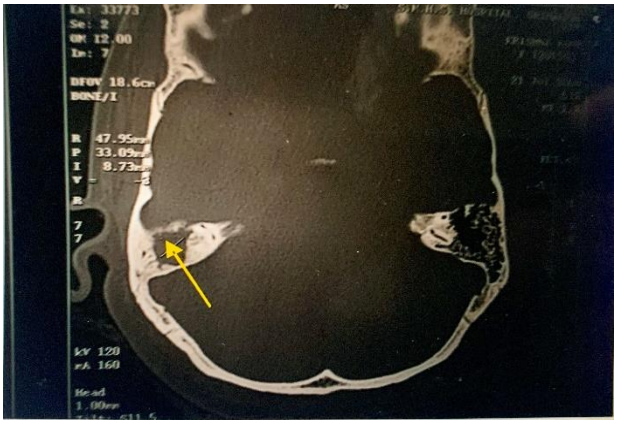

Figure 3: Axial cut of CT temporal bone showing right sided cholesteatomatous mastoid cavity.

DISCUSSION

In this study 40 patients were included which were screened and followed up at the Department of ENT and HNS Government Medical College Srinagar. In our series majority 33 (82.5%) patients were aged less than 30 years, of 16 (40%) patients were between 21 to 30 years of age and 38 (95.0%) were below the age of 40 years. The mean SD age of patients was 23.50±4.25 years ranging 3 to 50 years.

Chatterjee et al observed in their work that chronic otitis media affects mainly younger group of population, mostly below the age of 40 years (86.6%).[10] Kumar et al in their study on 25 patients subjected to different surgical procedures viz MRM and atttico-antrostomy, found that all the (100.0%) patients were under the age of 40 years, among which (40.0) patients were in the age groups of 16 to 25 years.[11]

In our series 33 (82.5%) patients were subjected to post aural approach and 7 (17.5%) end aural. Although there was no significant difference between the two approaches employed post aural approach was more comfortable. Inwood, Wallace, Clarke (2003) in their study observed that the only statistically significant difference between groups having either a postauricular or end aural approach was in how likely others were to comment on their scar.[12] Syed et al in their study reported that there was a significant preference by young female patients for the post aural approach.[13] There were more concerned about the site and visibility, from the scar and could camouflage the scar behind the pinna by hair or a traditional head scarf.

Thus, observations recorded in our series of cases were consistent with the observations made in the studies of above-mentioned authors.

All the patients in our series underwent surgical exploration. 21 (52.5%) patients underwent single stage tympanomastoid surgery CWD procedure with ossicular reconstruction, 3 patients by antero to posterior technique (inside out) and rest 18 by posterior to anterior (outside in).

Tympanomastoidectomy CWD procedure without ossicular reconstruction was done in 5 patients. Single stage tympanomastoidectomy (SSTM) CWU procedure with ossicular reconstruction was under taken in 8 patients. Autologous ossicles with conchal cartilage were used in 5 patients and autologous ossicles alone were used in 3 patients. 3 (7.5%) patients underwent tympanomastoidectomy without ossicular chain reconstruction as ossicular chain was intact. James et al in a series of 1540 cases performed SSTM CWD in 75% of patients, CWU in 9% and 4% underwent radical mastoidectomy.[14] Lau et al in a series 229 patients, did SSTM canal wall down procedure in 89 (39%) patients, SSTM CWU procedures in 87 (38%) patients and

tympanoplasty alone without mastoidectomy in 54 (23%) patients.[15] Hirsch et al in their study of 164 patients performed, SSTM (CWD) in 80 (48.7%) patients, SSTM (CWU) in 37 (22.5%) patients and radical mastoidectomy in rest 47 (28.6%) patients.[16] They noticed that CWD tympanomastoidectomy had a very low recurrence rates and gave patients a dry ear. The observations recorded in our study as far as the choice of surgical procedures undertaken is concerned are consistent with observations made by the above-mentioned authors as most of the authors have chosen single stage procedures and had good post-operative results.

In our series of cases all patients were followed up. Minimum follow up was for 6 months and maximum was 24 months. 29/40 (72.5%) patients were followed up for 12 to 18 months. 3/5 patients were seen at 6 months had dry, self-cleaning ear. 12/14 (85.7%) patients had dry ear at 12 months. 14/15 (93.4%) patients at 18 months follow up and 6/6 (100.0%) at 24 months follow up had dry, self-cleaning ear. An average of up to 20 dB ABG closure was noticed in 12/32 (44%) patients in our series of cases. Cordero, Alberto, Bottazzi (1997) in a retrospective study of 67 patients with cholesteatoma, who underwent CWD and CWU mastoidectomies with ossicular chain reconstruction or repair and were followed up for a period of 5 years.[18] 1 year after surgery recurrent cholesteatoma was found in 4% patients who underwent CWD. 10% patients who underwent CWU had recurrent cholesteatoma 1 year after surgery. A closure of ABG gap of 15dB was achieved in 70% patients at 6 months follow up. This observation in above conducted series is in accordance with our series.

CONCLUSION

In conclusion a perfectly performed CWD mastoidectomy with tympanoplasty, with or without ossiculoplasty in same sitting give good and acceptable post-operative results as far as the hearing improvement and dry and safe ear is concerned.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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