ORIGINAL ARTICLE

A STUDY OF INTACT CANAL WALL TECHNIQUE IN PAEDIATRIC CHOLESTEATOMA PATIENTS FOR 2YRS IN GGH, KURNOOL

Mohammed Naveed Ahmed¹, M. Mahendra Kumar², A. Sesha Prasad³, S. Muneeruddin Ahmed⁴, M. Praveen Kumar⁵, C. V. Rao⁶, Aghiri Nagaraju⁷, B. Durga Prasad⁸

HOW TO CITE THIS ARTICLE:

Mohammed Naveed Ahmed, M. Mahendra Kumar, A. Sesha Prasad, S. Muneeruddin Ahmed, M. Praveen Kumar, C. V. Rao, Aghiri Nagaraju, B. Durga Prasad. "A Study of Intact Canal Wall Technique in Paediatric Cholesteatoma Patients for 2yrs in GGH, Kurnool". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 34, August 11; Page: 9057-9067, DOI: 10.14260/jemds/2014/3168

ABSTRACT: INTRODUCTION: The surgical treatment of cholesteatoma in paediatric age group has changed opinion many times in the evolution of cholesteatoma surgery. Intact canal wall technique allows provision for maintaining the depth of the middle ear and post-operative hearing is much better than in canal wall down procedure. Canal wall down method precludes regular cleaning of the large cavity left behind. In CWU method incidence of recurrent and residual CH are more than in CWD methods. It is more common because inspection of epi-tympanum and medial aspects of the ossicles is not possible in ICW procedures. As a result, the disease recurs within 6 to 12 months. **MATERIALS AND METHODS:** Fifty children attending the OPD of Government General Hospital Kurnool with CH, confirmed with CT scan are taken and subjected to ICW tympano-mastoidectomy with or without ossiculoplasty. They are followed for a period of 18 months for residual disease, auditory evaluation and otoscopic examination for graft take up. **RESULTS:** There was improvement in hearing in 78% of the patients. Graft healing was good in 80.85% of cases. Recurrence was seen in 19.15% of patients. 14% of the patients ICW had to be converted to a CWD procedure within 8 months. There were no reports of intra cranial complication in this series. **CONCLUSION:** ICW procedure in paediatric cholesteatoma gives better results if the disease is limited to the posterior mesotympanum and not beyond the auditus. Uneventful 18months follow up period was seen in 80.85% of the patients. Recurrent disease is less common if the mastoids are less pneumatized. Revision to CWD may be required in early recurrence; in this series it was 14% of the patients.

KEYWORDS: Paediatric Cholesteatoma, ICW, CWD, Residual disease, Recurrent Cholesteatoma, Residual Cholesteatoma, Ossiculoplasty, Epitympanum, Mastoid cavity.

INTRODUCTION: Paediatric Cholesteatoma often runs a malignant course, destroying the patient's hearing and involving the surrounding structures, including the brain, thereby increasing the morbidity and mortality of those affected. Cholesteatoma is associated usually with attic-antral variety of CSOM, also called the dangerous variety due to its bone eroding properties and spreading to vital surrounding areas. Middle ear cholesteatoma is still in many ways not understood. In children, it has a more complex presentation.

However cholesteatoma in children is so aggressive that it cannot be treated conservatively. There is little disagreement regarding its sinister threat. It can lead to a wide spectrum of complications, ranging from disabling facial paralysis Deka¹⁵ 1983 and labyrinthine fistulae to life threatening Lepto -meningitis and brain abscess. Furthermore, bilateral disease, with a consequent hearing impairment may profoundly retard the development of speech and acquisition of linguistic skills (Holmes and Kunz, 1969).

ORIGINAL ARTICLE

Late diagnosis, extensive disease, a high rate of complications and poor follow up are the feature of this disease in developing countries. The goal of surgery in these patients is to give a safe, dry and functional ear. The incidence of both residual and recurrent cholesteatoma is higher in children than in adults. Hence a lot of debate occurs as to the surgical procedures to be adopted, whether CWU or CWD procedure.

AIM OF THE STUDY: The purpose of this study is to explore the clinical features, diagnosis and treatment of paediatric cholesteatoma. To study the efficacy of intact canal wall or CWU Canal wall up mastoidectomy in eradicating the disease from the middle ear and the mastoid.

MATERIALS AND METHODS: The present prospective study was conducted in the department of E.N.T. & HEAD AND NECK SURGERY, Government General Hospital, Kurnool medical college, Kurnool, during the period of August -2010 to August-2012. All the children below 12 years attending the ENT OPD with complaints of ear discharge, diminished hearing, earache, tinnitus, giddiness or swelling or discharge in the post-aural region and with symptoms of other complications of cholesteatoma and meeting the inclusion criteria were taken up for the study.

Inclusion Criteria:

1. Children below 12 years of age.
2. Clinical and Radiological evidence of Cholesteatoma.

Exclusion Criteria:

1. Children above 12 years of age.
2. No evidence of clinical and radiological Cholesteatoma.

Patients were selected based on the symptoms and otoscopic findings. Patients with evidence of cholesteatoma were examined in detail under microscope after taking a thorough history. Name, age, sex, socioeconomic status were noted for statistical study. Previous treatment with antibiotics and surgery was also enquired. General examination included built and nutrition and any evidence of anemia, jaundice or lymphadenopathy. Recording of vital signs included pulse rate, blood pressure and temperature.

Initially ear examination was done using a head mirror and an otoscope. The nature, type and odor of the ear discharge were noted and any debris obstructing the view of the tympanic membrane was cleared by dry aural toileting or by suction clearance. Later, thorough examination under microscope was done.

ENT examination and Systemic examination were done as per the Proforma. X-ray Mastoids (Schuller's view) of both sides and Pure Tone Audiometry were done in all the cases. CT scan, if required was carried out and evaluated. The principal controversy surrounds intact canal wall versus canal wall down mastoidectomy for removal of disease.

It is essential that the management of cholesteatoma be highly individualized on a case by case basis. Careful pre-operative patient counselling is mandatory. The following points should be explained and clarified prior to the procedure; Surgical goals, Risks of surgery, including facial

ORIGINAL ARTICLE

paralysis, vertigo, tinnitus, worsening of Hearing, Possible need for a staged procedure, the chronic nature of the disease process with necessity of long term follow up.

OBSERVATION AND STATISTICAL ANALYSIS: The statistical analysis in the present study is based on the observations made in the cases of CSOM (attico-antral) being treated surgically in the department of E.N.T. And HEAD & NECK surgery, Government General Hospital, Kurnool Medical College, Kurnool during the period of 2 years from August-2010 to August -2012.

AGE GROUP	NO. OF PATIENTS	PERCENTAGE %
5-6	2	4%
7-8	7	14 %
9-10	21	42 %
11-12	20	40 %
TOTAL	50	100
AGE DISTRIBUTION		

Of the 50 cases which presented during the study period the age of the patients varied between 6 to 12 years. The average age was 9.7 years $\pm$ 1.8 years. The youngest of children were 6 years of age and the oldest were 12 years of age.

In that, 2 patients (4%) were in the age group of 5 to 6 years, 7 patients (14%) were in the age group 7 to 8 years, 21 patients (42%) were in the age group 9 to 12 years and 20 patients (40%) were in the age group of 11 to 12 years. 32 children (64%) were males and 18 children (36%) were females. 78% of the children belonged to the lower socioeconomic group. 22% belonged to Middle group of income.

Bilateral disease was seen in 12% of children. In the present study, of the 50 cases, 26 (52%) patients had involvement of right ear only and 18 (36%) patients had involvement of left ear.

SYMPTOMS	No. of Cases	PERCENTAGE
Ear discharge	50	100
Hearing loss	40	80
Pain in ear	14	28
Swelling and pain behind ear	3	6
Fever	4	8
Tinnitus	2	4
Vertigo	2	4
SYMPTOMATOLOGY		

The above data reveals that the ear discharge and the hearing loss are the striking symptoms in the present study. In this study more than 60% of the patients had the ear symptoms from six months to five years.

ORIGINAL ARTICLE

Otorrhoea	No. of cases	Percentage
Foul smelling discharge	47	94
Purulent discharge	13	26
Muco-purulent discharge	38	76
Watery type of discharge	2	4
Bloody discharge	22	44
Intermittent discharge	41	82
Continuous discharge.	9	18
Moderate discharge	23	46
Scanty discharge	20	40
Profuse discharge.	7	14
TYPE OF EAR DISCHARGE		

Of the 50 ears (100%), 38 (76%) ears had Muco-purulent discharge, 13(26%) ears had purulent discharge and 2(4%) ears had watery type of discharge. Associated bloody discharge was noticed in 22(44%) ears. The discharge was foul-smelling in 47(94%) ears. Of the 50 (100%) ears, 41(82%) ears had an intermittent discharge and 9(18%) ears had a continuous discharge. Of the 50(100%) ears, 23(46%) ears had a moderate discharge, 20(40%) ears had a scanty discharge and 7(14%) ears had a profuse discharge.

SIGN		No. of cases	PERCENTAGE
Cholesteatoma	Postero-superior	27	54
	Attic	21	42
	Central	2	4
Polyp		4	8
Postural-Swelling		7	14
Clinical signs			

On examination, cholesteatoma was seen in the Postero-superior quadrant of the tympanic membrane in 27(54%) cases, while attic cholesteatoma was seen in 21(42%) cases. The remaining 2 cases (4%) had a central perforation. In this study, polyps were seen in 4 cases i.e. 8% of the cases. Also 7 cases i.e. 14% had a Post-auricular swelling resulting from mastoiditis.

Type	No. of cases	%Age of cases
Bilateral Sclerosed	31	62
Sclerosed on affected side and pneumatized on opposite side	15	30
Cellular	4	8
RADIOLOGICAL FINDINGS OF X -RAY MASTOIDS		

In our study all the cases with cholesteatoma, except 4 were found to have a sclerosed mastoid. Bilateral sclerosis was found in 31 cases (62%). Sclerosis on the affected side and pneumatized on the opposite side was noted in 15 of our cases (30%).

ORIGINAL ARTICLE

TYPE HL	No. of cases: ab gap	Percentage
conductive	39:<45dB	82
mixed	9:>45dB	18
PURE TONE AUDIOMETRY		

All the cases were subjected for pure tone audiometry and the hearing threshold for air conduction and bone conduction were noted. 2 cases had normal hearing 39(82%) cases had conductive hearing loss with ab gap less than 45dB and 9 (18%) had mixed hearing loss with ab gap more than 45dB.

DEGREE OF HL	No. of cases	Percentage
normal	7	14
Mild (20-40dB)	31	62
Moderate (41-60dB)	12	24
DEGREE OF HEARING LOSS		

In our study, of the 50 cases, 7 (12.5%) had a normal hearing (threshold under 20 dB), 31 cases had (20 to 40 dB loss, mild CHL), 12 cases (21.42) had threshold over 40 dB (moderate CHL).

Intraoperative findings	No. of cases	Percentage
Incus absent	32	64
Malleus absent	7	14
Stapes superstructure absent	11	22
Operative Findings		

Destruction of the incus either part or as a whole was the commonest intraoperative finding noted in our study. This was seen in as many as 32 cases (64%). Malleus was absent in 7 cases (14%) while stapes superstructure was eroded in 11 cases (22%).

Organism	No. of Patients	% Age of Patients
Staphylococcus	13	26
Pseudomonas	11	22
Proteus	9	18
Klebsiella	3	6
E. coli	1	2
H. influenza	1	2
Mixed	6	12
No growth	6	12
Microbiological profile		

ORIGINAL ARTICLE

Staphylococcus aureus was the commonest organism isolated in this series and was seen in 13 cases i.e. 26%. This was followed by pseudomonas 11(22%), proteus 9(18%), klebsiella 3(6%), E.coli 1(2%) and Haemophilus influenza 1(2%) cases. Mixed growth was seen in 6 cases i.e. 12%. No organism was isolated in another 6 cases (12%).

Hearing	No. of cases closure of ab gap <25dB	Percentage:%
improved	37	78
No change	10	21
declined	3	6
POST -OP HEARING ASSESSMENT		

Postoperatively, all the cases were subjected to pure tone audiometry after 6 months follow up. 3 out of 50 were not turned up and hence audiometry could not be done on them. The above table discloses the post-operative hearing outcomes pertaining to the 47 cases that pursued for 6 months. In this study, 78% children showed closure of ab gap to less 25dB and 21% children showed no improvement.

In view of meticulous post-operative care and good success rate we advised and insisted all the patients to have a regular follow up for 6 months. Despite that, 3 out of 50 were not turned up. 825 of the study group had the regular follow up while 12% visited irregularly.

Follow up	No. of cases	Percentage
Healed well	38	80.85
recurrence	9	19.15
Can't be judged	3	----
RESULTS OF EAR SURGERY (After 18 months follow up)		

DISCUSSION: It is observed in the present series that majority of the patients belonged to the age group of 6 to 12 years. The average age was 9.7 years $\pm$ 1.8 years. A. M. Elrashidi¹ (1992) found the incidence more common in the age group of with ages ranging from 5 to 14 years (mean, 9.8 + 2.8 years). Nelson et al.³ divulged the incidence of cholesteatoma as being about 1.4 times higher in men compared to women. These authors reported that the mean age of children with congenital cholesteatoma was 5.6 years; the mean age in children with the acquired disease was 9.7 years.

Kenneth M. Grundfast, MD; Gurpreet S. Ahuja, MD; Simon C. Parisier, MD⁴ report in their study of 125 children, that 77% of them were over 6 years of age. In their study of 60 children up to 12 years of age, Varshney, Pramod Kumar⁵ (1998) 26 report that the majority of them were of 12 years of age.

In the present study of 50 children, 32 were males and 18 were females, which correlate well with the existing literature of male predominance of paediatric cholesteatoma affection. The incidence of chronic suppurative otitis media appear to depend on race and socioeconomic group factors. In the present series the incidence in a low socioeconomic group is 39 (78%) and 22% in the middle income group. Poor socioeconomic status, overcrowding, poor nutrition, poor hygiene, and infectious diseases have been found to contribute to the development of chronic Suppurative otitis

ORIGINAL ARTICLE

media. Browning G.G. (1997), states that there is a close relationship of chronic otitis media and lower socio economic group.

Higher incidence is because of poor general health, malnutrition and overcrowding. In a study by Varshney, Pramod Kumar⁵ (1998), in their study of 60 children, 75% belonged to lower socio-economic group, while 15% belonged to middle socio- economic group.

Simon C. Parisier et al (1988), in their retrospective study of 125 cases affected, 63 were in patients with involvement of the right ear only, 57 were in patients with involvement of the left ear only and 5 patients had bilateral disease i.e. 120 (96%) had unilateral and 5(4%) had bilateral involvement. Varshney, Pramod Kumar (1998), in their study of 60 cases, 42 (70%) had unilateral involvement and 18 (30%) had bilateral affection.

In our present study of 50 cases 26 were in patients with involvement of the right ear only, 18 were in patients with involvement of the left ear only and 6 patients had bilateral affection i.e.44 (88%) had unilateral and 6 (12%) had bilateral involvement. These correlate well with the observations of the quoted literature.

In the present series Ear discharge is present in all the patients (100%), loss of hearing in (80%), pain in 28%, post-aural swelling 6%. None presented with any intracranial complications. Palvaet al⁶ (1977) in their series of 68 ears also noted an absence of complications.

In their retrospective study, Simon C. Parisier et al⁸ (1988), the most common presenting symptoms were Otorrhoea (73%), hearing loss (85%), otalgia (32%), tinnitus (8%) and vertigo(8%). Only (0.8%) presented with an intracranial complication. Marco- Algarra J. et al⁷ (1991) in their study of 52 patients (55 ears), the commonest presenting symptoms were Otorrhoea plus hearing loss (54%), Otorrhoea only(29%), hearing loss only (7.6%), mastoiditis(5.4%), pain (13%) dizziness (3.8%), tinnitus (3.8%), fever (1.9%).

None presented with any facial nerve involvement or any intracranial complications. Varshney, Pramod Kumar⁵(1998), in their study the symptoms at presentation included aural discharge (95%), hearing loss (100%), ear ache (65%), post aural swelling (28.3%) and vertigo (20%). 10% presented with intracranial complications.

Cholesteatoma was found in the posterosuperior quadrant in 54% of cases while it was found in attic in 42%. Edelstein et al⁹ noted 32% in posterosuperior quadrant and 20% in attic. Sade J. and Shatz A¹⁰ (1988) noticed the following in the 109 children (109ears) studied. 21 (19.2%) ears with attic retraction pocket cholesteatoma, 42 (38.6%) with postero- superior retraction pocket cholesteatoma, 31 (28.4%) ears with congenital cholesteatoma, 8 (7.3%) ears with cholesteatomas associated with central perforation and 7 ears were of an undetermined type. Of these none presented with a facial paralysis. 1 case showed a fistula of the semicircular canal and 3 cases presented with acute mastoiditis. Mills R. P, Padgham N.D.¹¹

(1991)in their retrospective study of 54 children (57 ears), noted 30 (52.6%) ears with attic cholesteatoma, 13 (22.8) ears with pars tensa marginal cholesteatoma, 8 (15.7%) ears with pars tensa central cholesteatoma, 5 (8.7%) ears with congenital cholesteatoma and 1 (1.7%) ears being unclassified. No report of complications associated is available. A.M. Elrashidi¹ showed that the most frequently affected locations were the epi-tympanum.

The present study showed cholesteatoma in the Postero-superior quadrant of the tympanic membrane in 27(54%) cases, while attic cholesteatoma was seen in 21(42%) cases. The remaining 2 cases (4%) had a central perforation. In this study, polyps were seen in 4 cases i.e. 8% of the cases.

ORIGINAL ARTICLE

Also 7 cases i.e. 14% had a Post-auricular swelling resulting from mastoiditis. This also showed that all the cases with cholesteatoma were found to have a sclerosed mastoid. Bilateral sclerosis was found in 31 cases (62%).

Of the 31 cases that showed bilateral sclerosis, 15 of them had bilateral disease and the rest 16 had bilateral sclerosis but unilateral disease. Pneumatized mastoid was seen only in 8% of the patients. So it is difficult to infer whether sclerosis predisposes the mastoids to cholesteatoma formation or if sclerosis is the result of cholesteatoma. Sclerosis on the affected side and pneumatized on the opposite side was noted in 15 of our cases (30%).

Marco- Algarra J. et al⁷ (1991) in their study of 52 patients (55 ears), revealed the mastoid bone to be sclerosed in 25 cases (45%), diploic in 10 cases (18%) and well pneumatized in 13 cases (23%). Evidence of cholesteatoma or destruction was not mentioned.

Tiwari R. et al (1991)¹² report in their study of 54 patients, a sclerotic type of mastoid in 50 cases (92.58%) and a cellular type (pneumatic) of mastoid in 4 cases (7.4%). 40 cases (70.08%) showed radiological evidence of cholesteatoma. Varshney, Pramod Kumar⁵ (1998) 26, in their study of 60 cases, showed sclerosis of air cells in 100% cases, evidence of cholesteatoma in 40 (66.67%) cases and destruction, cavitations in 13 (21.67%) cases.

In our study, of the 50 cases, 7 (12.5%) had a normal hearing (threshold under 20 dB), 31 cases had (20 to 40 dB loss, mild CHL), 12 cases (21.42) had threshold over 40 dB (moderate CHL).

Marco- Algarra J. et al⁷ (1991) 30 in their study of 52 patients (55 ears), report that 4 cases (7%) had normal hearing threshold under 20 dB, 37 cases (69%) had (20 dB to 40 dB loss) 12 cases (21%) had (threshold over 40 dB), 1 case (1.81%) had mixed loss and 1 case (1.81%) had a dead ear. Varshney, Pramod Kumar⁵ (1998), in their study of 60 cases found conductive hearing loss in 52 (86.67%) cases, 1 (1.67%) had purely sensorineural type of hearing loss and 7 (11.67%) cases had mixed type of hearing loss.

The discharge from the ear was sent for bacterial culture and antibiotic sensitivity. The predominant bacterium isolated in this study was staphylococcus aureus which was found in 26% of the cases. This was followed by pseudomonas (22%), proteus (18%), klebsiella (6%), E. coli (2%) and haemophilus influenza (2%). Mixed infection was seen in 12% and another 12% did not produce any growth.

This was similar to that found by B.N. Rao and M. S. Reddy¹³ (1994) which shows staphylococcus in 41%, pseudomonas in 21%, proteus in 18%, klebsiella in 10% and no growth in 10%. All the cases in this study underwent canal wall up mastoidectomy, operated under general anaesthesia. Intra-operatively 64% of the cases had a necrosed incus which was higher compared to Edelstein et al⁹ (1988) where it was 46% and was in accordance with Sade (1981) who noticed it in 80% of cases.

Ghodrat Mohammadi, Masoud Naderpour and Mehrnoosh Mousaviagdas¹⁴ colleagues reported total (55.4%) or partial (30.7%) erosion of the incus was the most common pathology. The Primary surgical treatment in all the patients is "intact canal wall technique" through a post aural route. Preoperative broad spectrum systemic antibiotic like Ceftriaxone sodium is administered to all cases just before the surgery. In all the patients standard Tympanomeatal flaps are raised and that includes Posterior meatal skin flap, Superior Tympanomeatal flap, Inferior Tympanomeatal flap and Posterior Tympanomeatal flap, which help to preserve the vascularity and thus helps in rapid epithelialization of the Tympanic membrane. In all the patients underlay grafting is done.

ORIGINAL ARTICLE

In all the possible cases primary ossiculoplasty was done depending upon the ossicular status. Septal cartilage and homograft ossicles are used as prostheses for partial ossicular replacement. In cases where Malleus is found eroded Type 2 tympanoplasty, in cases of Incus erosion Type 3 Tympanoplasty is done. Where Incus, Malleus and Stapes supra structure are eroded with the mobile foot plate, Type 4 Tympanoplasty is done. Single stage procedure with a second stage operation, whenever necessary is adopted in the present study.

All the patients are followed post operatively for 4 weeks, with the patient reporting to the outpatient department. Suture removal is done after 1st week. External canal pack removed after 3 weeks. Ear drops are allowed after 3 weeks.

Among the patients 82% of them turned up regularly for follow up. 12% of them came irregularly and 65 did not turn up for follow up. In the present study 80.85% of the patients showed well healed dry ear, 19.15% showed recurrence. The post-operative follow up included an Audiometric examination after a gap of 6 months to 1 year.

The closure of air bone gap in the present series is good with 10 to 15 dB of residual hearing loss. Sam E. Kinney² concluded that 25% recurrence rate is seen in children after a 5-years follow-up in their series of 104 patient's in 1981. He quotes "Recognizing that chronic otitis media is often not controlled by surgery, long-term follow-up is necessary to evaluate a particular operative approach to control the disease and restore function." The present study concurs with the view of the above author.

Series	Recurrence %
Schuring et al.	21
Glasscock et al.	23
Sanna et al.	11
Magnan et al.	19
Lerosey et al	12
Present series	20
Recurrent Disease in children	

CONCLUSION: Eradication of disease is the primary surgical goal followed by maintenance or restoration of hearing. Childhood cholesteatoma has an aggressive nature and has a high rate of recidivistic disease, hence the need for diligent long term follow up. The triad of Otorrhoea, hearing loss and abnormal otoscopic findings should raise the possibility of cholesteatoma. Low and middle socio-economic group children were affected exclusively.

Hearing preservation depends on the extent of the disease, the surgical procedure chosen, and preoperative SRT. Long-term follow-up is important to monitor for disease recurrence. Cholesteatoma in children may be more difficult to treat with a single surgical procedure. Therefore, treatment should be individualized for each patient. The recurrence rate in this series is 19.15% after primary surgery and after revision surgery it is 4%. Closure of dB gap to less than 25dB was 78%.

REFERENCES:

1. Elrashidi AM; cholesteatoma in children. An Egyptian overview.; Eur Arch Otorhinolaryngol. 1992; 249(7):389-92.

ORIGINAL ARTICLE

2. Sam E. Kinney MD; Intact canal wall Tympanoplasty with mastoidectomy for Cholesteatoma; Long-term follow-up. November 1988; 98(11):1190-1194
3. Jose Evandro Andrade Prudente de Aquino I; Nelson Alvares Cruz Filho II; Julia Negro Prudente de Aquino III Brazil; *J. otorhinolaryngol. (Impr.)* May/June 2011; 77(3): 343-48
4. Kenneth M. Grundfast, MD; Gurpreet S. Ahuja, MD; Simon C. Parisier, MD; Stephanie M. Culver, MD; Delayed Diagnosis and Fate of Congenital Cholesteatoma (Keratoma); *Arch Otolaryngol Head Neck Surg.* 1995; 121(8):903-907.
5. Varshney, Kumar P. A cross sectional study of paediatric Cholesteatoma in the department of ENT; District hospital, Belgaum; A dissertation (1998):45-48.
6. Palva A, Pekka K, Karja J; Cholesteatoma in children. *Arch Otolaryngology*; 1997; 103:74-7.
7. Marco- Algarra J et al, Cholesteatoma in children: results in open versus closed techniques; *The Journal of Laryngology and Otology*, Oct. 1991; (105): 820-824.
8. Levensenm ; Management of Congenital Pediatric Cholesteatomas. *American Journal of Otology.* 1999; 10:121-123.
9. Edelstein DR, Parisier SC. Surgical techniques and recidivism in Cholesteatoma. *Amer journal of Otology*; March 1989; 10(2):78-83.
10. Sade. J and Shatz A; Cholesteatoma in children. *The journal of Laryngology and Otology* Nov. 1988; 102: 1003-1006.
11. Mills R.P, Padgham N; The management of childhood Cholesteatoma, *Journal of Laryngology and Otology*, 1991; 105:343-345.
12. Tiwari et al; A clinicoradiological study of Cholesteatoma; *IJLO*; Sep 1991; 43:135-137.
13. Rao B N, Reddy M S; *Indian Journal of Otolaryngology*; April-June 1994, 46, (2): 72-77.
14. Mohammadi G, Naderpour M, Mousaviagdas M; *Iranian Journal of Otolaryngology*; 2012. Summer; 24(88):125-128.
15. Deka R C MS; *The Indian Journal of Paediatrics*; 50; (6): 643-646.

ORIGINAL ARTICLE

AUTHORS:

1. Mohammed Naveed Ahmed
2. M. Mahendra Kumar
3. A. Sessa Prasad
4. S. Muneeruddin Ahmed
5. M. Praveen Kumar
6. C. V. Rao
7. Aghiri Nagaraju
8. B. Durga Prasad

PARTICULARS OF CONTRIBUTORS:

1. Professor, Department of ENT, Gandhi Medical College, Secunderabad.
2. Assistant Professor, Department of ENT, Kurnool Medical College, Kurnool.
3. Professor, Department of ENT, Kurnool Medical College, Kurnool.
4. Professor and HOD, Department of ENT, Viswabharathi Medical College, Kurnool.
5. Consultant, Department of ENT, Vijaybhaskar ENT Hospital, Sattupalli, Khammam, A. P.

6. Assistant Professor, Department of ENT, Kurnool Medical College, Kurnool.
7. Senior Resident, Department of ENT, Kurnool Medical College, Kurnool.
8. Medical Officer, Department of ENT, PHC, Kurnool.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. S. Muneeruddin Ahmed,
Professor and HOD,
Department of ENT,
Viswabharathi Medical College,
Kurnool.
Email: ahmedmunirent@gmail.com

Date of Submission: 18/07/2014.
Date of Peer Review: 19/07/2014.
Date of Acceptance: 31/07/2014.
Date of Publishing: 09/08/2014.