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A HOSPITAL BASED STUDY ON CLINICAL INDICATIONS, PRESENTATIONS AND OPERATIVE FINDING OF MASTOIDECTOMY IN CHILDREN.

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ABSTRACT

Objective: a) To evaluate indications and presentations of the children who underwent mastoidectomy procedures. b) To evaluate different operative findings of mastoidectomy in children.

Study Design: Retrospective study.

Materials: Data of all the mastoidectomy procedures done in children of 16 years of age and below, at Dept. of ENT, Gauhati Medical College & Hospital from 1st March 2018 to 28th February 2019 were taken into account. Data were collected on gender, age, ear affected, clinical presentations and indications for surgery, operative findings and recidivistic disease.

Results: A total of 30 patients between 7 to 16 years of age had undergone mastoidectomy procedures in Dept of ENT, Gauhati Medical College & Hospital, between 1st March 2018 and 28th February 2019. It is found that total 88 cases of mastoidectomy surgeries (both adult and children) were done during the above said period and mastoidectomy in children in age group up to ≤16 years constitutes 34.09% of total cases. Out of total 30 cases 12 cases (40%) had bilateral ear diseases, 14 cases (46.66%) had left ear and only 4 cases (13.33%) had right ear involvement. 3 cases (10%) clinically presented with post aural abscess and CSOM with aural polyp was present in 3 cases (10%). CSOM with cholesteatoma without intra-cranial complications was noted in 21 cases (70.00%) and all of them underwent modified radical mastoidectomy. CSOM with intracranial complications were present in three cases (10%), out of which 2 cases presented with cerebellar abscess and one case with right sigmoid sinus thrombosis. Data on operative procedures showed 3 cases (10%) of cortical mastoidectomy, modified radical mastoidectomy in 21 cases (70%), and radical mastoidectomy was done in 6 cases (20%).

Conclusion: In mastoid surgery each operation should be tailored to each patient depending on the indications, age, duration of symptom, anatomy and preoperative and intra-operative findings. The disagreement between canal wall down (CWD) and canal wall up (CWU) techniques in matoidectomy of children still exists. Limitation of our study is that it is retrospective and period of study is only one year.

KEYWORDS

Cholesteatoma, Mastoiditis, Children

INTRODUCTION:

Pediatric mastoid disease is always life threatening and has become quite rare nowadays in developed countries but incidence is still high in rural areas of underdeveloped and developing countries due to low socioeconomic conditions and lack of proper health care facilities. Surgery of masoidectomy was revolutionized by Dr. Lempert in1922 by introducing electrically driven drill for better exposure of antrum and air cells. Mastoidectomy surgeries had been made more save by Dr. Wallstein (1933) who first introduced the operating microscope for modern mastoidectomy surgeries. With introduction of suction irrigation system and canal wall up mastoidectomy, Dr. House had revolutionalized the modern mastoidectomy to the present level. In comparison to adult, paediatric temporal bone especially in infant has an underdeveloped mastoid which is highly aerated and the tympanic ring is also underdeveloped. Cholesteatoma is more aggressive in children than in adults; its growth is fast and it becomes worse by superinfection, which is often due to the importance of tubal factor[1].The priorities in mastoid surgeries in otitis media are (1) the elimination of progressive disease to produce a safe and dry ear (2) modification of anatomy of tymanomastoid compartment to prevent recurrent disease, and (3) reconstruction of the hearing mechanism. The common indications for mastoid surgery in children are cholesteatoma, acute or chronic mastoiditis, mastoid abscess or coalescent mastoiditis and coexistence of any of above diseases.

AIM AND OBJECTIVE: a) To evaluate indications and presentations of the children who underwent mastoidectomy procedures. b) To evaluate different operative findings of mastoidectomy in children.

MATERIALS:

Study Design and Patients:

A retrospective review of data of all the mastoidectomy procedures done in children of 16 years of age and below, at Dept. of ENT, Gauhati Medical College & Hospital from 1st March 2018 to 28th February 2019 were taken into account. Data were collected on gender, age, side of ear, clinical presentations and indications for surgery, operative findings (i.e. extent of cholesteatoma, degree of atelectasis, and ossicular condition) and recidivistic disease (i.e. recurrent and residual cholesteatomas). Details of all the patients, radiological findings, diagnosis, indications and details of surgical findings were analyzed and compared with other similar studies and available literatures..

Surgical procedures:

The terminology used around mastoid surgery is not uniform. In the same time, these terminologies do not provide specific information regarding operative procedure undertaken inside middle ear cavity and antrum. The two main approaches for cholesteatoma are canal wall up and canal wall down mastoidectomy[2]. The most commonly used terms for canal wall down mastoidectomy are radical or modified radical mastoidectomy. However, a technically feasible and safe alternative to conventional canal wall up or down technique is atticotomy-limited mastoidectomy with cartilage reconstruction (inside-out)[2]. The aim of this modified surgical technique is to achieve less structural destruction and greater preservation of uninvolved middle-ear cleft structures and especially functional mastoid air cells[2].

Several terms are used to describe different types and approaches of mastoidectomy and in our study we have followed the below mentioned classification to describe different types of mastoidectomy performed (*Scott Brown Otolaryngology; 6th edition, 1997*)[3] –

Open or Canal-wall-down procedure (CWD)
- *Atticotomy*
- *Modified radical mastoidectomy (MRM)*
- *Radical mastoidectomy*

Closed or Intact-canal-wall or canal-wall-up procedure (CWU)
- *Cortical mastoidectomy*
- *Combined approach tympanoplasty*

RESULTS:

In the present study, a total of 30 patients between 7 to 16 years of age had undergone mastoidectomy procedures in Dept of ENT, Gauhati Medical College & Hospital, Guwahati, from 1st March 2018 to 28th February 2019. It is found that there were total 88 cases of mastoidectomy surgeries (both adult and children) done during the above said period and mastoidectomy in children in age group up to ≤16 years constitutes 34.09% of total cases. Youngest patient in our study was 7 years of age and highest age was 16 years with mean age of 13.71 years. In the studied group, there were 18 male cases and 12 female cases (male female ratio 1:0.66). Out of total 30 cases 12 cases (40%) had bilateral ear diseases, 14 cases (46.66%) had left ear and only 4 cases (13.33%) had right ear involvements. 3 cases (10%) clinically presented with post aural abscess and CSOM with aural polyp was present in 3 cases (10%) (Table:1). CSOM with cholesteatoma without intra-cranial complications was noted in 21 cases (70.00%) and all of them underwent modified radical mastoidectomy for the same. CSOM with intracranial complications (ICC) were present in three cases (10%), out of which 2 cases presented with cerebellar abscess and one case with right sigmoid sinus thrombosis. Our data on operative procedures showed 3 cases (10%) of cortical mastoidectomy, modified radical mastoidectomy in 21 cases (70%), and radical mastoidectomy was done in 6 cases (20%) (Table:2). Cortical mastoidectomy procedures were performed in all coalescent mastoiditis and mastoid abscess cases. Patients who had CSOM with intracranial complications had gone through neurosurgical procedures in Department of Neurosurgery before undergoing mastoid surgeries. In our study, only one (3.33%) 7 year old child had undergone revision mastoidectomy for recurrence of cholesteatoma.

If we look into final calculation on procedures performed in our study, canal wall was preserved in 3 cases, yielding 10% rate of canal preservation. There were CWD procedures in form of MRM and radical mastoidectomy in 27 patients, and thus 90% of our patients received CWD procedure. While looking into operative records the ossicular chain erosion were noted significantly in 16 cases of CSOM wth cholesteatoma without ICC and in all the 3 cases of CSOM with ICC, thus constituting 63.33% of total mastoidectomy performed in children. Mastoidectomy with tympanoplasty (type III) were done in same setting only in 7 cases constituting 23.33% of total cases and rest of patients were deferred for second surgery.

Table: 1

Sl. No.	Clinical Diagnosis	No. of patients underwent surgery	Percentage
1	Coalescent mastoiditis / Mastoid abscess /Postaural abscess	3	10%
2	CSOM with cholesteatoma without ICC	21	70%
4	CSOM with cholesteatoma and aural polyp	3	10%
5	CSOM with ICC	3	10%

Table: 2

Sl. No.	Mastoidectomy Procedures Performed	No. of cases	Percentage
1	Cortical Mastoidectomy	3	10%
2	MRM	21	70%
3	Radical Mastoidectomy	6	20%

DISCUSSION:

The successful treatment of chronic suppurative otitis media usually requires therapy with an antibiotic that covers pseudomonas and anaerobes, topically, orally or intravenously[4]. In the present study a detailed analysis was done of all factors or indications as well as investigation findings that influenced our decision to perform tympanomastoid surgery. The primary aim of our article was to analyse the clinical indications and presentations for performing mastoidectomy procedures within the context of a health care system and clinical preference that support mastoidectomy in paediatric age group, and operative findings noted during surgery. In our study total 88 cases of mastoidectomy were done during the above said period and mastoidectomy in children in age group up to ≤16 years constitutes 34.09% of total cases. This indicates that mastoid disease is still prevalent in lower age group and apart from aggressive conservative treatment mastoidectomy surgery has to be done as definitive treatment in a notable percent of cases. Asma binti A. et al[5] in their study found that out of total 84 CWD mastoidectomy surgeries, 86% cases were done in adults and only 14% were children[4]. We performed simple or cortical mastoidectomy in 3 (10%) cases and most common indication was mastoid abscess. The advantage of this procedure is hearing preservation. Taylor et al (2004)[6] studied 40 children with a diagnosis of acute mastoiditis and majority of them were treated by IV antibiotics, tympanostomy tube insertion, and incision and drainage of postauricular abscess. They performed mastoidectomy only in 10% cases of clinically suspected cholesteatoma[6]. According to Rickers J et al (2006)[7], mastoidectomy must be considered as a last resort when intense conservative treatment fails. Migirov L. et al (2005)[8] in their retrospective study performed 53 mastoidectomies in 51 patients with acute otomastoiditis and they performed the surgery within 48 hours of development of symptoms in 49.1% cases. In our present study 6 cases (20%) were managed by radical mastoidectomy procedures and all of them above 10 years of age.

In one series conducted by Asma binti A. et al[5], otorrhoea and reduced hearing were the most common presenting symptoms, which is consistence to our findings. When discharge does not respond to 2 weeks of aggressive medical therapy, mastoiditis, cholesteatoma, tuberculosis, or fungal infection should be suspected[4]. In our study canal wall was preserved in 3 cases, yielding 10% rate of canal preservation. CWD procedures in form of MRM and radical mastoidectomy were performed in 27 patients, and thus 90% of our patients received CWD procedure. A canal wall down mastoidectomy (CWDM) is an effective technique for eradication of advanced chronic otitis media or cholesteatomas[5]. Patients who have poor follow up, to avoid second surgery and recurrence, and with extensive disease in middle ear cleft are ideal candidates for CWDM[10]. But, in the same time, a review of the literature presented by Dodson et al[9] demonstrates an overall rate of residual and recurrent disease of 22% in CWD procedures.

Alexander J. et al (2012)[10] in their retrospective review of 420 children who underwent 700 procedures for cholesteatoma between 1996 and 2010 preferred CWU approach to pediatric cholesteatoma and were able to preserve the canal wall in 89.5% of cases. This approach is widely practiced in children, particularly because of their greater difficulty with management of the open mastoid cavity (with respect to aural toilet and swimming) and the hope that middle ear function may improve with age to yield a healthy and stable ear. The main disadvantages of the CWU technique are a higher rate of recidivism and need for a second surgery. While looking into operative records, the ossicular chain erosion were noted significantly in 16 cases of CSOM wth cholesteatomas without ICC and in all the 3 cases of CSOM with ICC. Thus 63.33% of our cases had different degree of ossicular chain erosions. Asma Binti et al [5]in their study noted ossicular chain erosion in 91% cases. While looking to the site of disease, the mastoid antrum (>50%) was the commonest site of the disease found intraoperatively, consistence to the study results conducted by other authors[5,11,12] . Regarding ossicular involvement, the operative data of our study showed that incus is the most common ossicle erroded followed by malleus. This is also in consistence to findings of studies conducted by Asma Binti A. et al, Joseph PG et al, and Kurien et al[5,13,14].

Ossicular chain involvement at the time of presentation was associated with more extensive disease as seen by Shirazi et al and their study found that ossicular chain involvement was a significant predictor of patients with a high risk for recurrent disease and therefore more aggressive surgical procedures became a necessity[15,16]. Mastoidectomy along with tympanoplasty (type III) were done in the same time only in 7 cases constituting 23.33% of total cases. Tympanoplasty is generally deferred until age 7 to 9 years[4]. Facial nerve palsy and dizziness were most common immediate postoperative complications found in few of our mastoidectomy cases but all of them recovered by medication within 7-15 postoperative days without any permanent facial disfigurement.

CONCLUSION:

Prevalence of mastoid disease along with mastoidectomy operation in children is still notably high. In mastoid surgery each operation should be tailored to each child depending on the indications, age, duration of symptom, anatomy and preoperative and intra-operative findings. The disagreement between CWD and CWU technique in matoidectomy of children still exists. Most of the authors do not favour the classical radical mastoidectomy in children as it results in a large cavity which frequently discharges and does not fulfill the goal of

mastoid surgery in children. Limitation of our study is that it is retrospective and period of study is only one year. Our society will be benefited by more prospective studies in large sample size, that will provide more information regarding present scenario of ear disease among the children.

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