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REVIEW ARTICLE

The Frequency of complications of tympanomastoidectomy

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Abstract:

Background: A lot of complications could arise during and after tympanomastoid surgeries. The study of the frequency of these complications is a crucial step to compare the risk and benefits of such surgeries and to compare the risk of surgery with that of the disease itself; in addition it provides an idea about the precipitating factors of these complications.

Aim of the study: To review cases of middle ear and mastoid disease treated surgically with different types of tympanomastoidectomies to find the frequency of complications of these surgical procedures and to assess intraoperative findings to ascertain the preventable factors that precipitate these complications.

Patients and methods: a retrospective study spanning a period of 2 years(Jan.2015-Dec.2016) .The data were collected from the records of 44 patients (50 ears) who underwent canal wall up and canal wall down tympanomastoidectomies in Ad-Diwaniyah Teaching Hospital. The charts were evaluated for patient`s age, sex, type of surgery, intraoperative pathology, and complications of surgery.

Results: Canal wall up mastoidectomy (CWUM) was performed for 36 ears (72%) while canal wall down procedure (CWDM) was done for 14 ears (28%). Patient's age was ranging between (9-67) yrs., the mean age was 31.43 yrs. Females were 29 (65.9%) and males were15 (34. 1%).The most common intraoperative finding was granulation tissues in 29 (64%) ears followed by ossicular erosion in 22 ears (44%), while cholesteatoma (CS) in 14 ears (28%).The most common type of surgical complications was the persistence of discharging ear in 9 ears (18%). The second most frequent complication was the change of taste and surgical site infection in 6 ears (12%) in each one. Perforated grafted TM was developed in 5 ears (10%), meanwhile the figures for facial nerve paralysis, meatal stenosis, perichondritis, vertigo, sigmoid sinus bleeding, hearing deterioration were in 1 ear (2%) for each one.

Conclusion: The current study showed that the frequency of complications of tympanomastoid surgery is low and many of them are temporary and can be treated without surgical interventions and most of these complications can be avoided if the patients properly evaluated preoperatively.

Key words: complications, tympanomastoidectomy

Introduction

A retrospective study was carried out at the department of otolaryngology, head and neck surgery department of Ad-Diwaniyah Teaching Hospital, in Ad-Diwaniyah city spanning a period of 2 years(from Jan. 2015 to Dec. 2016). The study was performed on 44 patients (50 ears) who underwent tympanomastoid surgery for chronic otitis media (COM). The age of the patients was ranging from 9-67 years, 29 of them were females and 15 were males. Canal-wall-up Mastoidectomy (CWUM) was carried out on 36 ears while Canal-wall-down (CWD) was carried on 14 ears.

The patients were followed-up for at least one year and data were obtained from the patients' records from the hospital. Patients who underwent revision mastoidectomy were excluded from this study.

Many cases of CWDM techniques were decided preoperatively especially for poor surgical candidates, sclerotic mastoid, extensive CS, erosion of the posterior canal wall, severe SNHL or dead ear and in non-compliant patients. Meanwhile CWUM was decided to the remaining cases especially those with limited disease. TPL was done in all cases (50 ears) and the type of TPL depending on situation of middle ear pathology. Meatoplasty was the final step of all CWDM.

All patients were operated upon under general anesthesia using oral-endotracheal intubation. Post auricular approach was used in all patients and the middle ear cleft was approached through the bony ear canal (anterior tympanotomy approach). Complications were grouped into ten categories and the criteria to include them were as followed: Persistence of ear discharge, Change of taste, Surgical site infection (SSI), Perforated

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tympanic membrane: Any cases of postoperative TM graft failure were included, Facial nerve palsy, EAC stenosis, Perichondritis, Vertigo, Sigmoid sinus bleeding, Hearing deterioration.

Results

A total of 44 patients (50 ears) with COM underwent CWU and CWD tympanomastoidectomy surgeries included in this study, 29 (65.9%) of them were females and 15 (34.1%) were males and the male to female ratio was (1:1.93). Their ages ranged from (9-67) years and the mean age was (31.43) years. The number of children ≤15 yrs. was four (9 %). Intra-operative pathologies are shown in table 1. CWUM and CWDM were performed in current series as in table 2. Tympanoplasty was performed in all cases. Meatoplasty was done in all cases of CWDM. The complications that discovered during and post-operatively were divided into ten categories (table 3).

Table (1): Intraoperative pathology noted

Intraoperative findings	Number of ears	Percentage %
Granulation tissues	29	64
Ossicular erosion	22	44
Cholesteatoma (CS)	14	28
Fallopian canal dehiscence	12	24
Anteriorly positioned sigmoid sinus	3	6
Dehiscent tegmen plate	2	4

Table (2): Surgical technique

Surgical technique	Number	Percentage
CWUM	36	72%
CWDM	14	28%
total	50	100%

Table (3): Surgical complications

Type of complications	Number of ears affected	Percentage
Persistence of ear discharge	9	18
Change of taste	6	12
Surgical site infection(SSI)	6	12
Perforation of the grafted tympanic membrane	5	10
Facial nerve paralysis	1	2
EAC stenosis	1	2
Perichondritis	1	2
Vertigo	1	2
Sigmoid sinus bleeding	1	2
Hearing deterioration	1	2

Discussion

The primary pathologies which were encountered intra-operatively in current series were granulation tissue and CS; there were 29(64%) ears with granulation tissue while cholesteatoma (CS) was discovered in 14(24%) ears. This was near the figures which were found by Paparella et al, [5] in a study of 375 patients, stated that CS was detected in one third and granulation tissue in two thirds of ears. It was the second most common intraoperative finding in the present study which affected 22(44%) ears, which was higher than the figures found in a study by Haider H, et al, [6] was discovered intraoperatively in (23.66%) cases of tympanomastoidectomies. This was because most of our cases were complicated and they accepted surgical treatment late. It was observed in 12 (24%) ears. The current result was within the range of the published literatures which was (6.0-85%),[7] while it was much less that that discovered byGarg Payal et al[8] , who stated this variation presented in (33.33%) of cases. Dehiscence of fallopian canal was related to the development of one case of facial palsy in current study.Rijal AS et al, [9]found that there was statistically significant relation between the type of pathology of the middle ear and both ossicular status and fallopian canal dehiscence.

Anteriorlydisplaced sigmoid sinus was discovered during surgery in 3 (6%) of cases. A case study by Zaher Addeen et al[10], who concluded that these anatomical variations are not uncommon. Jaya Chrisanthus et al,[11] concluded that anteriorly positioned sigmoid sinus was found in 13.9% of cases which was higher. In current series we had one case of moderate sigmoid sinus bleeding which happened because of this anatomical variation due to contracted mastoid.

Two cases (4%) of tegmen plate dehiscence. This was near to the result found by S.prasanna Kumar et al[12], and was 6.06%.On the other hand our result was much less than that of Garg Payal et al[8] which was 36.67% and the reason for this difference might be inadequate exploration of the tegmen plate in some cases of the current study. In our two cases the dehiscence was small in one case and managed by covering of the dehiscent area with fascia, while the other was covered with thick granulation tissue which was stick on it, the surgeon left it in place after exposing it and was regressed later on and both patients didn't developed any sequelae. CWUM was performed in 72%, while CWDM in 28% of cases which was near to the results found in a study by Jaya Chrisanthus et al, [11] which showed that CWUM was done in 64.23% and CWDM in 35.76% of cases. On the contrary, Carg Payal et al [7] results showed that CWDM was performed for 70% and CWUM for 30 % of cases. CWUM was more than CWDM in current study because in most cases the pathology (cholesteatoma or granulation tissues) was not extensive.

Persistence of ear discharge was the most commonly encountered type of complications in our series postoperatively, and seen in 9 (18%) cases (6 in CWDM and 3 in CWUM) in which

the ear discharge persist after 3 weeks in CWUM and after 3 months in CWDM despite medical treatment. This was near to that in a study by Magsi PBet al, [13] which was in 20% of cases. On the other hand it was much less than the figures of Suhail et al. [14] and Cheema et al. [15] which was 34% and 30 % consequently. In current study the persistent ear discharge was more in CWDM (42.85%) while in CWUM was in (8.33%) and this was agreed with the results of Mustafa SR results, who found this complication in (40%) of CWDM and in (10%) of CWUM. [16] Cases of postoperative ear discharge was treated with regular cleaning of the cavity through mobbing, instrumentations and microsuction, silver nitrates sticks to cauterize the granulation tissues, and appropriate antibiotics after culture and sensitivity tests with local steroids and most cases responded well after few months. The causes of persistence of discharge in current series werere-perforation of tympanic membrane graft in 5 cases, inadequate meatoplasty in one case, inadequate lowering of facial ridge in one ear, and recurrence or inadequate removal of disease in the hidden areas in the last two cases.

Temporary change of taste affected 6 patients (12%) immediately after surgery and the patients developed a metallic and in some a sour taste. All resolved gradually within 6 months postoperatively. The etiology was due to iatrogenic injury the chorda tympani nerve. According to Kiverniti E et al [17],(24.3%) of the patients were aware of taste disturbance straight away after surgery, while only (8.7%)declared instant disturbance which was near to current result.

Surgical site infection was seen in 6 (12%) of the operated ears and the patients were complaining of worsening redness few days after surgery and swelling and some of them developed purulent discharge from the postauricular wound. The precipitating factors of SSI were due to contamination during surgery, patient's non-compliance of water precaution. The onset of infections was within the first few days postoperatively and all cases were treated conservatively with regular cleaning and systemic and local antibiotics after culture and sensitivity tests and resolved completely without sequelae. There were no cases of wound dehiscence or fistula in the present study. This was slightly higher than the result of a study by Bastier PL et al[18], in which they found that the rate of postoperative surgical wound site infection was 10.8%. Perforated grafted tympanic membrane was seen in 5 (10%) ears,2 of them were in CWDM (14.28%) and 3 cases were in CWUM (8.3%). The perforations happened due to infections and failure of the grafts within the first 6 months. Our rate was slightly higher than that in a series by Thapa N et al, who found this complication in (6.09%) [19]. This higher rate was because of persistence of the underlying cause which was the Eustachian tube dysfunction that didn't responded to medical treatment. One (2%) cases of meatal stenosis and this represented (7%) out of 14 meatoplasties that performed in CWDM. This took place due to perichondritis which developed3 weeks after surgery which was treated by surgical evacuation of pus and antibiotics (ceftriaxone and healed after 2 weeks of treatment leaving some distortion and stenosis of the EAC. The current result was slightly higher than that of a study by Sanna et al, [20] who found that only (0.8%) developed meatal stenosis that required surgery while it was less than that in Khan S U et al study, [21] which was in (6.7%). The higher rate of meatal stenosis in the present study was because of patient's non-compliance with water precaution. Facial nerve palsies was seen in one Case (2%) who developed three days after surgery. The patient experienced moderate facial weakness (Grade 3 according to House-Brackman's scale), and treated conservatively with medical treatment (steroid and antibiotics) and recovered completely after 2 months. No clear injury detected during surgery. This was due to compression of facial nerve by oedema in a dehiscent facial nerve canal.

A resembling data was found by Thapa N et al, [36] who stated that there were five cases (2.18%) of facial paresis, who recovered totally and 1(0.43%) case with complete facial nerve palsy. Perichondritis Was observed in one case (2%), (in CWDM) which agrees with that of an observational study of meatoplasty of CWDM by Memari F et al,[22] who found one case (3.2%).

Sigmoid sinus bleeding was seen in one (2%) case of moderate bleeding from the sigmoid sinus happened by an iatrogenic trauma to an anteriorly placed sigmoid sinus (about 5mm from the posterior canal wall). This was unexpected finding because of bad radiologic technique and the report of the radiologist had not mentioned this abnormality. Anesthetist was informed immediately and the bleeding was managed by lowering the head down to increase the intracranial pressure to prevent embolization, and packing with Gel foam and giving him normal saline intravenous fluid and we request for blood cross matching to prepare for any further bleeding. The bleeding was stopped completely within few minutes and the operation continued. Vertigo was seen in one case (2%) experienced severe vertiginous attacks for the immediate first few postoperative days which were treated as in-patient with vestibular sedatives and supportive measures and settled down. This was due to excessive manipulations of ossicles, especially the stapes, or irritation to the inner ear. This figure is

not far from that found in a retrospective study by Chrisanthus J et al,[11] there were 9 cases of vertigo out of 137 patients (6.56%) which resolved with conservative treatments without any sequelae. Hearing deterioration was seen in one (2%) case of hearing deterioration. This figure was much less than that found by Asma Binti Abdulla et al,[23]in (22%) cases after tympanomastoid surgery. On the other hand, SivasankariL,[24] concluded that there were no any case of hearing deterioration in all of 60 patients that had been surveyed for the outcomes of tympanomastoidsurgery.

References

1 Martin M St. and Raz Y. Mastoid Surgery. In:Myers E N. Myers Operative Otolaryngology Head and Neck Surgery,2nd ed.PA:Saunders Elsevier 2008; Vol.1:1163-1176.

2 Milstein S: The history of mastoid surgery. Am J, Otol,1980; 1:174-8.

3 Sheehy JL, Patterson ME: Intact canal wall tympanoplasty with mastoidectomy. A review of eight years' experience. Laryngoscope1967; 77:1502-1542.

4 Katewad SKS,Avuluri RK,Maimal M K. Revision mastoidectomy and its goal. J. Evid. Med. Healthc 2016; 3(50): 2540-2543.

5 Paparella M M, Kim C S. Mastoidectomy update. The Laryngoscope 1977; 87: 1977–88.

6 Haidar H, Sheikh R, Larem A, Elsaadi A, Abdulkarim H, et al. Ossicular chain erosion in Chronic suppurative otitis media. Otolaryngol (Sunnyvale) 2015; 5:203.

7 Selesnick SH, Lynn-Macrae AG. The incidence of facialnerve dehiscence at surgery for cholesteatoma. Otol Neurotol.2001; 22:129-32

8 Payal G, Pranjal K, Gul M, Mittal M K, Rai A K. Computed tomography in chronic suppurative otitis media: value in surgical planning. Indian J Otolaryngol. Head Neck Surg. 2012 Sep; 64(3):225-9.

9 Rijal AS,Joshi RR,Dhungana A,Shrestha KK,Maharjan S,Jha AK.Fallopian Canal Dehiscence in Modified Radical Mastoidectomy and Facial Nerve Status.Nepal Med Coll J 2016; 18(1-2):40-3.

10 Zaher Adden S,Al-Mohammad M. Anteriorly displaced sigmoid sinus: a rare complication of myringoplasty.BMC Ear Nose Throat Disord.2017; 17: No.12.

11 Chrisanthus J et al. Mastoidectomy: A retrospective analysis of 137 cases in a tertiary care hospital. Int J Otorhinolaryngol Head Neck Surg. 2018 Jan; 4(1) :xxx-xxx

12 Prassanna K S,Ravikumar A,Somy L.Indian J Otolaryngol Head Neck Surg. 2013 December; 65(3): 548–52.

13 Magsi P B, Jamro B, Sangi H A. Clinical presentations and outcome of mastoidectomy in CSOM at tertiary care hospital, Sukkuru, Pakistan. Rawal Med J 2012; 37: 50-3.

14 Suhail Z, Moosani A, Ahmad R, Zafar A. Surgical management of CSOM in atertiary medical Centre. Pak J Otolaryngol 2008; 24:36-7.

15 Cheema KM, Maqbool M, Hameed A. Surgical management of chronic suppurativeotitis media. Ann K E Med Coll 1998; 4:23-4.

16 Mustafa SR. Comparison of Efficacy of Canal Wall Up Mastoidectomy with Canal WallDown Mastoidectomy in Surgical Management of Otitis Media. JIMDC. 2017; 6(2):78-82.

17 KivernitiE& Watters G. Taste disturbance after mastoid surgery: Immediate and long-term effects of chorda tympani nerve sacrifice. J Laryngol Otol. 2012 Jan; 126(1): 34-7.

18 Bastier P L,Leroyer C,Lasheras A,Rougue A-M,Darrouzet V,and Franco-Vidal V.Early and late surgical site infection in ear surgery.Acta Otorhinolaryngol Ital.2016;36(2):127-134.

19 Thapa N,Shrivastav R.Complications of Canal Wall Down Mastoidectomy. Journal of Nepal Medical Association2003; 42:15-18.

20 Sanna M,Facharzt A A, Russo A, Lauda L, Pasanisi E, Bucciu A.Modified Bondy's technique:Refinement of the surgical technique and long term results.Otol Neurotol.2009; 30(1):64-9.

21 Khan SU, Tewary RK, O' Sullivan TJ. Modified radical mastoidectomy and its complications: 12years' experience. Ear Nose Throat J 2014 Apr-May; 93 (4-5):E30-6.

22 Memari F,Delaristaghi MM,Mir p,Golmohammadi M,Koushki ES. Meatoplasty in Canal Wall Down Mastoidectomy:Our experience and Literature Review. Iran J Otorhinolaryngol.2017; 29 (90):11-17.

23 Asma Binti Abdulla, Latif JY,Razaq BT et al. Outcome of canal wall down mastoidectomy: experience in sixty three cases. Med J Malaysia 2013; 68:3

24 SivasankariL: A Study of Surgical Outcomes of Tympanoplasties withand Without Cortical Mastoidectomy. Annals of International Medical and Dental Research.2016; 2 (5):1-5.