Original Research Article

# Early and late surgical site infections in ear surgery at DMCH

Ashutosh Prasad[1*], Manoj Kumar[2], Nishant[3]

[1]Associate Professor, [2]Assistant Professor, [3]Senior Resident, Department of ENT, Darbhanga Medical College, Laheriasarai, Darbhanga, Bihar, INDIA.

**Email:** asutosh210@gmail.com

## Abstract

**Background:** Local infection during tympanoplasty may necessitate antibiotics, hospitalisation, and potentially re-intervention. Furthermore, infection may compromise tympanic graft uptake as well as the long-term functional outcomes of hearing and mastoid cell ventilation. **Methods:** This prospective observational study was conducted by the ENT department of Darbhanga medical College and Hospital. Total 50 patients were enrolled in this study, during the study period January 2019 – April 2020. All patients with COM who were eligible for therapeutic surgery using a retroauricular approach were included acute otitis media or external, retroauricular cutaneous infection at the time of surgery. **Results:** Seven late SSI were diagnosed amongst the 50 remaining patients (late SSI rate 8.0%) between 65 and 85 days after surgery. The most common presentation of late SSI was purulent otorrhoea. **Conclusion:** Larger trials would help to corroborate our findings, and the use of long-term functional measures and bacteriological analysis would aid in counselling clinicians when faced with the various types of COM that may be encountered.

***Address for Correspondence:**
Dr Ashutosh Prasad, Associate Professor, Department of ENT, Darbhanga Medical College, Laheriasarai, Darbhanga, Bihar, INDIA.
**Email:** asutosh210@gmail.com

Received Date: 05/09/2021 Revised Date: 14/10/2021 Accepted Date: 11/11/2021



Access this article online

Quick Response Code:

Website: www.medpulse.in

DOI: https://doi.org/10.26611/10162112

## INTRODUCTION

Chronic otitis media (COM) refers to a group of otological disorders characterised by chronic inflammation of the middle ear and mastoid cavity mucosa.[1] The most common manifestations of COM are dry or suppurative tympanic perforations, cholesteatomas, and inflammatory induced ossicular lesions. The retroauricular method, which is commonly used to treat COM, provides access to the tympanic membrane, middle ear cleft, and mastoid via a retroauricular incision. The goals of COM surgery vary depending on the type of lesion: removal of infective and devitalized tissues within the mastoid, excision of cholesteatomas, opening of all air cells in a shared cavity, and repair of the tympanic membrane or sound-conducting mechanisms.[2] Because infectious problems can occur both intra- and extracranially in COM, there is a risk of surgical site infection (SSI) following surgery.[3] In contaminated or filthy operations, the likelihood of SSI after ear surgery is roughly 10%. 6. Flora of the normal middle ear and rhinopharynx, flora of the skin through the external auditory canal (EAC) or retroauricular incision, and pathogenic bacteria within diseased mastoid cells are the three main sources of contamination.[4]

## METHODS

This prospective observational study was conducted by the ENT department of Darbhanga medical College and Hospital. Total 50 patients were enrolled in this study, during the study period January 2019 – April 2020. All patients with COM who were eligible for therapeutic surgery using a retroauricular approach were included acute otitis media or external, retroauricular cutaneous infection at the time of surgery. Patients were admitted to ambulatory or conventional hospitalisation the evening before or on the day of operation. Patients got a povidoneiodine shower with shampoo the day before and the morning after operation. At the time of admission, retroauricular hair was cut. All of the patients were operated on by one of two senior surgeons with extensive experience. The operation field was cleansed with povidone-iodine scrub solution before being coated with

How to cite this article: Ashutosh Prasad, Manoj Kumar, Nishant. Early and late surgical site infections in ear surgery at DMCH. *MedPulse International Journal of ENT.* January 2022; 21(1): 05-08. https://www.medpulse.in/ENT/

povidone-iodine solution and given a povidone-iodine ear bath. Adrenaline-laced lidocaine solution was used to infiltrate subcutaneous tissues from the hypoderma to the periosteum. Every patient underwent a retroauricular cutaneous incision to reach the middle ear via dissection along the osseous EAC and/or drilling through the mastoid chambers. Depending on the disease, further treatments such as antromastoidectomy utilising the canal wall up (CWU) or canal wall down (CWD) approach, cholesteatoma removal, ossiculoplasty, or tympanoplasty may have been performed. Autologous (auricular cartilage, ossicle, fascia temporalis) or foreign materials may have been employed in these procedures (titanium ossicular prosthesis, myringotomy tube, fibrin glue, gelatine sponge). Following the surgery, adults were sutured with nylon monofilament and children with polymeric absorbable suture. Ear packing was then placed in the EAC with the use of silicone sheets and ear wicks. A nurse at the patient's house provided daily cleaning, decontamination with an antiseptic, and dressing of the retroauricular incision. At each follow-up, a member of the surgical team recorded pre-, intra-, and post-operative data. Patient age and gender, tobacco use, previous surgery on the same ear, ear discharge six months before surgery, rhinosinusitis or antibiotic treatment (systemic or topical use) two weeks before surgery, results of pre-operative ear examination, month of surgery, type of hospitalisation (ambulatory or conventional), order of the intervention in the operating theatre's day's planning, duration of surgery, presence of cholangitis The pre-operative otoscopic examination distinguished "wet ear" patients from "dry ear" patients. Wet ears were characterised as EAC otorrhoea that was not purulent. This condition was distinguished from diseased ears, which were excluded, and was regarded as a symptom of active COM. We also calculated the National Nosocomial Infection Surveillance (NNIS) index 9-11 based on the American Society of Anesthesiologists (ASA) score and surgical wound contamination class for each patient. Wet ears and ears where an inflammatory state was identified after accessing the middle ear were examples of contaminated surgery. Clean-contaminated interventions were assigned to the remaining interventions. Associations between SSI and characteristics of patients and surgery were analysed using Fisher's exact test. Using SPSS-19, $<0.05$ was considered as statistically significant.

## RESULTS

**Table 1:** Demographical variables of Study population

| Variables | | Total n = 50 | SSI n = 4 | No SSI n = 46 | P Value |
|---|---|---|---|---|---|
| Age | ≤ 20 | 18 | 0 | 18 | 0.65 |
| | > 20 | 32 | 4 | 28 | |
| Gender | M | 30 | 2 | 28 | 0.87 |
| | F | 20 | 2 | 18 | |
| Tobacco use | Yes | 17 | 1 | 16 | 0.99 |
| | No | 33 | 3 | 30 | |
| Number of interventions on same ear | First | 31 | 3 | 28 | 0.21 |
| | Second | 19 | 1 | 18 | |
| Otorrhoea during previous six months | Yes | 12 | 2 | 10 | 0.48 |
| | No | 38 | 2 | 36 | |
| Pre-operative antibiotic therapy | Yes | 9 | 1 | 8 | **0.03** |
| | No | 41 | 3 | 38 | |
| Surgery duration (min) | ≤ 60 | 22 | 3 | 18 | 0.98 |
| | > 60 | 28 | 1 | 27 | |
| Surgical wound classification | II | 34 | 4 | 30 | **<0.0001** |
| | III | 16 | 0 | 16 | |
| Cholesteatoma | Yes | 29 | 2 | 27 | 0.58 |
| | No | 21 | 2 | 19 | |
| Technique | CWU | 42 | 3 | 39 | 0.32 |
| | CWD | 8 | 1 | 7 | |
| Fibrin glue | Yes | 6 | 1 | 5 | 0.29 |
| | No | 44 | 3 | 31 | |
| Resorbable suture | Yes | 22 | 0 | 22 | 0.56 |
| | No | 28 | 4 | 24 | |
| Intravenous intra-operative antibiotic administration | Yes | 10 | 1 | 09 | 0.78 |
| | No | 40 | 3 | 37 | |
| Oral post-operative antibiotic administration | Yes | 11 | 3 | 08 | **0.01** |
| | No | 39 | 1 | 38 | |

## DISCUSSION

The inflammatory status of the ear at the time of surgery has been connected to early SSI. Surgical operations on inflamed tissues appear to increase the growth of bacteria that are already present in the middle ear or on the patient's skin. The 04 characteristics we discovered to be strongly associated with early SSI are related and reflect the inflammatory condition of the middle ear in the days preceding or after surgery. Some publications differentiate between active and inactive COM. The distinction is based on the presence or absence of ear discharge at the pre-operative examination 12 or within one month of the procedure. 4. Wet ear in COM can be induced by mucosal oedema or myringitis around the perforation's margin. The differentiation between wet and dry ear is based on the surgeon's judgement immediately prior to the intervention, which may be more reliable than patient anamnesis and more related to COM activity on the day of surgery.[5] Our definition of early SSI corresponds to that of nosocomial SSI as defined by the Centers for Disease Control (CDC),[6] and can also be attributed to infections delivered to the surgical site by various manoeuvres despite pre-, intra-, and post-operative protective measures. Although data on SSI in ear surgery are very few and lack defined or standardised definitions and indices, nosocomial SSI has gained a lot of attention in the literature. For example, the time it takes to consider a nosocomial infection range from 2 weeks to 3 months, although the CDC considers it to be 30 days 6. Furthermore, the CDC defines nosocomial SSI as incisional infections (superficial and deep) as well as particular organ/space infections. The ear and mastoid are classified as a separate organ/space by the CDC. Because the retroauricular approach creates connectivity between the mastoid cavities and the subcutaneous plane, distinguishing between incisional and organ/space infection may be challenging in the case of retroauricular purulent discharge. It's also difficult to pinpoint the source of purulent otorrhoea. It could be caused by a superficial incisional infection of the EAC skin, a mechanical discharge of infection from the middle ear chamber through the separation planes, or a residual tympanic perforation. Exact diagnosis may necessitate surgical mastoid exploration or a CT scan. However, there has been a recent trend toward using a more useful and therapeutically relevant definition that distinguishes just wound infection from middle ear infection.[7] The sample size was insufficient to assess the relationship between antibiotic use, wet ear, surgical wound categorization, and NNIS score. Nonetheless, wet ear appears to be the most clinically important risk predicting early SSI. However, if wet ear is discovered prior to surgery, there is no agreement on whether the intervention should be postponed or antibiotic prophylaxis should be offered. Some authors have discovered that the healing and functional outcomes of tympanoplasty in ears with active COM are worse than in ears with inactive COM.[8] The wet/dry distinction is already incorporated into prognostic scores used in middle ear surgery and for predicting morphological and functional long-term outcomes. Other authors observed no difference in the result of tympanoplasty between wet and dry ears and confirmed that ear discharge was not a reason to postpone operation. 12. However, no indication of the causes of failure, including the rates of SSI, was provided in that study. Our study did not gather functional outcomes (auditory state, tympanic closure), and the onset of SSI halted the follow-up. In the instance of a moist ear, data on the consequences of SSI on functional result could have aided in the choice to postpone surgery. This was notably true in cases of minor SSI, such as delayed purulent ear discharge, which could be treated with local antibiotics without the need for surgery or rehospitalization. Ears with active COM are typically treated medically prior to surgery in order to stop the discharge and reduce mucosal inflammation.[9] We only operate on active COM ears that are resistant to medicinal treatment and where surgery may help control the inflammatory process by removing any infective tissues and re-establishing normal middle ear cavity airflow. In terms of antibiotic prophylaxis, a recent meta-analysis found no meaningful evidence that it is beneficial in lowering SSIs after ear surgery The same authors discovered bias in several studies in which surgical wound class was defined pre-operatively based on the kind of operation without taking intra-operative data into consideration.[7]

## CONCLUSION

Larger trials would help to corroborate our findings, and the use of long-term functional measures and bacteriological analysis would aid in counselling clinicians when faced with the various types of COM that may be encountered.

## REFERENCES

1. Verhoeff M, Veen EL, Rovers MM, et al. Chronic suppurative otitis media: a review. Int J Pediatr Otorhinolaryngol. 2006;70:1–12.
2. Becvarovski Z, Kartush JM. Smoking and tympanoplasty: implications for prognosis and the Middle Ear Risk Index (MERI) Laryngoscope. 2001;111:1806–1811.
3. Panda NK, Sreedharan S, Mann SB, et al. Prognostic factors in complicated and uncomplicated chronic otitis media. Am J Otolaryngol. 1996;17:391–396.
4. Govaerts PJ, Raemaekers J, Verlinden A, et al. Use of antibiotic prophylaxis in ear surgery. Laryngoscope. 1998;108:107–110.

5. Bidkar VG, Jalisatigi RR, Naik AS, et al. Perioperative only versus extended antimicrobial usage in tympanomastoid surgery: a randomized trial. Laryngoscope. 2014;124:1459–1463.
6. Horan TC, Gaynes RP, Martone WJ, et al. CDC definitions of nosocomial surgical site infections, 1992: a modification of CDC definitions of surgical wound infections. Infect Control Hosp Epidemiol Off J Soc Hosp Epidemiol Am. 1992;13:606–608.
7. Verschuur HP, Wever WWH, Benthem PPG. Antibiotic prophylaxis in clean and clean-contaminated ear surgery. Cochrane Database Syst Rev Online. 2004:CD003996.
8. Denoyelle F, Roger G, Chauvin P, et al. Myringoplasty in children: predictive factors of outcome. Laryngoscope. 1999;109:47–51
9. Mills R, Thiel G, Mills N. Results of myringoplasty operations in active and inactive ears in adults. Laryngoscope. 2013;123:2245–2249.

Source of Support: None Declared
Conflict of Interest: None Declared