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Original Article

Comparative Study of Hearing Status After Modified Radical Mastoidectomy with and without Reconstruction

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ABSTRACT

Chronic suppurative otitis media (CSOM) is a communal ailment of the middle ear **Objective:** To compare hearing status with and without reconstruction after a modified radical mastoidectomy. **Methods:** 40 total patients with Chronic suppurative otitis media (the Atico-antral variety) who endured a modified radical mastoidectomy (MRM) with reconstruction or without reconstruction were enrolled in the study. The subjects were alienated into 2 groups depending on the surgical procedure. Patients done with modified radical mastoidectomy but reconstruction was not accomplished were added in the group I (n = 20), and patients done with reconstruction after MRM (n = 20) added to the group II. The patients were thoroughly examined one week before the operation, and their hearing levels were assessed using pure tone audiometry. The general anesthesia was given to the patients of both groups and operated under a microscope with post auricular approach. Temporal fascia and cartilage were collected as a material for grafting after modified radical mastoidectomy in group II. After surgery, patients were monitored at regular intervals. After 8 weeks, pure tone audiometry was performed and the closure of the air-bone gap was compared with the hearing assessment. **Results:** Many of the patients in this analysis were amongst 11 and 20 years of age and the majority of patients were male. Bone-air gap closure was more common in patients undergoing reconstructive MRM. **Conclusion:** Reconstruction after MRM results in improved hearing amplification and similarly results in greater improvement of life quality.

INTRODUCTION

Chronic suppurative otitis media (CSOM) is a communal ailment of the middle ear [1-2]. The greater frequency of CSOM with cholesteatoma in developing countries has been accredited to underprivileged conditions of living, poor personal hygiene, overpopulation, passive smoking, lack of breastfeeding, reduced infection resistance, poor overall health, absence of awareness regarding health and available facilities, ignorance and illiteracy [3-4]. The atticoantral variability of CSOM is frequently related with cholesteatoma. Surgery is the preferred management option for cholesteatoma, the aim of which is to completely cure the disease, keep the ear dry and safe and, if possible, restore or maintain functional capacity [5-6]. Depending on the extent and degree of destruction of cholesteatoma, there are different surgical treatment methods, like intact canal wall surgery (cortical mastoidectomy and joint tympanoplasty approach) and canal wall down methods (radical mastoidectomy, attico-antrostomy, MRM and atticotomy). In the late 20th century, simple or radical mastoidectomy surgery was prosecuted to manage

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chronic disease of middle ear with no effort to preserve hearing pre-operatively [7-8].Contemporary concepts of middle ear reconstructive surgery entered the market when Zollner, Wullstein and Moritz introduced tympanoplasty in Germany [9-10].MRM can be performed with or deprived of reconstruction such as posterior canal wall reconstruction, ossicular chain and tympanic membrane reconstruction will prevent recurrence, discharge and improve hearing [11]. Currently, modern development in otology is the canal wall down modified radical mastoidectomy with augmented reconstruction under magnification [10-11]. In MRM, hearing outcomes depend on the condition of the ossicles and the restoration of sound conduction through the tympano-ossicular system. In this analysis, we evaluated pre-operative hearing among subjects planned for MRM in both the reconstruction and non-reconstruction groups [12].

METHODS

This cross-sectional observational study was held in the ENT Head & Neck Surgery Department, Lady Reading Hospital Peshawar and ENT Department SIMS, Lahore for six-months duration from August 2021 to January 2022. A total of 40 patients with Chronic suppurative otitis media (the Atico-antral variety) who endured a MRM with reconstruction or without reconstruction were registered in the analysis. The subjects were alienated into 2 groups contingent on the surgical procedure. Patients done with modified radical mastoidectomy but reconstruction was not accomplished were added in the group I (n = 20), and patients done with reconstruction after MRM (n = 20) added to the group II. The patients were thoroughly examined one week before the operation, and their hearing levels were assessed using pure tone audiometry. The general anesthesia was given to the patients of both groups and operated under a microscope with post auricular approach. Temporal fascia and cartilage were collected as a material for grafting after modified radical mastoidectomy in group II. After surgery, patients were monitored at regular intervals. After 8 weeks, pure tone audiometry was performed and the closure of the air-bone gap was compared with the hearing assessment. After the interview was completed, the subjects were carefully evaluated under a microscope and otoscope. A facial nerve integrity test, tuning fork test, and a fistula test were accomplished in all cases. Radiographs of the mastoid process were performed, and in few patients computed tomography of the petro-mastoid region was accomplished. All statistics were statistically analyzed using the SPSS 21.0.

RESULTS

Most of the patients were 11-20 years of age (45%). The ratio of M:F patients is 1.8: 1. Most of the patients had an attic perforation of 77.5%. The dry cavity (75%) in the reconstructed MRM group was higher than in the non-reconstructed MRM group (55%).

Sex	No of Patients	Percentage (%)
Women	14	35
Men	26	65
Total	40	100

Table 1: Gender distribution of patients

Age Groups (Years)	No of Patients	Percentage (%)
11-20	18	42
21-30	11	27.5
31-40	07	17.5
41-50	04	10
Total	40	100

Table 2: shows the distribution of patients according to the age

Age Groups (Years)	No of Patients	Percentage (%)
Postero-Superior marginal	9	22.5
Attic	31	77.5
Total	40	100

Table 3: exhibits the perforation type in tympanic membrane in surgically managed ears

Cavity wetness	Group I (n=20)	Group II (n=20)	Total
Wet	9 (45%)	05 (25%)	14 (35%)
Dry	11 (55%)	15 (75%)	26 (65%)
Total	20 (50%)	20 (50%)	40 (100%)

Table 4: The mastoid cavity Condition of afterwards the eight weeks post operatively)(n=40)

Hearing improved 80% of the cases in MRM with reconstruction. Hearing damage occurred in most (80%) cases after MRM without reconstruction. (Here, it is assumed that the variability of hearing <10 dB remains unchanged. The air gap (AB) was narrower in group II.

Age Groups (Years)	No of Patients	Percentage (%)
Improvement in hearing	16	80%
(10-20 dB)	09	45%
(21-30 dB)	04	20%
(>30 dB)	03	15%
Deteriorate	01	5%
Unchanged	03	15%
Total	20	100%

Table 5: The hearing status improvement post-operatively afterwards the eight weeks in MRM with Reconstruction (n=20)

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Age Groups (Years)	No of Patients	Percentage (%)
Improvement in hearing	Nil	Nil
Not changed	04	20%
Worsened	16	80%
(10-20 dB)	10	50%
(21-30 dB)	04	20.00%
(>30 dB)	02	10%
Total	20	100%

Table 5: The hearing status improvement post-operatively afterwards the eight weeks in MRM without Reconstruction (n=20)

DISCUSSION

This cross-sectional analysis was conducted to compare hearing status with and without reconstruction after modified radical mastoidectomy [10-11]. Research results are equated with formerly published related analysis. In this research, the age range was 11-50 years with mean age of twenty-one years. The maximum numeral of cases (42%) was in the 12-21 group of age. Younger age groups suffer much from the horizontal location of the Eustachian tube, cellular mastoid, and recurrent URTIs and enlarged adenoids, reinforced by various analyses [12-13]. In our study, males (65%) were much affected than females (35%), with a M: F of 1.8: 1, which has also been shown in other researches. In this analysis, attic perforation was noted in 77.5% and posterior-superior marginal perforation was noticed in 22.5%. These results are less or more comparable to various studies in which the attic perforation is larger than the posterior-upper marginal perforation [14-15]. The study showed 75% effectiveness of dry ear treatment with MRM and reconstruction after 8 weeks and 55% with MRM without reconstruction, which is comparable to additional analyses. The AB gap was 35.65 dB preoperatively in group-I and 38.15 dB post-operatively. After the operation, the AB increased in size and there was no development in hearing in group I, which was well-known in one other analysis [16-17]. In group II, 37.55 dB was the average preoperative AB interval, and 24.17 dB was the postoperative mean AB interval. This means that the average gain in hearing was 13.40 Db [18]. This outcome was less or more comparable to another analysis. During MRM, both groups had partially diseased incus and ossicle removed, thereby disrupting the ossicles chain by cholesteatoma, thus allowing further hearing. However, once the diseases were eliminated, the ossicular chain was bridged and the hearing was deteriorated [19]. Also, in the case of MRM with tympanoplasty, the graft medialization occasionally occurs, so that the middle ear cavity is not preserved and probably function of Eustachian tube is not properly established. As a consequence, the hearing was deteriorated [20-21].

CONCLUSION

Early treatment and detection of CSOM with cholesteatoma must be our aim to avoid complications, and follow-up along with postoperative care are essential to relapse prevention and life support. This study functional results support the significance of reconstruction with MRM. In fact, post-MRM reconstruction not only amended hearing amplification but also resulted in dry ears and prevention of complications, thus improving quality of life.

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