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Research Article

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Cholesteatoma Effects on Hearing and Ossicles at Al-Mouwasat University Hospital

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Abstract *Objective*: This study aimed to study the prevalence of cholesteatoma, the effect it conducts on auditory ossicles and the hearing loss using the values of air conduction (AC), bone conduction (BC) and air-bone gap (ABG). *Materials and Methods*: This study was a retrospective study of the files of the patients who reviewed Al-Mouwasat University Hospital and were diagnosed with middle ear cholesteatomas. 100 cases were included in the study from 1/1/2019 to 30/6/2020. To ensure the privacy, only the authors collected all the data, and all the names with their personal information were blinded. Statistical analysis was done using SPSS 25.0. *Results*: 18% of all patients were children (≤16 years old) and 82% were adults (>16 years old).Males were more dominant with 58% compared to females with 42%. Erosion of ossicles was found in 84% with the incus in 64%, stapes in 24% and malleus in 12%. *Conclusion*: The mean ABG air-bone gap values were 30db in cases with malleus erosion, 26db with incus erosion (least affected) and 33db in stapes erosion (most affected).

Keywords Cholesteatoma; Ossicle; Middle Ear; Hearing Loss; University Hospital

Introduction

Cholesteatoma may be defined as skin in the wrong place [1], which causes middle ear chronic inflammation, leading to ossicles and bone erosion. Chronic otitis with cholesteatoma is divided into congenital and acquired forms. The former is more frequent in young patients and is caused by skin growth behind the eardrum since birth. The latter is more frequent in adults and originates from tympanic retraction pockets or from migration of skin through perforations of the tympanic membrane into the middle ear [2-4].

Cholesteatoma is considered a benign epithelial lesion with a gradual and destructive expansion, which affects the ear canal and adjacent structures [5]. Epithelial accumulation and bone erosion, typically result in continuous otorrhea and hypoacusis. With the progression of cholesteatoma, there may also be involvement of the inner ear [6,7] and facial nerve, in addition to serious complications such as meningitis and brain abscess [8].

The estimated incidence in the general population is 3.7-13.9/100,000 [9-10]. This incidence is lower in children (3/100,000) than in adults (9/100,000) [11-14].

Materials and Methods

This study was a retrospective study of the files of the patients who reviewed Al-Mouwasat University Hospital and were diagnosed with middle ear cholesteatomas. We collected data regarding the age, gender, onset of symptoms, complains, site, unilateral /bilateral ear involvement and erosion of the auditory ossicles.

This study included 100 cases from 1/1/2019 to 30/06/2020. To ensure the privacy, only the authors collected all the data and all the names and personal information were blinded. Statistical analysis was done using SPSS 25.0.

Results

Patients between 11-20 years old were the most common, while those between 41-50 years old were the least. (Figure 1)

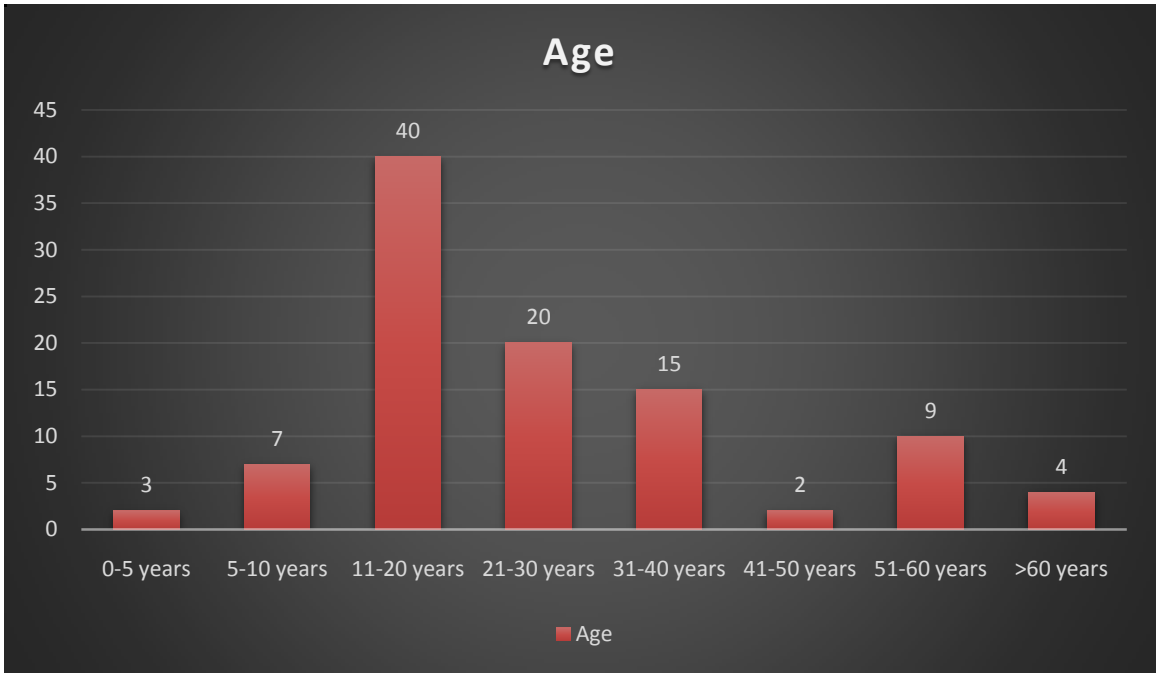

Figure 1: Age of participants in our study

Males were more dominant with 58% compared to females with 42%. (Figure 2)

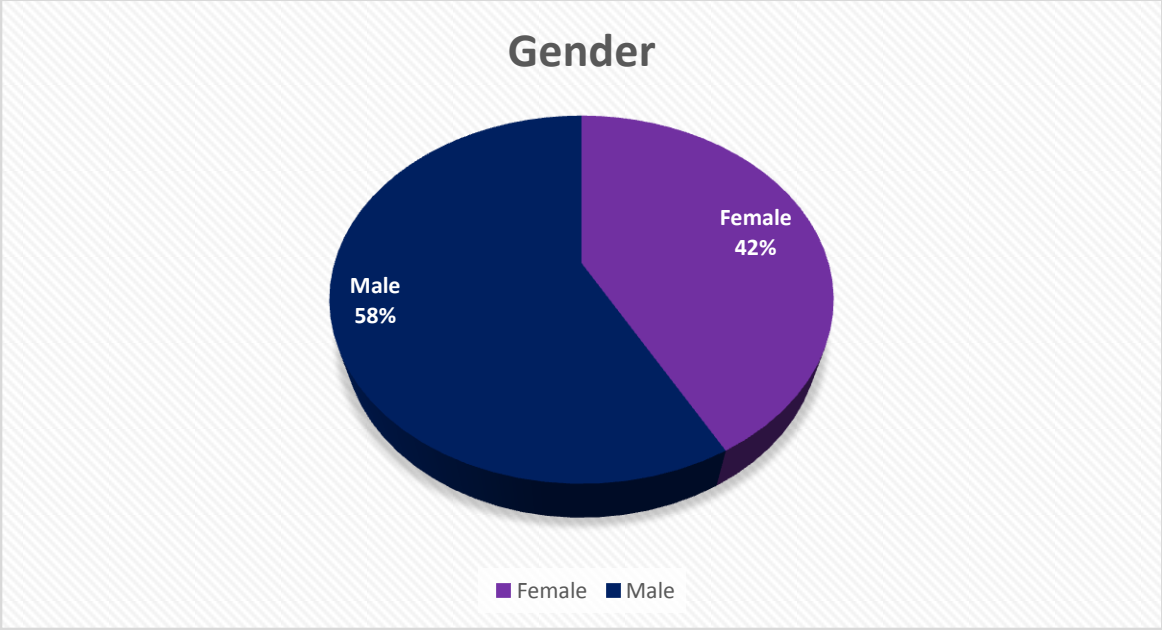

Figure 2: Gender of participants in our study

Erosion of the auditory ossicles was found in 84 cases and no erosion was found in 16 cases. (Figure 3)

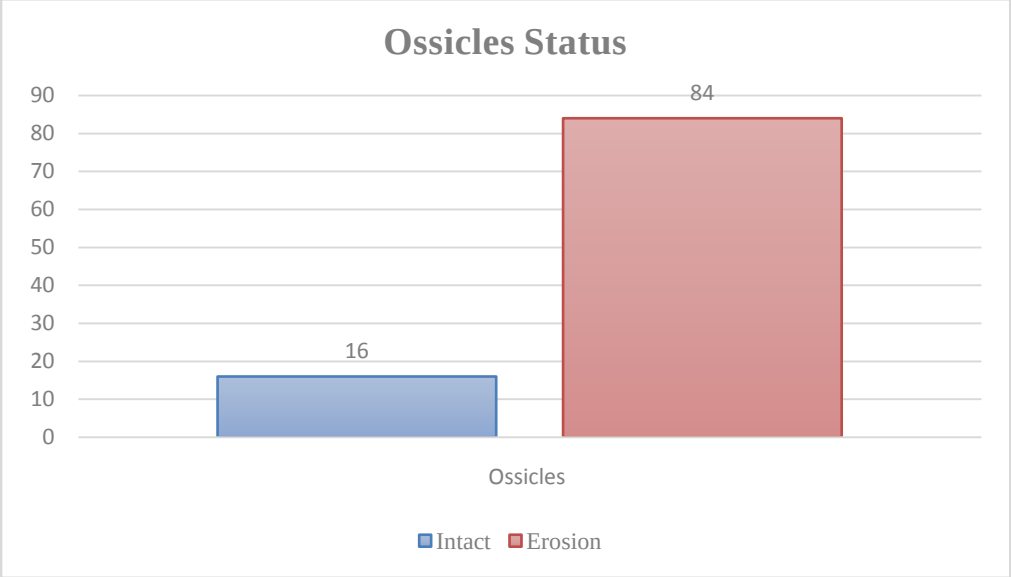

Figure 3: Status of ossicles in participants in our study

Regarding Erosion, the incus was the most common in 64 cases followed by the stapes in 24 cases and malleus in 12 cases. (Figure 4)

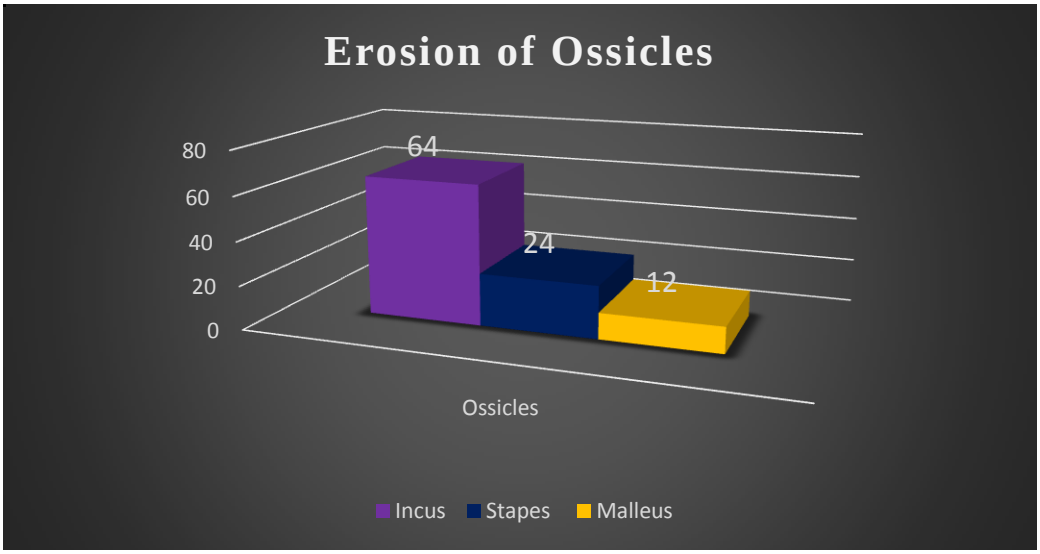

Figure 4: Distribution of erosion of ossicles in participants in our study

The mean AC (air conduction) values were 46db in cases with malleus erosion, 51db with incus erosion and 56db in stapes erosion. The mean BC (bone conduction) values was 16db in cases with malleus erosion, 25db with incus erosion and 23db in stapes erosion. Also, the mean ABG (air-bone gap) values were 30db in cases with malleus erosion, 26db with incus erosion and 33db in stapes erosion. Table (1)

Table 1: Ossicles Erosion effect on the AC, BC and ABG of participants in our study

	N	**Our Study**			**N**	**Similar Study (17)**		
Ossicular chain condition (Erosion)		AC	BC	ABG		AC	BC	ABG
Malleus	12	46	16	30	25	48	18	30
Incus	64	51	25	26	96	48	23	25
Stapes	24	56	23	33	40	58	29	29

AC = air conduction; BC = bone conduction; ABG = air-bone gap. Values, expressed in db.

Discussion

In our study, 18% of all patients were children (≤16 years old) and 82% were adults (>16 years old). This was similar to another study with 84% adults and 16% children [15]. (Figure 1)

In our study males were more dominant with 58% compared to females with 42%, which was also similar to other studies (64.7% males, 35.3% females) [16]. (Figure 2)

Erosion of the auditory ossicles was found in 84% of cases with the Incus being the most common in 64% followed by the Stapes in 24% and Malleus in 12% [16]. In our study, erosion of ossicles was found in 79% with the Incus in 91.3%, Stapes in 50% and Malleus in 38%. (Figure 3,4)

Regarding the air conduction, bone conduction and air bone gap in cases with ossicles erosion, in our study, the mean ac (air conduction) values was 46db in cases with malleus erosion, 51db with incus erosion and 56db in stapes erosion. The mean bone conduction BC (bone conduction) values was 16db in cases with malleus erosion, 25db with incus erosion and 23db in stapes erosion. The mean ABG air-bone gap values were 30db in cases with malleus erosion, 26db with incus erosion and 33db in stapes erosion.

In a similar study [17], the mean AC (air conduction) values were 48db in cases with malleus erosion, 48db with incus erosion and 58db in stapes erosion. The mean bone conduction BC (bone conduction) values was 18db in cases with malleus erosion, 23db with incus erosion and 29db in stapes erosion. The mean ABG air-bone gap values were 30db in cases with malleus erosion, 25db with incus erosion and 29db in stapes erosion. (Table 1)

Conclusion

The etiology of cholesteatomas remains unknown. Bigger epidemiological and statistical data, surgical reports, and conclusions of experimental studies are needed, as they may provide support for clarifying the pathogenesis of cholesteatoma.

Compliance with Ethical Standards

Funding: This study was not funded by any institution.

Ethical approval: The names and personal details of the participants were blinded to ensure privacy.

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