

Clinicopathology Study of Middle and External Ear Lesions: A Ten-Year Retrospective Study, Yazd, Iran

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Abstract

Introduction: External and middle ear diseases and tumors are among the most common cases referred to the ear clinic. These lesions can range from benign inflammatory lesions to metastatic tumors. Therefore, in this study, we aimed to study middle and external ear biopsy lesions to obtain information about the frequency distribution of gender, age and their clinical symptoms so that we may be able to take steps to detect them early and prevent their spread.

Methods: This descriptive and cross-sectional study was performed retrospectively. The data were collected through a premade questionnaire, including demographic data such as age, gender, the precise anatomical location, the involved side, clinical symptoms, and pathology report. Then, the obtained data were statistically analyzed through SPSS software version 17.

Results: Total 542 patients were enrolled in this study, whom 332(61.3%) of them were male and 208 (38.3%) of them were female. The mean age of patients was 36.93 ± 18.51 years old. Between them 57 (10.5%) of cases were malignant, and 485 (89.5%) were benign. There was a significant relationship between the pathologic types of middle and external ear lesions with age, gender, and clinical symptoms ($PV < 0.001$). Most lesions were seen in men older than 50 years. The benign lesions such as cholesteatoma were the most widespread lesion in the middle ear, mostly observed on the left side. The majority of patients with cholesteatoma were between 20 and 39 years old.

Conclusion: The results of this study showed that there is a close relationship between clinical symptoms and the type of the lesion. Most benign lesions presented with otorrhea and hearing loss, while most malignant lesions were presented as ulcerated lesions.

Keywords: External Ear; Middle Ear; Pathology; Lesions

Introduction

In addition to being effective in facial beauty, the ear can also play a role in communicating with peers and learning and balance [1,2]. Whether benign or malignant, any type of lesion can affect its function [3,4]. Inflammatory as well as tumoral (benign and malignant) lesions can occur in the external and middle ear [5,6].

Benign lesions include cysts, wounds, traumas, moles, and malignant lesions, ranging from squamous cell carcinoma to malignant melanoma of the ear [7-10]. Following the conducted research by Naeimi, et al. titled "Treatment and Outcome of Malignant External Auditory Canal and Middle Ear tumor in Ghaem Hospital-Mashhad" in 2009 on 63 patients (47 patients with external ear tumor and 16

patients with middle ear tumor), it was found that 46.81% of the external ear tumors patients had SCC and 53.19% of them had BCC. Moreover, from the 16 patients with middle ear tumors, 93.75% had SCC, and 6.25% had BCC [11]. The conducted research by Nahaei, *et al.* in 1998 on 50 patients showed that 88% of surgical procedures were due to chronic otitis media. Chronic perforation with middle ear complications accounted for 70% of all patients. Chronic perforation with and without cholesteatoma accounted for 18% and 52% of all patients, respectively. Chronic perforations due to chronic otitis media in the absence of cholesteatoma, granulation tissue, and tympanosclerosis, was seen in 16%, 14%, and 26% respectively. Retraction pocket with and without cholesteatoma consisted of 10% and 8% of the total patients. Cholesteatoma cases accounted for about half of all cases of chronic otitis media without cholesteatoma. tympanosclerosis was seen in 40% of the study population and 45% of chronic otitis media [12]. Since Yazd province is a desert province and sunlight can affect the external ear lesions and also because of extensive and comprehensive studies on external and middle ear lesions in this province, it has been aimed to evaluate the frequency of middle and external ear lesions that were sent to the pathology department in 2010 - 2020.

Methods

This study was a cross-sectional and descriptive-analytic study that was conducted retrospectively. The inclusion criteria included all patients who underwent biopsy due to middle and external ear lesions during the years 2010 to 2020 and their pathology report was available in the hospital file. Study data were collected through a questionnaire, including demographic information such as age, gender, exact anatomical location, involved side, year of diagnosis, clinical symptom, and pathology report. Data were analyzed by SPSS V.17 software using chi-square, T-test, and ANOVA tests. P values less than 0.05 were considered statistically significant.

Results

This research was performed as a cross-sectional and analytic study to demographically investigate the pathologic lesions of the external and middle ear in the samples sent to the pathology ward of Shahid Sadoughi Hospital of Yazd in 2010 - 2020. In this study, 542 patients with external and middle ear pathological lesions were studied. This study showed that 332 people (61.31%) of the patients were male, and 208 (38.3%) were females. In this study, 268 samples (49.4%) belonged to the right ear and 274 samples

(50.6%) were related to the left ear. In addition, 130 cases (24%) were related to the external ear, and 412 cases (76%) were related to the middle ear. 57 (10.5%) cases of the samples were malignant, and 485 cases (89.5%) were benign.

Type of lesion	Number	Percentage
Cholesteatoma	304	56.1%
Chronic otitis media	77	14.2%
Polyp	40	7.4%
Basal cell carcinoma	37	6.8%
Dermoid cyst	25	4.6%
Osteoma, colloid	21	3.9%
Squamous Cell Carcinoma	18	3.3%
Tympanosclerosis, Otosclerosis	10	1.8%
Melanoma	2	0.4%
Other	8	1.5%
Total	542	100

Table 1: Frequency distribution of different types of ear lesions in the studied samples.

According to table 1, which shows the types of middle and external ear lesions, the most common diagnosis was cholesteatoma (56.1%), and then chronic otitis media (14.2%), and the least common was melanoma (0.4%).

Symptoms	Number	Percentage
Otorrhea and hearing loss	902	38.5
Otorrhea	145	25.8
Hearing loss	95	17.5
Mass	51	9.4
Wounds	42	7.7
Total	542	100

Table 2: Frequency distribution of studied samples according to clinical symptoms.

According to table 2, which shows the frequency distribution of clinical symptoms, the most common symptom was Otorrhea and hearing loss (38.5%), and then, Otorrhea alone (25.8%), and the least common symptom was wound (7.7%).

	Cholesteatoma, polyp, dermoid cyst	Chronic otitis media	Malignant lesions	Other	Total	p-value
Gender						
Male	210 (63.3%)	43 (13%)	57 (17.2%)	22 (6.6%)	332 (100%)	
Female	158 (76%)	33 (15.9%)	0 (0%)	17 (6.2%)	208 (100%)	0.001
Total	368 (68.1%)	76 (14.2%)	57 (10.5%)	39 (7.2%)	540 (100%)	
Age group						
1-19	66 (77.5%)	12 (14.1%)	0 (0%)	7 (8.2%)	85 (100%)	
20-29	117 (78.5%)	19 (12.8%)	0 (0%)	13 (8.7%)	149 (100%)	0.001
30-39	80 (79.2%)	14 (13.9%)	1 (1%)	5 (5.9%)	101 (100%)	
40-49	49 (70%)	16 (22.9%)	2 (2.9%)	3 (4.3%)	70 (100%)	
50-89	57 (41.6%)	16 (11.7%)	54 (39.4%)	10 (7.3%)	137 (100%)	
Total	369 (68.1%)	77 (14.2%)	57 (10.5%)	39 (7.2%)	542 (100%)	
Clinical symptoms						
Mass	22 (43.1%)	3 (5.9%)	15 (29.4%)	11 (21.6%)	51 (100%)	
Otorrhea	106 (73.1%)	34 (23.4%)	0 (0%)	5 (3.4%)	145 (100%)	
Hearing loss	66 (69.5%)	11(11.6%)	0 (0%)	18 (18.9%)	95 (100%)	
Otorrhea and hearing loss	174 (83.3%)	29 (13.9%)	1 (0.5%)	5 (2.4%)	209 (100%)	0.001
Wounds	1 (2.4%)	0(0%)	41 (97.6%)	0 (0%)	42 (100%)	
Total	396 (68.1%)	77 (14.2%)	57 (10.5%)	39 (7.2%)	542 (100%)	

Table 3: Frequency distribution of ear lesions based on patients gender, age, and clinical symptoms.

Table 3 shows the frequency distribution of ear lesions by gender; the most common lesion was cholesteatoma, polyp, and dermoid cyst. In all cases, the frequency of ear lesions was higher in males than in females, which was statistically significant with $p = 0.001$. The frequency distribution of ear lesions by age group; cholesteatoma, polyp, and dermoid cyst were the most common lesions in all age groups. However, there were no type malignancies in the age group of 1 - 19 and 20 - 29. There was one case in the age group of 30 - 39 and 2 cases in the age group of 40 - 49. Most malignancies occurred over 50 years old. The results showed a significant relationship between age group and types of middle and external ear lesions using a chi-square test and $p = 0.001$. According to table 3, which shows the frequency distribution of ear lesions according to the clinical symptoms group, the most common symptom in all cases except malignancies was Otorrhea and hearing loss. In cases of malignancy, the majority of patients were

referred with wounds and afterward with symptoms of mass sensation. According to the chi-square test and $p = 0.001$, there was a significant relationship between clinical symptoms and types of middle and external ear lesions.

Table 4 shows the frequency distribution of lesions in terms of the involved side. There were 268 cases of left-side involvement, 188 of which were related to cholesteatoma, polyp, and dermoid cysts. 32 COM cases and 30 malignancy cases included melanoma, SCC, and BCC, and 18 cases were related to other diagnoses. On the right side, there were a total of 274 cases, 181 of which were cholesteatoma, polyp, and dermoid cyst. 32 COM cases, 27 malignancy cases, and 21 other cases were raised, which were not significant according to the chi-square test and $p = 0.5$. According to table 4, which shows the frequency distribution of middle and external ear lesions by age group, most of the lesions in the external ear lesions

	Lesion site	Cholesteatoma, polyp, cyst	Chronic otitis media	BCC, SCC, Melanoma	Other	Total	p-value
Involved side							
	Right	188 (70.1%)	32 (11.9%)	30 (11.2%)	18 (6.7%)	268 (100%)	0.5
	Left	181 (66.1%)	45 (16.4%)	27 (9.9%)	21 (7.7%)	274 (100%)	
	total	396 (68.1%)	77 (14.2%)	57 (10.5%)	39 (7.2%)	542 (100%)	
Age group							
External ear lesion	1-19	10 (71.4%)	0 (0%)	0 (0%)	4 (28.6%)	14 (100%)	0.001
	20-29	19 (76%)	0 (0%)	0 (0%)	6 (24%)	25 (100%)	
	30-39	9 (81.8%)	0 (0%)	1 (9.1%)	1 (9.1%)	11 (100%)	
	40-49	10 (71.4%)	0 (0%)	2 (13.3%)	2 (13.3%)	14 (100%)	
	50-89	8 (12.2%)	0 (0%)	53 (80.3%)	5 (7.5%)	66 (100%)	
	total	130 (100%)	18 (13%)	56 (43%)	0 (0%)	56 (43%)	
Middle ear lesion	1-19	3 (4.3%)	0 (0%)	12 (16.9%)	56 (78.8%)	71 (100%)	0.7
	20-29	7 (5.7%)	0 (0%)	19 (15.3%)	98 (79%)	124 (100%)	
	30-39	5 (5.7%)	0 (0%)	14 (15.5%)	71 (78.8%)	90 (100%)	
	40-49	1 (1.9%)	0 (0%)	16 (28.5%)	39 (69.6%)	56 (100%)	
	50-89	5 (7%)	1 (1.5%)	16 (22.5%)	49 (69%)	71 (100%)	
	total	21 (5%)	1 (0.4%)	77 (18.6%)	313 (76%)	412 (100%)	
Gender							
Ear lesion	Male	39 (37.2%)	0 (0%)	56 (53.3%)	10 (9.5%)	105 (100%)	0.001
	Female	16 (66%)	0 (0%)	0 (0%)	8 (34.5%)	24 (100%)	
	total	55 (42.6%)	0 (0%)	56 (43.4%)	39 (14%)	129 (100%)	
Middle ear lesion	Male	171 (63.3%)	43 (19%)	1 (0.5%)	12 (5.2%)	227 (100%)	0.86
	Female	142 (77%)	33 (18%)	0 (0%)	9 (5%)	184 (100%)	
	Total	313 (76.1%)	76 (18.4%)	1 (0.5%)	21 (5%)	411 (100%)	
Clinical symptoms							
External ear lesion	Mass	17 (41.4%)	0 (0%)	15 (0%)	9 (37.5%)	41 (100%)	0.001
	Otorrhea	11 (84.6%)	0 (0%)	0 (5%)	2 (5%)	13 (100%)	
	Hearing loss	10 (62.5%)	0 (0%)	0 (100%)	6 (0%)	16 (100%)	
	Otorrhea and hearing loss	18 (90%)	0 (0%)	1 (5%)	1 (5%)	20 (100%)	
	Wounds	0 (0%)	0 (0%)	40 (100%)	0 (0%)	40 (100%)	
	Total	56 (43%)	0 (0%)	58 (44.6%)	18 (12.4%)	130 (100%)	
Middle ear lesion	Mass	5 (50%)	3 (30%)	0 (0%)	2 (20%)	10 (100%)	0.001
	Otorrhea	95 (72%)	34 (25.7%)	0 (0%)	3 (2.3%)	132 (100%)	
	Hearing loss	56 (70.8%)	11 (14%)	0 (0%)	12 (15.2%)	79 (100%)	
	Otorrhea and hearing loss	156 (82.5%)	29 (15.3%)	0 (0%)	4 (2.2%)	189 (100%)	
	Wounds	1 (50%)	0 (0%)	1 (50%)	0 (0%)	2 (100%)	
	Total	313 (76%)	77 (18.6%)	1 (0.4%)	21 (5%)	412 (100%)	

Table 4: Frequency distribution of benign and malignant ear lesions based on the side, age, and sex of patients.

occurred in older ages, and malignancies increased with age. There was a significant relationship with age at external ear lesions ($p = 0.001$). However, cholesteatoma, polyps, and dermoid cysts in the case of middle ear lesions were more common in the age group of 20 to 39 years old. COM was also more common in the age group of 20 to 29 years, but there was no significant relationship between age and middle ear lesions. The frequency distribution of both external and middle ear lesions by gender, all malignant external and middle ear lesions were in males. Moreover, Cholesteatoma, polyp, and dermoid cyst lesions were also more frequent in males than fe-

males. There was a significant difference between the two genders regarding external ear lesions, but there was no significant difference between the two genders in the middle ear lesions. The frequency distribution of middle and external ear lesions according to clinical symptoms; the most common symptom for external ear lesions was wound and then, Otorrhea and hearing loss. However, the most common clinical symptom was Otorrhea and hearing loss in middle lesions. External and middle ear lesions were significantly correlated with clinical symptoms considering $p > 0.05$.

	Lesion nature	Cholesteatoma, polyp, cyst	Chronic otitis media	BCC, SCC, Melanoma	Other	Total	p-value
	Benign	369 (100%)	77 (6.7%)	0 (0%)	39 (11.9%)	485 (100%)	0.001
	Malignant	57 (100%)	0 (0%)	57 (9.9%)	0 (0%)	0 (0%)	
	Total	396 (100%)	77 (100%)	57 (100%)	39 (100%)	542 (100%)	
Lesion site							
External ear lesion	Benign	56 (57%)	0 (100%)	0 (0%)	18 (0%)	74 (100%)	0.001
	Malignant	0 (0%)	0 (0%)	56 (100%)	0 (0%)	56 (43%)	
	Total	56 (100%)	0 (0%)	56 (100%)	18 (100%)	130 (100%)	
Middle ear lesion	Benign	313 (100%)	77 (100%)	0 (0%)	21 (100%)	411 (99.7%)	0.003
	Malignant	0 (0%)	0 (0%)	1 (100%)	0 (0%)	1 (0.3%)	
	Total	313 (100%)	77 (100%)	1 (100%)	39 (100%)	542 (100%)	

Table 5: Frequency distribution of benign and malignant tumors based on anatomical location.

According to table 5, which shows the frequency distribution of ear lesions in terms of the nature of the lesion (malignancy and benignity), 57 diagnosed malignancies included BCC, SCC, and melanoma. The most common benign lesions were cholesteatoma, polyps, and dermoid cysts. The frequency distribution of middle and external ear lesions in terms of the nature of the lesion (malignancy and benignity), most malignant lesions were related to the external ear, and only one malignant case was observed on the middle ear. In contrast, benign lesions mostly involved the middle ear.

Overall, the results have indicated that the frequency of middle and external ear lesions was more common in males, mostly in the age range of 20 to 39 years old. Moreover, the frequency distribution of lesions in the left side was more frequent, and cholesteatoma was the most common diagnosis. The most common symptom in this study was Otorrhea, with hearing loss. Furthermore, the most commonly observed malignancy was BCC. The results of the

present research showed that the most common lesion in both genders was cholesteatoma, polyp, and dermoid cyst. The frequency of ear lesions in all cases was higher in males than females. Besides, all malignant lesions of the external and middle ear were in males. There was a significant difference between the two genders regarding external ear lesions, but the difference regarding the middle ear lesions between the two genders was not significant. The most common lesions in all age groups were cholesteatoma, polyp and dermoid cyst, but most types of malignancy have been over the age of 50 years old. Most of the lesions in the external ear lesions occurred at older ages, and malignancies have increased with age. There was a significant relationship between age and external ear lesions, but cholesteatoma, polyp and dermoid cyst lesions were more common in the age group of 20 to 39 years old. In addition, COM was more common in the age group of 20 to 29 years old, but there was no significant relationship between age and middle ear

lesions. The most common symptom in all cases except malignancies was Otorrhea and hearing loss. In the case of external ear lesions, the most common symptom was wound and then, Otorrhea and hearing loss, while the most common symptom in the middle ear lesions was Otorrhea and hearing loss. The results of the present research showed that most of the malignant lesions were related to the external ear, and only one malignancy was observed on the middle ear, while benign lesions mostly involve the middle ear.

Discussion

This research was conducted in the form of an analytic and cross-sectional study to demographically investigate the pathologic lesions of the external and middle ear in the samples sent to the pathology ward of Shahid Sadoughi Hospital of Yazd in 2010 - 2020. In this study, 542 patients with external and middle ear pathologic lesions were evaluated.

The survey by Naeimi, *et al.* (1989) for determining the frequency distribution and comparing middle and external malignancies in terms of demographic factors and treatment modalities showed that the most common site of involvement was auricle. Also, the ear malignancies were more prevalent in males than females, so that 90% of patients with SCC and 82% of patients with BCC were male, and the mean age for BCC was higher than SCC, which was consistent with the present study [11]. The study by Johns, *et al.* (1974) aimed at evaluating the clinical and pathologic findings of 20 patients with SCC showed that the prognosis of these patients is poor due to progression at the time of diagnosis. In this study, it was also mentioned that it is necessary to evaluate histopathology and classify patients with chronic otitis media due to the lack of timely diagnosis of these patients. The prevalence of the disease was also higher in males, and the mean age of the patients was often in the 5's and 6's decade, which is consistent with this study [13]. The study by Hosokawa, *et al.* (2014) aimed at examining the clinical and pathologic findings of external ear carcinomas, showed that the external ear was more frequently involved in SCC than other malignancies and prognosis was significantly weaker than the others. In contrast, BCC was the most common malignancy in the present study [6]. The results of Chole, *et al.* (2009) showed that cholesteatoma was the most common middle ear lesion among patients. According to the present study, most of the malignancies were related to the external ear, which was reported more in males and the elderly. However, unlike the present study, SCC was the most common malignancy [14]. The results of Javadi, *et al.* who ex-

amined the pathology of 100 patients with middle ear lesions, were in line with this study, and most of the patients had clinical symptoms of Otorrhea and hearing loss [15]. Pathologically, granulation tissue was the most common lesion and then tympanosclerosis and cholesteatoma, respectively, which were different from the present study. Similar to the present study, the highest frequency was in the age group of 20 to 39, but patients over the age of 50 were not included in the study by Javadi, *et al.* In some studies, such as Javadi, *et al.* the most common lesion of the middle ear was granulation tissue whose frequency was varied from 86% in Javadi's study to 97.4% in Rosita, *et al* [16]. This difference is probably due to the review method and prospective and retrospective follow-up time for patients because chronic diseases of the ear can lead to complications. Reviewing the previous studies revealed that the relationship between clinical symptoms and types of ear lesions was investigated in a few studies, which is one of the positive points of this study. In fact, patients' clinical symptoms can be an essential finding in diagnosing the type of lesion. The present study results showed that patients referring to hospitals with wound complaints had malignant processes in all cases and patients with other complaints, such as otorrhea and hearing loss, have benign lesions in most cases. However, malignancy of otorrhea and hearing loss have been observed in some cases.

Conclusion

The present research results indicated a significant relationship between types of external and middle ear lesions with age, gender, clinical symptoms, and nature of the lesion in terms of malignancy and benignity. The majority of malignant lesions are in males over 50 years old. In addition, benign lesions such as cholesteatoma were the most common lesions of the middle ear, often observed on the left side. Moreover, the majority of people with cholesteatoma were between 20 and 39 years old. Regarding the clinical symptoms in this research, it can be argued that attention to clinical symptoms in most cases can play a significant role in the diagnosis process. Most patients with benign lesions had otorrhea and hearing loss, while all malignant patients had wound.

Conflict of Interest

There is no conflict of interest.

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