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The Incidence of Parotid Gland Malignancy among Patients Who Underwent Surgery for Aberrantly Benign Lesions

Conflict of interest: nothing to declare.

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Ethics statement. All the enrolled patients were entirely oriented and comprehend the topic issue and its value, and verbal consent had been recruited from the patients before participation. The official endorsement was obtained from the Basrah Health Directorate on carrying out this study.

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Abstract

Introduction. Benign parotid tumors have a minor risk for malignant transformation. Parotid gland tumors account for almost 70% of all salivary gland tumors and over 85% of them are benign, since 80% of these benign tumors are pleomorphic adenomas.

Purpose. Determination of the incidence of parotid tumors in Iraq and the percentage of malignant cases.

Materials and methods. A randomized prospective cross-sectional study had been conducted from January 2017 to July 2022, on 41 patients. Data including; increase in mass size, painful mass, a heterogeneous picture on imaging techniques, and atypical findings on fine needle aspiration (FNA). The biopsy was examined by two expert histopathologists.

Results. The present study included 41 cases with a mean age of 47.51 ± 14.81 years, more than half of the cases were female 23 (56.1%). Most of the cases were from rural areas 24 (58.6%). And the majority of the cases had no family history of malignancy 29 (70.7%). However, nearly half of the cases were non-smokers 21 (51.2%). Meanwhile, the majority of the cases had a benign biopsy 39 (95.1%) while only 2 (4.9%) cases had malignant biopsy results. Features like increasing the size of the mass (70.73%) while only (29.27%) presented with pain, and most of these cases presented with less than 5 years (60.97%) while those who presented between 5 and 10 years in only (39.03%). However, postoperatively, the majority of patients suffered from numbness 27 (65.9%) followed by mouth deviation during laughing 2 (4.9%). Regarding the fine needle aspiration results of the patients; 80.48% of the patients recorded pleomorphic adenoma features, while 9.76% presented with atypical adenoma and Warthin's tumors.

Conclusion. Female gender, middle age, positive family history and smokers are frequent features of parotid gland tumors. Postoperative complications include seroma, hematoma

and facial neuropathy are recorded. Benign lesions are the most common pattern of parotid tumor than malignant. Enlarge size of the mass and chronic pain could be signs of malignancy of parotid gland tumors. Most common histology of parotid tumor is pleomorphic adenoma.

Keywords: parotid gland malignancy, atypical adenoma, benign parotid tumors, pleomorphic adenoma, head and neck mass, Warthin's tumors

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Частота встречаемости злокачественных новообразований околоушной слюнной железы у пациентов, перенесших хирургическое вмешательство по поводу патологических доброкачественных образований

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Этическое заявление. Все включенные пациенты были проинформированы о сути исследования и понимали его ценность, перед включением от них были получены устные согласия. Официальное одобрение на проведение исследования было получено от Управления здравоохранения Басры.

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Резюме

Введение. Доброкачественные опухоли околоушной слюнной железы характеризуются незначительным риском злокачественного перерождения. Опухоли околоушной слюнной железы составляют почти 70% всех опухолей слюнных желез, и более 85% из них являются доброкачественными, поскольку 80% этих доброкачественных опухолей представляют собой плеоморфные аденомы.

Цель. Определение частоты встречаемости опухолей околоушной слюнной железы в Ираке и процента пациентов со злокачественными новообразованиями.

Материалы и методы. Рандомизированное контролируемое перекрестное исследование проводилось с января 2017 года по июль 2022 года. В исследовании принял участие 41 пациент. Данные исследования включали: увеличение размеров образования, болезненность, неоднородность картины при визуализации и атипичные результаты тонкоигольной аспирационной биопсии (FNA). Исследование биоптатов выполняли два специалиста-гистопатолога.



Результаты. В данном исследовании участвовал 41 пациент. Средний возраст пациентов составил $47,51 \pm 14,81$ года, более половины пациентов были лицами женского пола (23 (56,1%) испытуемых). Большинство пациентов были из сельской местности (24 (58,6%) испытуемых). У большей части пациентов не было случаев злокачественных новообразований в семейной истории болезни (29 (70,7%) испытуемых). При этом почти половина пациентов не курили (21 (51,2%) испытуемый). В большинстве случаев результаты биопсии показали доброкачественные новообразования (у 39 (95,1%) испытуемых), и только в 2 случаях (4,9%) новообразования были злокачественными. Увеличение размера новообразований выявлено у 70,73% пациентов, болевые ощущения отмечены у 29,27% испытуемых. Давность заболевания в большинстве случаев не превышала 5 лет (60,97%), в то время как количество пациентов, имевших давность заболевания от 5 до 10 лет, составило всего 39,03%. После хирургического вмешательства большая часть пациентов ощущала онемение (27 (65,9%) испытуемых), а также искривление рта во время смеха (2 (4,9%) испытуемых). Что касается результатов тонкоигольной аспирационной биопсии, то у 80,48% пациентов были выявлены признаки плеоморфной аденомы, а у 9,76% – атипичная аденома и бронхиогенная аденома (опухоль Уортина).

Заключение. Основными факторами риска развития опухолей околоушной слюнной железы являются женский пол, средний возраст, случаи заболевания среди родственников и курение. Послеоперационные осложнения проявляются серомами, гематомами и параличом мышц лица. Доброкачественные новообразования встречаются чаще злокачественных. Увеличение размеров новообразований и постоянная боль могут быть признаками злокачественной опухоли околоушной слюнной железы. Наиболее частой гистологической формой опухоли околоушной слюнной железы является плеоморфная аденома.

Ключевые слова: злокачественное новообразование околоушной слюнной железы, атипичная аденома, доброкачественные новообразования околоушной слюнной железы, плеоморфная аденома, новообразования в области головы и шеи, опухоли Уортина

■ INTRODUCTION

Parotid gland tumors account for almost 70% of all salivary gland tumors, and over 85% of them are benign, furthermore, 80% of these benign tumors are pleomorphic adenomas, primarily on their superficial lobe [1]. The third to sixth decades are the most often affected age groups, with a clear female predominance [1, 2]. These tumors often have a slow-growing, painless mass that ranges in diameter from 2 to 6 cm² when removed. In 4% of cases, tumors might be cancerous [3]. Histopathological findings include a bosselated surface, frequently with protrusions that resemble tongues (pseudopods) [4].

Malignant transformation is a risk that can range from 5–15% increase over time, is more common in older people [5, 6], and is related to the length of time the lesion has been present (1.5% in the first five years, 9.5% after 15 years) [2]. The clinical big size and the medical history of diagnostic or therapeutic radiation are additional determining criteria [7]. Adipose metaplasia, osseous metaplasia, squamous metaplasia (with keratinization), sebaceous metaplasia and mucinous metaplasia are only a few examples

of the metaplastic alterations that observed [8, 9]. Hyperchromasia, clumped chromatin, high nucleus-to-cytoplasm ratio, and necrotic background may be noticed [10].

The frequent benign salivary gland tumor is Warthin's tumors, which described as cystadenoma lymphomatous, is virtually always seen in the parotid [5, 11]. Warthin tumors are made up of a lymphoid stroma with germinal centers and varied amounts of papillary-cystic structures lined by oncocytic epithelial cells [12].

Undifferentiated carcinoma, mucoepidermoid carcinoma, squamous cell carcinoma, oncocytic adenocarcinoma, and adenocarcinoma can all result from the malignant transition, despite the fact that it is incredibly rare [13]. The Warthin's tumor is unique in that it frequently develop synchronous multiple tumors; mucoepidermoid carcinoma is the most common combination [14–16].

Mucoepidermoid carcinoma is the most prevalent malignant salivary gland neoplasm, representing 10% of all salivary gland tumors and 30% of all salivary gland cancers [17]. The WHO 2005 and 2017 classified mucoepidermoid carcinoma as a cancerous glandular epithelial tumor with columnar, clear cell, and oncocytoid characteristics based on its various clinical and histological characteristics [18]. According to numerous research, which suggest a female preference [19]. Mucoepidermoid carcinoma has a 50% 5-year survival rate, which rises to 90% to 100% in cases with low malignancy grade and 26% in situations of high-grade malignancy, while the 5-year survival rate of pleomorphic adenoma and Warthin's tumors were 90% and 80% respectively [20, 21].

■ PURPOSE OF THE STUDY

To determine the incidence of parotid tumors in their region and the percentage of malignant cases.

To the best of our knowledge, this is the first study that include such a number of patients to estimate the status of parotid tumors in Iraq.

■ MATERIALS AND METHODS

Study design and setting

A randomized prospective cross-sectional study had been conducted from January 2017 to July 2022, on 41 patients who attended the General Surgical Department at Al-Sader Teaching Hospital and the private clinic- Al-Saadi Private Hospital.

Inclusion criteria:

- Increase size of mass;
- Painful mass;
- Heterogeneous picture on imaging techniques;
- Atypical findings on fine needle aspiration (FNA).

Exclusion criteria:

All patients with benign lesions and have no malignant features were excluded from the study.

Sample size

A simple random sampling technique was applied to enroll (41 patients) in the current study, and it was assisted by Epi Info™ 7.2.5.0 a recommended program of CDC.

Preoperative preparation

All patients who were included in this study were well prepared before the operative day. A detailed history, meticulous examination, and accurate investigations had been done for the patients as hematological, biochemical, serological, immunological, and virological tests. An enhanced recovery program had been established 24 hours before the day of operation, and prophylactic antibiotics had been administered. All patients underwent preoperative FNA biopsies. All cases were investigated by frequent neck ultrasound examination.

Postoperative period

Patient was kept on a post-operative fluid regimen (the first 24 hour) and intravenous antibiotics for two days followed by oral antibiotics for four days. The biopsy was examined by two expert histopathologists, and the results were obtained accordingly.

Statistical analysis

This was done using (SPSS Inc. 26). The categorical data were presented as numbers and percentages, while the continuous data were presented as mean $\pm$ SD.

RESULTS

The present study included 41 cases with a mean age of 47.51 ± 14.81 years and median 53 years. More than half of the cases were female 23 (56.1%) compared to males 18 (43.9%). Additionally, most of the cases were from rural areas 24 (58.6%). The study also revealed that the majority of the cases had no family history of cancer 29 (70.7%) while, only 12 (29.3%) case had a positive family history. Nearly half of the cases were non-smokers 21 (51.2%) and about 20 (48.8%) were smokers (Table 1).

In relation to postoperative complications, the majority suffered from numbness 27 (65.9%) followed by mouth deviation 2 (4.9%). Moreover, a radiovac drain was used in only 10 (24.4%) cases and most of the cases developed seroma 12 (29.3%), and only 1 (2.4%) case suffered from hematoma at the site of the incision (Fig. 1).

Table 1
Basic features of the studies cases

Variables		No.	%
Age (years)	Mean $\pm$ SD	47.51 $\pm$ 14.81	
	Median	53.0	
	Minimum	16	
	Maximum	68	
	Range	52	
Gender	Male	18	43.9
	Female	23	56.1
Address	Urban	17	41.5
	Rural	24	58.5
Family history of malignancy	Present	12	29.3
	Absent	29	70.7
Smoking history	Smoker	20	48.8
	Non-smoker	21	51.2

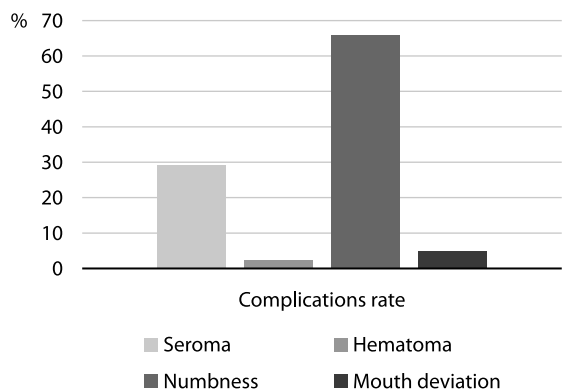


Fig. 1. Pie chart illustrated the rates of complications

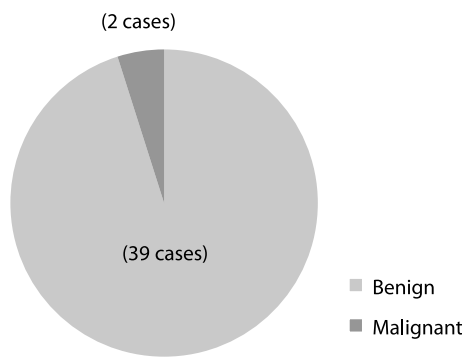


Fig. 2. Pie chart illustrated the rates of histopathological findings

Table 2
Clinical related data of the studies cases

Variables		No.	%
Symptoms at presentation	Enlarge size	29	70.73
	Pain	12	29.27
Duration of mass	<5 years	25	60.97
	5–10 years	16	39.03
Biopsy	FNA	37	90.24
	True cut biopsy	4	9.76
	None	0	0
Stage	I–II	40	97.56
	III and IV	1	2.44

The study showed that the majority of the cases had a benign pattern 39 (95.1%) while only 2 (4.9%) cases had malignant biopsies (Fig. 2).

It worthy to note, that most of the cases presented with enlarge size of the mass (70.73%) while only (29.27%) presented with pain. Most of cases presented with less than

Table 3
Preoperative FNAC findings of the patients enrolled in

Variables	No.	%
Atypical cells	4	9.76
Pleomorphic adenoma	33	80.48
Warthin tumor	4	9.76

Table 4
Preoperative assessment of patients by neck ultrasound

Variables	No.	%
Enlarge LN	35	85.36
Shape	Oval	58.53
	Round	41.47
Echogenicity	Homogeneous	48.78
	Heterogeneous	29.27
	Mixed	21.95
No necrosis	40	97.56
Central hilar	38	92.68

5 years (60.97%) while those who presented between 5–10 years were (39.03%). FNA was done in 90.24% and true cut biopsy done in 9.76%. In relation to disease stages, stage I–II was presented in 97.56% and only one case (2.44%) was stage III since tumors of intermediate and high malignancy require combined treatment (Table 2).

Regarding the FNA results, 80.48% of pleomorphic adenoma, while 9.76% with atypical adenoma and Warthin tumor (Table 3).

Table 4 showed the findings of neck ultrasound of LN. Enlargement of LN recorded in 35 (85.36%) of cases. Oval-shape LN found in 58.53% and round-shape in 41.47%. Homogeneous LN reported in 48.78% and heterogeneous in 29.27%. No necrosis documented in 97.56% of cases. Central hilum found in 92.68%.

■ DISCUSSION

All the cases in this study referred to our center complaining of primary benign parotid tumors with an indication of surgery and no evidence of malignant disease before the surgery were recorded, however, previous researches into parotid malignant progression has been considerable [22–24]. However, most of these researches lacked appropriate comparison groups as they investigated the temporal development or biological transformation of benign to malignant parotid tumors.

In this scenario, benign tumors with a long incubation time may develop into cancerous ones. Based on this fact, Choi et al., in their study found that throughout longer incubation times (more than 5 years), primary tumors had a higher probability of becoming cancerous [25].

The two cases with cancer gave a history of rapid increase in size and new pain episodes which is consistence with malignant pattern [26]. Specifically, mucoepidermoid carcinoma usually associated with these symptoms, interestingly [27], the tow discovered cases in the present study were mucoepidermoid carcinoma.

Facial nerve dysfunction is the most common postoperative complication found after parotid surgery and the reported prevalence is 18 to 27% in previous published studies [28, 29]. In our sample, majority of patients experienced temporary or persistent facial nerve dysfunction (65.9% paresthesia and 4.9% mouth deviation), with total parotidectomy being the most widely used treatment.

Prevalence of post-parotidectomy residual seroma varies widely in the literature from 3–24% of patients, regardless of drain placement at the end of the parotidectomy [30]. In the present study, a radovac drain was used in only 10 (24.4%) cases and most of the patients who didn't have a drain developed seroma 12 (29.3%).

According to Marchese-Ragona et al., hematoma is uncommon and usually related to inadequate hemostasis at the time of the surgical procedure [31]. Interestingly, in the present study, only 1 (2.4%) case suffered from hematoma at the site of the incision.

Enlargement of LN recorded in 35 (85.36%) of cases. Oval-shape LN found in 58.53% and round-shape in 41.47%. Homogeneous LN reported in 48.78% and heterogeneous in 29.27%. No necrosis documented in 97.56% of cases. Central hilum found in 92.68%. These features mostly of benign nature, however further studies must be conduct to estimate the data for such pattern.

In future we recommend to conduct study to describe the patterns of transformation of benign tumor of parotid gland to malignant. A synchronous benign and malignant parotid gland tumor should be removed in order to draw the conclusion that Warthin's tumor has undergone a malignant change. Additionally, some components must be visible in the histologic study, such as infiltrating growths in the surrounding lymphoid tissue or transitional zones between benign oncocytic and malignant cells [14].

This study, it is the first study in Iraq that deal with the subject and it include a relatedly good number of cases in comparison to other studies on the same subject.

The study has several limitations, it is a single-center study, therefore, generalization of the results to all communities maybe not be fully accepted. Secondly, there were no specific centers for salivary gland diseases in our locality making the collection of cases difficult.

■ CONCLUSION

Female gender, middle age, positive family history and smokers are frequent features of parotid gland tumors. Postoperative complications include seroma, hematoma and facial neuropathy are recorded. Benign lesions are the most common pattern of parotid tumor than malignant. Enlarge size of the mass and chronic pain could be signs of malignancy of parotid gland tumors. Most common histology of parotid tumor is pleomorphic adenoma. The tendency for malignant transformation raise with time and must be in the future discuss.

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