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An Overview on Parotid Gland Masses: Surgical Experiences

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Abstract

Background: The aim of the research was to review the clinical diagnosis, radiological examination, surgical method, and histopathological results of the patients who were operated due to the diagnosis of parotid gland mass in accordance with the literature.

Methods: Diagnosis, complaints and radiological examination and pre- and post-operative histopathological results of the patients, and surgical methods were retrospectively assessed between November 2013 and December 2018. Post-operative recurrence and exitus statuses of the patients were recorded.

Results: In our clinic, a total of 184 patients, 101 male and 83 female patients, were assessed with the diagnosis of a parotid gland mass. Of the patients, 151 underwent superficial parotidectomy, 33 underwent total parotidectomy and neck dissection. The sensitivity was 87.9% and the specificity was 93.6% in the FNAB benign/malignant discrimination. Of the 151 patients who had benign cytology and 33 patients who had malignant pathology.

Conclusion: The frozen section should be used for imaging methods for the diagnosis of malignant parotid gland masses, malignancy suspicion or during surgery after FNAB. Surgery should be expanded according to the frozen section results and radiotherapy should be planned based on histopathology results after total parotidectomy and neck dissection.

Keywords: Parotid masses; parotid tumors; parotidectomy; pleomorphic adenoma

Introduction

Salivary gland tumors are the masses that are frequently seen between the ages of 20-60 years and that constitute 3-12% of head neck cancers and 2-3% of all body tumors. 85% of these tumors develop in parotid glands, 10% in submandibular glands, and 5% in minor salivary glands. Most of the parotid gland tumors originate from duct epithelium and acinar epithelium and the first and most important symptom during palpation is the localized painless mobile mass in the tail of the gland.[1-3] Pain or facial nerve palsy or paralysis are the symptoms that are mostly seen in malignant neoplasms. Malignant parotid tumors are rigid, sensitive, fast-growing masses that are fixed on the skin or other surrounding tissues. 40% of these patients have an involved branch in the facial nerve.[4] Malignant tumors are involved in the upper pole and deep lobe of the gland more frequently. In the differential diagnosis, anamnesis, detailed head and neck examination, ultrasonography (US), computerized tomography (CT), magnetic resonance (MR) imaging are utilized. The final diagnosis is established by histopathological examination.[5,6] Except in special cases in salivary gland tumors (benign or malignant), open biopsy (incisional or excisional) is contraindicated since it will lead to the inoculation of tumor cells to the surrounding tissues and tumor recurrence. An incisional biopsy can be performed only for inoperable cases and tumors that are infiltrated to the skin, on which a previous biopsy, to determine palliative treatment. Gold standard Fine needle Aspiration Biopsy (FNAB) is implemented for preoperative cytological diagnosis. Since the sensitivity of FNAB is 54-96% and specificity is 84-100%, it is preoperatively useful. No complications such as infection, facial nerve damage or tumor inoculation have been reported for FNAB. The frozen examination is an intraoperative method that gives more accurate results than FNAB and that can change the course of the operation when needed. Its specificity on detection, typing, and staging of malignancy is 85-90% and the specificity is 96%. However, the final diagnosis for the tumor can be established by the pathological examination of the surgical specimen.[4-7]

There is no classification system that is clinically accepted for salivary gland tumors. Therefore, clinicians have classified malignancy as low-grade and high-grade malignancies. Generally, the probability of having a palpable cervical lymph node during a consultation in parotid cancers has been reported to be 12-30%. The rate of occult metastasis in N0 necks is 12-50% clinically; however, this rate varies based on histological type and tumor stage. Distant metastasis rate in parotid gland malignant tumors is 42% and it is most commonly seen in adenoid cystic carcinoma. Mucoepidermoid carcinoma is frequently seen but distant metastasis occurs rarely (9%). Tumors that metastasize to parotid glands are malignant melanoma by 46%, squamous cell carcinoma by 37%, respectively. In addition, renal cell carcinoma metastasis may occur rarely. 5-year survival rates vary between 11 and 15%. [3-7]

In the present study, it was aimed to review the clinical diagnosis, radiological examination, surgical method, and histopathological results of the patients who were operated due to the diagnosis of parotid gland mass in accordance with the literature.

Methods

184 patients who applied to our clinic between November 2013 and December 2018 with the complaint of a mass in the parotid gland were assessed retrospectively in terms of diagnosis, complaints and imaging methods, FNAB, and implemented surgical methods. All patients underwent head-neck examination preoperatively and were examined with FNAB, US, CT, and MRI. A preoperative frozen examination was conducted in patients with malignancy suspicion. The specimens were examined by the pathology department and histopathological diagnosis of the tumor, differentiation degree, the presence of a tumor in the surgical margins, vascular/muscle/nerve invasion and lymph node involvement in the patient who underwent neck dissection were examined. Recurrence and ex statuses of the patients were recorded. Cystic and infectious cases in the mass diagnosis were excluded from the study.

The approval of the ethics committee of the study was obtained from the Ethics Committee of Izmir University of Health Sciences Tepecik Training and Research Hospital. Institutional guidelines for retrospective studies acclaimed by the institutional review board were the baseline for the research. Due to the retrospective nature of the study, informed consent form was not obtained from the participants. For the statistical analysis, the SPSS (Windows 22.0) was used. In the analysis of the data, the descriptive information about the patients included in the study was given as number, percentage distribution and average.

Results

A total of 184 patients were operated. Of these patients, 101(54%) were male and 83(46%) were female. The mean age of the patients was 47.4(19-82) years. Under general anesthesia, superficial parotidectomy was performed on 151(82%) patients and total parotidectomy + neck dissection 33(18%) patients.

Following the classification of tumors as benign and malignant, 96% of the masses were mobile in benign tumors and 93.9% of the masses were rigid and fixed in malignant tumors. The distribution of patients' symptoms is presented in Table 1.

In the benign-malignant discrimination of parotid tumors, the sensitivity and specificity of FNAB was 87.9% and 93.6%, respectively. Of the 151(82%) patients with surgical pathology of benign cytology, 81(53.7%) were assessed as pleomorphic adenoma (Figure 1), 58(38.5%) as Warthin tumor, 6(3.9%) as monomorphic adenoma, 4(2.6%) as oxyphil adenoma, and 2(1.3%) as non-specific lymphadenopathy (Table 2). Of the 33(17%) patients reported as malignant pathology, 9(27.2%) had low-grade mucoepidermoid carcinoma (Figure 2), 5(15.1%) had high-grade mucoepidermoid carcinoma, 5 (15.1%) had squamous cell carcinoma, 4(12.1%) had acinic cell carcinoma, 3 (9.1%) had carcinoma ex pleomorphic adenoma, 3(9.1%) had adenocarcinoma, 2(6.1%) had lymphoepithelioma, 1(3.1%) had ductus carcinoma, and 1(3.1%) had renal cell carcinoma metastasis (Table 3).

Due to tumor diffuseness, it was considered necessary to perform a frozen examination for 9 patients during surgery. Surgical margins were intact in 3 patients. In 4 patients, diffuseness was reported in surgical margins and more expanded surgical procedures were performed. Of 33 patients with malignant tumors, 26(76.8%) had lymph node metastasis. The other 13(42.4%) patients who were diagnosed with metastatic renal cell carcinoma and malignancy received postoperative radiotherapy. The mean follow-up period of the patients was 36 ± 13 months (minimum 9 maximum 47 months). 3(9.09%) patients with malignant pathology had exitus due to advanced tumor diffuseness within postoperative 2 years.
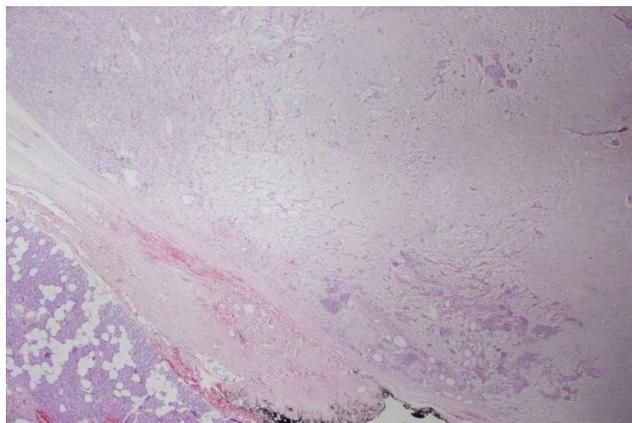

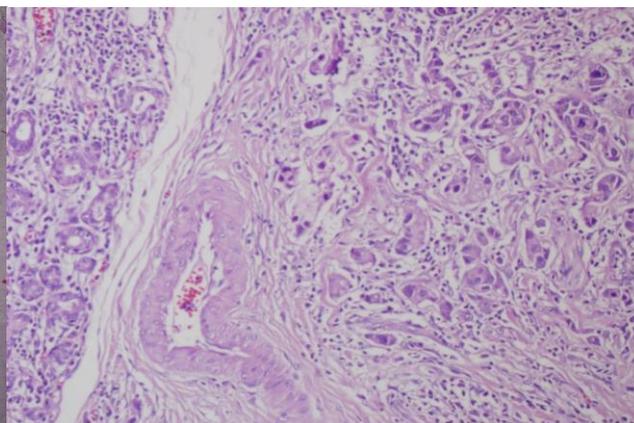**Figure 1. Histopathological appearance of pleomorphic adenoma. (H&Ex200).**

Figure 2. Histopathological appearance of low-grade mucoepidermoid carcinoma. (H&Ex200).

Table 1: Distribution of clinical symptoms of patients

Symptoms	Benign	%	Malign	%
Mobile mass	151	100	2	6.1
Hard mass	-	-	31	93.9
Fixed mass	-	-	26	78.7
Palpable mass (neck)	12	7.9	25	75.7
Painful mass	3	1.9	19	57.5
Fast growing	-	-	14	42.4
Facial paralysis	-	-	9	27.7

Table 2: Distribution of patients with benign parotid tumors.

Benign parotid tumors	n	%
Pleomorphic adenoma	81	53.7
Whartin tumor	58	38.5
Monomorphic adenoma	6	3.9
Oncocytoma	4	2.6
Nonspecific LAP	2	1.3
total	151	100

Table 3: Distribution of patients with malign parotid tumors.

Malign parotid tumors	n	%
Low-grade mucoepidermoid carcinoma	9	27.2
High-grade mucoepidermoid carcinoma	5	15.1
Squamous cell carcinoma	5	15.1
Acinic cell carcinoma	4	12.1
Carcinoma ex pleomorphic adenoma	3	9.1
Adenocarcinoma	3	9.1
Lymphoepithelioma	2	6.1
Ductal carcinoma	1	3.1
Metastasis (Renal Cell Carcinoma)	1	3.1
Total	33	100

Discussion

Salivary gland tumors constitute 1-2% of all body tumors and 5% of head-neck tumors. 80-85% of these tumors are seen in parotid glands. Until proven otherwise, a preauricular and infraauricular mass should be considered as a tumor.[1,2]

Sex ratio in parotid tumors is often reported as equal; however, there are different results in the literature. [1-4] In our study, the number of male patients was higher with a ratio of 54% (101).

Parotid tumors can be seen at almost any age; however, benign tumors are mostly seen in young individuals and malignant tumors are mostly seen in elderly individuals. Generally, salivary gland tumors are more frequently seen in women over the age of 45 years. [5-7] In the study conducted by Spiro et al.,[2] it was reported that 90% of the cases were between the age of 50-60 years. In our study, the oldest patient was 82 years old; the youngest patient was 19 years old; the mean age was 41 years for benign tumors and 49 years for malignant tumors. The highest ratio was observed in patients between the age of 31-40 years by 29.2% and this finding is similar to those in the literature.

Benign tumors are often mobile, semi-rigid, painless, and slow-growing masses. Malignant tumors, on the other hand, frequently show fixation, are rigid, and in some cases, are painful and fast-growing masses. Benign tumors may remain asymptomatic for a long time in the patient, but the patient may consult a physician due to facial asymmetry. [2-5] In the study conducted by Dunn et al.,[8] 41% of benign tumors and 61% of malignant tumors were diagnosed within one year following the diagnosis of first symptoms. In the same study, the mean latency in diagnosis was found to be 2 years for

benign tumors and 6 months for malignant tumors. 28 (43%) of our patients were diagnosed within one year. The earliest diagnosis was an 8-month adenocarcinoma case and the latest diagnosis was a 2-year pleomorphic adenoma case.

In patients with parotid tumors, pain occurs due to inflammation in benign tumors and to inflammation or neural invasion in malignant tumors. In parotid masses, facial nerve paralysis is a symptom of malignancy. In the literature, facial paralysis has been reported to be rare in benign tumors. [5-8] Spiro[2] reported the incidence of facial nerve involvement as 12-14% in patients with a malignant parotid tumor and also showed that the diagnosis of the histopathological tumor has an effect on facial paralysis. Accordingly, the highest risk of facial nerve involvement was reported to be in adenocystic carcinoma and undifferential carcinoma. In particular, the fact that pleomorphic adenomas cause pain and facial paralysis over time gives rise to the thought of carcinoma ex pleomorphic adenoma. In the study conducted by Kashiwagi et al.[9] with 10 patients, it was stated that more attention should be paid in the case of progression, pain, and facial paralysis in slow-growing parotid mass. In the study conducted by Wierzbicka et al.[10] with 103 patients with malignant parotid tumor, facial nerve involvement was diagnosed in 32 patients. In our study, facial paralysis was diagnosed in a total of 9 (27.2%) patients: 3 patients with high-grade mucoepidermoid carcinoma, 2 patients with adenocarcinoma, 2 patients with carcinoma ex pleomorphic adenoma, 1 patient with acinic cell carcinoma, 1 patient with low-differentiated squamous cell carcinoma which was accepted inoperable due to extracapsular diffuseness and distant metastasis.

In the past 30 years, FNAB has been the gold standard in the diagnosis of salivary gland tumors. When the literature was examined, it was seen that the sensitivity and specificity of FNAB are quite high. The sensitivity and specificity of FNAB in benign-malignant discrimination have been reported as 93.3-95.7% and 98-100%, respectively. The success of establishing the final pathology is not as high as the success of benign-malignant discrimination. In our study, the sensitivity and specificity of FNAB in benign malignant discrimination of parotid tumors were 87.9% and 93.6%, respectively and was lower than those reported in the literature. [11-14] The experience of the pathologist on FNAB plays an important role in the sensitivity and specificity values. For instance, the frozen section was performed for two patients with preoperative FNAB pleomorphic adenoma during the surgery and the pathology resulted in adenoid cystic carcinoma and mucoepidermoid carcinoma (T1N0Mx). These patients underwent total parotidectomy and neck dissection and the patient diagnosed with adenoid cystic carcinoma received postoperative radiotherapy. This patient has been followed up for 24 months and no locoregional recurrence and distant metastasis were diagnosed.

In parotid tumors, the diagnosis is tried to be established through anamnesis, physical examination, and radiological examinations; however, the final diagnosis can only be made by histopathological examination of the specimen. In the study conducted by Poulsen et al.,[15] histopathological distribution of parotid tumors was reported as pleomorphic adenoma by 51%, Warthin tumor by 27.5%, adenocystic carcinoma, and adenocarcinoma by 2.8%. In the study conducted by Bussu et al.[16] with 470 patients, parotid tumors were reported as pleomorphic adenoma by 49%, Warthin tumor by 40%, benign lymph node by 6%, monomorphic adenoma by 5%. In our study, parotid tumors were diagnosed as pleomorphic adenoma by 53.7%, Warthin tumor by 38.5%, basaloid monomorphic adenoma by 3.9%, and 'oxyphil adenoma by 2.6%. In the literature, mucoepidermoid carcinoma is the most frequently encountered malignant tumor in the parotid gland. [17-19] In our study, the histopathology of 14 (42.3%) malignant tumors was reported as mucoepidermoid carcinoma and this finding was consistent with the literature.

The mean follow-up period of patients with primary parotid tumors was 36 ± 13 months (minimum 9 months, maximum 47 months). No recurrence was seen in patients with benign parotid tumors who underwent superficial parotidectomy. This result indicates that superficial parotidectomy is an effective surgical technique in benign parotid tumors and is consistent with the literature. [20-25] In malignant tumor cases, total parotidectomy was performed and neck dissection and postoperative radiotherapy were added to the treatment. Recurrence was seen in 3 (9%) patients with a malignant tumor.

Conclusion

Preoperative FNAB is an effective diagnostic method in benign-malignant discrimination of parotid gland tumors. Superficial parotidectomy is a sufficient and effective method in benign parotid tumors and has a quite low complication ratio. In malignant tumors, superficial, total or radical parotidectomy should be performed and, if necessary, neck dissection and postoperative radiotherapy should be added to the treatment.

Author contributions

MG conceived of the study and participated in its design and coordination as well as helped to draft the manuscript; also read and approved the final manuscript. Also, MG participated in its design, manuscript draft, also read and approved the final manuscripts.

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Conflict of interest

All authors declare that they have no conflict of interest.

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