ABSTRACT

Background: While salivary gland tumors constitute 5-6% of all head and neck tumors, they constitute 2.3% of all trunk tumors. About 3.8 per 100,000 of parotid tumors are diagnosed in the US each year, about 1300 to 1600 cases. The salivary gland cancer rate is 0.9 per 10000. The frequency of salivary gland tumors varies according to localization.

Objective: In our study, we aimed to evaluate retrospectively the histopathological results, incidence, surgical treatment modalities and complications of parotid tumors operated in our clinic.

Methods: We examined the patients who were operated for parotid gland tumor. The files of 136 patients who were admitted to the Otorhinolaryngology department of Dicle University Medical Faculty Hospital between January 2010 and April 2020 due to a parotid mass and underwent parotidectomy and whose pathology results were reported as benign or malignant parotid tumors were retrospectively scanned and included in the study. Patients’ age, gender, FNAB cytology result, type of surgery, histopathological results after surgery and complications after surgical treatment were recorded.

Results: A total of 136 patients, 73 (53.7%) male and 63 (46.3%) female, were included in the study. The mean age of the patients was 48.26±17.37 (min=14, max=83) years. Superficial parotidectomy was performed in 108 (79.4%) patients and total parotidectomy was performed in 28 (20.6%) patients. According to the histopathological results after surgery, 108 (79.4%) benign tumors and 28 (20.6%) malignant tumors were diagnosed. Accordingly, pleomorphic adenoma (47.8%) was the second most common with 65 patients, followed by Whartin tumor (25.7%) with 35 patients. The sensitivity (sensitivity) of FNAB was 85.2%, and the specificity (specificity) was 96.2%. The accuracy of FNAB was found to be 94.0%.

Conclusion: Good identification of the parotid mass preoperatively, together with both FNAB and radiological imaging methods, gains much more value in differentiating malignant and benign pathologies. While superficial parotidectomy is mostly sufficient in benign tumors, total parotidectomy-radical parotidectomy in malignant tumors and neck dissection should be considered in high-grade tumors even if there is no neck metastasis. Patients should be evaluated for RT and CT according to the tumor type after surgery.

Keywords: parotid gland tumors, parotidectomy, pleomorphic adenoma.

1. BACKGROUND

While salivary gland tumors constitute 5-6% of all head and neck tumors, they constitute 2-3% of all trunk tumors. About 3.8 per 100,000 of parotid tumors are diagnosed in the US each year, about 1300 to 1600 cases. The salivary gland cancer rate is 0.9 per 10000 (1). The frequency of salivary gland tumors varies according to localization. While 70-85% are located in the parotid, 10-15% are located in the submandibular gland and 5-10% are located in the minor salivary glands (2). While 80% of parotid tumors are considered benign, 80% are seen as pleomorphic adenomas. Whartin tumor is the second most common benign tumor (3). The most common malignant tumor of the parotid gland is mucoepidermoid cancer, which accounts for approximately 30-35% of all malignant salivary gland tumors. The incidence of benign parotid tumors starts at the age of 15 to 25 and peaks at the age of 65 to 74 years, while the mean age of malignant salivary glands is 56, between 50 and 70 years and male dominance is more prominent (4).

It is important not to ignore the malignancy in the preoperative evaluation of the parotid mass. Generally, CT (Computed Tomography) or MRI (Magnetic Resonance Imaging) may be considered for any parotid mass. CT provides excellent resolution for assessing tumor location, size, extent, and lymph nodes if malignancy is suspected. FNAB (Fine Needle Aspiration Bi-
opsy) is an accurate and inexpensive method with low complication rates to differentiate benign and malignant lesions. Although the sensitivity and specificity vary, the positive predictive value (PPV) and negative predictive value (NPV) are around 90% and 94%, respectively (5). However, the place of FNAB in the diagnosis of parotid gland masses has been a matter of debate due to its low sensitivity for malignancy and differences in reported results. While FNAB has high specificity in malignant parotid tumors, its relatively low sensitivity complicates the diagnostic process of parotid gland tumors (6).

2. OBJECTIVE
In our study, we aimed to evaluate retrospectively the histopathological results, incidence, surgical treatment modalities and complications of parotid tumors operated in our clinic.

3. MATERIALS AND METHODS
The files of 136 patients who were admitted to the Otorhinolaryngology clinic of Dicle University Medical Faculty Hospital between January 2010 and April 2020 due to a parotid mass and underwent parotidectomy and whose pathology results were reported as benign or malignant parotid tumors were retrospectively scanned and included in the study. Patients’ age, gender, FNAB cytology result, type of surgery, histopathological results after surgery and complications after surgical treatment were included in the study. USG and USG guided FNAB were performed preoperatively in all patients. Computed Tomography and/or magnetic Resonance Imaging methods were used for the patients. Superficial parotidectomy or total parotidectomy was performed by revealing the facial trunk after the modified Blair incision under general anesthesia and following the branches. After the surgery, a drain was placed and followed up with tight dressing and daily dressing. Our study was approved by the Ethics Committee of Dicle University Faculty of Medicine, dated 30.06.2020 and numbered 184.

Statistical analysis
SPSS 22 (Statistical Package for the Social Sciences, version 22, (SSPS Inc, Chicago, IL, USA) statistical package program was used in the analysis of the data. Descriptive statistical methods (mean, frequency) were used in the evaluation of the recorded numerical data. In the statistical evaluations, descriptive analyzes were made on the characteristics of the variables. Categorical data are given as numbers and percentages, and measurement data are given as mean and standard deviation. (Mean±SD).

4. RESULTS
A total of 136 patients, 73 (53.7%) men and 63 (46.3%) women, were included in the study. The mean age of the patients was 48.26±17.37 (min=14, max=83) years. Superficial parotidectomy was performed in 108 (79.4%) patients and total parotidectomy was performed in 28 (20.6%) patients (Table 1).

According to the histopathological results after surgery, 108 (79.4%) benign tumors and 28 (20.6%) malignant tumors were diagnosed. Accordingly, pleomorphic adenoma (47.8%) was the second most common with 65 patients, followed by Whartin tumor (25.7%) with 35 patients (Table 2).

One patient with Whartin tumor had bilateral tumor. The most common malignant tumors were mucopidermoid carcinoma (6.6%) in 9 patients and squamous cell carcinoma metastases (5.2%) in 7 patients. Superiorial parotidectomy was performed in 108 patients (79.4%) as a surgical procedure, while total parotidectomy +/- unilateral neck dissection was performed in 28 patients (20.6%). Frey’s syndrome in 1 patient (0.7%), salivary fistula in 4 patients (2.9%), permanent facial paralysis in 1 patient (0.7%), and transient facial paralysis in 3 patients (2.2%) were surgical complications.

The sensitivity (sensitivity) of FNAB was 85.2%, and the specificity (specificity) was 96.2%. The accuracy of FNAB was found to be 94.0%.

5. DISCUSSION
It is very important to differentiate benign tumors from malignant tumors preoperatively in parotid gland masses. In order to evaluate all the cases more accurately, a detailed physical examination, imaging methods (usg, CT, MRI and pet-CT), FNAB result, and intraoperative nerve invasion and surgical margin when necessary are evaluated together in the light of the data obtained from frozen section examinations and surgery is planned. It gives the possibility of minimizing the type of surgical intervention and possible complications that should be evaluated together (7). In our study, after detailed anamnesis and history, we evaluated all patients with FNAB, imaging methods, and sometimes frozen sections for peroperative nerve invasion and surgical margins, and applied a treatment protocol accordingly.
The treatment for benign and malignant parotid tumors is surgical total removal of the tissue. In benign tumors, complete removal of the tumor is sufficient because of the possibility of recurrence and malignancy. Treatment of the neck includes neck dissection and radiotherapy. This is true for all high-grade malignancies and malignancies with clinically nodal metastases (1). We performed superficial parotidectomy in the majority of our patients with benign tumors. We performed total parotidectomy in a patient diagnosed with Whartin tumor extending to the deep lobe. We did not detect any recurrence or malignancy in the follow-up. We performed superficial parotidectomy in a patient with low grade epidermoid carcinoma, among patients with malignant tumors. We performed total or radical parotidectomy + neck dissection in other malignant patients.

In the meta-analysis of C. carrie Liu et al., they showed that it has a sensitivity of 78% (74-82%) and a specificity of 98% (97-98%) in retrospective studies in the general differentiation of FNAB from benign malignant parotid gland lesions. They also achieved a diagnostic accuracy rate of 96% (8). Another study reported high sensitivity (96%) and specificity (98%) and high positive (100%) and negative (81%) predictive value in a systematic review and meta-analysis of the diagnostic accuracy of FNAB for benign parotid neoplasms. For malignancies, the sensitivity and specificity were 79% and 96%, respectively. For treatment planning, they recommended starting with FNAB for all superficial, easily palpable lesions and ultrasound-guided FNAB for deeper lesions revealed during imaging (9). We applied the FNAB method with the help of USG for all patients who applied to our clinic. In our retrospective review, we found that our FNAB results had 96.2% specificity and 85.2% sensitivity. Our diagnostic accuracy rate was also 94%. We observed that our values were compatible with the literature.

As the mean age ratio for parotid tumors, the incidence of benign parotid tumors starts at 15 to 25 years of age and peaks at 65 to 74 years of age (10). While the average age is 56 in malignant tumors, it is observed between the ages of 50-70 and 3 times more in men than in women (1). In another study, Özbay et al. found the mean age of parotid gland tumors to be 49.7 years old (11). In our study, the mean age was found to be 48.26±17.37 years and there was a slight male predominance.

Pleomorphic Adenoma (PA) or benign mixed tumor is the most common benign parotid tumor. It constitutes 53.3%-68.6% of benign parotid tumors (12). These tumors appear as a slower, unilateral, asymptomatic swelling in women and middle-aged individuals (mean age 52.8 years). Very rarely, multifocal and/or bilateral PAs have been reported in previously untreated patients. 80% of PAs are superficial to the facial nerve in the parotid tail region (4). Malignant transformation may occur in 3% to 15%, and the risk increases with continued observation; therefore, surgical treatment at the time of diagnosis of PA is ideal (13). Given that tumors occur in the superficial lobe, a superficial parotidectomy or extracapsular dissection is sufficient, although the optimal technique is still debated. Superficial tumors that extend beyond the facial nerve require wider dissection (5). In our study, the most common benign tumor was found to be pleomorphic adenoma. While its rate among all tumors was 47.8%, its rate among benign tumors was around 60%. No malignancy was detected in any of our patients with pleomorphic adenoma, and bilaterality was not detected. We performed superficial parotidectomy in all our patients diagnosed with PA. We did not need any recurrence or additional surgery.

Warthin Tumors (WT) are the second most common benign parotid tumors with 25% to 32%. They occur almost exclusively in the parotid gland (98.3%) and smokers (92.3% smokers). They are 5% to 12% bilaterally. There is male dominance at a ratio of two to one (4, 14). Its treatment is surgery. Like PAs, the extent of surgery is discussed. A large case series at Johns Hopkins found a recurrence rate of 4.2% in superficial parotidectomies. Malignant transformation (1%) has been reported very rarely (15). In our study, Whartin tumor was seen as the second most common benign parotid tumor. It comprised 32.7% of all benign parotid tumors. One (2.8%) patient had bilaterality and was operated. We performed total parotidectomy in one patient because of deep lobe invasion. Other patients underwent superficial parotidectomy. No recurrence or malignancy was detected after surgery.

Basal cell adenoma, myoepithelioma, monomorphic adenoma, lymphadenoma and oncocytomas are extremely rare (0.6-1.1%) benign tumors (4). Other detected benign tumors in our study were basal cell adenoma (1.5%), monomorphic adenoma (0.7%), myoepithelioma (1.5%), lymphadenoma, oncocytoma, and lipoma (0.7%). Complete surgical excision is sufficient for most benign parotid tumors. Large superficial lobe tumors may require a complete superficial parotidectomy, while more conservative techniques (partial superficial parotidectomy, extracapsular dissection) may be sufficient for smaller tumors with adequate oncologic and safer outcomes. Tumors involving the superficial and deep lobes may require total parotidectomy with meticulous facial nerve dissection (5). All patients underwent superficial parotidectomy and no recurrence or malignancy was observed. We found that the rare parotid tumor incidence we detected was close to the literature.

The most common malignant tumor is mucoepidermoid cancer (MEC), which accounts for 30-35% of all malignant salivary gland tumors (2). Low grade mucoepidermoid cancers have a better prognosis than high grade mucoepidermoid cancers. While superficial parotidectomy and total parotidectomy are sufficient in low grade MEC, neck dissection and radiotherapy are recommended in addition to high grade MEC total parotidectomy (1). The most common malignant tumor in our study was muco epidermoid carcinoma. Of these, 3 were reported as low grade and 6 as high grade mucoepidermoid carcinoma. The rate among all malignant tumors was found to be 32.14%. We performed superficial parotidectomy in one patient and total parotidectomy in the other patients. We added lateral neck dissection to patients with lymph involvement reported as
high grade and patients with high grade reported and no lymph involvement.

The second most common malignant salivary gland tumor in our study was squamous cell carcinoma (SCC) metastasis with a rate of 25% among malignant tumors. Primary SCC of the parotid gland is very rare in the literature. It is mostly considered as metastatic SCC. In our surgical results, SCCs were reported as metastatic. No primary SCC was found. It is accepted that metastatic local control is achieved with routine total parotidectomy in 93% of SCC for metastatic cutaneous malignancies and close to 100% in cutaneous malignant melanoma (16). We performed total parotidectomy + neck dissection in all SCC metastasis cases. We explained the high rate of SCC with the low number of cases; We are of the opinion that these values may decrease with the increase in the number of probable cases.

Adenoid Cystic Carcinoma (ACCa) is the second most common cancer of the parotid gland in the literature. There is a strong correlation between pain and perineural invasion. Perineural invasion is seen in 29.2-62.5% of patients with ACCa and is considered to be associated with local tumor recurrence (17). In our study, 4.4% of the patients were diagnosed with adenoid cystic carcinoma as the third most common malignancy. In our study, one of our patients had facial paralysis and skin involvement at the time of diagnosis. All our patients underwent total parotidectomy + neck dissection. We think that the general findings follow a similar course to the literature.

It is accepted that only superficial parotidectomy is sufficient for benign tumors of the parotid. Since deep lobe involvement is very rare in benign cases, total parotidectomy is also very rare. Malignant tumors should be treated with total and/or radical parotidectomy and neck dissection. Radiotherapy should be added to the post-surgical treatment of malignant tumors with poor prognosis criteria (18). We performed superficial parotidectomy except for one of our patients with benign tumors. We did not detect any recurrence or malignancy in the follow-up. We performed superficial parotidectomy in one of the patients with malignant tumors and total or radical parotidectomy + neck dissection in the others.

The authors recommend that the facial nerve be exposed and traced along its tracing during parotid surgery. Every effort is made to protect this nerve when it is not directly invaded by cancer; however, the surgeon should be prepared to perform a total parotidectomy with nerve resection and facial reanimation in cases of preoperative facial nerve palsy. The operation can sometimes extend to the temporal bone for proximal negative margin resection of the facial nerve (19). Permanent facial paralysis occurred in one of our patients preoperatively due to facial nerve paralysis and tumor extension to the temporal bone. Frey’s syndrome in one patient (0.7%), salivary fistula in 4 patients (2.9%), permanent facial paralysis in one patient (0.7%), and transient facial paralysis in 3 patients (2.2%) were surgical complications.

Study limitations
Although this study provides valuable information, there are some limitations, primarily its retrospective design. There is a need for further, randomized controlled studies with higher patient numbers to extend this topic’s knowledge.

6. CONCLUSION
As a result, good identification of the parotid mass preoperatively and its evaluation together with both FNAB and radiological imaging methods gain much more value in differentiating malignant and benign pathologies. While superficial parotidectomy is mostly sufficient in benign tumors, total parotidectomy-radical parotidectomy in malignant tumors and neck dissection should be considered in high-grade tumors even if there is no neck metastasis. Patients should be evaluated for radiotherapy and chemotherapy according to the tumor type after surgery.

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