



Research Article

Lipomatous Tumors of the Parotid Gland: A Clinicopathological Analysis of Eight Cases with Surgical Documentation

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Received: 27 May 2026; Revised: 30 July 2026; Accepted: 7 August 2026

Abstract

Background: Lipomatous tumors developing inside the parotid gland are a rare form of salivary gland tumors that pose considerable challenges in diagnosis owing to their wide range of histomorphologic types from simple lipomas to lipoeithelial variants and their benign course like other parotid masses. **Objective:** To describe clinical manifestations, operative appearance, histopathological types, and outcomes after surgery for lipomatous tumors of the parotid gland based on our experience. **Methods:** A prospective analysis of surgical treatment for eight patients (5 females and 3 males, mean age 54 years) with lipomatous tumors of the parotid gland was conducted. Data about preoperative investigation, operative features, histology, and postoperative outcomes were analyzed. **Results:** The dimensions of the tumors varied between 2.1 and 4.1 cm. Pure lipoma was diagnosed in four cases (50%), sialolipoma in two patients (25%), and oncocytic lipoadenoma in the remaining two cases (25%). Superficial parotidectomy was conducted in seven patients, and one underwent total parotidectomy. Temporary facial palsy and seroma each occurred in only one patient and fully resolved. No patient had tumor recurrence after surgery. **Conclusions:** Lipomatous tumors of the parotid gland are rare entities with characteristic intraoperative appearance. Precise preoperative imaging combined with meticulous surgical technique yields excellent outcomes with minimal morbidity.

Keywords: Head and neck surgery; Fat-containing salivary gland tumors; Oncocytic lipoadenoma; Parotid lipoma; Parotidectomy; Sialolipoma.

الأورام الدهنية في الغدة النكفية: تحليل سريري ومرض لثمانية حالات مع توثيق جراحي

الخلاصة

الخلفية: الأورام الدهنية التي تتطور داخل الغدة النكفية هي شكل نادر من أورام الغدة اللعابية التي تشكل تحديات كبيرة في التشخيص بسبب تنوع أنواع الأورام النسيجية من الأورام الشحمية البسيطة إلى الدهنية-الظهارية ومساها الحميد المشابه لأنواع أخرى من الأورام النكفية. **الهدف:** وصف الأعراض السريرية والمظهر الجراحي والأنواع النسيجية والنتائج بعد الجراحة لأورام الغدة النكفية الدهنية بناء على خبرتنا. **الطرائق:** تم إجراء تحليل استعادي للعلاج الجراحي لثمانية مرضى (5 إناث و3 ذكور، متوسط العمر 54.0 سنة) الذين يعانون من أورام الغدة النكفية الدهنية. تم تحليل البيانات حول الفحوصات قبل العملية والمميزات الجراحية والنسيجية والنتائج بعد الجراحة. **النتائج:** تفاوتت أبعاد الأورام بين 2.1 و4.1 سم. تم تشخيص الورم الدهني النقي في أربع حالات (50%)، ورم السالوليكوب في مريضين (25%)، ورم شحمي الأورام في الحالتين المتبقيتين (25%). تم إجراء استئصال ميكرو للورم السطحي لسبعة مرضى، وخضع أحدهم لاستئصال الورم الكامل. حدث شلل وجه مؤقت في مريض واحد فقط وتم علاجها بالكامل. لم يتعرض أي مريض لعودة الورم بعد الجراحة. **الاستنتاجات:** الأورام الدهنية في الغدة النكفية هي حالات نادرة ذات مظهر مميز أثناء العملية. التصوير الدقيق قبل العملية مع التقنية الجراحية الدقيقة يعطي نتائج ممتازة مع أقل معدلات من الانتكاسات الجانبية.

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Article citation: Hammoody SA, Abdjlalel MK, Aftan KT. Lipomatous Tumors of the Parotid Gland: A Clinicopathological Analysis of Eight Cases with Surgical Documentation. *Al-Rafidain J Med Sci.* 2026;11(2):25-29. doi: <https://doi.org/10.54133/ajms.v11i2.3134>

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INTRODUCTION

Lipomatous tumor of major salivary glands is an important but infrequent benign lesion. With regard to the incidence of adipose tumors in the whole body, the head and neck region constitute approximately 13% of all lipomas, whereas lipomatous lesions constitute only 0.2 to 0.8 percent of tumors of major salivary glands [1,2]. Within the different anatomical sites of the salivary glands, the parotid gland is the most commonly involved site. This is because the parotid gland contains

comparatively more adipose tissue than the submandibular and sublingual glands [3]. Two important challenges in the diagnosis of lipomatous tumors exist. Clinically, the lesion cannot be distinguished on palpation from the more frequent pleomorphic adenoma that usually manifests as a slow-growing firm lump within the parotid gland. Radiologically, although CT scans are helpful in identifying lesions with fat-equivalent attenuation values ranging from -130 to -50 Hounsfield units, ultrasound demonstrates a heterogeneous echogenic pattern depending upon the

type of lipoma and its site within the gland [4,5]. These lipomatous parotid tumors present a wide variety of subtypes, from simple or classic lipoma—histologically identical to cutaneous lipomas—to more complex lipoepithelial tumors such as sialolipoma and oncocytic lipoadenoma, which contain salivary tissue elements within a matrix composed predominantly of adipose cells [5]. Each subtype of lipomatous salivary gland tumors has its specific prognosis, and mistreatment leads to either unnecessary surgical excision or incomplete resection. This paper presents a review of eight surgically treated cases of lipomatous parotid tumors from our institution.

METHODS

Study design and patient selection

This study reports on eight patients with lipomas in major salivary glands treated at our center in the Department of Oral and Maxillofacial Surgery at Ramadi Teaching Hospital.

Inclusion and exclusion criteria

Inclusion criteria include patients who underwent surgical excision of a histopathologically confirmed lipomatous mass from the parotid gland between 2022 and 2026. Exclusion criteria include inadequate follow-up period (less than six months) and systemic lipomatosis syndromes such as Madelung disease and malignancy.

Clinical evaluation

Each patient was examined systematically, taking a thorough history and clinical examination of the head and neck with documentation of swelling size, duration, rate of expansion, cranial nerve exam, and any previous surgeries. The symptoms were classified into three groups: asymptomatic incidental mass, painful mass, or mass with effect on adjacent structures.

Imaging Protocol

A high-frequency linear transducer ultrasound (7.5 MHz) was used in all cases as the primary diagnostic tool. The parameters that are used are the echogenicity of the mass, the homogeneity or heterogeneity of the internal architecture, and the compressibility of the mass. Additionally, contrast-enhanced CT scans of the neck were used in every case to assess the extent of the lesion to verify fat-equivalent Hounsfield unit measurements and aid in surgical planning. Hounsfield unit measurements were obtained from three separate regions of each mass (Figure 1). Fine needle aspiration cytology (FNAC) was performed in four cases, but it produces non-specific findings such as lipid or acellular

specimens, confirming the primacy of imaging in preoperative diagnosis.

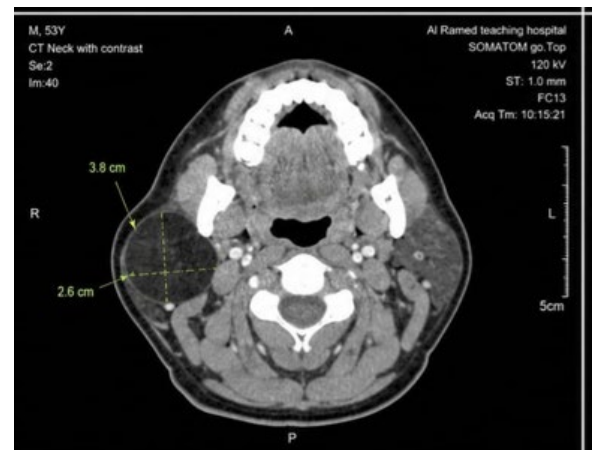


Figure 1: CT (axial section) of right parotid lipoma showing homogeneous fat-equivalent attenuation.

Surgical technique

We performed all surgeries under general anesthesia. The type of approach was the modified Blair approach with pre-auricular and post-auricular extensions. Following skin flap elevation, the trunk of the facial nerve was identified at the tragal pointer and traced anterogradely to its peripheral branches. Superficial parotidectomy was performed when the tumor was confined to the superficial lobe (Figure 2A-G). Total parotidectomy with facial nerve preservation was performed when the tumor involved the deep lobe.

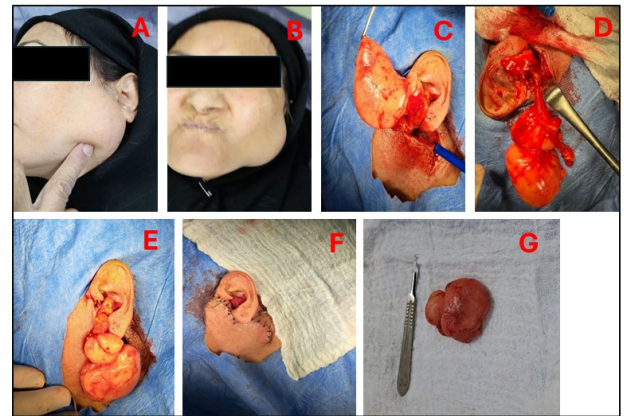


Figure 2: (A & B) Clinical examination of parotid mass; (C, D, E, F & G) Sequential intraoperative steps illustrating dissection and excision of the lipomatous mass.

Histopathological evaluation

By using 10% buffered formalin, all excised tumors were fixed. Then the specimens were embedded in paraffin and serially sectioned at 4 μ m. Hematoxylin and eosin (H&E) staining was performed on all sections. Tumors were classified according to the WHO classification of head and neck tumors (2022 edition) [6].

Ethical considerations

The study protocol was approved by the Institutional Review Board of the College of Dentistry, Al Anbar University. Additionally, the Medical Ethics Commission at Al Ramadi Teaching Hospital approved the study. All procedures were performed in accordance with the ethical standards of the institutional and national research committee and with the updated Declaration of Helsinki and its later amendments (2002). Written informed consent was obtained from all individual participants prior to surgery and data collection.

Statistical analysis

Owing to the limited sample size, only descriptive statistical analysis was performed. Continuous variables are presented as mean $\pm$ standard deviation with range; categorical variables are presented as frequencies and

percentages. Postoperative follow-up was conducted at two weeks, three months, and six months. Each visit included wound assessment and evaluation of facial nerve function using the House-Brackmann grading scale. Tumor recurrence was assessed by U/S for the presence of any lipomatous regrowth at the surgical site.

RESULTS

Eight patients: five women (62.5%) and three men (37.5%) with ages varying from 43 to 67 years and a mean age of 54.0 ± 7.6 years. The mean duration of symptoms before the presentation was 18.3 months (range 6–36 months). Each patient presented with a painless, slowly growing parotid mass. There were no signs of facial nerve weakness, trismus, or skin fixation. All clinicopathological and surgical details are reported in Table 1.

Table 1: Clinicopathological and surgical characteristics of eight patients with parotid lipomatous tumors

Case	Sex	Age (year)	Location	Size (cm)	Procedure	Histology	Outcome
1	Female	52	Right parotid	3.2	Superficial parotidectomy	Pure lipoma	Uneventful
2	Female	47	Left parotid	2.8	Superficial parotidectomy	Sialolipoma	Uneventful
3	Male	53	Right parotid	3.9	Total parotidectomy	Pure lipoma	Transient facial weakness
4	Female	55	Left parotid	2.1	Superficial parotidectomy	Oncocytic lipoadenoma	Uneventful
5	Female	49	Right parotid	3.5	Superficial parotidectomy	Pure lipoma	Uneventful
6	Male	58	Left parotid	4.1	Superficial parotidectomy	Sialolipoma	Seroma formation
7	Female	43	Right parotid	2.5	Superficial parotidectomy	Pure lipoma	Uneventful
8	Male	67	Left parotid	3.7	Superficial parotidectomy	Oncocytic lipoadenoma	Uneventful

The U/S shows that all eight cases clearly appear as well-defined compressible mass. In seven cases, the echogenicity is less than normal surrounding parotid tissue, but in one case, the mass is hypoechoic due to a deeply seated tumor and is assumed to be pleomorphic adenoma. The CT scan shows that all eight patients have consistent fat attenuation, ranging from -112 to -58 Hounsfield units, with no internal enhancement, calcifications, or visible invasive boundaries. Combining the negative attenuation CT with the compressibility appearance on the U/S allowed for a pre-surgery diagnosis in seven patients. During surgery, all lesions were encapsulated, soft, lobulated masses with yellow-orange to tan color. By touch, we can feel the diagnostic softness, which is quite different from normal parotid glands, and this assists in the dissection of the tumor. The surface of the tumor was shiny and smooth with an intact pseudocapsule. Figure 3A-F shows the various stages of the surgery, from the initial exposure and facial nerve dissection to tumor mobilization and complete excision. All specimens were sent for histopathological examination and categorized into three groups. The first type is pure lipoma, which is found in four patients (50%). These tumors were characterized by well-encapsulated masses of mature adipocytes with no nuclear atypia, mitotic figures, or lipoblasts and were histologically similar to soft-tissue lipomas, except for their specific location within the parotid tissue. The second type is sialolipoma, which was found in two

patients (25%) and characterized by the presence of both mature adipocyte lobulations mixed with evenly distributed normal-appearing salivary gland elements, including serous acini, ductal structures, myoepithelial cells, and basal cells.

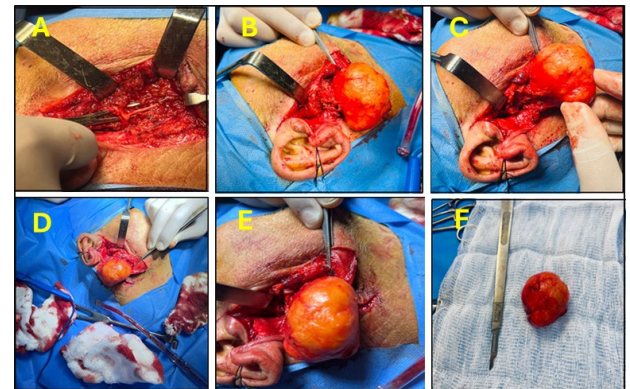


Figure 3: A) Intraoperative steps that capture the initial exposure of the right parotid area after the skin flap has been elevated. B) the tumor in its original position after we've carefully dissected around the facial nerve. C) The yellow-orange lobulated structure standing out against the parotid parenchyma with identifying the branches of the facial nerve throughout the procedure. D) The mass is nearly fully dissected from the surrounding gland, with hemostatic gauze packs placed around the surgical field. E) removal the tumor with a good margin. The parotidectomy bed is visible, complete with a suction drain in place. F) The tumor specimen resting on sterile gauze, revealing its globular shape, smooth intact capsule, and the characteristic golden to orange hue of mature fat cells.

The third type is oncocytic lipoadenoma, which is found in two patients (25%) and characterized by compact oncocytes intermingled with adipocytes forming a

lipoma-like background, with scattered residual serous acini in both cases (Figure 4A-C).

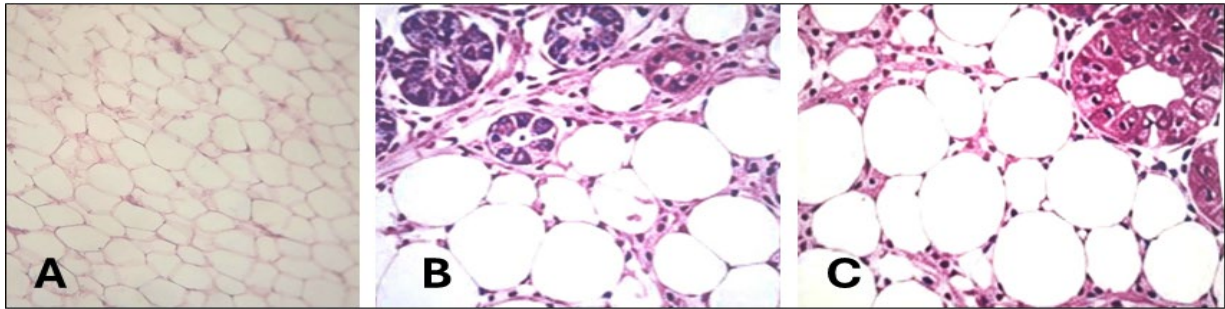


Figure 4: A) Pure lipoma stained with (H&E) revealing adipocytes with flattened nuclei at the periphery. There are no epithelial or oncocytic elements. B) Sialolipoma stained with (H&E) showing adipocytes mixed with salivary gland acini. C) Oncocytic lipoadenoma stained with (H&E) showing oncocytic epithelial cells within mature adipose tissue.

The postoperative course was smooth for six out of the eight patients. One patient (Case 3, a 53-year-old man) who had a total parotidectomy to remove a deeply located pure lipoma experienced a temporary weakness in the facial muscles on one side (House-Brackmann Grade II), specifically affecting the marginal mandibular branch. Thankfully, this issue resolved completely by the third month after surgery without the need for any medication. Another patient (Case 6, a 58-year-old man) developed a submandibular seroma five days post-op, but it was successfully treated with aspiration. There were no cases of Frey syndrome, sialoceles, permanent nerve damage, or wound infections reported. Plus, at the six-month follow-up ultrasound, none of the patients showed any signs of tumor recurrence.

DISCUSSION

This study reported a case series of eight patients with histopathologically confirmed lipomatous tumors in the parotid gland, which are rare lesions found in limited peer-reviewed published articles. The age distribution of the study group mainly includes the middle-aged patients, and there's a slight female predominance with a ratio of 5:3. This is different from the commonly noted male predominance of 2–4:1, which is seen in typical lipomas of salivary glands. This contradiction can be due to the presence of sialolipoma and oncocytic lipoadenoma, which don't show a clear sex predominance [7,8]. Dependence on palpation signs (softness and compressibility) of lipomas is unreliable and may produce false positives because other lesions, such as reactive lymph nodes and Warthin tumors, may have the same palpation. The imaging and echoing findings from Gritzmann's classic series are crucial for accurate preoperative assessment [1]. It's important to use imaging and echocardiography results to assess classic Gritzman features in cases that have undergone surgery. In seven patients, the U/S showed classic ultrasound features: a well-defined hypoechoic oval mass with striated (feather-like) echoes. These masses were dense

and smooth in shape, according to the diagnostic criteria mentioned. In one patient with a deeply located mass in the parotid gland, the striated feathers were not present or clear, so it may have been misdiagnosed as pleomorphic adenoma. All patients underwent CT imaging, which showed uniformity in fat suppression in the range of -130 to -50 HU, but the imaging was the only useful tool for the final diagnosis before surgery [10]. The different lipomatous salivary gland tumors have been documented in the literature [11]. In our study group, the most commonly observed subtype was pure lipoma, making up 50%, followed by sialolipoma and oncocytic lipoadenoma, each representing 25%. The pure lipoma of salivary glands is histologically similar to soft-tissue lipoma and can be managed successfully via surgical resection, with no reported cases of recurrence [11]. The term "sialolipoma" describes tumors that contain both mature adipose tissue and normal salivary gland tissue; the epithelial salivary tissue is entrapped within adipose tissue and did not represent neoplastic changes [4]. Oncocytic lipoadenoma refers to tumors that contain large oncocytic epithelial cells with scattered adipose cells. Thus, it has common features between pure lipoma and pleomorphic adenoma, and this similarity indicates the neoplastic origin of this tumor [12]. The histological differentiation between pure lipoma and sialolipoma is important clinically because sialolipoma can be misdiagnosed as diffuse interstitial lipomatosis (a non-neoplastic condition that occurs in liver disease, obesity, or HIV-related lipodystrophy), especially when small biopsies are assessed without relying on macroscopic and radiological context [2]. The ordinary lipoma does not have uniformly distributed salivary gland elements that are characteristic of sialolipoma. For management, once a CT scan documents a lipomatous parotid tumor, we can often take a wait-and-see approach for patients with mild symptoms. This cannot be done in solid salivary gland tumors due to the need for tissue biopsy to exclude any potential malignancy [12]. The wait and see policy is applied in lipomatous tumors because they are universally benign without any recurrence or malignant

changes. One exception is liposarcoma, a rare type of malignant tumor that we should be considered if the imaging features were different from a typical benign lipoma or if there was a history of rapid growth. Regarding the four cases where results of fine needle aspiration cytology (FNAC) are equivocal, we did not perform core needle biopsy (CNB) as a standard procedure. In practice: Ultrasound with CT showing fat attenuation provides sufficient confidence to diagnose benign lipomatous conditions before surgeries. However, in soft, mobile, and purely fatty structures, CNB can lead to sampling errors and damage the capsule, and it does not enhance diagnostic outcomes compared to imaging data alone. Similarly, when results clearly indicate a lipomatous lesion, we do not need selective re-imaging. Nevertheless, we believe that CNB or other imaging may be necessary in some cases, especially when imaging results are unclear or there is a slight clinical or radiologic suspicion related to pleomorphic adenoma or liposarcoma, as it may progress further.

Study Limitations

Certain limitations to our study are present. First, the small sample size is a limitation because lipomatous tumors of the parotid are rare. Second, this is a single-center study, which limits the generalizability of the findings. Third, the follow-up period is generally six months in some patients, and so the recurrence cannot be detected. Finally, the FNAC data are available in only half of patients, and this limitation restricts findings of diagnostic cytology.

Conclusion

Lipomatous tumors of the parotid gland are uncommon lesions with diagnostic intraoperative features. Accurate preoperative U/S and contrast CT (to verify fat-equivalent Hounsfield unit measurements) combined with meticulous surgical technique provide excellent positive outcomes with minimal morbidity.

Conflict of interests

The authors declared no conflict of interest.

Funding source

The authors did not receive any source of funds.

Data sharing statement

The data that supports the findings of this study are available from the corresponding author upon a reasonable request

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