Beyond the Ordinary: Giant Parotid Oncocytoma and the Complexity of Diagnosis

Burak Kaan İnan[1,*], Altan Argun[1], Saim Pamuk[1], Mehmet Akif Abakay[1], İbrahim Sayın[1], Zahide Mine Yazıcı[1]

ABSTRACT

Parotid oncocytoma is a rare benign salivary gland tumor, often misdiagnosed due to overlapping features with other parotid neoplasms. We present the case of an 87-year-old male with a progressively enlarging right parotid mass, confirmed as oncocytoma through imaging and histopathological analysis. The excised oncocytoma measured approximately 9 cm in its greatest dimension, making it one of the largest parotid oncocytomas reported in the literature to date. This case highlights the diagnostic challenges associated with parotid oncocytomas, the limitations of fine-needle aspiration, and the importance of comprehensive diagnostic tools. Surgical resection was curative, with no recurrence at 12 months.

KEYWORDS

parotid oncocytoma; salivary gland; histopathology; neoplasm

AUTHOR AFFILIATIONS

[1] Department of Otorhinolaryngology & Head and Neck Surgery, Bakırköy Dr. Sadi Konuk Training and Research Hospital, 34147, Istanbul, Turkey

* Corresponding author: Department of Otolaryngology & Head and Neck Surgery, Bakırköy Dr. Sadi Konuk Training and Research Hospital, Zuhuratbaba, Dr. Tevfik Sağlam Street, 11, 34147, Istanbul, Turkey; e-mail: burakkaaninan@gmail.com

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INTRODUCTION

Oncocytoma is a rare benign salivary gland tumor composed of large epithelial cells known as oncocytes. According to the World Health Organization, oncocytic lesions are histologically classified into three categories: oncocytosis, oncocytoma, and oncocytic carcinoma. Oncocytomas account for only 0.4%–1% of salivary gland tumors, making them among the rarest parotid neoplasms. These tumors, characterized by large oncocytes with abundant eosinophilic cytoplasm, are predominantly found in the parotid gland, often in patients over 60 years old. Although fine-needle aspiration biopsy (FNAB) is commonly used in the initial evaluation of parotid masses, it may be insufficient for an accurate diagnosis – particularly in oncocytic neoplasms – due to cytological overlap with other lesions. While core needle biopsy (CNB) offers improved tissue architecture and higher sensitivity, it can also be inconclusive in oncocytic tumors where the distinction between benign and malignant lesions requires evidence of invasion, which may not be captured in limited samples. Therefore, further investigations such as ultrasound (US), magnetic resonance imaging (MRI), and detailed histopathological evaluation following surgical excision are often necessary. This case report presents an oncocytoma case and compares its clinical, radiographic, and histopathological features with those in the literature. The rarity of parotid oncocytoma and its frequently overlapping features with other benign parotid tumors contribute to frequent misdiagnoses, underscoring the importance of thorough diagnostic evaluation.

CASE REPORT

An 87-year-old male patient presented to our clinic with a swelling in the right parotid gland region, persisting for five years (Fig. 1).

Over five years, the lesion progressively enlarged, ultimately reaching a remarkable size of 9 cm, causing visible facial asymmetry. His medical history included a 35-pack-year smoking history, with no known family history of head or neck cancer. On physical examination, palpation revealed a painless, immobile, firm mass with well-defined borders. The patient did not report any associated symptoms, such as difficulty with speech, chewing, or swallowing, indicating that the mass primarily affected facial appearance.

Before presenting to our clinic, the patient underwent initial evaluations at another hospital, including color Doppler ultrasonography performed at an outside facility, which identified a 58 × 44 mm hypoechoic solid mass with moderate internal vascularization. The fine-needle aspiration biopsy (FNAB) result suggested that the mass was consistent with a Warthin tumor, another benign neoplasm of the parotid gland.

The patient presented to our clinic for the first time approximately one year later, during which time the lesion had progressively increased in size. A repeat color Doppler ultrasonography revealed an 85 × 52 mm hypoechoic solid lesion extending into the right submandibular region and adjacent to the internal jugular vein. Contrast-enhanced MRI demonstrated a well-defined 88 × 65 mm

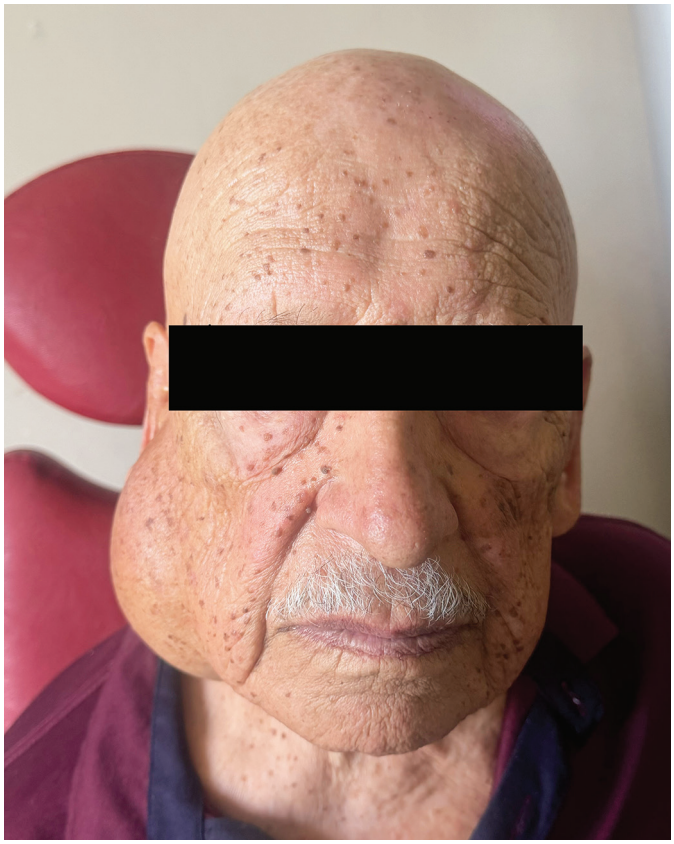

Fig. 1 Preoperative clinical image of the patient demonstrating a large, asymmetric swelling in the parotid region, consistent with a parotid gland oncocytoma.

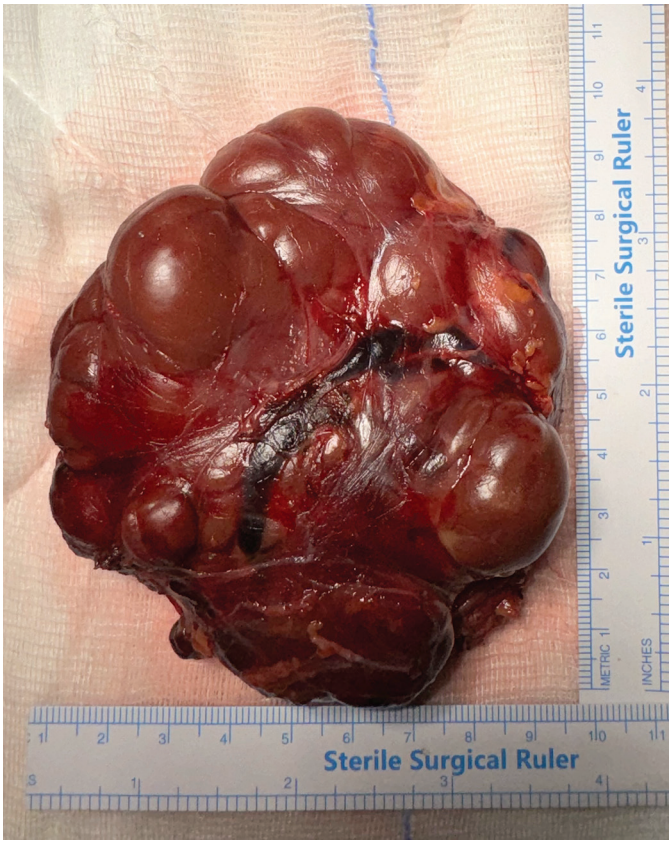

Fig. 2 Gross specimen of the excised parotid mass consistent with oncocytoma. The mass exhibits a lobulated, encapsulated appearance with a shiny, reddish-brown surface, and cystic spaces.

mass occupying and expanding the right parotid gland. The mass showed hypointense signals on T1-weighted imaging and mixed signals with linear hyperintense areas on T2-weighted imaging, with intense contrast enhancement.

FNAB findings indicated histopathological features compatible with oncocytic neoplasia. However, the exact diagnosis – whether oncocytosis, oncocytoma, or oncocytic carcinoma – remained uncertain. Based on imaging and histopathological evaluations, surgical resection of the mass was recommended. A superficial parotidectomy was performed, limited to the superficial lobe of the parotid gland, with careful preservation of the facial nerve. The gross surgical specimen measured approximately 9 × 9 cm, confirming the significant interval growth of the lesion over time (Fig. 2)

Microscopic evaluation of the hematoxylin and eosin-stained specimen showed oncocytic cells with abundant eosinophilic granular cytoplasm rich in mitochondria, forming trabecular and acinar structures. No necrosis was observed in the tumor tissue (Fig. 3). Due to the benign nature of the tumor and clear surgical margins, adjuvant chemotherapy or radiotherapy was not administered.

At the 12-month postoperative follow-up, the patient remained recurrence-free, with no signs of facial nerve deficit (Fig. 4).

Written informed consent was obtained from the patient.

DISCUSSION

Oncocytoma is a benign salivary gland tumor characterized by epithelial cells known as oncocytes, which contain abundant eosinophilic cytoplasm and centrally located pyknotic nuclei. As shown in Tandler et al.'s study, these cells contain numerous mitochondria (1). Oncocytes produce low levels of adenosine triphosphate (ATP), leading to increased mitochondrial numbers, a key distinguishing feature of these cells. While the pathophysiology of oncocytoma remains unclear, mitochondrial functional defects are thought to play a role.

Oncocytomas primarily occur in the parotid gland. As noted in the study by Stomeo et al., they can present bilaterally (2), though they are usually unilateral with a slow growth pattern, as seen in our case. Generally non-cystic and encapsulated, these tumors measure less than 5 cm, with rare instances of malignant transformation or local recurrence. Patients are commonly over 60 years of age, with no significant gender preference (3). Özcan et al. and Sepulveda et al. noted that while oncocytomas can rarely arise from the deep lobe, they generally originate from the superficial lobe, as observed in our case (4, 5).

For diagnosis, histopathological confirmation is essential, and imaging techniques such as CT, MRI, and US serve as useful adjuncts. US, as the first-line imaging method for parotid masses, can reveal regular borders and an absence of dystrophic calcifications in oncocytomas, distinguishing them from pleomorphic adenomas, which often have lobulated borders and may exhibit calcifications. Another frequently encountered parotid mass, Warthin tumor, can contain necrotic areas, further aiding differentiation. Similar to studies in the literature on oncocytomas, a hypoechoic mass lesion with internal vascularization was also detected on Doppler US in our case (6).

MRI reports suggest that oncocytomas appear hypointense on T1- and T2-weighted images due to high cellularity and low water content. However, variability in

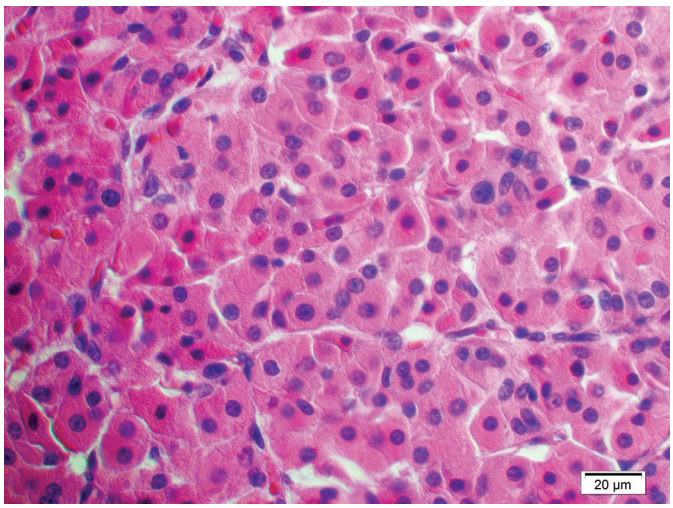

Fig. 3 Histopathological examination revealed oncocytic cells with abundant eosinophilic granular cytoplasm, occasionally forming acinar and trabecular structures. These cells exhibited small, round, centrally located nuclei (H&E, X60).

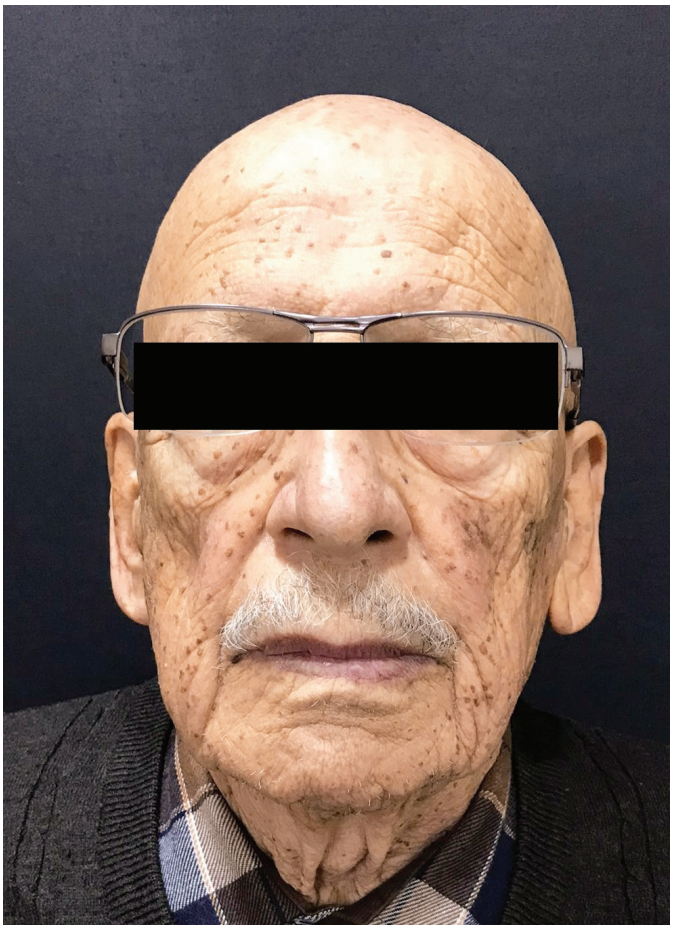

Fig. 4 Postoperative clinical image of the same patient showing complete resolution of the parotid mass following surgical excision.

MRI appearances exists, as seen in Hamada et al., where oncocytomas appeared hypointense on T1 and iso- to hyperintense on T2 sequences (7). Sepulveda et al. similarly reported isointensity on T1 and hyperintensity on T2 sequences (5). Our case demonstrated hypointense T1 signals and mixed T2 signals with linear hyperintensities, aligning partially with Hamada et al.'s findings but presenting unique radiographic characteristics (7).

FNAB is commonly employed as an initial diagnostic tool in many clinics due to its minimally invasive nature. However, FNAB has significant limitations in accurately diagnosing oncocytomas, particularly due to their overlapping cytological features with other oncocytic lesions. Chakrabarti et al. highlighted the diagnostic challenges FNAB presents in distinguishing oncocytic lesions (8). Diouf et al. reported a case initially misdiagnosed as pleomorphic adenoma, while Miladinovic et al. documented a misinterpretation of parotid oncocytoma as metastatic squamous cell carcinoma based on FNAB findings (9, 10). Furthermore, Capone et al. demonstrated that the sensitivity of FNAB in diagnosing parotid masses is only 29%, underscoring its limitations (3). In our case, the initial FNAB result suggested a Warthin tumor rather than an oncocytoma, consistent with reports in the literature where oncocytomas are often misdiagnosed as other benign parotid tumors. (9) Although both are benign neoplasms, Warthin tumors can be distinguished from oncocytomas by their histological structure, which includes cystic spaces filled with lymphoid stroma. These findings emphasize the need for advanced diagnostic methods. Techniques such as core needle biopsy or intraoperative frozen section analysis could significantly improve diagnostic accuracy by providing more extensive tissue samples and allowing real-time histopathological evaluation.

Though facial nerve involvement typically suggests malignancy in parotid masses, benign parotid tumors like oncocytoma can, on rare occasions, cause facial paralysis, as reported by Hamada et al. (7). Consistent with the benign nature of oncocytomas, our patient exhibited no facial paralysis. The primary treatment for parotid oncocytoma is surgical resection, either radical or superficial parotidectomy, as performed in our case with preservation of the facial nerve (5). Follow-up showed no evidence of recurrence, reinforcing surgical excision as an effective approach.

CONCLUSION

Our case represents the largest reported parotid oncocytoma to date, underscoring the importance of considering parotid oncocytoma in the differential diagnosis of parotid masses. This case not only highlights the diagnostic challenges associated with parotid oncocytomas but also emphasizes the need for advanced imaging and histopathological techniques to accurately identify these rare tumors. Histopathological confirmation, in conjunction with imaging, is crucial for accurate diagnosis. Surgical intervention remains the primary treatment, and close postoperative follow-up is essential to monitor for recurrence.

MAIN POINTS

- Oncocytoma is a rare benign tumor of the salivary glands, most commonly occurring in the parotid gland and often affecting patients over 60 years old.
- Fine-needle aspiration biopsy has significant limitations in accurately diagnosing oncocytoma, often leading to misdiagnosis as other benign tumors like Warthin tumor or pleomorphic adenoma.
- Imaging modalities such as MRI and ultrasound are essential for evaluating parotid masses, but definitive diagnosis requires histopathological examination.
- Surgical resection, typically superficial parotidectomy with facial nerve preservation, is the primary treatment for parotid oncocytomas.
- Close postoperative follow-up is crucial, as although oncocytomas are benign, recurrence is possible in rare cases.

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