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Case Report

Pathology Section

Cytodiagnosis of Oncocytoma of Parotid Gland: A Report of Two Cases

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ABSTRACT

Among benign neoplasms of the salivary gland, malignancies are less common. One of the rarest tumours found in the oral cavity is oncocytoma, comprising less than 2% of all oral neoplasms and carrying a 1% risk of malignant transformation. Oncocytoma is rare among benign neoplasms, typically affecting females and impacting the major salivary glands. Literature discussing the cytodiagnosis of oncocytoma through Fine Needle Aspiration Cytology (FNAC) is even scarcer. Cytomorphological features indicating a predominantly oncocytic population with benign nuclear characteristics suggest the diagnosis of oncocytoma. The presence of oncocytes alongside other cell types in cytology smears suggests oncocytosis or a tumour-like presentation of Warthin's tumour. Due to its unique features and clinical presentation, clinicians may misdiagnose this tumour as pleomorphic adenoma, haemangioma, or another form of oncocytosis due to its rarity and clinical features. Therefore, only histopathological examination can provide a definitive diagnosis. The present report discusses two unusual cytodiagnoses of oncocytoma identified through FNAC of the parotid gland in a 50-year-old female and a 70-year-old male, along with their clinicoradiological findings and subsequent tumour excision. Furthermore, the authors aim to raise awareness about the importance of a comprehensive work-up and optimal treatment selection for these lesions.

Keywords: Differential diagnosis of oncocytosis, Fine needle aspiration cytology, Oxyphilic adenoma

CASE REPORT

Case 1

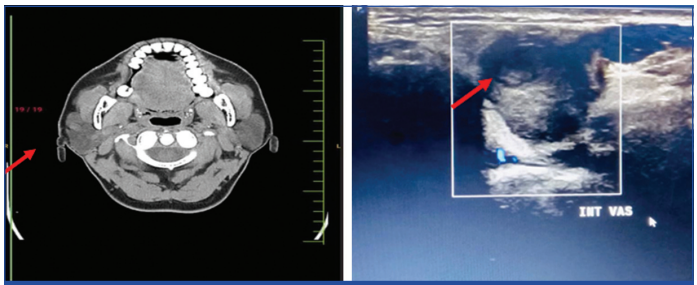
A 50-year-old female presented to the Ear, Nose and Throat (ENT) outpatient department with a two-month history of earache. She also reported a nodular swelling in the preauricular region on the right-side [Table/Fig-1].

[Table/Fig-1]: Preauricular little nodular swelling in a 50-year-old female patient, shown in a clinical picture.

It was a round, fibrous, painless swelling that was initially small but slowly progressed in size with no cutaneous inflammatory reaction. There was no accompanying fever, mouth dryness, or soreness during chewing. The patient did not notice any variation in salivation. The patient had no history of radiation exposure or co-morbidities, no prior surgical experience, and was not taking any regular medication. The patient reported a medical history of right ear discharge 20 years ago, which was treated with oral antibiotics and anti-inflammatory drugs.

The ENT examination revealed a normal right-sided tympanic membrane, while the left ear examination was normal. The size of the preauricular nodular swelling was 5×4×2 cm, firm, and non tender. Transillumination examination of the swelling indicated a non cystic nature. The patient was referred for sonography of the swelling. Additionally, the patient complained of a headache, which was suspected to be clinically related to ear discharge and a temporal bone pathology. She was advised to undergo a Computed Tomography (CT) scan of the temporal bone. The CT findings of the right temporal bone were normal, except for minimal soft tissue density collection in the mastoid air cells. No abnormalities were observed in the bony and cartilaginous structures of the left external auditory canal, internal auditory canal, middle ear, and facial nerve bony canal on both sides. The radiologist suggested a diagnosis of mastoiditis [Table/Fig-2].

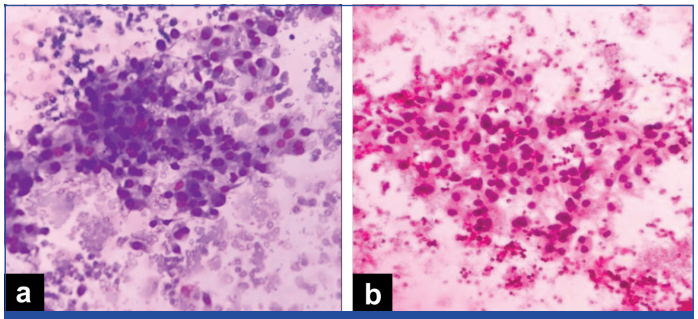
Further investigations included a Complete Blood Count (CBC), which yielded results within normal limits. Ultrasonography (USG) of the bilateral parotid region was conducted. The USG of the right parotid gland revealed a well-defined oval lesion in the superficial lobe with a hypervascular solid component. The nodule measured 2.5×1.5 cm with postacoustic enhancement. Sonography of the left parotid region did not show any abnormalities [Table/Fig-3].



[Table/Fig-2]: CT Temporal bone-Minimal soft-tissue density collection in right mastoid air cells. **[Table/Fig-3]:** USG of right parotid- well-defined, hypoechoicoval lesion in the superficial lobe of right parotid gland with a hypervascular solid component. (Images from left to right)

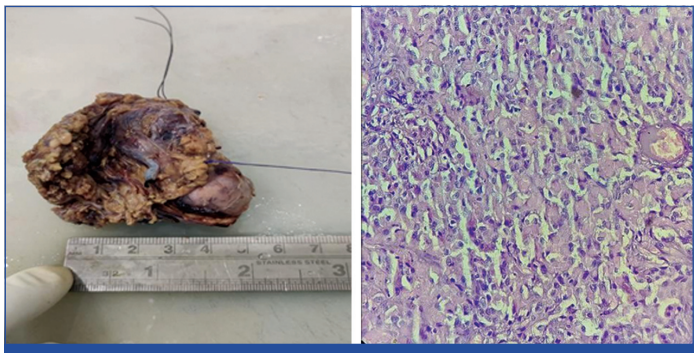
The patient was advised to undergo sonography-guided Fine Needle Aspiration Cytology (FNAC). The FNAC was performed using standard procedure, and the aspirated material was smeared for processing with Papanicolaou and Giemsa stains.

The cytologic smears were moderately cellular and predominantly composed of oncocytic cells. These cells were arranged in monolayered cell sheets, papillaroid fragments, and smooth globular cell sheets. The oncocytes exhibited moderate to ample granular cytoplasm, centrally placed nuclei with frequent nucleoli and anisonucleosis. The nuclei appeared slightly hyperchromatic but lacked significant pleomorphism. The background contained scant granular material from cytoplasmic lysis, sparse lymphocytes, and minimal necrosis. These cytomorphological features supported the diagnosis of oncocytoma [Table/Fig-4].



[Table/Fig-4]: a) The photomicrograph shows oncocytic population placed in little dyscohesive sheets (Fine needle aspiration cytology, Giemsa stain, 40x); b) The photomicrograph showing clusters of oncocytes with granular, eosinophilic cytoplasm in a clear background. {Fine Needle Aspiration Cytology (FNAC), Giemsa stain, 40x}.

Subsequently, the patient underwent complete excision of the nodule within the superficial lobe of the right parotid. Microscopic examination revealed sheets of benign oncocytic cells with pyknotic nuclei and moderate to abundant eosinophilic cytoplasmic densities. The histopathological analysis {Haematoxylin and Eosin (H&E)} of the excised nodule confirmed the diagnosis of a benign oncocytoma. After one year of follow-up, the patient remains disease-free without any local or distant recurrence [Table/Fig-5,6].

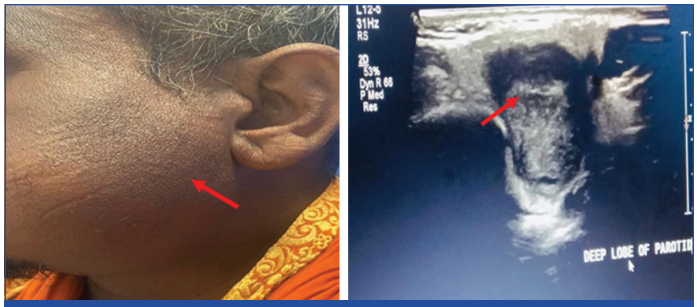


[Table/Fig-5]: Gross image of oncocytoma–solid, tan-red-brown, lobulated mass with fibrous capsule. **[Table/Fig-6]:** Photomicrograph show sheet of oncocytic cells with benign nuclei and pyknotic nuclei in a few with modest to ample dense eosinophilic cytoplasm (40x, H&E). (Images from left to right)

Case 2

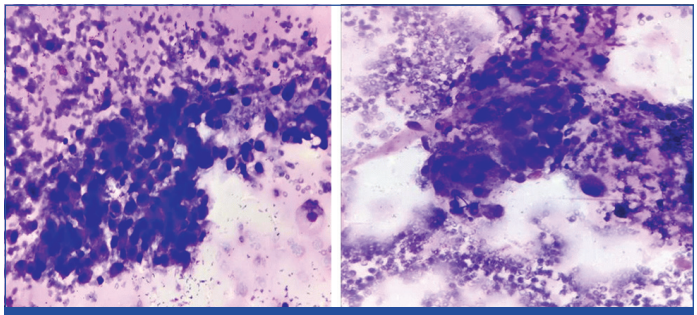
A 70-year-old male presented to the surgery outpatient department with a swelling on the right-side of his face [Table/Fig-7]. The swelling had been present for the past three years, gradually increasing in size, with no associated symptoms related to the ear, nose, throat, or oral cavity. The patient did not report any significant past medical history relevant to the swelling. The results of the clinical evaluation were normal. The swelling measured 3.5×3 cm and was soft to the touch, non-tender, and not adherent to underlying tissues.

The swelling had a firm consistency and was non cystic, as well as non-tender. The patient was referred for Ultrasound (USG). The sonography revealed a solitary lesion in the superficial lobe of the right parotid, which was well-circumscribed. There was a slight increase in vascularity but no significant cystic component. No lymph nodes were noted around the swelling. The patient was then referred for Fine Needle Aspiration Cytology (FNAC) under USG guidance [Table/Fig-8].



[Table/Fig-7]: Clinical photograph of a nodular swelling in the infra-auricular region in the carotid area of 70 years male. **[Table/Fig-8]:** USG of the parotid gland- Solitary lesion of the parotid gland with little increase in vascularity. (Images from left to right)

The aspirated material was creamy and abundant. It was smeared and fixed for Papanicolaou and Giemsa staining. The smears were moderately cellular and predominantly composed of oncocytic cells. The lobulated cells were arranged in small sheets and a few monolayered cell sheets. The cells were intermediate in size, polygonal to cuboidal, with moderate to ample cytoplasm. The nuclei were uniform, round to ovoid, with rare spindling and anisonucleosis, but without significant pleomorphism. The background in many areas contained a few macrophages, sparse lymphocytes, and mucomyxoid and haemorrhagic material in hyaline globules. Based on these cytomorphological features, a diagnosis of oncocytoma was made [Table/Fig-9].



[Table/Fig-9]: A pure population of oncocytes arranged in small, non cohesive sheets is visible in the oncocytoma photomicrograph {Fine Needle Aspiration Cytology (FNAC), Giemsa stain, 40x}.

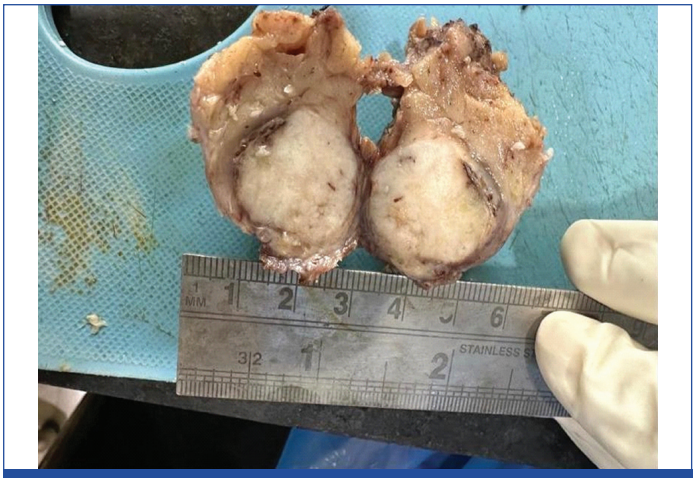
Following standard haematological and biochemical investigations, the patient underwent surgical removal of the tumourous nodular swelling. The haematological reports (including complete blood count and coagulation profile) and biochemical reports (such as salivary amylase, carbonic anhydrase, lysozyme C) were within normal limits.

On gross examination, the cut section of the specimen revealed a predominantly solid, well-circumscribed tumour mass with areas of cystic necrosis. Microscopically, the specimen showed sheets of large polyhedral cells, or oncocytes, with sparse connective tissue stroma and abundant granular eosinophilic cytoplasm. No mitotic figures were observed. The histological features of the tumour mass were consistent with a benign oncocytoma [Table/Fig-10,11a,b].

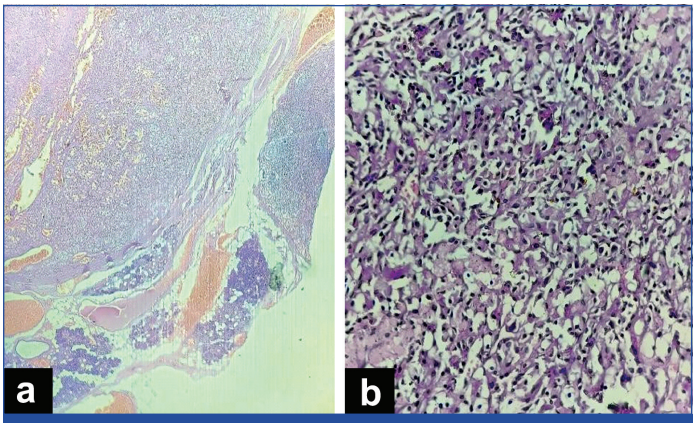
The patient is currently free of illness and shows no symptoms of relapse.

DISCUSSION

Parotid neoplasms account for less than 3% of all head and neck tumours, with 1% of parotid tumours originating from oncocytic cells [1]. The presence of oncocytes in salivary gland neoplastic pathology was previously classified by the World Health Organisation (WHO) into three categories: Oncocytosis, Oncocytoma, and Oncocytic Carcinoma. However, the WHO 2022 classification has made several changes, reclassifying oncocytic carcinoma as salivary carcinoma, Not Otherwise Specified (NOS) type, with emerging entities. On the other hand, the lesion of oncocytoma, as classified in the WHO 2017 version, has been retained in the 2022 classification as Oncocytoma [2].



[Table/Fig-10]: Gross image- Cut section shows mostly solid, well-circumscribed tumour mass which appears capsulated.



[Table/Fig-11]: a) Photomicrograph shows three distinct areas–the oncocytic tumour, capsule, and normal salivary gland tissue (10x, H&E); b) Photomicrograph shows large polyhedral cells, or oncocytes, with a lot of granular, eosinophilic cytoplasm in sheets under a microscope. No signs of mitosis were seen (40x, H&E).

Oncocytoma is an uncommon benign salivary gland tumour composed of large epithelial cells known as oncocytes, primarily derived from the salivary duct-lining oncocytic cells. The prefix "onco" is derived from the Greek word "on koustai," meaning "to swell." The term "oncocytoma" was coined by Jaffe. Meza-Chavez later proposed the term "Oxyphilic granular cell adenoma," linking the increased mitochondrial content in tumour cells to the eosinophilic granular cytoplasm [3].

Oncocytes in salivary glands are rare in individuals under 50 years old but are typically present in individuals by age 70 years. They are often observed in the seventh to eighth decade of life, with a slight female predilection. Oncocytes can be found in various parts of the body, including the respiratory tract, mammary glands, thyroid gland, pancreas, parathyroid gland, pituitary gland, testes, fallopian tubes, liver, stomach, as well as the major salivary glands in the oral cavity. The first case of oncocytoma in a salivary gland was discovered by Hamperl in 1931 [3].

The oncocyte is an epithelial cell with a unique morphology characterised by abundant granular eosinophilic cytoplasm and a central or eccentric nucleus with coarse chromatin or pyknotic nuclei. The appearance of the nuclei can sometimes be atypical, raising suspicion of malignancy within the oncocytes [4].

Encountering a pure oncocytic cell pathology is rare, especially when a diagnosis confirmation is required through fine needle aspiration cytology. This rarity is also true for the occurrence of oncocytic neoplasms among head and neck tumours.

Cytodiagnosis of oncocytic neoplasms is challenging for two main reasons: 1) Oncocytic cells can be found in conditions other than oncocytic neoplasia, such as chronic parotitis (chronic sialadenitis) and others; and 2) Oncocytes can maintain morphological differentiation even in the presence of oncocytic carcinoma [4].

The difficulty in interpretation can be overcome by the presence of lymphoid cell infiltration and the presence of nuclear atypism in smears of fine needle aspirate in chronic sialadenitis. Well-differentiated oncocytic carcinomas exhibit low-grade malignant nuclear features that allow for the distinction based on cytomorphology in the smears.

There are isolated case reports in the literature describing the diagnosis of oncocytoma of the parotid gland. Cytodiagnosis achieved through fine needle aspiration cytology of oncocytoma is even rarer.

Verma K and Kapila K published a comprehensive report on cytologic findings and the differential diagnosis of salivary gland tumours with prominent oncocytic components. The results of their study suggested that the FNAC work-up for salivary gland tumours containing oncocytic components is fairly accurate for a preoperative diagnosis [1].

Chakrabarti I et al., studied that clinically and cytologically, an oncocytic neoplasm was suspected, but further histological study revealed diffuse hyperplastic oncocytosis. Therefore, histological investigation often remains the cornerstone of diagnosis in cases of oncocytic lesions of the salivary glands, presenting significant challenges to cytopathologists [5].

Palakshappa SG et al., studied that, to the best of their knowledge, this oncocytoma originating from a small salivary gland was the first example documented and the 18th overall occurring in the right retromolar area. Due to the lack of extensive series, a thorough analysis of the cases reported in the literature could lead to a better understanding of this uncommon phenomenon [6].

Sharma V et al., studied that oncocytes can be found in salivary glands in various circumstances, from hyperplasia to obviously malignant tumours. Due to localised sampling of the lesion, diagnosis by FNAC can be exceedingly challenging because oncocytic alterations can occur in a wide range of neoplastic and non neoplastic diseases. Histopathology remains the most reliable method for determining an accurate diagnosis [4].

Previous studies showed that rare and benign oncocytomas of the parotid gland have not received much attention. The current gold standard of care is surgical excision. Although they are uncommon, appropriate imaging such as CT and Magnetic Resonance Imaging (MRI), followed by FNAC, would aid in determining the right surgical technique. Since there is evidence of recurrence, all patients undergoing MRI are encouraged to follow-up [7].

Oncocytomas of the parotid gland are uncommon [8] and are a distinct benign neoplasm described in the WHO classification [2]. Oncocytes are epithelial cells rich in mitochondria [9]. Oncocytes are known to be present in various lesions, such as chronic inflammatory lesions of the salivary gland, as an active process. However, a smaller population of oncocytes, whether in histological sections or cytologic preparations, indicates primary oncocytic cell neoplasia [3,9,10].

Oncocytomas are known to have frequent cytogenetic abnormalities, such as Copy Number Alterations (CNAs) of 7q, 10q, and 16p on comparative genomic hybridisation, but these abnormalities are inconsistent [11].

Cytodiagnosis performed on FNAC of oncocytomas of the parotid gland is infrequently published in the literature. This rarity of incidence and overlapping cytomorphologies contribute to this. The classic cytologic features described for oncocytoma include the absolute population of oncocytes without significant accompanying cells, such as lymphocytes, cysts, macrophages, and pure ductal cells, which should raise suspicion of oncocytoma. The cases described in the literature showed similar cytomorphology in the diagnosis of oncocytoma.

Cytopathologists commonly face a dilemma in the FNAC diagnosis of oncocytoma. The reasons for this include: i) its occurrence as

a metaplastic change in chronic sialadenitis; ii) Warthin's tumour; iii) distinguishing between benign and malignant oncocytomas.

It is described in the literature that oncocytes associated with inflammatory cells, cysts, macrophages, or a polymorphous population of lymphoid cells are less likely to be oncocytoma itself [5,6]. Another challenge for cytologists is differentiating between benign oncocytoma and malignant oncocytoma. Higher degrees of nuclear pleomorphism within the cells and a comparative decrease in cell size favour the diagnosis of malignant oncocytoma. The cases presented lacked nuclear pleomorphism, and the cell size was intermediate to large. Additionally, there were no inflammatory cells or other cells in the cytology smears from fine needle aspiration in these cases.

The two cases presented in these articles underwent excision of nodular tumours, confirming the diagnosis of oncocytoma. Some studies consider the differential diagnosis for oncocytoma to include conditions showing oncocytosis, such as diffuse hyperplastic oncocytosis or multifocal nodular oncocytic hyperplasia. However, both of these conditions do not alter the treatment approach for the lesion.

An interesting report by Patel ND et al., in the literature described oncocytoma as a vanishing parotid mass. It is known that oncocytes undergo necrosis in many instances after FNAC due to ischaemic necrosis [9].

CONCLUSION(S)

The experience with these two cases of cytodiagnosis of oncocytoma by FNAC leads to the conclusion that a pure population of oncocytes with benign nuclei correlates well with benign oncocytoma neoplasia. The preoperative diagnosis of oncocytoma allows the surgeon to plan the surgical excision. Despite their remarkable survival rate and low recurrence rate, oncocytomas require a proper diagnosis.

The two cases described are unique due to the rarity of oncocytoma being diagnosed through fine needle aspiration cytology, in addition to histological diagnosis, alongside routine clinical and radiological diagnosis. This aids in more accurately detecting a head and neck lesion with specific microscopic characteristics. This will contribute to the existing literature on cytodiagnosis of oncocytoma. Since there are not many extensive series available, a thorough examination of the examples documented in the literature should help authors better understand this uncommon phenomenon.

REFERENCES

[1] Verma K, Kapila K. Salivary gland tumours with a prominent oncocytic component: Cytologic findings and differential diagnosis of oncocytomas and Warthin's tumour on fine needle aspirates. Acta cytologica. 2003;47(2):221-26.
[2] Żurek M, Fus Ł, Niemczyk K, Rzepakowska A. Salivary gland pathologies: Evolution in classification and association with unique genetic alterations. Eur Arch Otorhinolaryngol. 2023;280(11):4739-50.
[3] Singh J, Chandra A, Srilatha T, Jain T, Raja D, Agrawal R. Oncocytoma of the parotid gland: A rare benign tumour. J Oral Maxillofac Pathol. 2023;27(Suppl 1):S41.
[4] Sharma V, Kumar S, Sethi A. Oncocytoma parotid gland. Ann Maxillofac Surg. 2018;8(2):330.
[5] Chakrabarti I, Basu A, Ghosh N. Oncocytic lesion of parotid gland: A dilemma for cytopathologists. J Cytol. 2012;29(1):80-82.
[6] Palakshappa SG, Bansal V, Reddy V, Kamarthi N. Oncocytoma of minor salivary gland involving the retromolar region: A rare entity. J Oral Maxillofac Pathol. 2014;18(1):127-30.
[7] Vlachaki E, Tsapas A, Dimitrakopoulos K, Kontzoglou G, Klonizakis I. Parotid gland oncocytoma: A case report. Cases J. 2009;2:6423. Doi: 10.1186/1757-1626-0002-0000006423. PMID: 20181155; PMCID: PMC2827107.
[8] Capone RB, Ha PK, Westra WH, Pilkington TM, Sciubba JJ, Koch WM, et al. Oncocytic neoplasms of the parotid gland: A 16-year institutional review. Otolaryngol Head Neck Surg. 2002;126(6):657-62.
[9] Patel ND, Van Zante A, Eisele DW, Harnsberger HR, Glastonbury CM. Oncocytoma: The vanishing parotid mass. AJNR Am J Neuroradiol. 2011;32(9):1703-06.
[10] Sreedevi NM, Vernekar SS, Samee MM, Dandinarasaiah M. A large malignant oncocytoma of parotid gland: A case report. Int J Otorhinolaryngol Head Neck Surg. 2020;6(12):2307.
[11] Zerjav M, DiAdamo A, Grommisch B, Katherine A, Chai H, Peng G, et al. Cytogenomic abnormalities in 19 cases of salivary gland tumours of parotid gland origin. Case reports in genetics. 2020;2020:8897541.

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