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Case Report

Cytological diagnosis of rare variant of anaplastic thyroid carcinoma: case report

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ABSTRACT

Anaplastic thyroid carcinoma (ATC) is an exceptionally rare and highly aggressive malignancy, accounting for merely 1-2% of all thyroid cancers (TC). Despite its low incidence, ATC is notorious for its fulminant clinical course and dismal prognosis. Among the histological subtypes of ATC, the osteoclastic variant represents an exceedingly rare morphologic entity. It is characterized by the presence of numerous multinucleated osteoclast-like giant cells interspersed within the undifferentiated malignant component, raising diagnostic challenges and often necessitating thorough histopathological evaluation for confirmation. The advent and widespread utilization of fine-needle aspiration cytology (FNAC) has markedly transformed the diagnostic landscape of thyroid nodules. FNAC allows for early identification of undifferentiated and aggressive neoplastic processes, facilitating prompt clinical decision-making. Herein, we present a case of ATC with osteoclast-like giant cells in an elderly female patient. The diagnosis was initially suggested by cytological features observed on FNAC and subsequently confirmed on histopathological examination of the resected specimen. This case underscores the critical role of cytopathology in the early recognition of rare ATC variants and highlights the need for heightened clinical suspicion in rapidly evolving thyroid masses.

Keywords: Anaplastic thyroid carcinoma, Osteoclastic variant, FNAC

INTRODUCTION

According to GLOBOCAN 2022, TC is the most prevalent malignancy of the endocrine system.[1] However, ATC remains a rare subtype, with a global incidence of only about 1-2 cases per million people annually. Although it represents only about 1-2% of all TCs, it accounts for a disproportionately high. number of TC-related deaths due to its aggressive behavior and poor prognosis.[2]These tumors commonly occur in elderly women, presenting as rapidly growing masses.[3] Histologically, three main variants are more commonly described: spindle cell, epithelial (squamoid), and giant cell, which can occur singly or in combination. Among these, the osteoclast-like giant cell variant is rare, accounting for only about 10% of undifferentiated thyroid carcinoma cases. There are few published reports detailing the cytological features of this uncommon variant.[4] We report a case of anaplastic carcinoma in an elderly female patient, characterized by the focal presence of squamoid cells and osteoclast-like giant cells, as acknowledged through FNAC.

CASE REPORT

A 72-year-old woman presented with a neck swelling that had been present for 40 years, with a recent history of rapid enlargement over the past month. The swelling was associated with dull, aching pain, dysphagia, and dyspnea. There was no history of fever or cough. On examination, a 10×8 cm soft to firm anterior neck mass was noted, which moved with deglutition. Thyroid function tests were within normal limits, indicating a euthyroid state.

Figure 1: Patient with a large, visible swelling on the anterior (front) aspect of her neck (A) front view; and (B) lateral view.

Ultrasonography revealed a large, multilobulated solid-cystic lesion with a peripheral rim of calcification, categorized as TIRADS 5, suggestive of high suspicion for malignancy. Contrast-enhanced CT (CECT) of the neck demonstrated a large space-occupying lesion measuring 10×7.3×7 cm in the right thyroid lobe, with peripheral thick calcification. The lesion showed anterior protrusion with compression and displacement of the overlying anterior strap muscles, as well as leftward displacement of the trachea and midline structures, without evidence of local invasion. The left thyroid lobe appeared unremarkable. Small lymph nodes were noted bilaterally in the submental and submandibular regions, the largest measuring 8 mm in maximum dimension. Fine-needle aspiration (FNA) was performed, and smears were stained using Papanicolaou and hematoxylin and eosin (H and E) stains. Initial smears revealed dense inflammatory infiltrate within a necrotic background, without the presence of atypical or benign follicular cells. A repeat FNA was therefore advised, targeting the solid component of the lesion.The repeat aspirate showed few discohesive clusters, groups, and singly scattered highly pleomorphic cells. These cells exhibited enlarged nuclei, irregular

nuclear membranes, coarse clumped chromatin, prominent nucleoli, and moderate to abundant cytoplasm. Focal squamoid differentiation was observed. Additionally, multinucleated osteoclast-like giant cells and scattered epithelioid cells were noted in a background of acute inflammation and extensive necrosis. The final cytological impression was classified as Bethesda category V-suspicious for malignancy, with differential diagnoses including: Undifferentiated (Anaplastic) carcinoma, metastatic poorly differentiated carcinoma and medullary carcinoma.

A total thyroidectomy was performed, revealing a solid-cystic mass with a prominent central area of necrosis on the cut surface. Histopathological examination demonstrated sheets of pleomorphic cells exhibiting squamoid differentiation, along with the presence of multinucleated giant cells. These were admixed with inflammatory infiltrates and extensive necrotic areas. Based on the combined radiological and pathological findings, lesion was diagnosed as the osteoclastic variant of ATC. However, no further treatment was done as patient was not willing for further treatment or follow-up.

Figure 2: Large solid-cystic lesion in the right thyroid lobe with thick peripheral coarse calcification (A) Sagittal view; and (B) axial view.

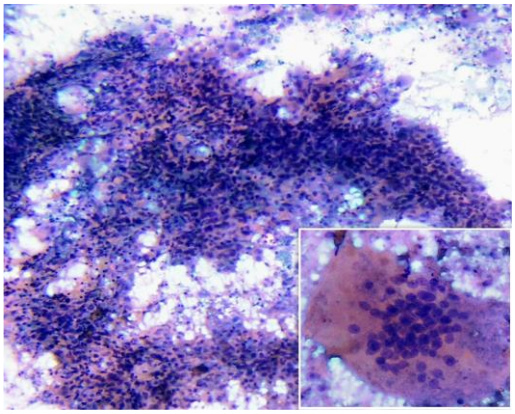

Figure 3: FNAC smears reveal pleomorphic tumor cells arranged in clusters and singly scattered, admixed with inflammatory cells in a background of necrosis. The inset highlights a multinucleated giant cell (PAP stain, 100X).

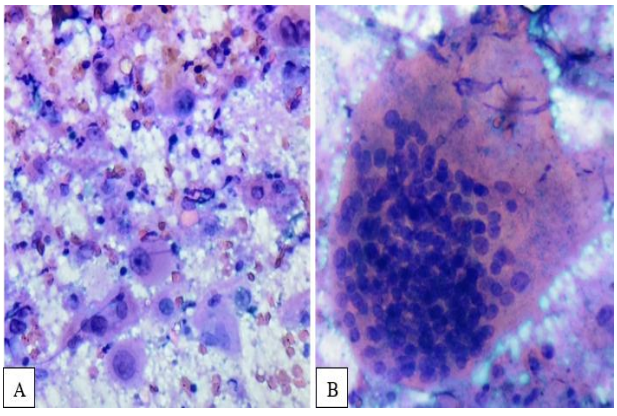

Figure 4: (A) Singly scattered pleomorphic cells exhibiting enlarged nuclei, coarse clumped chromatin, prominent nucleoli, and moderate to abundant cytoplasm; and (B) presence of multinucleated, osteoclast-like giant cells interspersed within the smear (PAP stain, 400X).

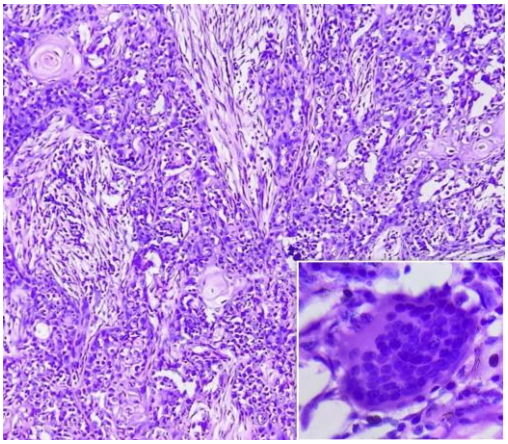

Figure 5: H and E (100X) stained slide demonstrates sheets of pleomorphic cells with focal squamoid differentiation, admixed with inflammatory infiltrates and extensive necrosis. Inset highlights a multinucleated osteoclast-like giant cell.

DISCUSSION

ATC is a rare but highly aggressive tumor, accounting for only 1% to 2% of all TCs.[5] Despite its rarity, it is the most lethal form of primary thyroid malignancy, with mortality rate of 50% and a median one-year survival rate of just 10% to 20%.[6]

The etiopathogenesis of ATC remains largely elusive; however, limited studies have implicated a potential association with iodine deficiency, radiation exposure, pre-existing thyroid disease and longstanding goitre. Historically, ATC was misclassified by some as a variant of sarcoma, while others hypothesized a C-cell origin. Current consensus, however, supports the notion that ATC arises from dedifferentiation of follicular epithelial cells. Notably, these tumor cells lack the functional hallmarks of their cells of origin, including iodine uptake and thyroglobulin synthesis-features attributed to a profound loss of antigenicity accompanying cellular dedifferentiation.[7,8]

ATC predominantly affects individuals over the age of 60, with a notable female predominance ranging from 55% to 77%.[9] Clinically, it most commonly manifests as a rapidly enlarging, painful mass in the lower anterior neck, characteristically firm and often adherent to surrounding tissues. The aggressive local invasion frequently results in compressive symptoms such as hoarseness, dysphagia, dyspnea, and persistent cough, reflecting involvement of adjacent aerodigestive and neural structures.[10] Our patient was also an elderly female presenting with a history of sudden increase in long standing neck swelling with compressive symptoms of dysphagia, dyspnea and hoarseness of voice. However, there was no cervical lymphadenopathy and no metastasis at the time of diagnosis. The designation 'undifferentiated carcinoma' in the context of the thyroid gland encompasses two principal histopathological patterns, which may coexist within the same tumor. The first is the squamoid variant, while the second includes spindle cell and giant cell morphologies. These neoplastic components are frequently accompanied by areas of necrosis and a prominent inflammatory infiltrate. The occurrence of osteoclast-like giant cells is an uncommon but documented histological feature.[11]

The diagnosis of ATC relies on a multimodal approach incorporating cytological evaluation, histopathological examination, imaging modalities, and immunohistochemical (IHC) profiling. FNAC has demonstrated high diagnostic reliability, with reported accuracy rates of approximately 90% in identifying ATC.[12] In a comprehensive analysis of 724 cases, Sharma reported an FNAC accuracy of 97% for thyroid malignancies.[13] Wagan et al further highlighted that the incidence of malignancy within non-toxic multinodular goitre is approximately 10.58%, predominantly represented by papillary thyroid carcinoma (7%), whereas the occurrence of anaplastic carcinoma in this context remains exceedingly rare.[14] Although hyperthyroidism has been occasionally documented in cases of ATC, Marcelino et al noted that the concomitant presentation of ATC with non-toxic multinodular goitre has not been reported in the existing literature.[15] In the present case, the patient exhibited a large, prominent anterior neck swelling that yielded a non-diagnostic result on initial fine-needle aspiration. However, guided by ultrasonographic findings, multiple targeted aspirates were obtained from different anatomical sites, ultimately facilitating an accurate diagnosis.

Although the presence of osteoclast-like giant cells was noted, this histological feature bears no influence on the inherently aggressive biological behavior of ATC, nor does it alter the overall prognosis. Importantly, the presence of numerous giant cells warrants careful consideration of differential diagnoses, particularly subacute (granulomatous) thyroiditis and papillary thyroid carcinoma with giant cell components. Notably, both granulomatous thyroiditis and ATC may exhibit a background rich in inflammatory cells and cellular debris. However, in subacute thyroiditis, the giant cells are typically much larger and more prominent. In elderly patients presenting with a rapidly enlarging, obstructive thyroid mass, the possibility of an underlying malignancy must be promptly considered. Rapid and definitive diagnostic evaluation is critical to enable timely initiation of appropriate therapeutic interventions.[16] Recent studies have indicated that combined modality treatment incorporating radiotherapy and chemotherapy may offer promising preliminary outcomes in select cases.

CONCLUSION

ATC with osteoclast-like giant cells is a rare variant of this highly aggressive malignancy. Despite its distinct cytological features, it can pose significant diagnostic challenges. This case underscores the diagnostic value of multi-site aspiration in diffusely enlarged thyroid

swellings, particularly when unusual giant cells with necrosis are present in the aspirate, aiding in the identification of osteoclastic variant of ATC.

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REFERENCES

1. International Agency for Research on Cancer WHO. GLOBOCAN 2022. Available at: https://gco.iarc.fr/today/en2024. Accessed on 03 April 2026.
2. Nagaiah G, Hossain A, Mooney CJ, Parmentier J, Remick SC. Anaplastic thyroid cancer: a review of epidemiology, pathogenesis, and treatment. J Oncol. 2011;2011:542358.
3. Bantumilli S, Zhu L-C, Sakthivel M, Dodd L. A case of osteoclastic variant of anaplastic thyroid carcinoma: Diagnostic and prognostic marker studies by cytology. Diagnostic Cytopathol. 2022;50(12):E357-60.
4. Rosai J, Carcangiu ML, DeLellis RA, editors. Atlas of tumour pa thology: Tumours of the thyroid gland, 3rd series. Washington DC: AFIP. 1992;142.
5. Gilliland FD, Hunt WC, Morris DM. Prognostic factors for thyroid carcinoma. A population based study of 15,698 cases from the Surveillance, Epidemiology and End Results (SEER) program 1973-1991. Cancer, 1997;79:564-73.
6. Mathur P, Rana C, Gupta V. Osteoclastic variant of anaplastic thyroid carcinoma: An insight into a rarest of rare entity. Diagnostic Cytopathol. 2022;50(8):E210-3.
7. Valand AG, Ramraje SN, Shedge R, Aware S. Anaplastic thyroid carci noma with osteoclast-like giant cells. J-Assoc Physicians India. 2004;52:585-6.
8. Chiacchio S, Lorenzoni A, Boni G, Rubello D, Elisei R, Mariani G. Ana plastic thyroid cancer: prevalence, diagnosis and treatment. Minerva Endocrinol. 2008;33(4):341-57.
9. Pichardo-Lowden A. Anaplastic thyroid carcinoma in a young woman: a rare case of survival. Thyroid. 2009;19(7):775-9.
10. Tennvall J, Lundell G, Hallquist A. Combined doxorubicin, hyper fractionated radiotherapy, and surgery in anaplastic thyroid carcinoma: report on two protocols. Swedish Anaplastic Thyroid Cancer Group Cancer. 1994;74:1348-54.
11. Mehdi G, Ansari H, Siddiqui SA. Cytology of anaplastic giant cell carcinoma of the thyroid with osteoclast like giant cells- a case report. Wiley Inter Sci. 2007;35:111-2.
12. Negro R, Valcavi R, Toulis KA. Incidental thyroid cancer in toxic and nontoxic goiter: Is TSH associated with malignancy rate? Results of a meta-analysis. Endocr Pract. 2013;19:212-8.
13. Sharma C. Diagnostic accuracy of fine needle aspiration cytology of thyroid and evaluation of discordant cases. J Egypt NatlCanc Inst. 2015;27(3):147-53.
14. Adorable-Wagan P, Martinez A, Chua-Agcaoili M, Alcazaren EAS. A case of toxic multi-nodular goiter with anaplastic carcinoma. JASEAN Federat Endocrine Societ. 2012;27(1):109.
15. Marcelino M, Marques P, Lopes L, Leite V, Castro JJ. Anaplastic carcinoma and Toxic multinodular goiter: An unusual presentation. Eur Thyroid J. 2014;3:278-82.
16. Beena D. Anaplastic Carcinoma Occurring in a Longstanding Multinodular Goitre Diagnosed by FNAC: A Rare Case Report. J Clin Diagnost Res. 2019;13(3):ED01-2.

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