

## Case Report


# A rare case of osteoclastic variant of Anaplastic Thyroid Carcinoma diagnosed by Fine Needle Aspiration Cytology

Nisha Mehta<sup>1</sup>, Jigna Patel<sup>2\*</sup>, Niyati Shah<sup>3</sup>, Premnath Hiryu<sup>4</sup>

<sup>1,3</sup>P.G. Student, <sup>2</sup>Assistant Professor, <sup>4</sup>Professor

Pathology Department, SBKS MI & RC, Sumandeep Vidyapeeth, Vadodara, India

\*Corresponding author email: [creativity.art.j@gmail.com](mailto:creativity.art.j@gmail.com)

	International Archives of Integrated Medicine, Vol. 6, Issue 6, June, 2019.	
	Copy right © 2019, IAIM, All Rights Reserved.	
	Available online at <a href="http://iaimjournal.com/">http://iaimjournal.com/</a>	
	ISSN: 2394-0026 (P)	ISSN: 2394-0034 (O)
	Received on: 20-05-2019	Accepted on: 13-06-2019
	Source of support: Nil	Conflict of interest: None declared.
<b>How to cite this article:</b> Nisha Mehta, Jigna Patel, Niyati Shah, Premnath Hiryu. A rare case of osteoclastic variant of Anaplastic Thyroid Carcinoma diagnosed by Fine Needle Aspiration Cytology. IAIM, 2019; 6(6): 132-136.		

## Abstract

Anaplastic thyroid carcinoma (ATC) is a rare, highly malignant thyroid tumor with dismal prognosis. Its usual presentation is in elderly patients as a very rapidly growing mass. ATC mainly shows three patterns: spindle cells, giant cell and squamoid but these three subtypes frequently coexist. Osteoclastic giant cell variant of ATC is extremely rare and is characterized by the presence of a large number of multinucleated giant cells resembling osteoclasts. We are reporting here this unusual variant in a 67-year-old male with a history of progressively increasing midline neck swelling and pulmonary metastasis and left jugular vein thrombosis. Cytologically, many multinucleated osteoclast-like giant cells were seen accompanying the malignant spindle cell component.

## Key words

Anaplastic thyroid carcinoma, Osteoclasts, Giant cells.

## Introduction

Anaplastic thyroid carcinoma (ATC) is a high-grade neoplasm that arises from the follicular cells of thyroid gland, characterized by an aggressive clinical course with brief survival, and is refractory to currently available local and systemic modalities of treatment. ATC is the

third in frequency at a rate of 1.6% after papillary and follicular carcinomas [1, 2, 3] but accounts for up to 39% of thyroid carcinoma deaths [2, 4-6]. The average survival is 6-12 months with a 10-year survival of approximately 3 percent [7]. Most patients have local symptoms such as dysphagia, dysphonia, stridor and neck

pain. Although some series report a few cases of incidental ATC in thyroid nodules, ATC frequently appears as a rapidly growing mass in the neck. About 40% of the cases have cervical lymph node metastases, 90% directly invade the surrounding soft tissues and organs such as trachea and larynx and 75% have distant metastases. Metastases are seen most commonly in the lungs and the brain [1, 2, 8]. The diagnosis of ATC is usually based on clinical examination and cytology, histology, study and immunohistochemical study are helpful in establishing the correct diagnosis of ATC [9].

Microscopically, squamoid, giant cell and/or spindle cell variants are the usual patterns seen in the ATC [10-12]. However, association of this tumor with many multinucleated giant cells resembling osteoclast is very rare [13-15]. No evidence of osteoid formation is seen in these tumors [12].

### **Case report**

A 75 year old male patient was presented with midline neck swelling more towards left side and dysphagia as chief complaint and associated complaint of cough and breathlessness. On examination, swelling was about 10 x 8 cm, hard to firm, non-mobile and overlying skin was normal with a small ulcerated area on it (**Photograph - 1**).

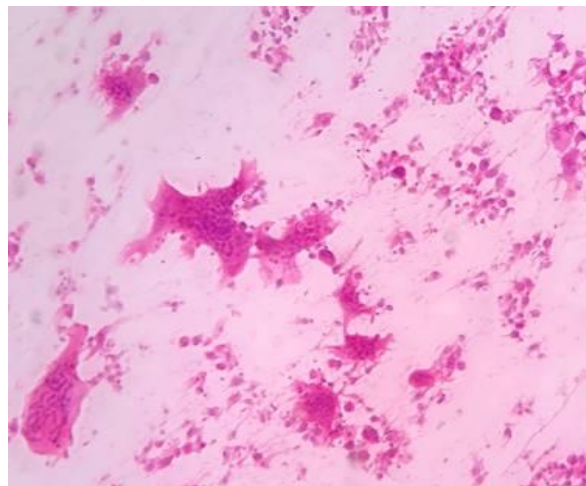
**Photograph – 1:** Midline neck swelling more towards left side.



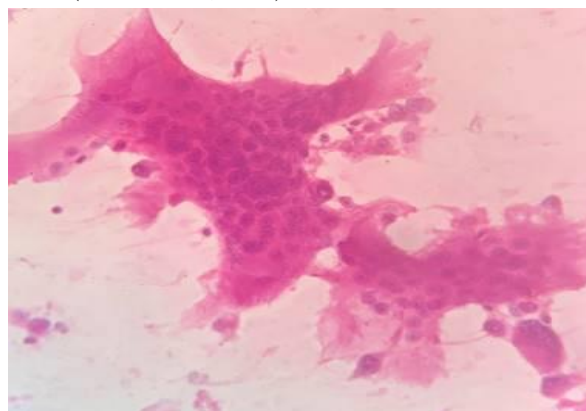
**Photograph – 2:** Axial contrast enhanced CT scan showing soft tissue mass arising from left lobe of thyroid displace trachea to right.



**Photograph – 3:** Marked pleomorphic malignant cells with Large multinucleated giant cells (H&E Stain, 10 X).



**Photograph – 4:** Large multinucleated giant cells (H&E Stain, 40X).



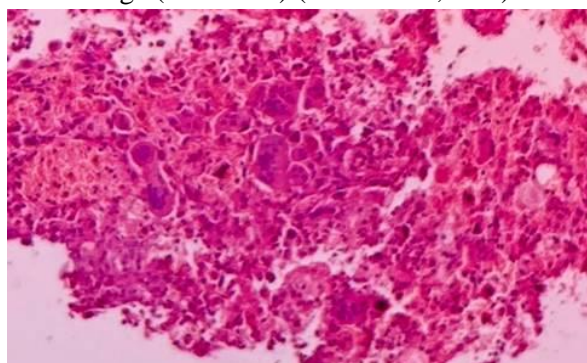
Computed Tomography study revealed a large ill-defined soft tissue mass arising from left lobe of thyroid showing heterogeneous post contrast enhancement with internal necrotic areas. The mass abuts and displace trachea to right, abuts

esophagus, engulf internal jugular vein. Multiple intra parenchymal soft tissue density was noted in right upper lobe and superior segment of left lower lobe of lung (**Photograph - 2**).

Fine needle aspiration cytology (FNAC) was performed by standard procedure [16, 17, 18, 19] from the thyroid swelling and also Cell block was made. The smears from the thyroid swelling showed neoplastic cells arranged in loose clusters as well as dispersed singly in the background of large intervening areas of necrosis, neutrophils and hemorrhage. The cells were extremely variable in shape show bizarre nuclei with macronucleoli, irregular nuclear membranes and coarse clumped chromatin and a mixture of spindle cells and osteoclast like giant cells were seen (**Photograph - 3, 4**).

Microscopic examination of multiple sections from the cell block revealed a multifocal tumor composed of solid areas with pleomorphic, bizarre mononuclear cells and many osteoclast like giant cells. Giant cells were large with 10 to 30 bland looking vesicular nuclei. Extensive areas of hemorrhage and necrosis were also present (**Photograph - 5**). A diagnosis of Osteoclastic variant of anaplastic thyroid carcinoma was made.

**Photograph – 5:** Numerous osteoclasts-like multinucleated giant cells embedded in hemorrhage (cell block) (H&E Stain, 40X).



## Discussion

ATC is a rare swiftly growing extremely aggressive tumor [13, 16]. The peak incidence is in late adulthood with slight female

preponderance [13, 15]. Clinically, the patient usually presents with a rapidly increasing bulky neck mass associated with dysphonia, dysphagia and dyspnea. Compression of the adjacent vital structures of the neck and extension into the ribbon muscles, esophagus, trachea, skin and adjoining bones is generally present at the time of initial presentation in most of the cases [11-13]. Most are fatal within 6 to 12 months of the initial diagnosis.

Origin of these tumors has been investigated by many authors [13]. For many years, most of these anaplastic giant cell tumors of the thyroid were considered as sarcomas [13-15]. In 1930, Smith proposed an epithelial origin. The osteoclastic variant of ATC was first reported as a tumor of unknown histogenesis by Nadal in 1910. In 1940, Hebbel classified them as giant cell tumors of epithelial origin. In 1974, Ultrastructural studies done by Jao and Gould suggesting a follicular epithelial origin for these tumors [13-15, 21]. Since then, based on cumulative evidence from electron microscopic, immunohistochemical (IHC) and cell culture studies, most pathologists agree that ATC with all its heterologous tumor elements arise from follicular epithelial cells [13, 15, 20]. There are two morphological types of ATC: a) spindle and giant cell carcinoma and b) squamoid carcinoma. The smears of giant cell type contain mainly necrotic matter, cellular debris, inflammatory cells mainly granulocytes and large polymorphous, often multinucleated cells with large bizarre nuclei and very prominent nucleoli. In squamoid type aspirate contain malignant cells with round to oval nuclei and scanty cytoplasm [11, 21]. Common microscopic diagnostically useful features of ATC are high mitotic activity, large areas of necrosis with palisading at necrotic edges and tendency for tumor cells to invade the walls of the veins replacing normal smooth muscle [11, 21].

Most of these tumors arise as a result of dedifferentiation of preexisting differentiated thyroid tumor. Mostly develops in papillary carcinoma or its variants but may also take place

in follicular, Hurthle cell or insular carcinomas or in a metastatic focus [11-13, 15]. Immunohistochemically, in 50-100% of the cases, these undifferentiated tumors are positive for low molecular weight keratins (CK7+ve, CK20-ve), thus, confirming their epithelial origin [11, 14]. Vimentin positivity is present in spindle cell component [11, 12, 14]. Anaplastic carcinomas in 79% of the cases express PAX8. TTF-1 is usually negative except in few cases with a squamoid component [11]. Thyroglobulin is generally undetected [11, 12]. At molecular level, the major genetic alteration present in majority of ATC is the presence of inactivating TP53 mutations which is not present in residual differentiated tumor. Other common mutations are RAS and BRAF mutations which are seen in both differentiated and dedifferentiated cancers [11, 12].

### **Conclusion**

Although ATC is a rare thyroid carcinoma, still accounting for a significant portion of the morbidity and mortality associated with thyroid cancer. There is no standard approach to therapy in ATC, so recognizing the cytological finding and making the prompt and proper cytological diagnosis are helpful to determine the treatment plan for the patients who suffer with this entity.

### **References**

1. Oktay MH, Smolkin MB, Williams M, Cajigas A. Metastatic anaplastic carcinoma of the thyroid mimicking squamous cell carcinoma: report of a case of a challenging cytologic diagnosis. *Acta Cytol.*, 2006; 50: 201-204.
2. Are C, Shaha AR. Anaplastic thyroid carcinoma: biology, pathogenesis, prognostic factors, and treatment approaches. *Ann Surg Oncol.*, 2006; 13: 453-464.
3. Kebebew E, Greenspan FS, Clark OH, Woeber KA, McMillan A. Anaplastic thyroid carcinoma. Treatment outcome and prognostic factors. *Cancer*, 2005; 103: 1330-1335.
4. Ain KB. Anaplastic thyroid carcinoma: behavior, biology, and therapeutic approaches. *Thyroid*, 1998; 8: 715-726.
5. Fraker DI, Skarulis M, Livolsi V. Thyroid tumors. *Cancer Principles and Practice of Oncology*, 6<sup>th</sup> Edition, Devita VT, Hellman S, Rosenberg DA (eds.). Philadelphia: Lippincott Williams and Wilkins, 2001; p. 170-1763.
6. Schlumberger MK. Anaplastic thyroid carcinoma. *Orphanet Encyclopedia*, March 2004.
7. Lam KY, Lo CY, Chan KW, Wan KY. Insular and anaplastic carcinoma of the thyroid: a 45-year comparative study at a single institution and a review of the significance of p53 and p21. *Ann Surg.*, 2000; 231: 329-338.
8. Pierie JP, Muzikansky A, Gaz RD, Faquin WC, Ott MJ. The effect of surgery and radiotherapy on outcome of anaplastic thyroid carcinoma. *Ann Surg Oncol.*, 2002; 9: 57-64.
9. Mobeen Alwani, Gunvanti B. Rathod. Diagnosis of anaplastic thyroid carcinoma on fine needle aspiration cytology- A rare case report. *IAIM*, 2015; 2(3): 183-187.
10. Han KM, Kim DH, Lee W. Aspiration cytology of the osteoclastic variant of anaplastic thyroid carcinoma: with special emphasis on the undifferentiated mononuclear cells. *Korean J Pathol.*, 2010; 44: 682-686.
11. Rosai J, Tallini G. Thyroid gland. In: Rosai J, eds. *Rosai and Ackerman's Surgical Pathology*, 10<sup>th</sup> edition, Elsevier, 2011, p. 524-526.
12. Joseph LD, Ravi A, Rekha A, Rao S, Aarthi R, Panicker VK. Osteoclastoma-like anaplastic carcinoma of the thyroid. *J Cytol.*, 2008; 25(2): 65-66.
13. Valand AG, Ramraje SN, Pandeya BS, Shedje R, Aware S. Anaplastic thyroid

- carcinoma with osteoclast-like giant cells. JAPI, 2004; 52: 585-586.
14. Karapandzic A, Panjkovic M, Eri Z, Klem I, Budisin E. Primary anaplastic osteoclastic-like carcinoma of the ectopic thyroid gland. Med Data Rev., 2009; 1(3): 53-55.
  15. Esmaili HJ, Hafez GR, Warner TFCS. Anaplastic carcinoma of the thyroid with osteoclastoma like giant cells. Cancer, 1983; 52: 2122-2128.
  16. Rathod GB, Goyal R, Bhimani RK, Goswami SS. Metaplastic carcinoma of breast in 65 years old female report. Medical Science, 2014; 10(39): 77-81.
  17. Disha Singla, Gunvanti Rathod. Cytodiagnosis of renal cell carcinoma case report. IAIM, 2015; 2(2): 133-137.
  18. Gunvanti Rathod, Pragnesh Parmar. Fine needle aspiration cytology of swellings of head and neck region. Indian Journal of Medical Sciences, 2012; 66: 49-54.
  19. Gunvanti Rathod, Sangita Rathod, Pragnesh Parmar, Ashish Parikh. Diagnostic efficacy of fine needle aspiration cytology in cervical lymphadenopathy – A one year study. International Journal of Medical and Pharmaceutical Sciences, 2014; 4(5): 1-8.
  20. Han KM, Kim DH, Lee W. Aspiration cytology of the osteoclastic variant of anaplastic thyroid carcinoma: with special emphasis on the undifferentiated mononuclear cells. Korean J Pathol., 2010; 44: 682-686.
  21. Patil SP, Patil SD. Osteoclastoma like giant cell tumor of the thyroid-a variant of undifferentiated carcinoma-a case report. Indian J Pathol Microbiol., 1997; 40(20): 169-170.