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Original Research Paper

Pathology

ANAPLASTIC THYROID CARCINOMA: A CYTOMORPHOLOGICAL REVIEW OF 11 CASES

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ABSTRACT Eleven cases of anaplastic thyroid carcinoma were reviewed. This is a swiftly growing, and rapidly fatal neoplasm that generally develops in the elderly. In the majority of cases, areas of well differentiated thyroid carcinoma could be identified, supporting the concept that epithelioid, giant cell and spindle cell carcinoma results from the transformation of pre-existing well-differentiated thyroid carcinoma. Because of the aggressive biologic activity of this neoplasm, treat all cases with combination of surgery, irradiation, and chemotherapy; however, these results still leave much to be desired. Patients with only small foci of spindle and giant cell carcinoma, at the time of diagnosis, may have a better chance of prolonged survival. The wide spread use of fine-needle aspiration has significantly changed the approach to thyroid nodules and has made it possible to identify such aggressive thyroid neoplasms from aspirated cellular material.

KEYWORDS : Anaplastic thyroid carcinoma; Giant cell variant; Epithelioid cell variant; Spindle cell variant

INTRODUCTION

Anaplastic thyroid carcinoma (ATC) represents an undifferentiated and highly aggressive form of thyroid cancer that is believed to result from dedifferentiation of well differentiated thyroid carcinomas. ATC comprises only about 1.3–2.0% of thyroid carcinomas. Significant prognostic factors including older age at presentation (50 or higher), the presence of extrathyroidal invasion, and distal metastasis negatively affect the survival of ATC.

The wide spread use of fine-needle aspiration has significantly changed the approach to thyroid nodules and has made it possible to identify such aggressive thyroid neoplasms from aspirated cellular material. The clinical implications and therapeutic approach when a thyroid lesion is diagnosed as anaplastic carcinoma by aspiration are completely different from those of other thyroid neoplasms of follicular origin. This article accounts our experience with anaplastic carcinoma of the thyroid, diagnosed cytologically.

MATERIALS AND METHODS

Over a period of 6 yr, from 2004-2010 11,425 fine needle aspirations of the thyroid were performed using a technique described elsewhere. In all cases, there were papanicolaou-stained smears available for review along with Diff-quick stained smears. Selected cases were evaluated for the following: Cellularity, Cluster formation; Cell morphology; pleomorphism; nucleoli; MNG cells; colloid; mitotic figures; necrosis; neutrophilic infiltrate; well differentiated component.

RESULTS

The review of 11,425 fine needle aspirations of the thyroid disclosed eleven cases of anaplastic carcinoma. Nine patients were females and two were males. Age ranged from 40 to 77yr (Mean 54yr).

Ten cases presented with rapid enlargement of a long standing multinodular goiter (MNG). The remaining case, operated for papillary carcinoma developed ATC eight months later. One patient had a concurrent adenocarcinoma of colon. Two cases each had accompanying lung metastasis and cervical lymphadenopathy. Two cases had an accompanying follicular neoplasm and two revealed features of nodular colloid goiter in one of the nodules. One case was clinically and biochemically hyperthyroid.

Morphological Characteristics Of Anaplastic Thyroid Carcinoma

The aspirates showed cytological changes diagnostic of anaplastic carcinoma (Fig 1-4). The following cytological features were found in the smears: (1) there were bizarre giant, epithelioid and spindle cells, syncytial clusters, isolated or forming follicles; (2) the cells showed single or multiple nuclei; (3) the nuclei disclosed irregular coarse chromatin clumps with generalised hyperchromasia; (4) multiple irregularly shaped micro and macro nucleoli were identified; (5) the tumor cells had variable amounts of cytoplasm, but was abundant in giant cells; (6) atypical mitosis; (7) a tumor diathesis predominantly neutrophils with necrosis found in the background.

All samples were considered diagnostic of malignant process. In two patients, follicular structures were identified, in another papillary formations with squamous metaplasia were recognised. In five patient's predominantly giant cells (Fig 1), four patients show predominantly plump epithelioid cells (Fig 2) and other two patients show spindle cells (Fig 3). One patient had history of adenocarcinoma of colon complained with neck mass diagnosed as anaplastic carcinoma of the thyroid. Incidental finding of microfilaria parasite was identified (Fig 5).

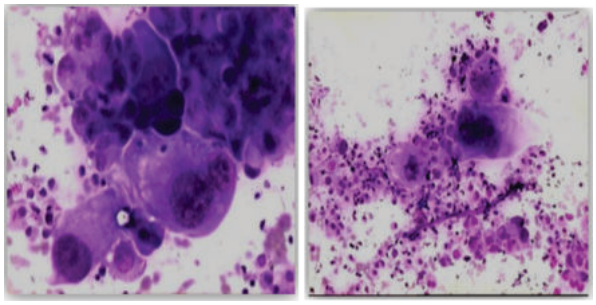

Fig 1. Anaplastic carcinoma of the thyroid with giant cells (A) and atypical mitosis (B)

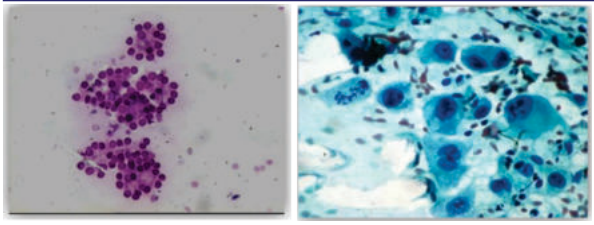

Fig 2. Anaplastic carcinoma of the thyroid with Follicular pattern (A) Epitheloid cells (B)

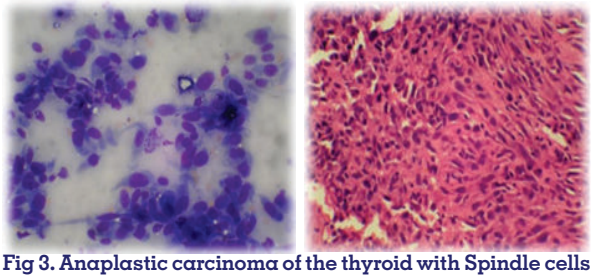

Fig 3. Anaplastic carcinoma of the thyroid with Spindle cells on aspirate (A) respective biopsy (B)

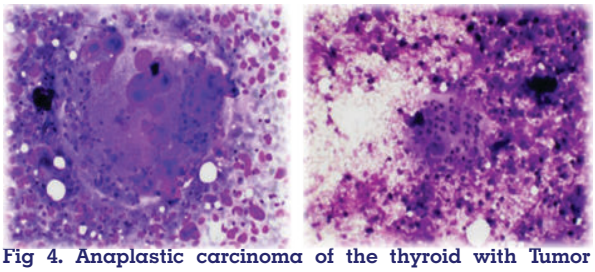

Fig 4. Anaplastic carcinoma of the thyroid with Tumor diathesis and neutrophilic infiltrate

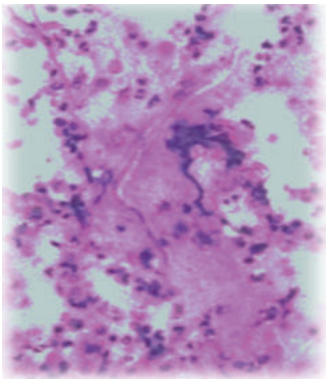

Fig 5. Microfilaria parasite in thyroid aspirate

DISCUSSION

Anaplastic carcinoma is also known as undifferentiated, dedifferentiated, sarcomatoid carcinoma.[1] The tumor is usually seen in the elderly above 50 years of age with a mean age of 66.6 years.[1, 2] In our study, one case had an age of less than 50 years, however the mean age was 54 years, which is similar to what was found in other literature.[1-3] The patients usually presented with a rapidly growing mass that frequently had an extra thyroid extension that led to hoarseness, dysphagia and dyspnoea.[1,2]

The main presenting feature of all of our cases was swelling of the neck with a mean duration of 6 months. On FNAC, these tumors yielded a highly cellular aspirate containing large pleomorphic malignant cells. These malignant cells had either a giant cell like, epithelioid cell or spindle cell like appearance. The background was mostly dirty with frequent necrotic debris and showed inflammation and scant colloid.[4] The bizarre tumor cells along with a clinical history of a rapidly increasing mass usually allows for an easy diagnosis. However, marked fibrosis may lead to inadequate sampling and follicular adenoma rarely shows severe nuclear atypia.

These tumors are commonly widely invasive with frequent invasion into the surrounding muscles and other structures of the neck.[3,5] In our study, 2 cases had lung metastasis with cervical lymphadenopathy.

Commonly, these tumors also show microscopic coagulative necrosis, which we found in all 11 cases.[6] Risk factors may include iron deficiency, long standing goiter, history of radiation or previous papillary carcinoma.[1]

The differential diagnosis of anaplastic carcinoma includes sarcoma, solid variant of papillary carcinoma, poorly differentiated (insular) carcinoma, thymic-related tumors, large cell lymphoma, osteclastoma, hemangiopericytoma, metastatic carcinoma, parathyroid carcinoma, Riedel thyroiditis, reactive benign process such as reparative epithelial atypia in benign tumor (due to infarction or following fine needle aspiration) or florid granulation tissue due to organization of infarcted tumor. Unusual variants resemble sarcomas like fibrosarcoma, malignant fibrous histiocytoma, angiosarcoma and rhabdomyosarcoma. For practical purposes, any sarcoma like tumor of the thyroid can be reported as anaplastic carcinoma because the distinction between sarcoma and anaplastic carcinoma is not so important as they are both an aggressive malignancy.[1,7]

Papillary carcinomas have characteristic nuclear features while insular carcinoma shows typical islands with the presence of microfollicles. [1] Lymphoma and metastatic carcinoma may only occasionally show the degree of atypia as seen in anaplastic carcinoma. Both of them can usually be distinguished by clinical correlation and immunomarkers. [7] The paucicellular variant of anaplastic carcinoma can be confused with Riedel's thyroiditis which has better prognosis. However, Riedel's thyroiditis shows minimal atypia and absence of tumor emboli. [1,7] Most patients with anaplastic carcinoma survive less than 6 months following the diagnosis. [6] The rare survivor has completely resectable small tumors less than 5 cm in size and is treated with chemotherapy and radiotherapy. [6,7]

CONCLUSION

Anaplastic carcinoma of the thyroid is an uncommon but markedly aggressive tumor which is more commonly seen in areas of endemic thyroid disease. It is important to diagnose them early by differentiating these tumors from other entities and start these patients on aggressive therapy.

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