Case Report

Collision tumour of thyroid gland comprising of papillary carcinoma and medullary carcinoma – a rare presentation

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Abstract Collision tumors of the thyroid are extremely rare and pose a diagnostic as well as therapeutic challenge. They are different from Composite tumours and mixed tumours. Several hypotheses have been described as the mechanisms underlying collision tumors .Treatment guidelines are poorly defined due to the dearth of literature on this subject.
Keywords: Collision tumour, thyroid gland.

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INTRODUCTION

The term "collision tumor" represents the coexistence of two or more histologically distinct tumors in close proximity to each other[6]. Collision tumors can occur within the same organ or adjacent organs or in conjunction with a systemic malignancy as a metastatic phenomenon. Collision tumour in the thyroid have been reported involving papillary and medullary carcinoma or papillary and follicular carcinoma or papillary and primary squamous carcinoma. Only about 18 such cases have been reported from all over the world[15]. We are reporting this highly unusual case of collision tumour of thyroid.

CASE REPORT

A 65 year old female presented with an anterior cervical swelling which was gradually increasing in size. H/o of recent onset of dysphagia was also present. She was a known case of hypothyroidism and was on thyroxine tablet for 10 years. On examination multiple nodules approximately 2 X 2 cm on both lobes of thyroid was found. On Indirect Laryngoscopy the vocal cord showed normal mobility. Investigations revealed free T3- 1.4 pg/ml, Free T4 1.4 ng/ml, TSH 0.5 IU/ml;. USG revealed multiple nodules with colloid and cystic degeneration in thyroid. FNAC was suggestive of colloid goiter with cystic degeneration. X-ray of cervical spine was normal. The patient was taken up for total thyroidectomy because of the suspicion of malignancy

GROSS EXAMINATION

The total thyroidectomy specimen measured 7.5 cm × 3 cm × 2 cms, with a solid, encapsulated tumor. Cut section showed multiple nodules of varying sizes, largest measuring 1.5 X 1.5 cms showing cystic degeneration. Another nodule in the right lobule measuring 1 X 0.7 cms having uniform grey white appearance on cut surface was seen.

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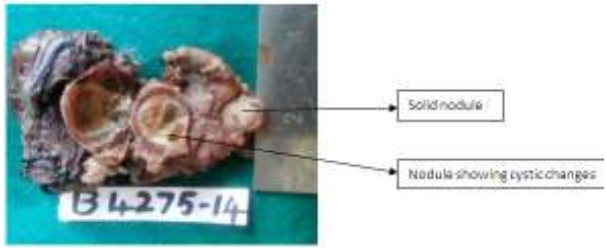

Figure 1: Gross specimen showing multiple nodules with with solid areas and cystic changes

MICROSCOPIC EXAMINATION

The post-operative histopathology revealed collision tumour of medullary carcinoma and papillary carcinoma of thyroid. Multiple sections showed nodules composed of thyroid follicles of varying sizes. One nodule showed cystic degeneration lined by follicular cells showing small papillary projections. These cells had moderate cytoplasm and central clear appearing nucleus (Orphan Annie nucleus). These findings are suggestive of papillary carcinoma thyroid. There was another nodule composed of cells arranged in sheets and clusters and separated by delicate vasculature. These cells had moderate to abundant granular eosinophilic cytoplasm and the nuclei showed anisonucleosis with fine granular chromatin, Congo red staining for amyloid was positive suggestive of medullary carcinoma thyroid.

Figure 2: Histological section showing both Medullary carinoma and Papillary carcinoma thyroid

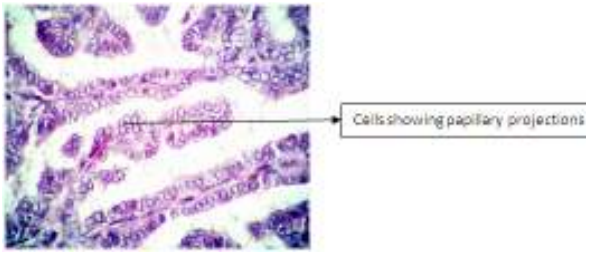

Figure 3: Histological section showing Papillary projections with cells showing Orphan Annie nucleus

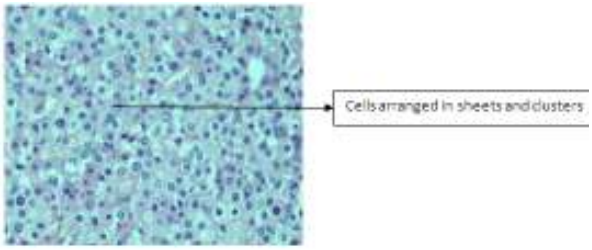

Figure 4: Histological section showing cells arranged in sheets and clusters, with granular eosinophilic cytoplasam and staining positive for congo red

In the post operative period Thyroglobulin and calcitonin were elevated. The patient was screened for multiple endocrine neoplasia (MEN) with negative results. She had normal serum level of calcium, phosphorus and parathyroid hormone. Urinary levels of vanyl mandelic acid and catecholamine were normal. The LFT was normal. CT neck revealed no cervical lymphadenopathy. USG abdomen showed only an incidental large calcified fibroid in body of uterus and no liver nodules or ascites. IHC and Electon microscopic studies were not available in the institute. Even though it is a $T_2N_0M_0$ papillary carcinoma thyroid, considering the age of the patient (45 years), the possibility of cervical or retrosternal lymph nodal metastasis, and the inherent risks involved in re-expoloration for lymphadenectomy, the patient has been advised radio iodine therapy an regular follow-up.

DISCUSSION

The term "collision tumor" refers to multiple coexistent but independent tumors that are histologically distinct[1]. Collision tumors of the thyroid are distinct from composite and mixed tumors. Composite tumors contain two discrete cell populations consisting of thyroglobulin-positive papillary carcinoma cells and calcitonin-positive medullary carcinoma cells[2]. On the other hand, mixed tumors have a common cellular origin, and their cells co express both thyroglobulin and calcitonin[2] Several hypotheses have been described as the mechanisms underlying collision tumors[2,3]. The first hypothesis is a *"Coincidental Colocalization"* of the multiple primary tumors. Another hypothesis suggests that the presence of *the first tumor alters the microenvironment*, thereby increasing the probability of a second adjacent tumor. The third hypothesis suggests that the multiple tumors originate from *a common stem cell*[2, 3]. Recently, Takano proposed a new model of thyroid carcinogenesis that was termed the "fetal cell carcinogenesis" model[4]. According to the multi- tep carcinogenesis model, which is generally accepted, thyroid carcinomas are generated from thyrocytes via multiple genomic changes that foster the development of cancerous characteristics. On the other hand, based on the fetal cell carcinogenesis model,

thyroid carcinomas are derived from the remnants of fetal thyroid cells that have the ability to migrate to surrounding tissues[4]. In this hypothesis, papillary carcinomas, follicular tumors, and anaplastic carcinomas are thought to be derived from the remnants of thyroblasts, prothyrocytes, and thyroid stem cells, respectively[4] Apart from light microscopy and staining IHC play an important role in establishing the diagnosis.

Immunohistochemical markers for Medullary Ca thyroid and Papillary Ca thyroid

Immunoreactivity for multiple antigens in cases of MCT was studied by Uribe *et al*[5]. They found that Apart from Calcitonin. thyroglogulin and CEA levels, the cells were positive for keratin, gastrin, CCK, serotonin, insulin, glucagon, somatostatin, adrenocorticotropic hormone (ACTH) and prostatic acid phosphatase using the immunoperoxidase peroxidase antiperoxidase technique. This suggests the origin of medullary thyroid carcinomas from a neuroendocrine cell potentially capable of producing numerous hormone substances. The neoplastic cells in 35% of the tumors contained hormonal substances as well as thyroglobulin, inferring that suggested that papillary or follicular tumors mixed with a neuroendocrine component exist more commonly than previously suspected. In papillary carcinoma thyroid, the immunopanel consisting of elevated HBME-1, reduced or absent CD56 and elevated CK19 has the highest sensitivity (95.6%).

CONCLUSION

Collision tumors pose a diagnostic as well as therapeutic challenge. Metastasis from distant organs and contiguous primary tumors should be excluded. Treatment guidelines are poorly defined due to the dearth of literature on this subject. Treatment for collision tumors should depend upon the combination of primary tumors involved and each component of the combination should be treated like an independent primary. The reporting of similar cases with longer follow-up periods will help define the epidemiology and biology of these extremely rare tumors and establish standardized protocols for their treatment.

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