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Case Series

Collision tumour of thyroid – A case series

Lopa Mudra Kakoti[1], Shiraj Ahmed[1], Anupam Sarma[1], Tarali Pathak[1]*, Yopovinu Rhutso[1]

[1]*Dept. of Oncopathology, Dr. B. Borooah Cancer Institute, Guwahati, Assam, India*

ARTICLE INFO

Article history:
Received 21-09-2023
Accepted 14-11-2023
Available online 08-01-2024

Keywords:
Collision tumour
Thyroid
Papillary carcinoma
NIFTP
Hurthle cell adenoma
Medullary carcinoma

ABSTRACT

A collision tumour is described as the coexistence of two adjacent but histologically distinct and morphologically independent malignant tumours in the same organ with no histological admixture. In this article we present 3 cases of simultaneous occurrence of two thyroid neoplasm in the same patient. A 49 year old lady with swelling in right lobe of thyroid, diagnosed as follicular neoplasm with hurthle cell morphology (Bethesda category IV) on Fine needle aspiration cytology (FNAC). Histopathological examination (HPE) showed Hurthle cell carcinoma, right lobe and 3 mm foci of NIFTP, left lobe. Another 45 year old lady with bilateral thyroid swelling diagnosed as hurthe cell neoplasm (Bethesda category IV), left lobe and suspicious of papillary thyroid carcinoma, right lobe on FNAC. HPE showed papillary thyroid carcinoma, classical variant in the right lobe with a focus of papillary carcinoma in the isthmus and hurthle cell adenoma in left thyroid. A 27 year old man with thyroid swelling revealed medullary carcinoma in FNAC. Final histopathological diagnosis was medullary carcinoma, right lobe of thyroid and isthmus, papillary carcinoma (micropapillary variant) in pyramidal lobe along with metastatic medullary carcinoma in right level II lymph nodes and metastatic medullary and papillary carcinoma in central compartment nodes. Collision tumors are a diagnostic as well as therapeutic challenge due to the dual pathology. Extensive sampling should be done as co-existence of different neoplasms can occur.

1. Introduction

Thyroid malignancies are the most prevalent type of endocrine malignant neoplasms. The presence of two intimately associated but morphologically distinct neoplasm in thyroid- named Collision Tumours- is an unusual phenomenon.They are therapeutically challenging due to dual pathology and clinical behaviour. There is also paucity of literature on collision tumors of thyroid. Thus documentation of such cases are critical to understand the pathogenesis, clinical behaviour, prognosis and decide on a treatment protocol. We present 3 such cases of collision tumour in thyroid gland in this report.

* *Corresponding author*.
E-mail address: tarali8pathak@gmail.com (T. Pathak).

2. Case Series

2.1. Case 1

A 49 year old female presented with firm, nodular swelling over right lobe of thyroid. Her systemic examination and biochemical tests were normal. Fine Needle Aspiration Cytology of right nodular swelling was suggestive of follicular neoplasm with hurthle cell morphology (Bethesda category IV). Total thyroidectomy was performed and the specimen was sent for histopathological examination. Microscopic sections from right lobe showed features of Hurthle cell carcinoma without extrathyroidal extension. Lymphovascular emboli was seen. Sections from left lobe showed a foci of tumour measuring 3mm in greatest dimension with features of Non Invasive Follicular thyroid

https://doi.org/10.18231/j.achr.2023.066

neoplasm with papillary- like nuclear features (Figure 1). The adjacent thyroid was unremarkable. All the lymph nodes showed reactive changes.

2.2. Case 2

A 45 year old female presented with swelling in the anterior part of neck. Biochemical tests were within normal limits. FNAC from left lobe of thyroid was suggestive of hurthe cell neoplasm (Bethesda category IV). FNAC from right lobe was suspicious of papillary thyroid carcinoma. Total thyroidectomy with bilateral radical neck dissection (RND) was performed. HPE showed papillary thyroid carcinoma, classical variant in the right lobe without extrathyroidal extension. The isthmus showed a foci of papillary carcinoma. Sections from left lobe showed features of hurthle cell adenoma with adjacent lymphocytic thyroiditis (Figure 2).

2.3. Case 3

A 27 year old man presented with gradually increasing, soft and non-tender swelling involving right side of neck. The thyroid function tests were normal. FNAC from the right lobe of thyroid showed medullary carcinoma. Serum calcitonin level was found elevated (2959 pg/ml).

Patient underwent total thyroidectomy with right RND and removal of central compartment nodes. Sections from growth in right lobe showed features of medullary carcinoma with extrathyroidal extension into the surrounding skeletal muscle. Left lobe showed colloid filled normal thyroid follicles with foci of lymphocytic thyroiditis and isthmus was infiltrated by medullary carcinoma. A tiny pyramidal lobe in the isthmus was noted displaying nuclear features suggestive of papillary carcinoma (micropapillary variant). Two Lymph nodes from right level II showed metastatic medullary carcinoma. Left central compartment showed 4 nodes with metastatic medullary and papillary carcinoma (Figure 3A). Immunohistochemistry showed diffuse Synaptophysin positivity in medullary component (Figure 3B).

3. Discussion

Thyroid malignancy is the most common type of endocrine cancer. Although differentiated malignancies are mostly seen in the thyroid, it is rare for the gland to harbour more than one type of malignancy at the same time. This kind of dual pathology affecting the thyroid gland could take different forms such as medullary carcinoma–papillary carcinoma combination or squamous cell carcinoma–papillary carcinoma combination. [1]

To consider multiple primary tumours occurring together, the criteria established first by Bilroth in 1879 modified by Warren and Gates should be met. [2] These are (i) each tumour must demonstrate a definite picture of

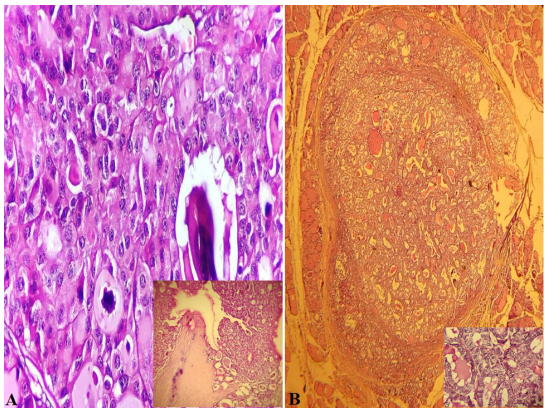

Figure 1: A: Photomicrograph of hurthle cell carcinoma. H&E, 400x. Insert showing capsular invasion, H & E 100x. **B:** Photomicrograph of NIFTP, H&E,100x. Insert showing nuclear features of papillary carcinoma, H&E,400x

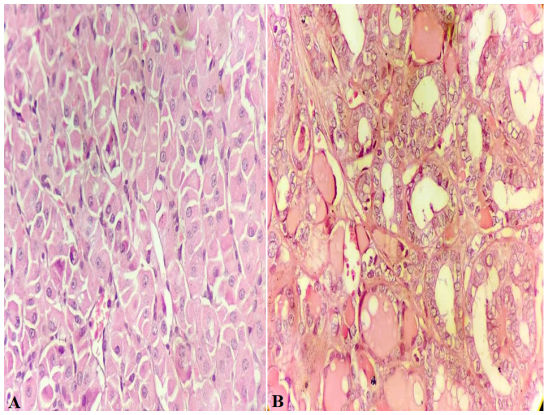

Figure 2: A: Photomicrograph of hurthle cell adenoma. H& E, 400x; **B:** Photomicrograph of papillary carcinoma. H & E, 400x

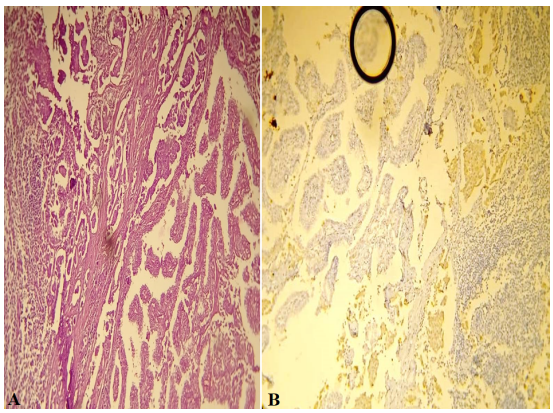

Figure 3: A: Photomicrograph of lymph node showing metastasis of medullary carcinoma and papillary carcinoma. H & E, 100x; **B:** Photomicrograph showing Synaptophysin positivity in medullary component. Immunohistochemistry,100x

malignancy, (ii) each tumour must be distinct, and (iii) the possibility that one of the tumours is a metastatic lesion from the other should be excluded.Such combinations of tumours occurring in the same gland or organ could be one of three types – collision tumours, mixed tumours, or composite tumours.[1]

The pathogenesis of mixed tumours were previously explained with common stem cell theory, collision theory which suggests simultaneous multifocal origin from different cell clones, or hostage theory which postulates that adenomatous areas are sequestrated by another tumour type, though the exact mechanism is not enlightened.[3,4]

A collision tumour is described as the coexistence of two adjacent but histologically distinct and morphologically independent malignant tumours in the same organ with no histological admixture. In contrast, the term mixed tumour is used when there is a histological admixture of the two tumours in the same organ.[5,6] Mixed tumours are, therefore, thought to have a common cell of origin.[7] The term composite tumour, in turn, refers to the condition where a tumor contains two discrete cell populations as with thyroglobulin positive papillary carcinoma cells and calcitonin-positive medullary carcinoma cells.[7]Collision tumours can occur in various organs such as the ovaries, colon, lung, stomach, skin, and kidneys but are extremely rare in the thyroid.[8]The most common type described is the presence of mixed histology consisting of papillary and medullary carcinomas.

Regarding our first case of hurthle cell carcinoma and NIFTP, review of literature showed only one case of co-incidence of hurthle cell carcinoma and NIFTP have been reported so far to the best of our knowledge. Kreze A et al reported a case of 64 year old lady with growing mass in the right side of neck. FNA showed Bethesda III (oncocytic lesion of uncertain malignant potential). Definitive histological finding was Hurthle cell carcinoma and NIFTP.[9]

There are only a few reported cases of collision tumour with combination of hurthle cell adenoma and papillary carcinoma. Rana et al described of co-existence of Hurthle cell adenoma and papillary microcarcinoma occurring in middle-aged female.[10] Ravi A et al also have reported collision tumour having Hurthle cell adenoma and papillary microcarcinoma as its components in a 47 year old women.[11] Another case of incidental finding of NIFTP in hurthle cell adenoma in a 42 year old female was reported by Pigac et al.[12]The common follicular histogenesis of Hurthle cell adenoma and papillary carcinoma explains the synchronicity of these two entities.[10] Seetu Palo et al recently reported a case of Hurthle cell adenoma and papillary microcarcinoma in right lobe of thyroid. On FNAC it was initially reported as Hurthle cell neoplasm.[13] Therefore, the gross specimen in our cases were sampled exclusively to exclude possibility of any capsular or vascular invasion and rule out hurthle cell carcinoma.

Rossi et al reported the simultaneous occurrence of medullary thyroid carcinoma (MTC) and papillary thyroid carcinoma (PTC), presenting as spatially distinct and well-defined tumour components, in three cases.[14] Metastasis to lymph nodes can show pure tumour cell populations of one or two components or an admixture of both components within the same lymph node. Sadat Alavi et al in their article reported that four lymph nodes isolated from the neck dissection specimen showed metastasis of MTC, and one of them showed metastatic PTC.[15] Shanika Samarasinghe et al reported a case of a lady who had bilateral multifocal papillary thyroid carcinoma with small foci of medullary thyroid carcinoma in the right lobe with extrathyroidal extension. There was two lymph nodes which were positive for intermixed PTC and MTC.[16]

4. Conclusion

Collision tumours and mixed tumours though rare, have been reported from across the world. They are a diagnostic as well as therapeutic challenge due to the dual pathology that they harbour. No single theory can completely explain the pathogenesis of these tumours in all cases. It is the duty of the pathologist to do extensive sampling of even benign appearing thyroid nodules as co-existence of different neoplasms can occur.

5. Source of Funding

None to disclose.

6. Conflict of Interest

The authors declare no competing or conflicts of interest.

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Author biography

Lopa Mudra Kakoti, Assistant Professor

Shiraj Ahmed, Professor https://orcid.org/0000-0003-4155-7238

Anupam Sarma, Professor & HOD https://orcid.org/0000-0001-8631-2651

Tarali Pathak, Ex-Senior Resident https://orcid.org/0000-0003-3749-1600

Yopovinu Rhutso, Ex-Fellow https://orcid.org/0009-0005-2301-0759

Cite this article: Kakoti LM, Ahmed S, Sarma A, Pathak T, Rhutso Y. Collision tumour of thyroid – A case series. *IP Arch Cytol Histopathology Res* 2023;8(4):288-291.