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A Diagnostic Surprise of Thymoma Type B1 – Case Report

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Abstract

In the anterior mediastinum, thymoma is the most common tumor followed by lymphoma being the second most common with subtypes being hodgkin's lymphoma, diffuse large B-cell lymphoma and lymphoblastic lymphoma. Since thymomas are of lymphoepithelial organ and consist of thymocytes and epithelial cells, the differential diagnosis of thymoma against lymphoma is challenging. Differentiating lymphoma from a thymoma is important for treatment regimes.

Here, we discuss a case of a 37 year old with an anterior mediastinal mass who was diagnosed as having Non- hodgkin's lymphoma radiologically and also in FNAC but surprisingly turned out to be Thymoma Type- B1 after histopathological analysis by immunohistochemistry that differentiated it from Non- Hodgkin's lymphoma.

Introduction

Thymomas are tumors that arise from the thymic epithelial cells. They occur in adults above 40 years of age with no major sex predilection. All thymomas, regardless of subtype, are considered malignant. They are usually associated with myasthenia gravis. Common location is in the anterosuperior mediastinum. The prognosis is poor with a ten year survival rate.

Radiographically, CT scan and MRI are the choice of preoperative diagnosis and Fine needle aspiration is a good method to diagnose based on presence of epithelial cells and lymphocytes with the appropriate cytological features.

Histopathological diagnosis can be enhanced by the use of immunohistochemical studies to rule out the close differential diagnosis. The WHO system classifies thymic epithelial tumors into six relevant categories – A, AB, B1, B2, B3, and thymic carcinoma. Thymoma Type- B1 is lymphocytic, organoid, lymphocyte rich or predominantly cortical.

Case Details

A 37 year old male, came with H/O odynophagia and C/O difficulty in breathing on raising both hands above the head. On examination it was found to be a diffuse enlargement of the neck and it did not move on deglutition.

CT Imaging showed a thymic lesion possibly Lymphoma. Fine needle aspiration was done and was given as Non-Hodgkins Lymphoma.

Surgery of Thymectomy with debulking was done and was sent for histopathological diagnosis.

Grossly we received the thymectomy specimen in piece meal of four large fragments and multiple tiny fragments with external surface irregular, grey-white to dark brown and cut surface was firm and grey-white.

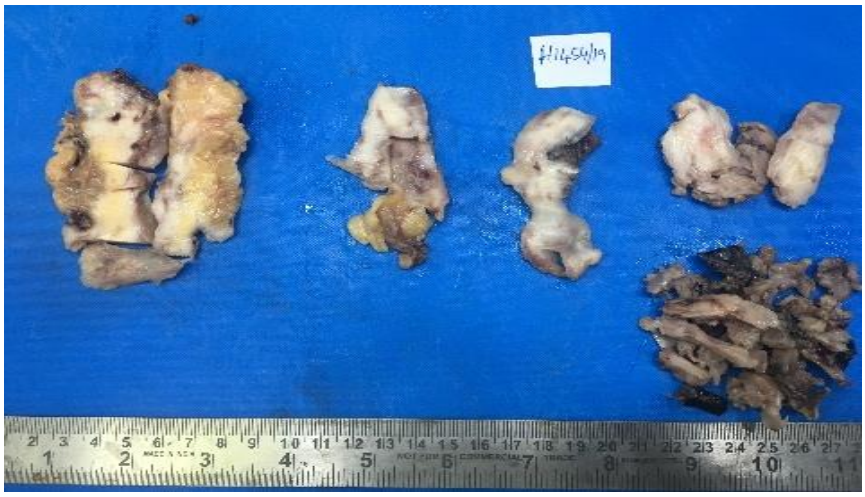

Fig 1: Gross image of thymectomy specimen received as piecemeal of four large fragments and multiple tiny fragments. External surface showing appearance of irregular, grey-white to dark brown fragments. Cut surface appears firm and grey-white.

Microscopically, the neoplasm was arranged in sheets and in perivascular pattern infiltrating into the surrounding fatty tissue. The predominant neoplastic cells were small and round with scanty cytoplasm and dense nuclei. In some areas, the neoplastic cells are separated by fibrous strands. Occasional foci showing epithelial cells with eosinophilic cytoplasm and vesicular nuclei. Few areas of necrosis also seen.

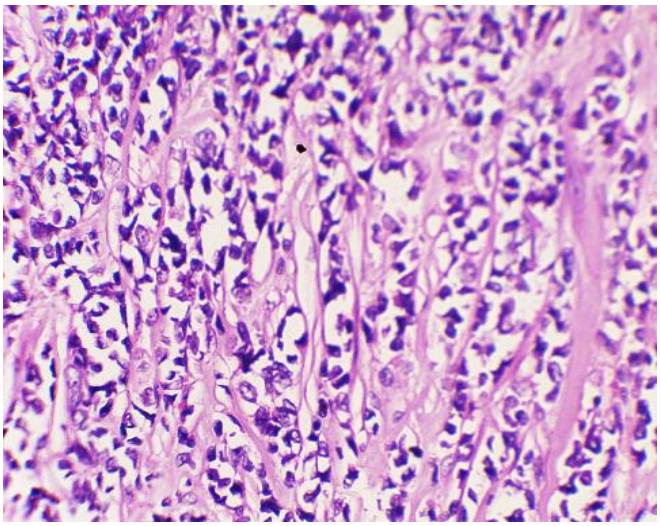

Fig 2 :Thymic Epithelial Cells With Fibrous Strands

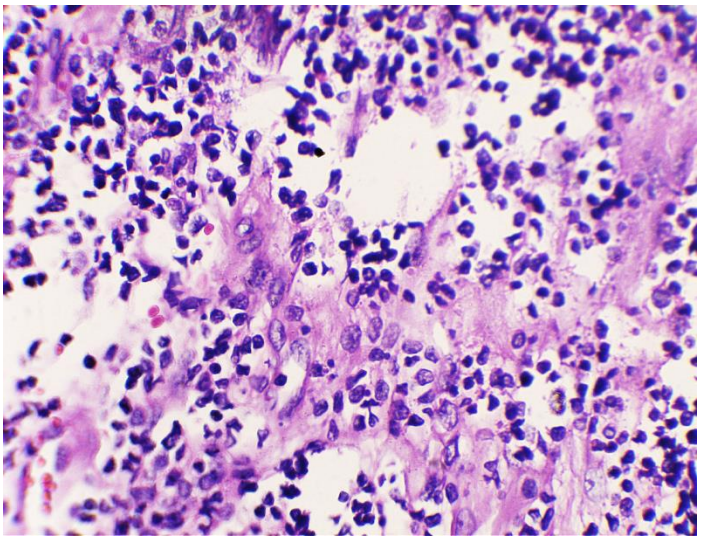

Fig 3:Thymic Epithelial Cells

Immunohistochemistry was done with five markers CD3, CD45, CD20, Ki-67 and Pan-CK. The results showed positivity for CD3(T cell marker), CD 45 (Lymphoid cells), CD20, Pan CK (Focal nodular positivity) and Ki-67 (90% nuclear positivity). Pan CK showed focal nodular positivity thus confirming as thymoma.

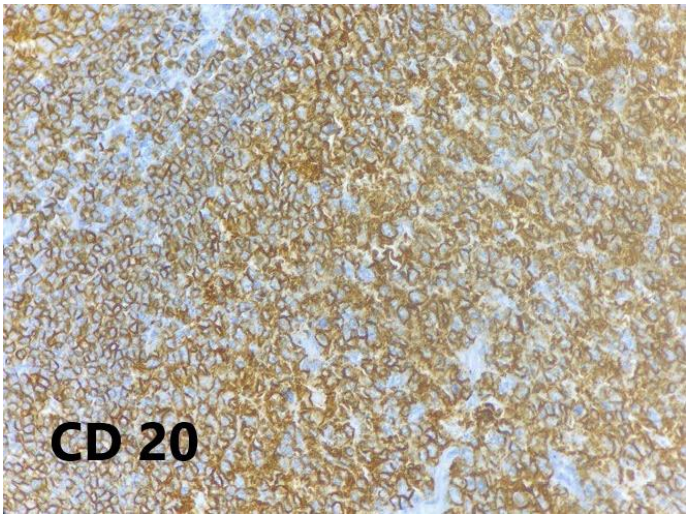

Fig 4: CD 20 showing cytoplasmic positivity of thymic epithelial cells.

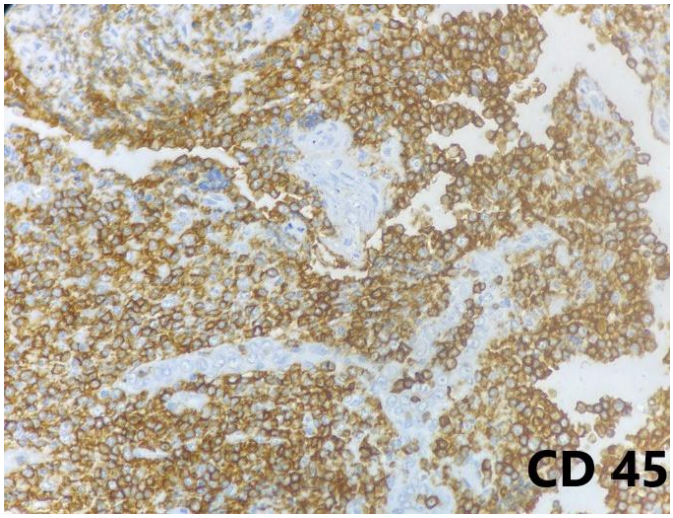

Fig 5: CD 45 showing cytoplasmic positivity of thymic Epithelial cells.

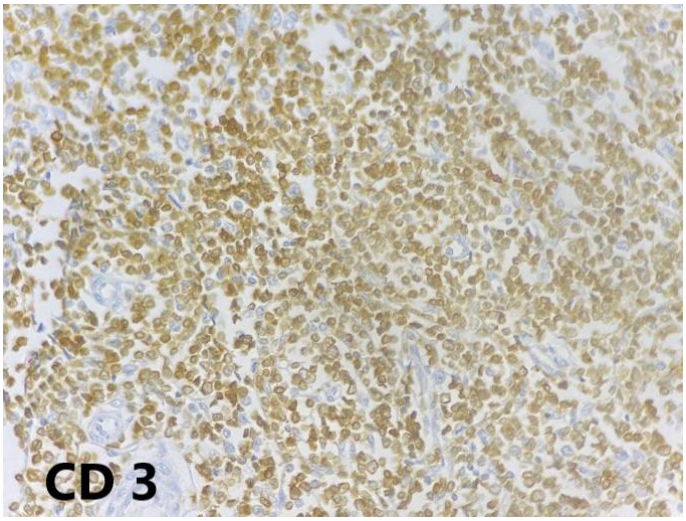

Fig 6: CD 3 showing Cytoplasmic Positivity of Thymocytes(T cells).

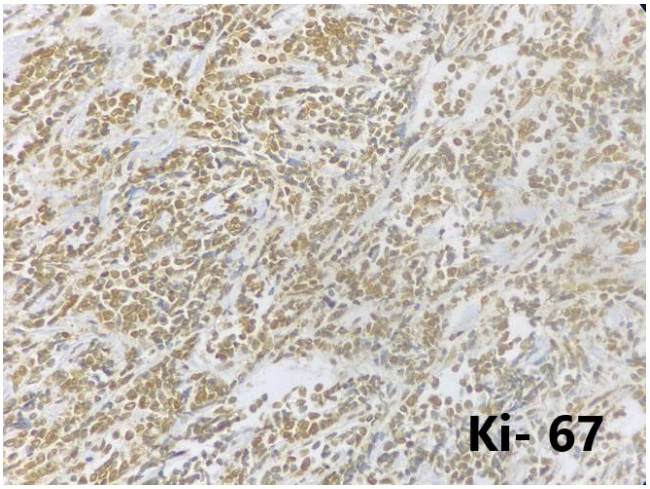

Fig 7: Ki- 67 showing 90% Nuclear Positivity Indicating Proliferation.

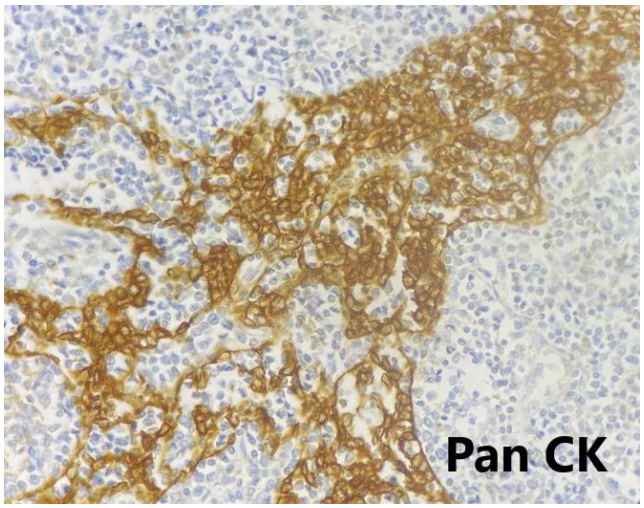

Fig 8: Pan – CK Showing Focal Positivity Confirming Diagnosis of Thymoma.

Finally, the impression was given as Thymoma Type-B1 with infiltration into the mediastinal fat.

Discussion

Thymomas are tumors that arise from the thymic epithelial cells. Common location is in the anterosuperior mediastinum. The thymus is an encapsulated bilobed gland. The thymus is essential in the development of the immune system and usually shrinks after puberty into fat. A strong association between myasthenia gravis and thymomas is found to exist. Benign and malignant thymomas cannot be directly differentiated based on history because of the histologic heterogeneity found among thymomas. There is a 10-year survival rate seen in thymomas. Cardiac tamponade or other cardiorespiratory complications are the main complications causing deaths related to thymomas.

On gross examination thymomas are solid tumours that are usually large, firm and infiltrating with multiple areas showing hemorrhage, necrosis and cystic changes. They are sometimes lobulated with intervening bands of fibrous stroma.

The World Health Organization has classified thymomas into Types A, AB, B1, B2, B3 and thymic carcinoma. Since subtype B1of thymoma is lymphocyte rich, they can be mistaken for non- hodgkins lymphoma or small lymphocytic lymphomas and should be differentiated by using immunohistochemical stains. However, they do possess some important histologic differences.

Type B1 is composed predominantly of lymphocytes admixed with scattered epithelial cells without clustering (< 3 contiguous epithelial cells) and paler medullary islands with rare Hassall corpuscle-like elements. Sometimes dilated perivascular spaces are also seen. These spaces are filled with plasma fluid containing few lymphocytes, plasma cells, or foamy macrophages and the centre of these spaces contain small vessels with hyalinized walls. Neoplastic cells palisade these spaces. Hassall's corpuscles are very specific to subtype B1 thymomas.

To identify thymomas, immunohistochemical stains are helpful. Stains that show positivity for thymic epithelial cells are keratins, epithelial membrane antigens, p63, p40, PAX and Pan-CK. And the thymic lymphocytes show positivity for terminal deoxynucleotidyl transferase (TdT), CD1a, CD3, CD45, and CD99.

CT and MRI are useful in evaluating the mass if it is resectable or not. CT of the chest evaluates the association of the mass with other mediastinal structures and MRI differentiates between solid and cystic masses. Nowadays, PET scans are helpful in differentiating benign thymomas from thymic carcinomas.

Differential diagnosis for thymomas include thymic carcinoid tumors, thymic cysts, non-Hodgkin's lymphomas, germ cell tumors, ectopic parathyroid glands, thyroid goiters, and rarely paragangliomas.

Treatment also includes chemoradiotherapy, corticosteroids, immunotherapy, tyrosine kinase inhibitors, and surgical resection. Management of an encapsulated or an invading thymoma, includes total thymectomy and lymph node dissection. The long-term survival of the patient depends upon the complete resection.

Thymomas are generally slow-growing tumors, so the most accurate adverse prognostic marker is the invasiveness of the tumor and prognosis also depends on stage of disease and the resectability of the tumor.

Conclusion

Thymoma type B1 are lymphocyte rich, resembling normal functional thymus combining normal thymic cortical areas with those resembling thymic medulla. A delicate network of immunohistochemistry of Pan CK showing focal nodular positivity thus confirms as thymoma type- B1, as Pan CK is negative in lymphomas. So, the very close differential diagnosis of non-hodgkin's lymphoma can be ruled out. Early diagnosis confirming histopathology with immunohistochemistry is mandatory for diagnosis of thymic

tumors. This simplified approach to the reporting of thymic epithelial neoplasms offered here provides all of the pertinent information for our clinical colleagues, including the WHO subtype.

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