

Mediastinal Teratoma with Coexisting Adenocarcinoma and Carcinoid Tumor (Somatic-Type Malignancy): A Case Report with a Review of the Literature

Adenokarsinom ve Karsinoid Tümör (Somatik Tip Malignite) Eşliğinde Mediastinal Teratom: Literatürün Gözden Geçirilmesi İle Birlikte Bir Olgu Sunumu

Swati Agarwal¹, Shalini Mullick¹, Kumud Gupta¹, Ravindra Kumar Dewan²

¹Department of Pathology, National Institute of TB and Respiratory Disease, New Delhi, India

²Department of Thoracic Surgery, National Institute of TB and Respiratory Diseases, New Delhi, India

Abstract

Özet

Germ cell tumors constitute 10% to 15% of anterior mediastinal neoplasms. Of these, mature teratoma is the most common. Somatic malignant transformation in mature teratoma is a very rare phenomenon. In the anterior mediastinum, few cases of malignant transformation in the form of carcinoma, sarcoma, or neuroendocrine tumors have been described. We present the case of a mature mediastinal teratoma in a 24-year-old female, diagnosed on computed tomography, where both carcinoid tumor and adenocarcinoma were seen. To the best of our knowledge, this is the first report of such a case. Malignant transformation in a mature teratoma confers a significantly worse prognosis and is difficult to diagnose only on clinical and radiological evaluation. As these lesions are so rare, the treatment options for these lesions are also not clearly defined. Extensive sampling and careful microscopic examination are needed when teratomas are submitted for pathological evaluation.

KEY WORDS: Mature teratoma, mediastinum, somatic malignancy, adenocarcinoma, carcinoid tumor

Germ hücreli tümörler anterior mediastinal neoplazmların %10 ila %15'ini oluşturmaktadır. Bunlar arasında matür teratom en yaygın olanıdır. Matür teratomda somatik malign transformasyon çok nadir bir olaydır. Anterior mediastinümde, karsinom, sarkom veya nöroendokrin tümörler şeklinde malign transformasyonu olan çok az vaka tanımlanmıştır. Biz bilgisayarlı tomografi ile tanı konulan 24 yaşındaki bir kadında hem karsinoid tümör hem de adenokarsinomun görüldüğü matür mediastinal teratom olgusu sunmaktayız. Bildiğimiz kadarıyla, bu tür bir olgunun ilk raporudur. Matür teratomda malign transformasyon anlamlı bir şekilde daha kötü prognoz gösterir ve sadece klinik ve radyolojik değerlendirme ile tanı konması zordur. Bu lezyonlar çok nadir olduğundan, lezyonların tedavi seçenekleri de açıkça tanımlanmış değildir. Teratomlar patolojik değerlendirme için gönderildiğinde geniş örnekleme ve dikkatli bir mikroskopik inceleme gereklidir.

ANAHTAR SÖZCÜKLER: Matür teratom, mediasten, somatik malignite, adenokarsinom, karsinoid tümör

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INTRODUCTION

Mediastinal mature teratoma is a benign neoplasm and accounts for less than 10% of all mediastinal tumors [1]. Mature teratomas show well-differentiated somatic elements, such as nerve, fat, skin, and cartilage. A non-germ cell malignant tumor arising from a teratoma has been described as a teratoma with malignant transformation [1]. According to most recent World Health Organization (WHO) classification, this is described as teratoma with somatic-type malignancies [1,2]. These lesions, especially in the mediastinum, are very rare, with only a few documented cases [3,4]. The malignancies reported in mature mediastinal teratomas include sarcoma, adenocarcinoma, squamous cell carcinoma, and neuroendocrine neoplasms [2]. The simultaneous presence of two somatic malignancies in a mature mediastinal teratoma has been described by Kim et al. [5]. We report a rare and probably the first case of synchronous mucin-secreting adenocarcinoma and carcinoid in a mediastinal mature teratoma.

CASE PRESENTATION

A 24-year-old female presented with dull aching chest pain for months. There was no associated dyspnea and palpitation. Routine hematological and biochemical investigations and pulmonary function tests were within normal limits. Contrast-enhanced computed tomography (CECT) of the chest showed a well-defined mass measuring 6.2 x 6.1 x 5.1 cm, with predominantly fat density. The mass was located in the anterior mediastinum, compressing the superior vena cava (Figure 1). There was no hilar lymphadenopathy. A diagnosis of teratoma was suggested on radiological evaluation, and the patient was taken up for surgical resection. Informed consent was taken, and right posterolateral thoracotomy was performed. The tumor mass was located in the anterior mediastinum, reaching up to the right atrium, and was found adherent to the diaphragm, pericardium, and right lower lobe lung. The mass was excised, and multiple fragmented

Address for Correspondence / Yazışma Adresi: Swati Agarwal, Department of Pathology,

National Institute of TB and Respiratory Disease, New Delhi, India

Phone/Tel: 9990762667 E-mail/E-posta: drswatiagr@yahoo.com

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pieces were sent for histopathological examination. Irregular tissue pieces from the mass measured 6 x 5 x 4 cm altogether (Figure 2). No definite capsule or lung parenchyma was identified. The external surface appeared variegated, with large yellow glistening and congested areas, hair, bone, and cystic spaces filled with mucoid and serosanguinous fluid (Figure 2). There was a small grey-white nodular area measuring 1.8 x 1.2 cm (Figure 2). Microscopy showed elements of all three germ layers (Figure 3a). The cystic spaces were lined by stratified ciliated columnar epithelium and stratified squamous epithelium. In addition, other areas showed adipose tissue, sweat glands, sebaceous glands, cartilage, and bone with marrow elements. A subcentimeter area showed a single focus of adenocarcinoma, where crowded glands with back-to-back arrangements were seen (Figure 3b). These glands were lined by columnar cells showing a moderate degree of pleomorphism. These cells showed cytokeratin positivity (Figure 3c). Extracellular mucin pools were seen, along with stromal invasion by neoplastic glands. Also seen was a circumscribed area comprising monomorphic cells arranged in nests and lobules (Figure 4a). The tumor cells had round nuclei, mild anisonucleosis, granular chromatin, and scanty cytoplasm (Figure 4b). Few cells showed oncocyctic changes with eosinophilic granular cytoplasm. These tumor cells were positive for synaptophysin,

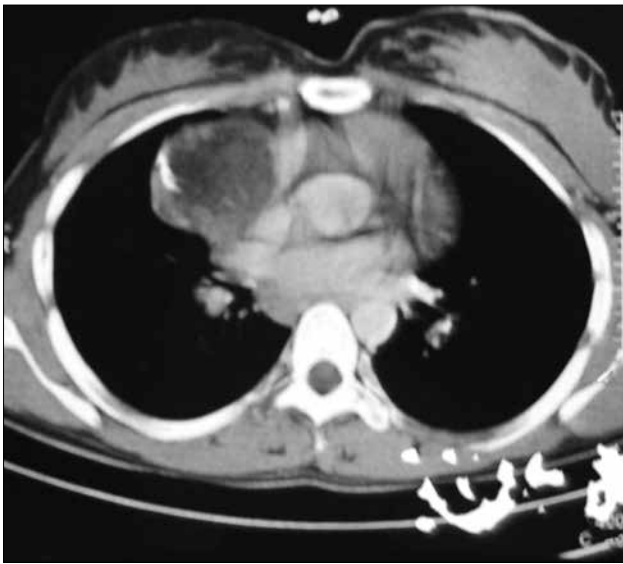


Figure 1. Computed tomography scan showing a well-defined, 6.2 x 6.1 x 5.1 predominantly fat density mass in the anterior mediastinum compressing the superior vena cava

chromogranin, and CD56 (Figure 4c). A final diagnosis of a mature teratoma with somatic-type malignancy (carcinoid and mucin-secreting adenocarcinoma) was made.

The repeat CECT scan 4 weeks after surgery showed no residual tumor (Figure 5). The patient is well and is kept on follow-up.

DISCUSSION

Mature teratoma is a primary germ cell neoplasm that consists of fully differentiated adult tissues derived from more than one of the three embryonic germ cell layers: ectoderm, mesoderm, and endoderm [1,3,4]. It accounts for 5%-10% of all mediastinal tumors [1]. The coexistence of a malignant component in mature teratoma is extremely rare [1,4,6]. Non-germ cell malignancies arising in a teratoma have been described as teratoma with malignant transformation [1,2,4]. The current terminology for these lesions, as recommended in the World Health Organization (WHO) classification, is teratoma with somatic-type malignancies [1,2]. This is defined as a germ cell tumor accompanied by a somatic-type malignant counterpart of sarcoma, carcinoma, or both [1,2]. A minimum size of one low-power field has been suggested as the threshold for the diagnosis of somatic-type malignancy in germ cell tumors [1,2]. The majority of reports of somatic-type malignancy in teratomas has described a single histological type of malignancy [4,7]. However, Armah et al. [8] described a renal teratoma similar to our case, where coexisting adenocarcinoma and carcinoid tumor were seen.



Figure 2. Gross photograph shows irregular tissue pieces showing large yellow glistening and congested areas, hair tuft, and cystic spaces filled with mucoid and serosanguinous fluid with small grey-white to yellow nodular area measuring 1.8 x 1.2 cm

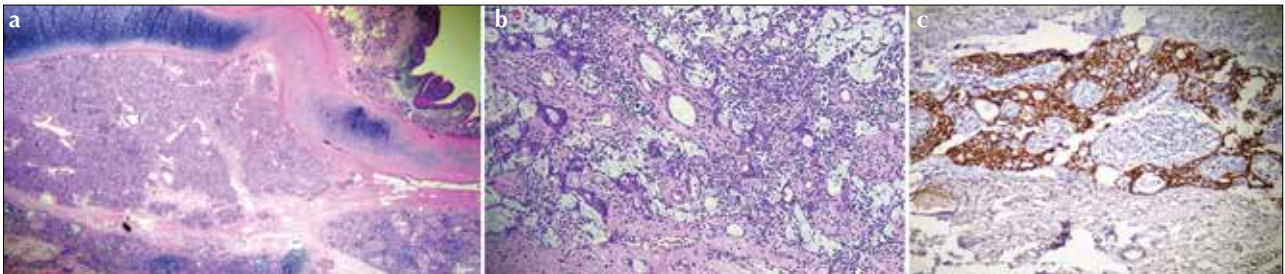


Figure 3. a-c. (a) Photomicrograph showing elements of all three germ layers. The cystic spaces were lined by stratified ciliated columnar epithelium and stratified squamous epithelium. In addition, other areas showed adipose tissue, sweat glands, sebaceous gland cartilage, and bone with marrow elements. (b) A subcentimeter area showed a single focus of adenocarcinoma, where crowded glands with back-to-back arrangements were seen. These glands were lined by columnar cells showing a moderate degree of pleomorphism. (c) Tumor cells in gland positive for cytokeratin

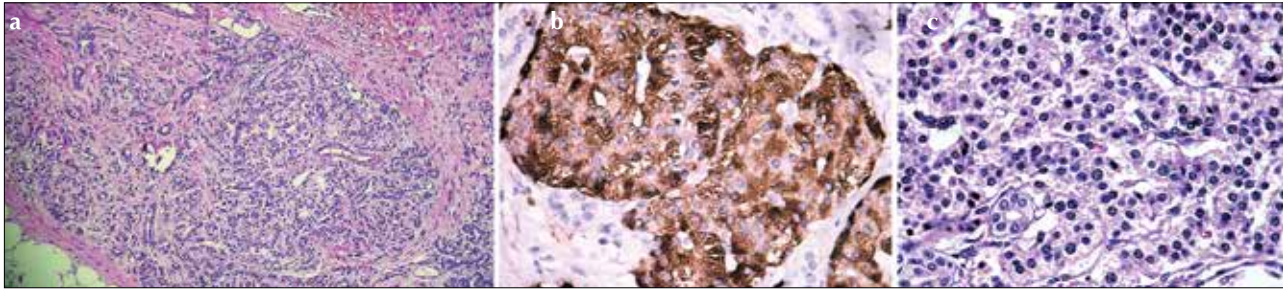


Figure 4. a-c. (a) Circumscribed area comprising monomorphic cells arranged in nests and lobules. (b) The tumor cells had round nuclei, mild anisonucleosis, granular chromatin, and scanty cytoplasm. (c) These tumor cells were positive for synaptophysin, chromogranin, and CD56



Figure 5. Computed tomography scan 4 weeks after surgery showing no residual tumor

While sarcomas and carcinomas have been described in association with mediastinal teratomas, neuroendocrine neoplasms appear to be especially rare, with only about 6 cases reported [7,9,10]. Mediastinal mature teratoma may rarely be associated with two different somatic-type malignancies, like carcinoid tumor and mucin-secreting adenocarcinomas, as in the present case report. To the best of our knowledge, the presence of these two histogenetically distinct neoplasms has not been reported in mediastinal teratomas.

It is postulated that somatic-type malignancies develop from either malignant transformation of preexisting teratomatous elements or by differentiation of totipotent germ cells [1,2]. Because of their rarity, little is known about the exact clinicopathological features of somatic-type malignancies in mature teratoma [4]. However, these somatic-type malignancies are likely to be seen in older patients with mature teratomas of long duration, in comparison with the common age (early adulthood) of the diagnosis of mature teratoma in the mediastinum [1,4]. The tumor tends to be at least 10 cm in size or larger, and areas of thickening in mature teratoma should raise the suspicion of malignancy [1,2,4]. Though the tumor seen in our case was smaller than 10 cm, the malignant areas were seen in the thick, solid parts of the tumor, as expected.

Treatment options are not clearly defined. Complete surgical resection plays an essential role in therapy when the tumor is limited to a single site [11]. There is no response to chemotherapy used for treatment of germ cell tumors; however,

adapted chemotherapy based on histology (such as 5-fluorouracil-based regimens for adenocarcinoma transformation) has recently been advocated, and it may help improve patient outcomes [11,12]. But, carcinoid tumors are usually chemoresistant, and radiotherapy has only a palliative role in local control. Therefore, in cases with carcinoid, it is advocated that patients with low-volume metastatic disease be kept under observation, whereas those who have carcinoid syndrome should receive long-term somatostatin analogs [9]. In a study of a series of patients with mediastinal teratoma with malignant transformation, 3 patients were noted to have only 4-6 months of treatment response, despite comprehensive treatment of surgery, chemotherapy, or radiation [12].

A diagnosis of teratoma with somatic-type malignancy, especially in the mediastinum, confers a poor prognosis, with a high frequency of metastasis and recurrence [1,2,11]. It is important to identify the malignant component within these neoplasms, because they can infiltrate adjacent organs or even metastasize, thereby increasing the disease [1,2]. In the few cases reported to date, the histology of the somatic malignancy does not appear to have a major impact on the prognosis [1,2]. The survival rate largely depends on the completeness of the resection and disease burden.

This case highlights that careful sampling of solid areas in a teratoma is required, even in young patients whose lesions are not extensive in size or spread. A high index of suspicion and meticulous gross and microscopic examination are required, because clinical and even radiological examination can not always reliably predict the malignant component of such tumors.

Informed Consent: Written informed consent was obtained from patient who participated in this case.

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