A basaloid carcinoma with multilocular thymic cyst mimicking a mediastinal teratoma: A case report

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Case Report

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Abstract

Background: Thymic tumors pose diagnostic challenges, with basaloid carcinoma being a rare and elusive variant that can mimic other mediastinal masses.

Case presentation: We present a case of a 71-year-old female initially diagnosed with a mediastinal teratoma. Imaging displayed a cystic, calcified tumor with close proximity to vital structures, suggestive of a mediastinal teratoma. The patient underwent subxiphoid thoracoscopic mediastinal tumor resection, and postoperative pathology and immunohistochemistry revealed thymic basaloid carcinoma. Fortunately, the patient had no postoperative complications, and no signs of tumor recurrence or metastasis were found during the 3-month follow-up.

Conclusions: While thymic basaloid carcinoma is infrequent, its resemblance to mediastinal teratoma complicates diagnosis and treatment planning. As we accumulate cases, a collective analysis will enhance diagnostic precision and therapeutic approaches for these intricate malignancies.

Background

Thymic tumors are particularly intricate due to their potential to manifest in a wide range of histological subtypes, each presenting distinct clinical and pathological characteristics(1). One such rare and challenging variant is basaloid carcinoma of the thymus, which poses diagnostic dilemmas due to its resemblance to other mediastinal masses(2). In this case report, we present a perplexing clinical scenario where a patient with a presumed mediastinal teratoma was ultimately diagnosed with basaloid carcinoma of the thymus following comprehensive pathological and immunohistochemical analyses. This report aims to contribute to the existing medical literature by shedding light on the clinical nuances and diagnostic intricacies inherent in basaloid carcinoma of the thymus, emphasizing the imperative need for accurate differentiation to optimize patient outcomes.

Case presentation

A 71-year-old female patient was admitted one month following the discovery of an anterior mediastinal tumor. She was asymptomatic and had a medical history of hypertension. Vital signs on arrival were unremarkable except for a mild elevation of blood pressure. The patient’s tumor markers and inflammatory markers were within normal limits. The anterior mediastinal tumor was incidentally detected during a chest computed tomography (CT) examination. The tumor was approximately 5.0 cm × 4.0 cm in size, exhibiting a roundish shape and being characterized by multiple cystic cavities with observed calcification. Contrast enhanced CT scan revealed a clearly delineated tumor border, with heterogeneous enhancement of solid and mixed cystic lesions (Fig. 1). Furthermore, the inferior aspect of the tumor was in close proximity to the right atrium, while its left and right aspects abut the pericardium and lung respectively. The primary diagnosis in this patient was mediastinal teratoma. She underwent subxiphoid thoracoscopic resection of the mediastinal tumor. During the operation, it was observed that
the tumor displayed a soft consistency, and clear fluid became evident upon rupture of the cyst wall. Furthermore, partial resection of the right lung was performed due to its close adherence to the tumor. Pathological results and immunohistochemistry revealed thymic basaloid carcinoma, positive staining for CK, P63, P40, and CD117 (Fig. 2). The patient was discharged without any complications and after a period of three months, she remained asymptomatic. Furthermore, the repeated CT scan showed no indications of tumor recurrence.

Discussion and Conclusions

This case exemplifies the intricacy of diagnosing thymic basaloid carcinoma, an infrequent but invasive tumor that occasionally mimics mediastinal teratoma thereby posing substantial diagnostic hurdles.(3). The thymus, a critical organ in T-cell maturation, can give rise to a spectrum of neoplasms, including thymic carcinomas with various histological subtypes. Basaloid carcinoma, a distinct subtype, is characterized by its aggressive behavior and propensity for local invasion and distant metastasis(4). Its unique scarcity, coupled with shared traits with mediastinal tumors such as teratomas, impedes precise diagnosis and optimal treatment planning.

The phenomenon of cystic changes within anterior mediastinal tumors is well-documented, encompassing a diverse array of neoplasms intimately associated with multilocular thymic cyst (MTC). This encompasses an array of primary mediastinal tumors, encompassing thymomas, germ cell tumors, and lymphomas(5, 6). Furthermore, instances of MTC coexisting with metastatic malignancies have also been well-established(7). Two prevailing theories have emerged in explicating the pathogenesis of MTC within tumors and tumor-like contexts. One theory suggests a transformation of the lining epithelium of pre-existing MTC, accounting for the observed continuity between cyst lining and tumor. An alternate hypothesis postulates cystic changes as a hyperplastic reaction of thymic epithelium to specific tumor antigens, culminating in the dilation of Hassall corpuscles(8). Previous literature indicates thymic basaloid carcinoma, with MTC changes accounting for approximately 50% of cases(9). These instances underscore the intricate relationship between thymic malignancies and cystic changes, urging a deeper comprehension of their interplay and its implications in the clinical landscape.

To our knowledge, no more than 30 cases of thymic basaloid carcinoma have been reported in the literature(2). Accurate differentiation between basaloid carcinoma of the thymus and mediastinal teratoma is crucial due to the disparate treatment paradigms associated with these entities. Surgical resection remains the cornerstone of treatment for both conditions. However, the extent of resection, necessity for adjuvant therapy, and overall prognosis vary significantly(10, 11). Basaloid carcinomas often require aggressive surgical management and may necessitate adjuvant chemotherapy and radiation due to their propensity for recurrence and metastasis. Conversely, the management of mediastinal teratomas primarily revolves around surgical excision, with the potential for long-term cure in localized cases. In this case, CT revealed MTC with localized calcifications and clear fluid outflow observed during surgery, thus warranting the diagnosis of a mediastinal teratoma until final pathology results were obtained. Immunohistochemical staining revealed positivity for CK, CD117, and p63,
indicating a malignant tumor of thymic epithelial origin. However, as the gold standard pathological results were not yet available, an interim diagnosis of teratoma warranted local tumor resection without total thymectomy, potentially compromising the patient's prognosis. A previous study demonstrated that a subset of patients with thymic basaloid carcinoma had a propensity for recurrence or metastasis post-surgery(9). Therefore, the challenging differential diagnosis of this disease poses significant obstacles to the patient's overall prognosis. Fortunately, no evidence of tumor recurrence or metastasis was observed in the patient after 3-month follow-up. A comprehensive evaluation is necessary to determine her prognosis.

In conclusion, the presented case emphasizes the intricacies of diagnosing basaloid carcinoma of the thymus, which can masquerade as mediastinal teratoma due to overlapping clinical, radiological, and histological features. As we continue to unravel the complexities of rare thymic malignancies, including basaloid carcinoma, the collective accumulation of such cases and their comprehensive analysis will pave the way for improved diagnostic precision and therapeutic strategies.

### Abbreviations

<table>
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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CT</td>
<td>chest computed tomography</td>
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<tr>
<td>MTC</td>
<td>multilocular thymic cyst</td>
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<tr>
<td>CK</td>
<td>cytokines</td>
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<tr>
<td>CD117</td>
<td>cluster of differentiation 117</td>
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<tr>
<td>p63</td>
<td>tumor protein p63</td>
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<tr>
<td>Ki-67</td>
<td>antigen kiel 67</td>
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<tr>
<td>H&amp;E</td>
<td>hematoxylin and eosin staining</td>
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### Declarations

#### Consent

All patient details have been de-identified, so a signed patient consent form for publication was unnecessary.

#### Acknowledgment

We thank all those who contributed to this work.

#### Authors' contributions

Chen Su wrote the manuscript; Qiang Wang managed the figures; Xiaobo Zhu and Junjie Zhang performed the surgery and approved the manuscript; all the authors have read and approved the
Disclosure Statement

The authors have no conflicts of interest to declare.

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Availability of data

The data used during the current study are available from the corresponding author on reasonable request.

References

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**Figures**

**Figure 1**

A. Contrast-enhanced chest CT showed a well-circumscribed mass containing multiple cystic cavities in the right anterior mediastinum, with enhancement of the cyst wall. B. Contrast-enhanced chest CT showed punctate calcification with heterogeneous density in the mass, and the cyst wall was close to the right lung and pericardium.
Figure 2

A. H&E staining showed a primary thymic basaloid carcinoma with multilocular thymic cyst surrounded by a thick fibrous membrane without obvious extracapsular infiltration (×40). B. H&E staining showed the tumor cells grew in a papillary pattern, converging into cords, trabeculae and nests, with an obvious palisade structure at the edge (×100). C, D, E. Immunohistochemical staining showed CD117, CK and p63 were positive respectively. F. Immunohistochemistry showed that Ki-67 accounted for approximately 20%.