Case Report

Thoracoscopic resection of a rare atypical Type A thymoma: A case report

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ABSTRACT

Tumors originating from the thymic epithelium are distinctly uncommon, and within this already rare group, atypical Type A thymoma represents an exceptional pathological diagnosis. Fewer than 20 well-substantiated cases have been documented in the international literature, with only isolated reports emerging from the Indian subcontinent. We present a rare case of atypical Type A thymoma identified following surgical excision of an anterior mediastinal mass in a middle-aged patient. Radiological evaluation revealed a localized thymic lesion without distinctive features suggestive of aggressive or atypical histology, underscoring the inherent limitations of pre-operative assessment in such neoplasms. The patient underwent complete thoracoscopic resection with curative intent. Detailed histopathological analysis of the excised specimen demonstrated architectural and cytological features diagnostic of atypical type a thymoma, a conclusion that could only be established after complete tumor removal. The post-operative course was uneventful, and resection margins were free of disease. This report highlights the diagnostic obscurity and extreme infrequency of atypical Type A thymoma, emphasizing the indispensable role of surgical excision in establishing an accurate diagnosis. Given the scarcity of reported cases and the limited representation from India, this case contributes meaningful insight to the existing body of evidence and may aid in improving recognition, pathological interpretation, and clinical understanding of this exceedingly rare thymic epithelial tumor.

Key words: Atypical type a thymoma, Thymic epithelial neoplasms, Thymic tumors, Thymoma, Video-assisted thoracoscopic surgery

Thymomas are uncommon epithelial neoplasms arising from thymic epithelial cells and constitute the most frequent primary tumors of the anterior mediastinum. According to the World Health Organization (WHO) classification, thymomas are subdivided into distinct histological subtypes based on epithelial cell morphology and lymphocytic content. Type A thymoma is traditionally considered a low-grade neoplasm, characterized by spindle or oval epithelial cells, minimal lymphocytic infiltration, and an excellent prognosis following complete surgical resection [1,2].

A rare and distinct variant, termed atypical Type A thymoma, has been recognized in recent classifications. This entity is defined by the presence of increased mitotic activity, focal or extensive tumor necrosis, and cytological atypia, features that differentiate it from conventional Type A thymoma and suggest a potentially more aggressive biological behavior [3-6]. Atypical Type A thymoma is exceedingly rare, with fewer than 20 well-documented cases reported worldwide and only isolated or anecdotal cases from India, resulting in limited understanding of its natural history, optimal management, and long-term prognosis [3-7].

Radiological evaluation typically demonstrates a well-circumscribed anterior mediastinal mass; however, imaging characteristics are largely non-specific and do not reliably distinguish between thymoma subtypes [8]. Furthermore, pre-operative tissue diagnosis may be limited by sampling error, particularly in tumors with focal atypical features. Consequently, a definitive diagnosis of atypical Type A thymoma is most often established only after thorough histopathological examination of the completely resected specimen [3,5]. Complete surgical resection remains the cornerstone of treatment for thymic epithelial tumors. With advances in minimally invasive surgery, video-assisted thoracoscopic surgery (VATS) has become an established and oncologically sound approach for early-stage thymomas, offering outcomes comparable to open surgery with the added benefits of reduced post-operative morbidity and faster recovery [9,10].

We report an extremely rare case of atypical Type A thymoma, in which the definitive diagnosis was

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established only on post-operative histopathological evaluation following thoracoscopic thymectomy. This case adds to the scarce global literature and highlights the rarity of this entity, particularly in the Indian population.

CASE PRESENTATION

A middle-aged patient presented with an incidentally detected anterior mediastinal mass identified on routine chest imaging. The patient was asymptomatic with no history of chest pain, dyspnea, cough, myasthenic symptoms, or constitutional complaints. There was no significant past medical or surgical history.

Contrast-enhanced computed tomography (CT) of the chest revealed a well-defined, encapsulated mass located in the anterior mediastinum, suggestive of well-defined thymic lesion. Based on the radiological findings, a provisional diagnosis of thymoma was considered. Patient was taken for CT-guided biopsy, and Immuno-histochemistry was consistent with Type A thymoma, but further characterization needed an excision biopsy.

Patient was given neoadjuvant chemotherapy for 3 cycles, but tumor size increased as shown in (Fig. 1: Pre-Chemotherapy) and (Fig. 2: Post-Chemotherapy), respectively.

The patient underwent thoracoscopic thymectomy using a VATS approach. Intraoperatively, a well-circumscribed thymic mass was identified without invasion of adjacent structures (Fig. 3). Complete excision of the thymus along with the tumor was achieved. The procedure was completed without intraoperative complications. The post-operative course was uneventful, and the patient had an early recovery.

Gross examination of the resected specimen showed an encapsulated mass composed of sheets of spindle to oval cells, increased mitotic activity, and focal necrosis (Fig. 4). These features were consistent with atypical Type A thymoma. Surgical margins were free of tumor, and there was no evidence of capsular invasion.

Based on the histo-pathological findings, a final diagnosis of atypical Type A thymoma was established. The patient was advised regular follow-up and remains asymptomatic with no evidence of recurrence on follow-up.

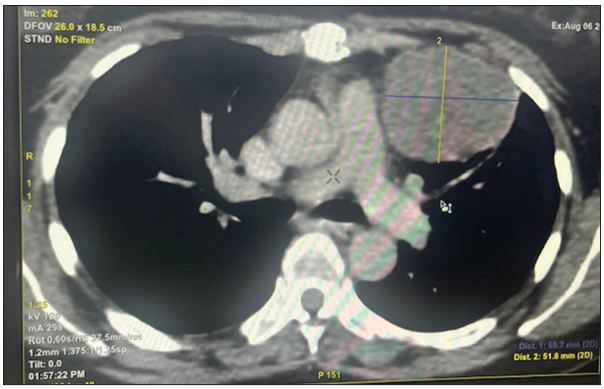

Figure 1: Contrast-enhanced computed tomography of the chest showing a well-defined anterior mediastinal mass before initiation of neoadjuvant chemotherapy

DISCUSSION

Thymomas are rare epithelial tumors of the anterior mediastinum and demonstrate considerable histological and clinical heterogeneity. Based on the WHO classification, thymomas are categorized into Types A, AB, and B (B1–B3) according to epithelial morphology and lymphocytic content [11]. Type A thymomas account for approximately 5–10% of all thymomas and are

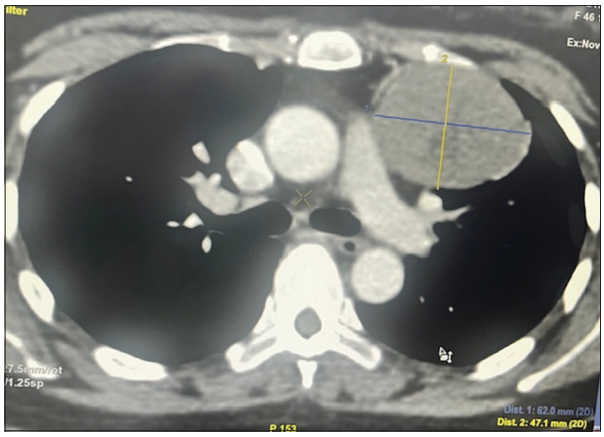

Figure 2: Post-chemotherapy contrast-enhanced computed tomography image demonstrating an interval increase in size of the anterior mediastinal mass

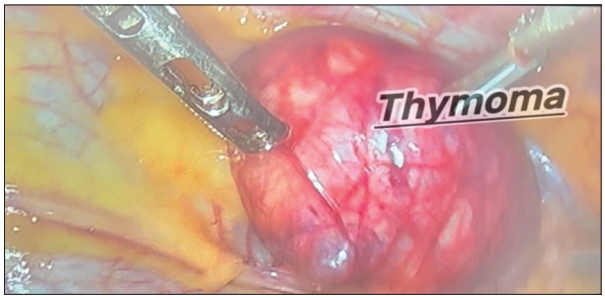

Figure 3: Intraoperative thoracoscopic view showing a well-circumscribed thymic mass during video-assisted thoracoscopic surgery

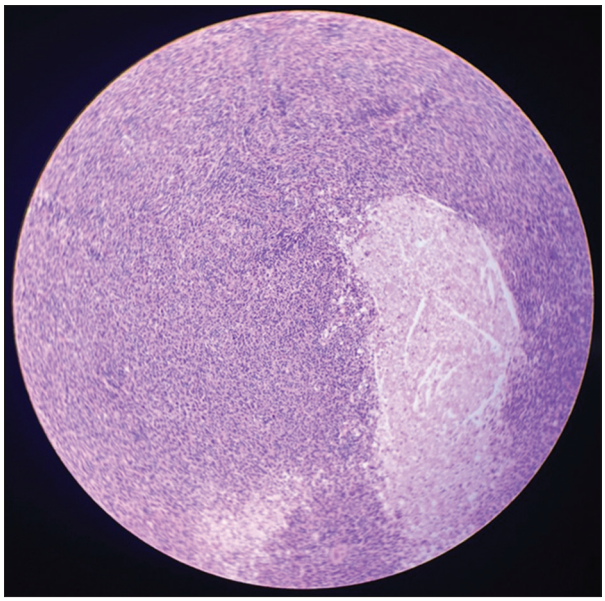

Figure 4: Histopathological section showing spindle to oval epithelial cells with increased mitotic activity and focal necrosis, suggestive of atypical Type A thymoma

typically associated with an indolent clinical course and excellent long-term outcomes following complete surgical excision [12].

Within this category, atypical Type A thymoma represents a distinctly uncommon variant characterized by increased mitotic activity, focal necrosis, and cytological atypia [3-6]. These features distinguish it from conventional Type A thymoma and raise concern regarding a potentially higher risk of recurrence or aggressive behavior. To date, fewer than 20 cases have been well documented in the global literature, with no large series and only sporadic reports from India, underscoring the exceptional rarity of this diagnosis and the absence of standardized management recommendations [3-7].

Pre-operative identification of atypical Type A thymoma remains challenging. Cross-sectional imaging modalities such as CT and magnetic resonance imaging are valuable for anatomical delineation but lack the specificity required to differentiate thymoma subtypes [8]. Image-guided biopsy may provide preliminary histological information; however, sampling limitations can result in underrecognition of focal atypical features. Consequently, as illustrated in the present case, definitive diagnosis is frequently established only after complete surgical excision and detailed histopathological assessment [5,13].

Role of Neoadjuvant Chemotherapy

Neoadjuvant chemotherapy is generally reserved for locally advanced or initially unresectable thymic epithelial tumors, where tumor downstaging may facilitate complete resection [14,15]. Platinum-based regimens have demonstrated meaningful response rates, particularly in Type B thymomas and advanced-stage disease.

In contrast, early-stage thymomas, especially Type A and AB subtypes, are characterized by low proliferative indices and relatively indolent tumor biology, rendering them less responsive to cytotoxic chemotherapy [14]. In the present case, as a pre-operative biopsy had already been performed and radiological imaging raised concern for capsular breach with possible local extension, neoadjuvant therapy was considered following multidisciplinary discussion to optimize the chances of complete resection

Though it failed achieve tumor regression and was associated with slight interval disease progression. This observation supports existing evidence that systemic therapy has a limited role in atypical Type A thymoma and reinforces the importance of early surgical intervention in resectable disease, even when biopsy is taken.

Role of Surgery and Prognosis

Complete (R0) surgical resection remains the most important prognostic factor for thymic epithelial tumors, irrespective of histological subtype or prior systemic therapy [9,10]. Minimally invasive techniques, particularly VATS thymectomy, have gained widespread acceptance for early-stage thymomas, with multiple studies demonstrating oncological equivalence to open approaches while offering reduced post-operative pain, shorter hospital stay, and faster functional recovery [9].

In the present case, thoracoscopic thymectomy enabled complete en bloc resection with negative margins, confirming surgery as definitive treatment. Although the prognostic significance of atypical histological features in Type A thymoma remains uncertain, available evidence suggests that overall survival remains favorable following complete resection, albeit with a potentially higher risk of recurrence compared to conventional Type A thymoma [3,6,12]. Given the limited number of reported cases and lack of long-term follow-up data, close post-operative surveillance is strongly recommended, even in early-stage disease.

CONCLUSION

This case highlights the extreme rarity of atypical Type A thymoma, particularly in the Indian population, and underscores the diagnostic challenges associated with this entity. The lack of response to neoadjuvant chemotherapy reinforces the limited role of systemic therapy in early-stage atypical Type A thymoma, while emphasizing complete surgical excision as the definitive treatment modality. Thoracoscopic thymectomy represents a safe and oncologically sound approach, and meticulous long-term follow-up remains essential due to the uncertain biological behavior of this rare thymoma subtype.

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