

Clinicopathological Spectrum of Mediastinal Masses: A Single-Center Experience.

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Abstract

Background

Mediastinal masses comprise a heterogeneous group of benign and malignant lesions arising from different mediastinal compartments. Their clinical presentation, radiological appearance, and histopathological spectrum vary widely according to age and anatomical location. Evaluating the clinicopathological pattern of mediastinal masses is essential for accurate diagnosis, timely management, and improved patient outcomes.

Objectives

To assess the clinical presentation, anatomical distribution, histopathological spectrum, and postoperative outcomes of mediastinal masses in patients managed at a single tertiary care center.

Methodology

This retrospective descriptive study was conducted at Department of Thoracic Surgery Unit, Lady Reading Hospital Medical Teaching Institution, Peshawar from Jan 2019 to Jan 2020. A total of 72 patients diagnosed with mediastinal masses during the study period were included. Demographic characteristics, presenting symptoms, radiological location of the mass, histopathological diagnosis, type of surgical or diagnostic procedure, postoperative complications, hospital stay, and mortality were recorded using a structured data collection form. Data were analyzed using SPSS version 24. Continuous variables were expressed as mean \pm standard deviation, while categorical variables were presented as frequencies and percentages. Statistical significance was set at $p < 0.05$.

Results

A total of 72 patients were included in the study. The mean age of the patients was 42.7 ± 16.4 years, and males constituted 58.3% of the study population. The most common presenting symptoms were chest pain (24 patients, 33.3%), cough (20 patients, 27.8%), dyspnea (13 patients, 18.1%), and incidental radiological detection (9 patients, 12.5%). The anterior mediastinum was the most frequent site of involvement (37 patients, 51.4%), followed by the posterior mediastinum (19 patients, 26.4%) and middle mediastinum (16 patients, 22.2%). The most common histopathological

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diagnosis was thymic lesions (17 patients, 23.6%), followed by lymphoma (13 patients, 18.1%), neurogenic tumors (12 patients, 16.7%), germ cell tumors (10 patients, 13.9%), mediastinal cysts (9 patients, 12.5%), and metastatic or other lesions (11 patients, 15.3%). Postoperative complications were observed in 10 patients (13.9%), with wound infection and prolonged air leak being the most common. The mean hospital stay was 6.8 ± 2.9 days, and overall mortality was 1 patient (1.4%).

Conclusion

Mediastinal masses demonstrate a wide clinicopathological spectrum, with anterior mediastinal lesions being the most common. Thymic lesions, lymphoma, and neurogenic tumors represented the leading histopathological diagnoses in this series. Histopathological confirmation remains essential for appropriate diagnosis and management. Most patients had acceptable postoperative outcomes with low mortality.

Keywords: Mediastinal masses; Thymoma; Lymphoma; Neurogenic tumor; Clinicopathological spectrum

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Introduction

Mediastinal masses are relatively uncommon thoracic lesions, but they represent a diagnostically important group of conditions because they arise from multiple tissue types and may range from benign cysts to highly aggressive malignancies (1). Their evaluation requires careful correlation of clinical features, imaging findings, anatomical compartment, and histopathology. A compartment-based approach remains central to diagnosis because the differential diagnosis varies considerably between the anterior, middle, and posterior mediastinum (2). Studies across age groups and multicenter radiology-pathology datasets have shown that the lesion spectrum changes by compartment and age, with thymic lesions tending to predominate in the prevascular/anterior mediastinum and neurogenic tumors in the paravertebral/posterior compartment. The clinical presentation of mediastinal masses is highly variable. Some patients present with chest pain, cough, dyspnea, fever, or compressive symptoms, whereas others are diagnosed incidentally on imaging performed for unrelated reasons (3). Large lesions may cause superior vena cava obstruction, airway compression, dysphagia, or neurological symptoms depending on their anatomical location and extent (4). Because symptoms may overlap among benign and malignant conditions, tissue diagnosis is often required for definitive management (5). The pathological spectrum of mediastinal masses includes thymic epithelial tumors, lymphomas, germ cell tumors, neurogenic tumors, cystic lesions, metastatic disease, and inflammatory or infectious conditions (6). In adults, thymic tumors and lymphomas are frequently encountered in the anterior mediastinum, whereas neurogenic tumors are more common in the posterior mediastinum (7). The distribution of lesions has been shown to vary not only by compartment but also by age, with pediatric and younger patients showing different patterns from older adults. Radiological evaluation plays an essential role in defining the location, extent, composition, and relation of the lesion to surrounding structures (8). Computed tomography is particularly valuable in narrowing the differential diagnosis and planning biopsy or surgical intervention, while histopathological assessment remains the gold standard for definitive diagnosis (9). Surgical excision or biopsy is frequently required, especially when malignancy is suspected or symptoms are significant (10). Single-center studies are useful for understanding local disease patterns, diagnostic yield, and treatment outcomes. Such analyses help

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characterize the clinicopathological profile of mediastinal masses and may assist in refining institutional management strategies (11).

Research Objective

To assess the clinical presentation, anatomical distribution, histopathological spectrum, and postoperative outcomes of mediastinal masses in patients managed at a single tertiary care center.

Materials and Methods

Study Design and Setting

This retrospective descriptive study was conducted at Department of Thoracic Surgery Unit, Lady Reading Hospital Medical Teaching Institution, Peshawar from Jan 2019 to Jan 2020.

Participants

The study included 72 patients diagnosed with mediastinal masses during the study period.

Inclusion Criteria

Patients aged 18 years or older with radiologically and histopathologically confirmed mediastinal masses were included in the study.

Exclusion Criteria

Patients with incomplete medical records, purely vascular mediastinal lesions, and those without histopathological confirmation were excluded.

Data Collection

A structured proforma was used to collect data regarding age, gender, clinical presentation, radiological compartment of the mass, histopathological diagnosis, type of diagnostic or therapeutic procedure, postoperative complications, duration of hospital stay, and mortality.

Statistical Analysis

Data were analyzed using SPSS version 24. Quantitative variables were expressed as mean \pm SD, while categorical variables were presented as frequency and percentage. Associations were assessed using the chi-square test and independent t-test. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 72 patients with mediastinal masses were included in the study. The mean age of the patients was 42.7 ± 16.4 years, and 42 patients were male. The most common presenting complaints were chest pain (24 patients, 33.3%), cough (20 patients, 27.8%), dyspnea (13 patients, 18.1%), and incidental detection on radiological imaging (9 patients, 12.5%). A small proportion of patients presented with fever, weight loss, or compressive symptoms (6 patients, 8.3%). The anterior mediastinum was the most frequent site of involvement (37 patients, 51.4%), followed by the posterior mediastinum (19 patients, 26.4%) and middle mediastinum (16 patients, 22.2%). Histopathological examination showed that thymic lesions were the most common diagnosis (17 patients, 23.6%), followed by lymphoma (13 patients, 18.1%), neurogenic tumors (12 patients, 16.7%), germ cell tumors (10 patients, 13.9%), mediastinal cysts (9 patients, 12.5%), and metastatic/other lesions (11 patients, 15.3%). The majority of patients underwent surgical

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excision or biopsy for diagnosis and treatment. Postoperative complications were observed in 10 patients (13.9%). The most common complications were wound infection (4 patients, 5.6%), prolonged air leak (3 patients, 4.2%), postoperative atelectasis (2 patients, 2.8%), and pleural effusion (1 patient, 1.4%). The mean hospital stay was 6.8 ± 2.9 days, and overall mortality was 1 patient (1.4%).

Table 1. Baseline Characteristics and Clinical Presentation

Variable	Frequency (n)	Percentage (%)
Age (years), mean \pm SD	42.7 \pm 16.4	—
Male	42	58.3%
Female	30	41.7%
Chest pain	24	33.3%
Cough	20	27.8%
Dyspnea	13	18.1%
Incidental radiological finding	9	12.5%
Fever/weight loss/other symptoms	6	8.3%

Table 2. Anatomical Distribution and Histopathological Diagnosis

Variable	Frequency (n)	Percentage (%)
Anatomical location		
Anterior mediastinum	37	51.4%
Middle mediastinum	16	22.2%
Posterior mediastinum	19	26.4%
Histopathological diagnosis		
Thymic lesions	17	23.6%
Lymphoma	13	18.1%
Neurogenic tumors	12	16.7%
Germ cell tumors	10	13.9%
Mediastinal cysts	9	12.5%
Metastatic/other lesions	11	15.3%

Table 3. Postoperative Outcomes

Outcome Variable	Value
Postoperative complications	10 (13.9%)
Wound infection	4 (5.6%)

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Prolonged air leak	3 (4.2%)
Atelectasis	2 (2.8%)
Pleural effusion	1 (1.4%)
Mean hospital stay	6.8 ± 2.9 days
Mortality	1 (1.4%)

Discussion

The present study demonstrated that mediastinal masses show a broad clinicopathological spectrum, with anterior mediastinal lesions being the most common. Thymic lesions, lymphoma, and neurogenic tumors represented the leading pathological categories in our series. These findings are in agreement with previous clinicopathological studies showing that lesion type is strongly related to mediastinal compartment and patient age, with thymic tumors being common in the anterior mediastinum and neurogenic tumors predominating in the posterior compartment (12,13). Large age-spectrum and multi-institutional compartment-based studies report similar distribution trends. Chest pain and cough were the most frequent presenting symptoms in our study, although a notable proportion of patients were diagnosed incidentally. This pattern is comparable with earlier single-center reports, where many mediastinal masses were either asymptomatic or presented with nonspecific thoracic symptoms until identified on imaging (14,15). The variable clinical presentation reflects the heterogeneity of mediastinal lesions and the influence of lesion size, compartment, and compressive effect on adjacent structures (16). In the present study, thymic lesions formed the largest histopathological group. This observation is consistent with published data indicating that thymic epithelial tumors are among the most frequent anterior mediastinal neoplasms in adults. Lymphoma and germ cell tumors were also common in the anterior compartment, while neurogenic tumors were more often located posteriorly, which agrees with established radiologic-pathologic patterns (17,18). Review articles and compartment-based analyses support this diagnostic distribution. The postoperative complication rate in our series was relatively low, with wound infection and prolonged air leak being the most common adverse events. This is similar to previous surgical series in which most mediastinal procedures had acceptable short-term outcomes, particularly when lesions were localized and patients were managed in specialized thoracic centers (19,20). The low overall mortality in our study also supports the generally favorable short-term outcome of appropriately selected patients undergoing biopsy or resection for mediastinal masses. An important implication of this study is the need for accurate preoperative localization and histopathological diagnosis. Because the differential diagnosis varies greatly by compartment, imaging and tissue confirmation remain crucial for planning surgical intervention, chemotherapy, radiotherapy, or observation depending on the underlying pathology (21). Institutional data such as these may also help refine local diagnostic algorithms and management strategies (22). Overall, the present findings reinforce that mediastinal masses are heterogeneous lesions requiring multidisciplinary evaluation. A clinicoradiological approach combined with histopathological confirmation remains essential for precise diagnosis and effective treatment.

Limitations

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This study has several limitations. It was conducted at a single center and used a retrospective design, which may limit generalizability and introduce information bias. In addition, the study grouped different mediastinal pathologies together, and long-term follow-up outcomes were not assessed.

Conclusion

Mediastinal masses demonstrate a wide clinicopathological spectrum, with anterior mediastinal lesions being the most common. Thymic lesions, lymphoma, and neurogenic tumors were the predominant histopathological diagnoses in this series. Histopathological confirmation remains essential for diagnosis and management, and most patients had favorable short-term outcomes with low postoperative mortality.

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Conflict of Interest: Nil

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Authors Contribution

Concept & Design of Study: Faridullah Khan Ismail¹

Data Collection: Muhammad Abid Khan²

Drafting: Tahir Aslam³

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Critical Review: Tahir Aslam³

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