A case series of mediastinal masses

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Abstract:

Introduction: The majority of mediastinal masses are discovered incidentally. At least half of all mediastinal masses are asymptomatic and detected by chest radiography performed for unrelated reasons. Primary lesions of the mediastinum are less common than lesions that secondarily involve the mediastinum. This case series discuss and highlight the varied presentations, different diagnostic modalities available in establishing the diagnosis of mediastinal masses. The importance and the role of performing immunohistochemistry staining in establishment of final diagnosis and planning of management are also highlighted.

Case Details:

CASE 1: A 55 year old female presented with diffuse chest pain for 6 months and cough with expectoration for 2 years. Chest x ray and CT chest revealed a posterior mediastinal mass. Excision biopsy was done which revealed neurofibroma.

CASE 2: A 60 year old male patient presented with shortness of breath, cough and difficulty in swallowing for 6 months. Chest X-Ray and CT chest revealed a posterior mediastinal mass with loss of fat plane with posterior wall od oesophagus. A biopsy was done and a diagnosis of leiomyosarcoma was made after histopathological examination and IHC.

CASE 3: A 60 year old male patient presented with shortness of breath for 10 days and chest pain for 2 days. A Chest X Ray revealed a homogenous opacity an ICD was inserted subsequently. A CT done after 2 days revealed Large avidly enhancing soft tissue density lesion in anterior mediastinum extension to surrounding mediastinal structures. CT guided biopsy was done and a diagnosis of sarcomatoid carcinoma was done after histopathological examination and immunohistochemistry staining.

Conclusion: Based on location of the tumor a proper technique has to be selected for obtaining a tissue sample sufficient enough for histopathology and immunohistochemistry typing. Early diagnosis can prevent adverse outcomes in benign tumors.

Keywords: Mediastinal masses, benign tumors, mediastinum
Introduction

The mediastinum is a potential space between the two pleural cavities in the thorax which contains a lot of vital structures. Mediastinal masses represent a wide collection of tumors that include cysts arising in various organs and vascular abnormalities.

Anatomically mediastinum is divided into three compartments. Anteroposterior mediastinum, middle mediastinum, posterior mediastinum. Thymomas, lymphomas ad germ cell tumors are common lesions in the anteroposterior compartment.1,2 Fore gut cysts and lymphomas are the common lesions in the middle compartment. Nerve sheath tumors and neurogenic tumors are the common lesions in the posterior compartment.1,2

The majority of mediastinal masses are discovered incidentally. At least half of all mediastinal masses are asymptomatic and detected by chest radiography performed for unrelated reasons. Primary lesions of the mediastinum are less common than lesions that secondarily involve the mediastinum.3

This case series discuss and highlight the varied presentations, different diagnostic modalities available in establishing the diagnosis of mediastinal masses. The importance and the role of performing immunohistochemistry staining in establishment of final diagnosis and planning of management is also highlighted.

Case 1

- A 55-year-old female agricultural labourer by occupation presented with complaints of cough and expectoration-2 years, yellow purulent. Breathlessness on exertion for the last two years. Diffuse chest pain more on right side for 6 months radiating to the neck and back. She is a known COPD on treatment since last 2 years. She has history of biomass fuel exposure for 20 years.

- Chest x ray and CT chest revealed a posterior mediastinal mass.
In view of persistent symptoms after discussing with the cardiothoracic surgeon patient was planned for excisional biopsy which revealed neurofibroma with myxoid degeneration and ossification. IHC panel was positive for S 100 and negative for synaptophysin which finalise the diagnosis of benign peripheral neve sheath.

**CHEST X RAY:** Right paratracheal opacity with superior mediastinal widening, scoliosis with convexity to the right side noted compressing the lung.

**CECT CHEST:** Hypodense mass lesion, broad based towards pleura, in right paravertebral location at the level of D2-D6 with multiple areas of calcification and associated suspicious erosion of posterior aspect of fourth rib.

On follow-up patient symptoms were relieved and no complications are seen.
Case 2

- A male farmer aged 60 years presented with cough with expectoration for 6 months, breathlessness on exertion with MMRC grade 2-3 for 6 months. Difficulty in swallowing more for liquids than solids since last 6 months. Patient had history of fever and experienced loss of weight and loss of appetite. Patient was treated for tuberculosis 10 years back.
- Patient is a smoker of 20 pack years with 1 pack per day.
- All routine blood investigations were normal. Chest x-ray: Right hilar opacity, calcified nodules right upper zone and midzone, left upper zone heterogeneous opacity. CECT chest: A heterogeneous enhancing posterior mediastinal mass measuring 8.8*6.0*6.8 cm with few non enhancing areas and calcification within is seen at the level of tracheal bifurcation causing loss of fat plane with posterior wall of esophagus, anterior wall of descending thoracic aorta.
- Bronchoscopy was done which revealed only narrowed right intermediate bronchus and no endobronchial lesion was seen, Brush biopsy: suspicious of malignancy.
- Patient underwent an Esophageal ultrasound guided core biopsy was done and the histopathology was suggestive of spindle cell sarcoma.
- A tumor resection was planned after discussing with the cardio thoracic surgeon. Intraoperatively as the tumor was seen encircling the aorta and he esophagus only a biopsy was taken. Histopathological examination revealed spindle cells arranged in short fascicles and collagen cells having elongated moderately pleomorphic nuclei with abundant granular vacuolated cytoplasm suggestive of spindle cell sarcoma. Immuno histochemistry markers were positive for SMA and negative for S100. Which confirmed Leiomyosarcoma. Patient was given a palliative chemotherapy of Ifosfamide and Adriamycin. 6 cycles of chemotherapy was completed and no growth in size of tumor was seen in follow-up scans.

Figure 4,5,6:
Case 3

A 60 year old male patient presented to the outpatient department with complaints of breathlessness MMRC grade II-III for 10 days, chest pain for 2 days. Non-smoker/alcoholic.

Chest x-ray showed right sided homogenous opacity with tracheal shift. ICD was inserted with the help of ultrasound. The x ray repeated on second day after ICD revealed a large heterogenous opacity. A CT chest was done which revealed mediastinal mass of 14.8*15.7*9.4 cm lesion.

Pleural Fluid analysis showed exudative effusion with lymphocytic predominance. Cytology showed no presence of malignant cells.

CECT chest: Large avidly enhancing soft tissue density lesion in anterior mediastinum extension to surrounding mediastinal structures. Right middle lobe collapse. CT abdomen and Brain showed no signs of metastasis. A CT guided biopsy was done after doing contrast enhanced study.
Histopathological examination showed large number of spindle shaped cells with increased nuclear cytoplasmic ratio, scant cytoplasm and dark hyperchromatic nuclei with absence of nucleoli. Immuno Histo Chemistry: Positive for CK5/6 and CD99. Negative for CD45, Synaptophysin, Chromogranin, TTF, TLE.

Histopathology and immunohistochemistry: **Sarcomatoid carcinoma**

Patient is being treated with chemotherapy of Etoposide and Cisplatin.

**Chest X-ray**

![Chest X-ray images](image)

**Figure 7.8.9:**

**CECT Chest:**(Figure 10,11,12)

**Discussion**
Mediastinal tumors have a wide variety of symptoms and often they are nonspecific. A high clinical suspicion is necessary to diagnose mediastinal mass. CT scan is an effective tool in evaluating mediastinal masses. Moreover, appropriate approaches for sampling the mass should be chosen based on the location of the mass to get good sample. The tumor types have a close association with long term survival of patients.

Various methods available for obtaining a tissue sample are percutaneous needle aspiration and biopsy of mediastinal masses which was used for several decades. These techniques has seen increased utilization with the emergence of image guidance.\(^4\)

Mediastinoscopy has utility in evaluating mediastinal adenopathy or mass lesions in a variety of settings, including the evaluation of complications of HIV infection. However, its most frequent application is in the staging of bronchogenic carcinoma.

Video-assisted thoracoscopic surgery, usually considered a tool for the evaluation of pleural and lung abnormalities, also can be helpful in the management of mediastinal diseases. Mediastinal lymph nodes can be sampled to aid in the staging of malignancies such as oesophageal carcinoma and for the diagnosis and resection of primary mediastinal tumors and cysts.

Fibreoptic bronchoscopy with EBUS can be used for evaluation of mediastinal adenopathy and a biopsy can be taken. With the advent of fibreoptic bronchoscopy and endobronchial ultrasound the role of percutaneous needle aspiration is being decreased. Mediastinoscopy is also an invasive procedure and been used less since the advent of EBUS.\(^5,6\)

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**CHEST X RAY:** Right sided homogenous opacity with tracheal shift

**CECT CHEST:** Large avidly enhancing soft tissue density lesion in anterior mediastinum extension to surrounding mediastinal structures

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Table 1: Advantages and disadvantages of mediastinal biopsy techniques

<table>
<thead>
<tr>
<th>Biopsy technique</th>
<th>Advantages</th>
<th>Disadvantages</th>
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<tr>
<td>Image-guided percutaneous biopsy</td>
<td>Less invasive</td>
<td>Risk of nondiagnostic biopsies</td>
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<tr>
<td>(IGPB)</td>
<td>Local anesthesia</td>
<td>Incisional biopsies only</td>
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<tr>
<td></td>
<td>Minimal postprocedure pain</td>
<td></td>
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<tr>
<td>Cervical mediastinoscopy (CM)</td>
<td>Larger biopsies than IGPB</td>
<td>General anesthesia</td>
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<td></td>
<td>Some excisional biopsies</td>
<td>Visceral compartment only</td>
</tr>
<tr>
<td>Anterior Mediastinotomy (AM)</td>
<td>Larger biopsies than IGPB</td>
<td>General anesthesia</td>
</tr>
<tr>
<td></td>
<td>Some excisional biopsies</td>
<td>Postoperative pain</td>
</tr>
<tr>
<td>Endoscopic ultrasound (EUS)</td>
<td>Less invasive</td>
<td>Risk of cosmetic deformity</td>
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<tr>
<td></td>
<td>Minimal postprocedure pain</td>
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<tr>
<td>Endobronchial ultrasound (EBUS)</td>
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<td>Visceral compartment only</td>
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<td></td>
<td>Minimal postprocedure pain</td>
<td>Incisional biopsies only</td>
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<td>Video-assisted thoracic surgery</td>
<td>Access to all 3 compartments</td>
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</tr>
<tr>
<td>(VATS)</td>
<td>Excisional biopsies</td>
<td>Postoperative pain</td>
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<td></td>
<td>Evaluation of lung and pleura</td>
<td>Potential for chest tube</td>
</tr>
</tbody>
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Image Source: Mediastinal Lesions Diagnostic Pearls for Interpretation of Small Biopsies and Cytology(table 2.3)

With the availability of large spectrum of chemotherapy drugs and recent advances like targeted therapy it is essential to subtype the tumor. IHC markers play a very important role in confirming the diagnosis and subtyping of the tumor thereby helping to determine the type of treatment. In the three cases there was a diagnostic dilemma after histopathological examination which was resolved by IHC later. From this case series we want to stress the importance of IHC markers in the diagnosis of mediastinal masses.  

First two cases are from posterior mediastinum nerve sheath tumors which are the most common type of posterior mediastinal tumors which are benign 98% of the times in adults. Most of the patients with these tumors are asymptomatic. When suspected in adults a MRI also should be done to rule out any intra spinal extension. The treatment of choice is complete resection. The immuno histochemistry was positive for S 100 and negative for synaptophysin which ruled out neuroendocrine tumor and confirmed benign peripheral nerve sheath tumor. While planning for this patient since the tumor was centrally located and TBLB was not available we planned for an excision biopsy.

Second case was of liposarcoma which is a rare posterior mediastinal mesenchymal tumor which is malignant. Surgical resection is the treatment of choice since the tumor is encircling the great vessels and oesophagus a decision was taken not to resect the tumor and a biopsy was done which revealed sarcoma. As the tumor is centrally located bronchoscopy was done which was not definitive and only showed a few atypical cells. In this
case as the tumor was central and a CT guided biopsy could not be planned a EUS guided biopsy was planned which gave a clue for diagnosis. As the patient has a history of tuberculosis in Indian scenario missing a hilar mass is common so careful examination and CT chest are necessary to rule out mediastinal tumors.

Third case is a rare biphasic mesenchymal malignant tumor. Initially patient presented with acute onset breathlessness and examination revealed a pleural effusion after inserting an ICD and draining pleural fluid only we were able to identify a mass and subsequently a CT guided biopsy was planned as the tumor was assessable easily trans thoracically. Even though surgery is the treatment of choice it was not advised to the patient in view of age and size of the tumor. Histopathological examination revealed large number of spindle cells and IHC was positive for CK5/6 and CD 99 so a diagnosis of sarcomatoid carcinoma was finalised since the IHC showed positivity for both mesenchymal and epithelial markers10. Sarcomatoid carcinoma is very rarely seen in mediastinum with only a few cases reported in literature.11

CONCLUSION

Mediastinal tumors are mostly asymptomatic. A careful systematic examination, CT and MRI imaging are necessary to identify and localise mediastinal tumor. Based on location of the tumor a proper technique has to be selected for obtaining a tissue sample sufficient enough for histopathology and immunohistochemistry typing. Early diagnosis can prevent adverse outcomes in benign tumors.

REFERENCES


