

Pulmonary synovial sarcoma: A case series and review of literature



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ABSTRACT

Synovial sarcoma is a rare malignant mesenchymal tumor that can develop at any anatomic site. Pulmonary sarcomas constitute 0.1–0.5% of all primary lung malignancies. Primary pulmonary synovial sarcoma is highly uncommon. Most of the patients present with large intrathoracic masses with complaints of cough, chest pain, shortness of breath, or hemoptysis. Multimodality treatment in the form of wide excision, chemotherapy, and radiotherapy is the mainstay of therapy. Synovial sarcoma is considered a high-grade tumor with a poor prognosis. We hereby present three cases of histologically proven synovial sarcoma with predominantly pulmonary involvement, along with their management and in hospital outcome.

Key words: Synovial sarcoma; Pulmonary sarcoma; Pulmonary involvement

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INTRODUCTION

Synovial sarcoma is a spindle cell sarcoma with a mesenchymal origin and constitutes up to about 5–10% of all soft-tissue sarcomas. Synovial sarcomas are associated with a characteristic chromosomal translocation t (X; 18) (p11;q11).¹ Although periarticular tissue is the most common site of synovial sarcoma, it has also been reported from various other body sites.^{2,3} The age of presentation is usually between 15 and 35 years. Almost 90% of cases are reported before the age of 50, with equal sex predisposition.¹

Case 1

A 75-year-old male, chronic smoker, a farmer by occupation, presented with complaints of shortness of breath, cough with expectoration, and fever of 1-month duration.

Shortness of breath was progressive, from mMRC Grade 1 at the onset to mMRC Grade 4 at presentation. He also had complaints of cough with expectoration; sputum was scanty, non-foul smelling, whitish, and mucoid. He also had associated complaints of loss of appetite and weight over the past 2 months. There was no significant medical or surgical history. The patient was a chronic beedi (leaf-wrapped tobacco) smoker for more than 40 years, with an estimated smoking index of 800.

On general physical examination, he had no anemia, engorged neck veins, or lymphadenopathy. Early clubbing was present. He was underweight (body mass index, that is - 15.5 kg/m²). He was afebrile, respiratory rate was 22/min, pulse rate was 110/min, blood pressure 108/62 mmHg, and resting oxygen saturation (measured by pulse oximetry) was 94% on room air. He

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had few subcutaneous, non-tender, and firm swellings (approximately 2–3 cm by 3 cm) over the anterior abdominal wall, without elevation of local temperature or overlying skin changes (Figure 1a and b). Examination of the chest revealed chest movements reduced over the right hemithorax. On percussion, a dull note was present over the right mammary, infra-axillary, and infrascapular areas. On auscultation, air entry was reduced over right mammary, infra-axillary, and infrascapular areas. Clinical findings were suggestive of a lung mass.

Chest X-ray showed a well-defined right lower zone homogenous opacity (Figure 1c). USG abdomen revealed

the presence of a hypoechoic lesion on the anterior abdominal wall suggestive of metastatic deposits. CT chest (Figure 1d) showed a sizeable ill-defined mass in the right lung (9.7×8.8×7.8 cm) with multiple enlarged mediastinal nodes, bilateral adrenal metastasis, and a right inferior renal pole mass. A transthoracic lung biopsy was performed; histopathologic examination revealed necrotic tissue and viable focal areas showing sheets of malignant cells. Immunohistochemistry report showed positivity for TLE1, Bcl2, and focal CD99 and negative for S100, desmin, and calretinin favoring a possibility of synovial sarcoma (Figure 1e-j). The patient received one cycle of doxorubicin and ifosfamide.

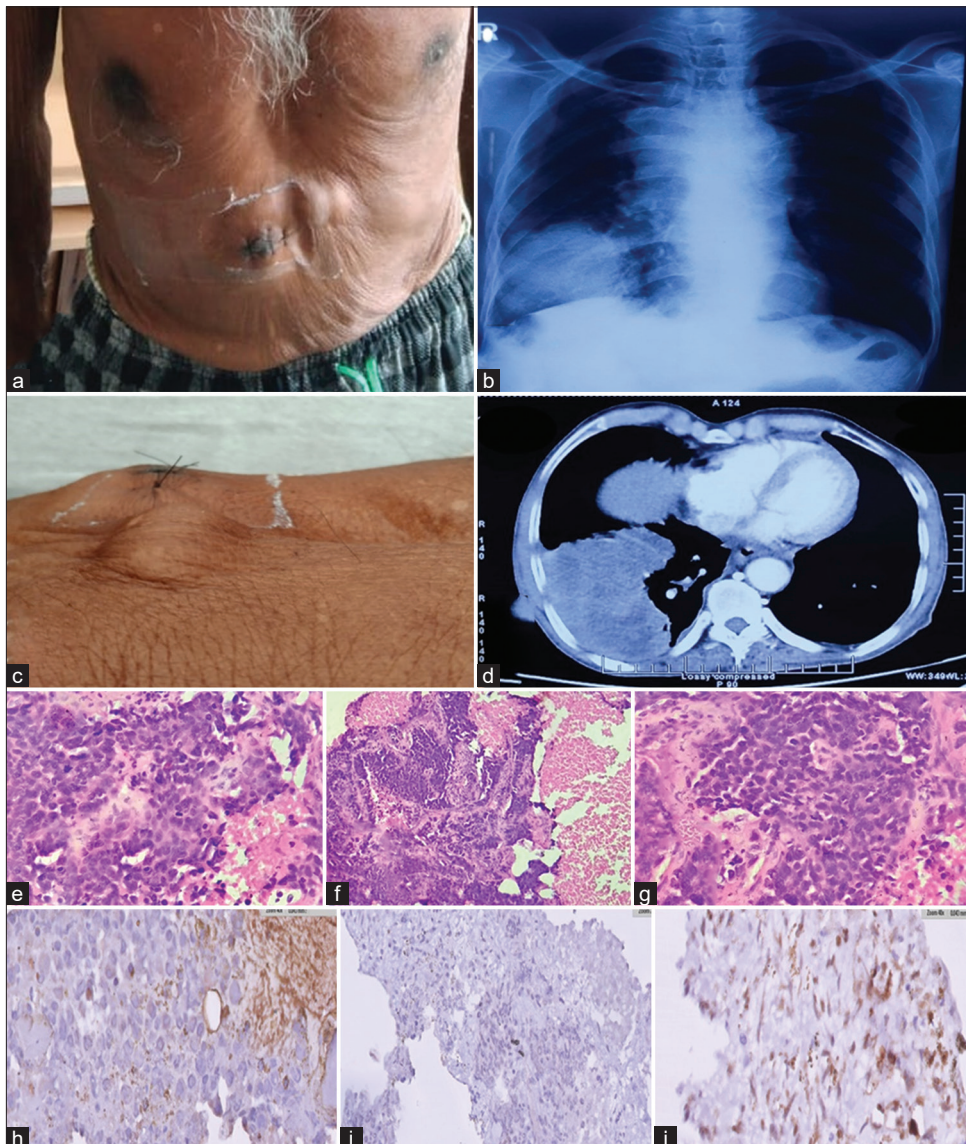


Figure 1: (a and b) Multiple subcutaneous skin nodules can be visualized, along with suture at biopsy site. (c) Chest X-ray showing the right lower zone heterogenous opacity. (d) Chest CT showing the right lower lobe heterogeneously enhancing mass with hypodense area. (e-g) Histopathology (Hematoxylin Eosin staining) showed necrotic tissue and viable focal areas showing sheets of malignant cells. (h-j) Immunohistochemistry showed negativity for cytokeratin and TTF1; TLE1 staining was positive

However, he continued to have disease progression and died after 4 weeks of receiving the first cycle of chemotherapy.

Case 2

A 45-year-old male, a farmer by occupation, presented to the hospital with a 4-month history of the left-sided dull aching chest pain, dry cough, and gradually progressive dyspnea (mMRC Grade 1–Grade 3). Patient had no history of hemoptysis, chest trauma, loss of appetite, or weight. He was on treatment for essential hypertension; the rest of his medical history was unremarkable. He was an exsmoker with a smoking index of 180. He was on regular treatment with tablet amlodipine 5 mg once daily for hypertension.

On general physical examination, he had no anemia, clubbing, engorged neck veins, or lymphadenopathy. He was afebrile. General physical examination was unremarkable. Clinical examination of the chest revealed reduced vocal fremitus over left infra-axillary and infrascapular areas, dull percussion note with reduced air entry, and reduced vocal resonance in these areas.

Chest X-ray revealed a well-defined homogenous opacity involving the left middle and lower zone (Figure 2a). Lung ultrasonography showed a heterogeneous hypoechoic mass in the lower part of the left lung. CECT chest (Figure 2b) showed a well-defined mass lesion in the left lower lobe of

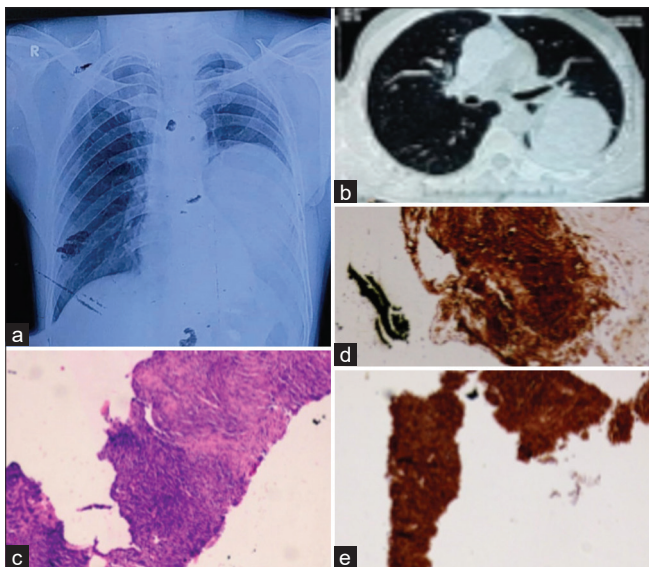


Figure 2: (a) X-ray chest showing the left middle and lower zone heterogenous opacity. (b) CT Chest showing the left lower lobe lung mass. (c) Histopathologic examination (h and e stain) shows hypercellular bits of spindle to oval cells arranged in fascicles and solid sheets amidst a few vascular channels, with features suggestive of a spindle cell neoplasm. (d and e) Immunohistochemistry showed positivity for CD99 and BCL2

the lung (99×90 mm), showing internal vascularity. There was no significant mediastinal lymphadenopathy. USG-guided FNAC from lung mass was inconclusive. Biopsy from lung mass showed the presence of hypercellular bits of spindle to oval cells arranged in fascicles and solid sheets amidst a few vascular channels, with features suggestive of a spindle cell neoplasm (Figure 2c). On immunohistochemistry (Figure 2d and e), the tumor cells were positive for TLE-1, CD 99, and Bcl 2 while negative for SMA and S100. Ki67 was 10%. Based on the above report, final diagnosis of synovial sarcoma of the lung was made. Management options were discussed with the patient and family members, who opted for palliative chemotherapy at a higher center. The patient was referred for further management.

Case 3

A 50-year-old male, chronic smoker, a farmer by occupation, presented with complaints of shortness of breath, right-sided chest pain, and cough with expectoration of 8 months duration. Shortness of breath was gradually progressing from mMRC Grade 0 to mMRC Grade 3. He also had a dull aching type of right-sided chest pain and expectoration of scanty, non-foul-smelling, and mucoid sputum with one episode of blood streaks in sputum. He had associated complaints of loss of appetite and weight. There was no significant past medical or surgical history. The patient was a chronic beedi and ganja smoker for 30 years duration, with a smoking index of 600. On general physical examination, he had no anemia, clubbing, engorged neck veins or lymphadenopathy. He was afebrile, respiratory rate 24/min, pulse rate 98/min, blood pressure 110/70 mmHg, and SPO₂ 98% on room air. Examination of chest proper revealed reduced air entry in the right mammary and infra-axillary area.

Chest X-ray revealed a mediastinal mass with mild right pleural effusion. CT chest showed a contrast-enhancing heterogeneous anterior mediastinal soft-tissue lesion with extrinsic compression of trachea and bilateral main bronchi, encasement of the left pulmonary artery, along with bilateral pleural effusion (Figure 3a-c). Transthoracic FNAC and biopsy from mass were positive for malignancy. Immunohistochemistry showed positivity for TLE1, CD99, Bcl2, and vimentin and negative for S100, calretinin, desmin, CK 7, TTF-1, and LCA, Ki67 was 30%, and this report was suggestive of synovial sarcoma. The patient was referred to a higher center for palliative chemotherapy; subsequent follow-up was not available.

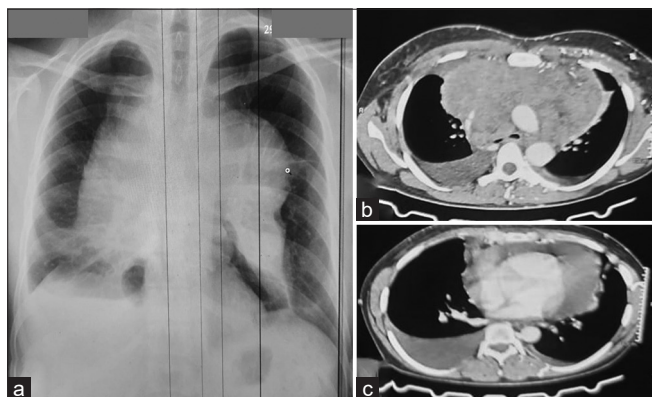


Figure 3: (a-c) Chest radiograph and CT Chest showing anterior mediastinal mass with compression of great vessels and bilateral pleural effusion. Histopathology and immunohistochemistry (not shown) demonstrated features of synovial sarcoma

DISCUSSION

The various types of primary pulmonary sarcomas are leiomyosarcoma, undifferentiated pleomorphic sarcoma, fibrosarcoma, and synovial sarcoma. The lung is the most common site where an intrathoracic synovial sarcoma can arise, followed by pleura, mediastinum, esophagus, and heart. The most preferred location of metastasis in soft-tissue synovial sarcoma is the lung.¹ As primary and metastatic synovial sarcoma radiological features are similar, a thorough clinical and radiological evaluation is necessary to exclude an extrathoracic tumor.

The four subtypes of primary pulmonary synovial sarcomas are monophasic fibrous (spindle), monophasic epithelial, biphasic, and poorly differentiated. Monophasic subtype is the most common. The biphasic subtype has both epithelial and spindle cell component.^{4,5} Clinicoradiologic, pathological, and immunohistochemical investigations are essential for diagnosing primary pulmonary synovial sarcoma and differentiating primary tumors from metastatic ones. Immunohistochemistry in synovial sarcoma shows positivity for cytokeratin, EMA, Bcl2, and vimentin and negative for S100, desmin, smooth muscle actin, and vascular tumor markers.⁶ Cytogenetic studies by reverse transcriptase-polymerase chain reaction help in differentiating monophasic from biphasic type. In 90% of synovial sarcomas, a specific translocation t (X;18) (p11.2;q11.2) can be detected. A biphasic subtype is associated with SYT–SSX 1 gene and has a bad prognosis, whereas the monophasic subtype is associated with SYT–SSX 1 or SYT–SSX 2 gene.⁷

There are no standard recommendations for the management of synovial sarcoma. Surgical resection

is the preferred modality of treatment followed by chemotherapy and radiotherapy. Most operable cases are treated with a lobectomy or pneumonectomy because of large tumor size. Surgery is not recommended for locally invasive tumors or metastasis. Neoadjuvant and adjuvant chemotherapy or radiotherapy may be required in some cases apart from surgery. This tumor has a tendency for late recurrence and metastasis.⁸ Thus, a longer follow-up of more than 10 years is recommended. The localized disease has a good chance of being cured with surgery and radiotherapy.

CONCLUSION

The primary synovial sarcoma of the lung is a rare tumor and has a poor prognosis. The diagnosis requires clinicopathologic and immunohistochemical investigations to exclude alternative primary tumors and metastatic sarcoma. Surgical excision with negative margins, whenever feasible, is the most appropriate treatment. Adjuvant chemotherapy and radiotherapy have a limited role. Because of high recurrence rates, the patient needs to be kept under close follow-up.

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