Case Report

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Chondrosarcoma Arising from Bronchial Cartilage: A Rare Case Report

Surgery Section

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ABSTRACT

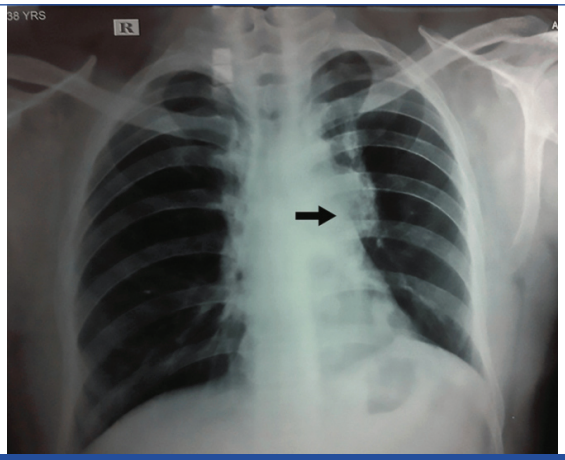
Primary pulmonary chondrosarcoma is an exceptionally rare malignancy, particularly originating from bronchial cartilage within the lung. Hereby, the authors present a case report of a 38-year-old non smoking male farmer who presented with persistent cough with expectoration and occasional streaks of haemoptysis, revealing a well-defined mass in the left lower lobe arising from bronchus and extending into the lung parenchyma. Radiographic and surgical findings confirmed a lobulated mass with dense pleural involvement. Chondrosarcoma, characterised by its cartilaginous origin, poses diagnostic challenges due to its unusual location and radiographic features resembling more common bronchial tumours. Surgical excision remains the cornerstone of treatment, offering favourable outcomes. The present report underscores the importance of early recognition and comprehensive management strategies for optimising patient outcomes in rare bronchial malignancies like chondrosarcoma.

Keywords: Haemoptysis, Lobulated mass, Lung parenchyma, Malignancy

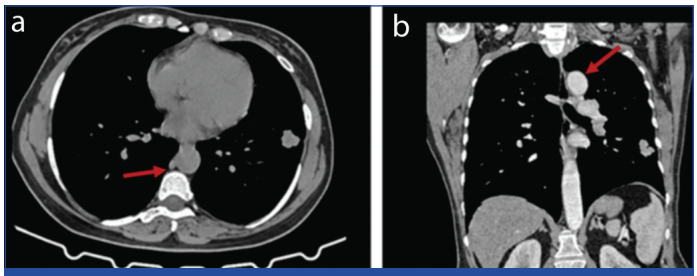
CASE REPORT

A 38-year-old male farmer presented to the hospital with complaints of a chronic cough with expectoration and intermittent streaks of haemoptysis for three months. He denied any significant history of respiratory diseases, breathlessness, weight loss, or bony pain. There was no history of tobacco chewing/smoking. There were decreased breath sounds in the left lung base, but no lymphadenopathy or hepatosplenomegaly on physical examination.

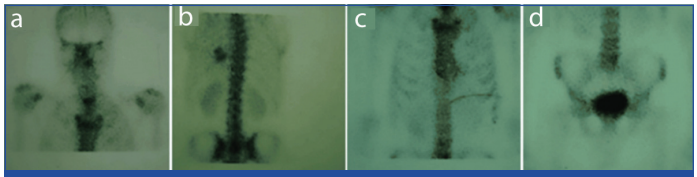
Further investigations included a chest X-ray, which showed a shadow in the left lower lung field with no pleural effusion [Table/Fig-1]. A Computed Tomography (CT) scan confirmed a large space-occupying lesion (8.3×9.10 cm) with smooth edges in the left upper hemithorax [Table/Fig-2a,b]. Bronchoscopy revealed no visual lesions compressing the left lower lobe bronchi. Biopsy via bronchoscopy preoperatively could not be done. Findings from pre-operative lung function tests were suggestive of obstructive airway impairment. Metastatic workup was negative for other sites, and a bone scan was done to see skeletal metastasis, which was suggestive of no bony metastasis [Table/Fig-3a-d]. A Positron Emission Tomography (PET) scan was not done for the patient due to unavailability. Subsequently, a left posterolateral thoracotomy was planned, revealing a mass approximately 11.5×8 cm in diameter at the base of the left lower lobe, attached to the diaphragmatic pleura [Table/Fig-4].



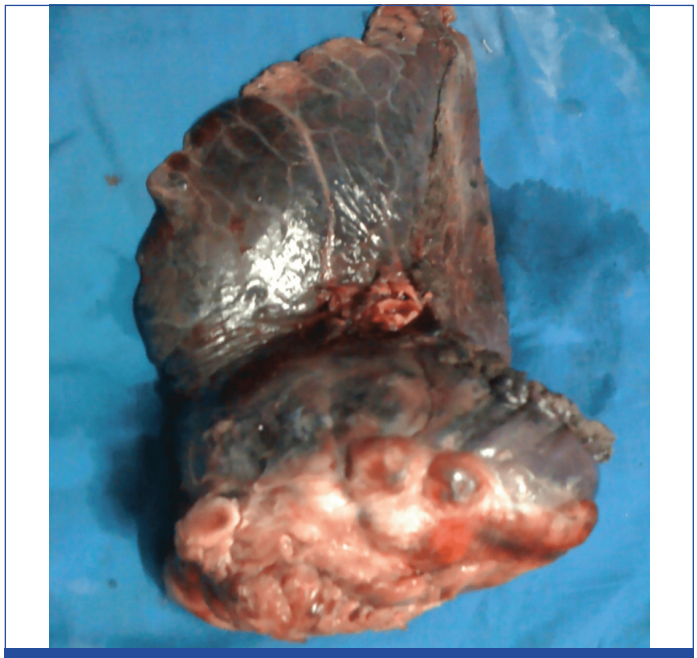
[Table/Fig-1]: Initial chest X-ray posteroanterior view showing mass on the left-side (hilum) with no pleural effusion. The arrow points towards the mass on the left lower lobe of the lung.



[Table/Fig-2]: a) Axial view; and b) Coronal view of CT scan showing a space occupying lesion in the left upper hemithorax measuring 8.3×9.10 cm (red arrow).

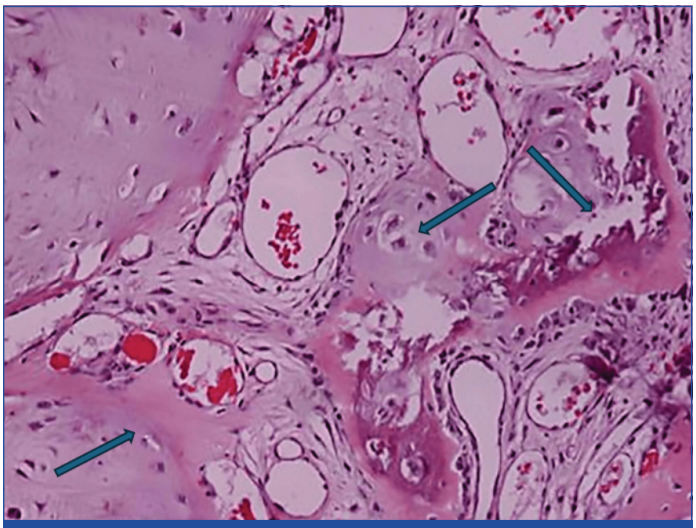


[Table/Fig-3]: Bone scan which was suggestive of no bony metastasis: a) Bone scan of the anterior skull; b) Bone scan of lumbodorsal spine; c) Bone scan of anterior chest; d) Bone scan of pelvis.



[Table/Fig-4]: Gross examination of excised mass measuring 11.5×8 cm.

The patient underwent a standard left lower lobe lobectomy. Intraoperatively, the mass was dissected from the diaphragmatic pleura, and after ligating the pulmonary artery, left inferior pulmonary vein, and bronchus, the lobectomy was completed. The chest was closed with an intercostal drain in-situ, connected to an underwater seal. Grossly, the specimen was a nodular mass in the upper lobe, white and solid, measuring 8 cm in diameter. Microscopically, it showed the features of pleomorphic sarcoma with abundant neoplastic cartilage, which was suggestive of sarcoma subtype mesenchymal chondrosarcoma (Grade II) by Haematoxylin and Eosin (H&E). Immunohistochemistry marker was not done due to affordability issues [Table/Fig-5].



[Table/Fig-5]: Histopathology image showing diffuse growth of chondrocytes (Blue arrows) embedded in lacunae with mild atypia chondrosarcoma Grade II (H&E, 400x).

Postoperatively, recovery was uneventful. The chest tube was removed on postoperative day 6 when pleural drainage was clear and less than 50 cc. A postoperative X-ray showed loss of lung volume in the left lower lobe without fluid or air collection. The patient received chest physiotherapy until postoperative day 12. The patient was followed-up for three years postoperatively, the patient remained asymptomatic and was recurrence-free.

DISCUSSION

The majority of primary malignancies in the lungs and bronchi are epithelial tumours, with non small cell carcinomas being the most common type [1]. One of the very uncommon primary lung tumours is primary pulmonary chondrosarcoma originating from the bronchial cartilage [2]. Malignant neoplasms that exhibit cartilaginous and/or osteoid features are uncommon [1]. Certain malignancies potentially affect the major bronchi (tracheobronchial variation) or only the lung parenchyma (lung variation). Tracheobronchial chondrosarcomas are confined tumours that do not spread widely or form lymph nodes. The lung form often involves mediastinal lymph nodes and thoracic metastases, making it more invasive [2].

Because of their rare occurrence, a comprehensive clinical history is essential to identify the true origin of these neoplasms. Although similar tumours have been observed in the upper airways, like the larynx, their presence in the lungs is even more infrequent, with most instances documented as individual case reports [1].

Chondrosarcoma is a cartilage-forming tumour comprising a heterogeneous family, including mainly conventional, secondary, periosteal, clear cell, dedifferentiated, and mesenchymal chondrosarcoma [3]. Chondrosarcoma originating from bronchial cartilage is an extremely rare malignancy, with limited reported cases in the literature [Table/Fig-6] [4-9]. The pathogenesis of primary bronchial chondrosarcoma remains unclear, but it is hypothesised to arise from the metaplasia of bronchial cartilage or cartilaginous remnants during embryonic development [10].

Worldwide, bronchogenic carcinoma is recognised as one of the most common cancers, with a high death rate of roughly 18% each year [11]. Although it can spread to many organs, the brain, liver, adrenal glands, hilar nodes, and bones are the most common locations for metastases; it is rare for metastases to spread to the skin, subcutaneous tissues, or other soft tissues. While autopsies have documented soft tissue metastases at a rate of between 0.75% and 9%, the overall frequency of soft tissue metastasis from bronchogenic cancer is 2.3% [12].

The radiographic appearance of chondrosarcoma is often diagnostic, and radiography is crucial for the initial diagnosis. X-ray findings typically show a lucent lesion with a calcification pattern characterised as punctuate, popcorn, or comma-shape [13]. A soft-tissue mass

Authors	Age/gender	Chief complaints	Symptoms	Radiological findings	Management	Outcome
Maish M and Vaporciyan AA [4]	78 years/ Male	Progressive shortness of breath over 3 months	Dyspnoea on exertion, episodic hoarseness, significant weight loss	CT: Non calcified mass in the lower third of the trachea with near-complete obstruction; extratracheal extension present	Endoscopic resection followed by definitive surgical resection	Uneventful recovery; discharged 7 days post-surgery
Chandrasekharan R et al., [5]	19 years/ Male	Progressive dyspnoea	Dyspnoea, no other significant symptoms reported	HRCT: Acute, large, saddle embolus filling the left pulmonary artery and partly occluding the right pulmonary artery, as well as multiple, detached peripheral pulmonary artery thrombi in the upper and right lower lobes	Emergency echocardiography followed by embolectomy	Uneventful recovery
Ghattas C et al., [6]	91 years/ Male	Inability to expectorate sputum for months	Mild dysphonia, no exertional dyspnea, wheezing, or stridor	CT: 15×11 mm mass arising from the left lateral wall of the trachea, 3 cm below the vocal cords; no tumour extension or metastasis	Endoscopic mechanical coring of the tumour	Tracheal patency achieved; specific long-term outcome not detailed
Heuermann M et al., [7]	66 years/ Male	Haemoptysis and dyspnea	Mildly increased dyspnea with exertion	CT: >75% intraluminal tracheal narrowing secondary to a calcified 4.8×3.6×5.6 cm mass involving right thyroid lobe and proximal trachea, splaying rings 1 and 2, but sparing cricoid	Right thyroid lobectomy and proximal tracheal resection	Disease free at 16 months post-treatment
Kiriyama M et al., [8]	59 years/ Male	Dyspnoea	Increasing shortness of breath	CT: Polypoid, round mass 2 cm in diameter almost obstructing the trachea; the tumour was densely calcified and arose from the right anterior wall of the lower third of the trachea	Neodymium:yttrium-aluminum garnet laser vaporisation via the fiberoptic bronchoscopy	Postoperative recovery uneventful
Jiang J et al., [9]	59 years/ Male	Haemoptysis, cough, and dyspnea	Cough and worsening dyspnea	CT: Fast-growing mass in the upper lobe of the right lung (10.5×8 cm)	Right upper-sleeve lobectomy with mediastinal lymphadenectomy	Adriamycin and Ifosfamide chemotherapy ongoing

[Table/Fig-6]: Tabular representation of chondrosarcoma cases reported in literature [4-9].

with aggressiveness may occasionally be seen, along with periosteal response and cortical damage. In addition to serving as a guide for percutaneous biopsies. The CT can detect cortical destruction, endosteal scalloping, and matrix calculi [14]. Magnetic Resonance Imaging (MRI) can accurately determine the extraosseous and intramedullary tumour extensions [15]. The tumours are lytic on radiography, with irregular spiculations, dispersed radiodensities, and cortical alterations that frequently include scalloping and thinning [3]. Radiologically, chondrosarcoma mimics various conditions: (a) Ewing's sarcoma, which often manifests as a permeative or moth-eaten bone destruction pattern with an associated soft tissue mass [16]; (b) small cell osteosarcoma, characterised by small round cells and osteoid production, may mimic other small round cell tumours [17]; (c) dedifferentiated chondrosarcoma features a high-grade non cartilaginous component alongside a low-grade cartilaginous tumour [18]; and metastatic carcinoma consists of secondary lesions in the lung that can present with varied radiologic appearances depending on the primary tumour [19].

The prognosis of bronchial chondrosarcoma depends largely on the extent of surgical resection and the tumour grade [20]. The most crucial factor in predicting local recurrence and metastasis is the histologic grade of the tumour. Low-grade chondrosarcomas have a good prognosis as they metastasise rarely, with Grade I chondrosarcomas demonstrating a 5-year survival rate of 83%. On the other hand, for dedifferentiated and high-grade chondrosarcomas the 5-year survival rate for Grade II and Grade III chondrosarcomas is 53% [21,22].

Conventional chondrosarcoma cannot be treated with chemotherapy [15]. Surgical resection with negative margins remains the mainstay of treatment for localised chondrosarcomas, including cases originating from bronchial cartilage, as per literature [23]. Adjuvant therapy, such as radiotherapy, is considered for risk reduction of local recurrence, although its efficacy in chondrosarcoma is debated due to the relative radioresistance of cartilaginous tumours [20,23,24]. For recurrence or metastasis, long-term follow-up of the patient is done, although these occurrences are rare in localised cases following adequate surgical management [20].

CONCLUSION(S)

Chondrosarcoma originating from bronchial cartilage is a rare but important differential diagnosis in patients with lung masses. The first investigation that gives a roadmap may be a simple chest radiograph, followed by a CT scan of the chest. It allows us to know about the extent of the disease and the surgical resectability of the disease. Chondrosarcomas are seen as centrally located masses that originate from the lung parenchymal tissue. Early recognition, accurate diagnosis, and multidisciplinary management involving surgical resection and adjuvant therapy are essential for achieving optimal outcomes and improving the quality of life for affected individuals.

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