

# Imaging findings of pulmonary carcinosarcoma: A case report

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## ABSTRACT

Pulmonary carcinosarcoma is a rare lung tumor, which contains both malignant carcinomatous and heterotopic sarcomatous components. There are only few case reports on the imaging diagnosis of this rare tumor. Herein, we present the radiological findings of this rare tumor, which was suspected on computed tomography (CT) scan due to atypical CT findings of malignant lung mass (not usually seen in bronchogenic carcinoma) and was finally confirmed histologically.

**KEY WORDS:** Calcification, carcinosarcoma, computed tomography, lung

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## INTRODUCTION

Lung malignancy is the most common cause of cancer in males. Bronchogenic carcinoma is the most common malignant lung tumor and accounts for 95% of the lung malignancies.<sup>[1]</sup> It is divided mainly into two groups: non-small cell carcinoma (which includes squamous cell carcinoma, adenocarcinoma, and large cell carcinoma) and small cell carcinoma. One of the rare tumor of lung is pulmonary carcinosarcoma, which is a subgroup of pulmonary sarcomatoid carcinomas.<sup>[2]</sup> In 2004, WHO classified sarcomatoid carcinomas into pleomorphic carcinoma, spindle cell carcinoma, giant cell carcinoma, carcinosarcoma and pulmonary blastoma.<sup>[2,3]</sup> Pulmonary carcinosarcoma contains mixture of malignant epithelial and sarcomatous mesenchymal elements such as cartilage, bone or skeletal muscle.<sup>[4,5]</sup> It accounts for 0.3–1.3% of all lung tumors.<sup>[6]</sup> It occurs in elderly age mostly in 6th and 7th decade and is four times more common in males.<sup>[5]</sup> There is strong association of this tumor in heavy smokers.<sup>[6,7]</sup> Prognosis of sarcomatoid carcinomas is worse than the bronchogenic carcinoma due to their rapid growth, invasive nature and early metastatic spread and, hence, need for their early diagnosis and timely treatment.<sup>[8]</sup> We report a case of elderly male patient who

was found to have malignant mass in right lower lobe along with pulmonary metastases and was diagnosed as a case of carcinosarcoma in this report.

## CASE REPORT

A 90-years-old male patient came to our hospital with chief complaints of cough with expectoration and breathlessness for one month. There was history of treatment for pulmonary koch's for two years. Personal history revealed that the patient was heavy smoker. Chest radiograph was done and showed a large lobulated right lower lobe opacity silhouetting the right dome of diaphragm. There was blunting of right costo-phrenic angle. Multiple other rounded lobulated opacities were seen in both lung fields. Provisional diagnosis of malignant lung mass with pulmonary metastases was made [Figure 1].

Computed tomography (CT) scan of chest was done with intravenous contrast for further evaluation on Siemens Somatom perspective, 128 slice. CT scan showed a large cavitating heterogeneous mass with lobulated margins measuring approximately  $8.7 \times 8.2 \times 7.4$  cm in the lower lobe of right lung [Figure 2]. The mass showed inhomogeneous contrast enhancement at the periphery and decreased attenuation centrally. Ground-glass haze was seen surrounding the mass [Figure 3]. Coarse foci of calcification were seen within the mass. Inferiorly the mass was invading the diaphragm and infiltrating directly into the liver involving segment VII of right lobe of liver [Figure 4] and [Figure 5a and b]. Postero-laterally, the mass was invading the pleura [Figure 2] and chest wall with associated pleural thickening and subtle rib

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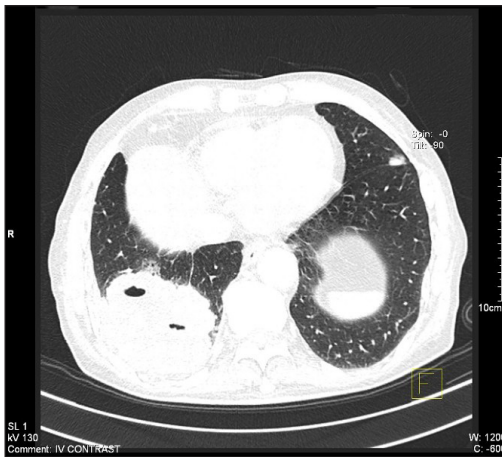
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**Figure 1:** Chest radiograph shows large mass in right lower zone silhouetting the dome, associated with multiple rounded radio-opacities in bilateral lung fields s/o lower zone malignant mass with pulmonary metastasis. Also noted is fibrocavitary lesion in right apical region



**Figure 2:** Axial CT scan shows a large heterogeneous hypodense lobulated peripheral lung mass showing few calcific foci and few small areas of cavitation. Mass is invading the adjacent pleura



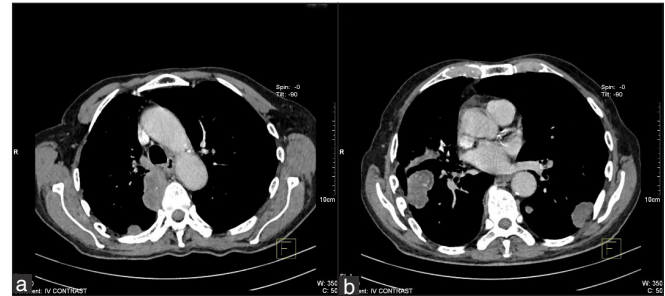
**Figure 3:** Lung window shows a large mass with lobulated margins, surrounding mild ground glass haze with small cavitating areas



**Figure 4:** Mass is highly invasive showing infiltration of right dome with direct transdiaphragmatic infiltration into the posterior segment of right lobe of liver



**Figure 5:** (a-b) Coronal and sagittal reformatted images show transdiaphragmatic invasion of mass into liver with few calcific foci. Multiple pulmonary metastatic lesions are seen with few calcific foci seen in larger ones. Also noted is an old cavity in right apical region- old tubercular infection

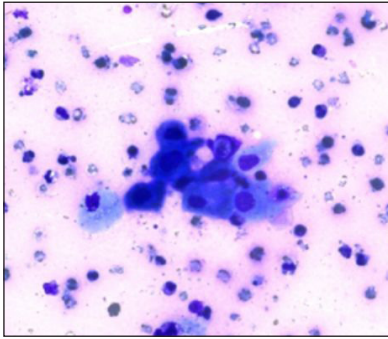


**Figure 6:** (a and b) Axial CT scan shows bulky hypodense deposits in right paraspinal region and right lower lobe with smaller ones in posterior subpleural region bilaterally. Note presence of small calcific foci within the larger metastatic lesions

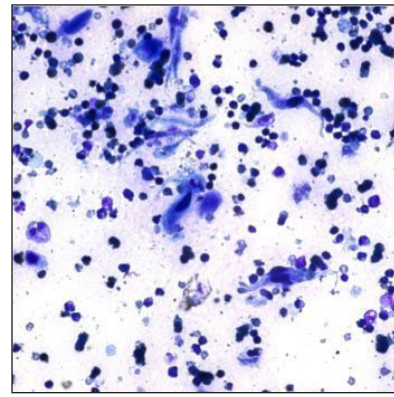
erosion, which suggested the mass to be malignant. In addition, multiple bulky lobulated hypodense masses were seen in both lung fields suggesting pulmonary metastases, one of them in right para-vertebral region was invading the mediastinum. Foci of calcification were seen within the larger metastatic masses [Figure 6a and b] and [Figure 5a and b]. Multiple small mediastinal lymph nodes were also seen.

Sequelae to old pulmonary koch's were also seen in form of thick walled cavity and few fibrotic lesions in upper lobes and right middle lobe with foci of calcification within them.

On basis of chest CT findings: highly invasive bulky lobulated hypodense mass infiltrating the diaphragm and liver inferiorly and chest wall laterally along with lobulated metastases in both lung fields and coarse foci of



**Figure 7:** H&E (hematoxylin and eosin) stain of FNAC of primary lung tumor shows cluster of malignant squamous epithelial cells showing hyperchromatic, pleomorphic and irregular nuclei and bluish cytoplasm



**Figure 8:** Few tadpole cells are also seen

calcification within the primary tumor and metastases.- possibility of some sarcomatous component within the primary lung tumor along with metastases was considered. These features are unusual to bronchogenic carcinoma, which usually shows spiculated ill-defined margins and does not usually infiltrate into the liver directly. Amorphous foci of calcification may be seen within the primary bronchogenic carcinoma but is not seen in its metastases.

Ultrasound-guided fine needle aspiration cytology (FNAC) of the primary tumor was done. It showed extensive necrosis and scattered squamous cells having hyperchromatic, pleomorphic nuclei along with few tadpole cells and anucleate squamous cells [Figure 7] and [Figure 8]. So diagnosis of squamous cell carcinoma was given.

Patient was referred to another hospital for treatment of malignancy. Fine-needle percutaneous biopsy of the primary tumor was done there under ultrasound guidance. Few neoplastic osteoids and ossification was seen in addition to necrosis and malignant squamous cells. So final diagnosis of carcinosarcoma was made consisting of mainly squamous cell carcinoma and component of osteosarcoma. Foci of calcification seen in the primary tumor and metastasis on chest CT was metaplastic osteosarcomatous component. Patient refused further treatment.

## DISCUSSION

Pulmonary carcinosarcoma, a subtype of sarcomatoid carcinomas of lung is a rare lung tumor consisting of admixture of malignant epithelial and mesenchymal elements.<sup>[2]</sup> Sarcomatous component probably arise through the mesenchymal metaplasia of previously existing carcinoma.<sup>[4]</sup> There is strong association of this tumor with cigarette smoking,<sup>[3,4,8]</sup> as was seen in our case. Carcinosarcomas can present either as central endobronchial type or peripheral intra-parenchymal type.<sup>[6,9]</sup> Central endobronchial tumors have a better prognosis than the peripherally invasive tumors because of earlier development of symptoms due to bronchial obstruction

and hence earlier treatment.<sup>[4,10]</sup> It occurs more commonly in elderly males (male: female ratio is 4:1).<sup>[3,7]</sup> These tumors are usually bulky (> 5 cm) and have a high tendency to invade the adjacent structures like pleura, chest wall, diaphragm or mediastinum depending upon the location.<sup>[2]</sup> Large low attenuation areas are found on CT that corresponds to regions of necrosis and myxoid degeneration.<sup>[2]</sup> Most common carcinomatous component is squamous cell carcinoma (69%) as was seen in our case followed by adenocarcinoma (20%) or large cell carcinoma (11%). Sarcomatous component is mostly chondrosarcoma or osteosarcoma followed by rhabdomyosarcoma and rarely fibrosarcoma or mixture of these.<sup>[6,11]</sup> Calcification may be observed within the primary tumor as well as metastases on CT scan, which likely represents osteosarcomatous or chondrosarcomatous component of the tumor.<sup>[11-13]</sup> Prognosis is poor and median survival rate at six months is 27% and depends upon the size of sarcomatous component. Once the tumor is disseminated, most of the patients die within few weeks to months from the progressive disease.<sup>[10,14]</sup>

## CONCLUSION

We conclude that whenever we see a bulky lobulated and highly invasive lung tumor with likely invasion of adjacent structures on CT scan along with bulky metastases and amorphous /coarse foci of calcification within the primary tumor as well as metastases, possibility of some sarcomatous component should be considered. Final diagnosis is made histologically by biopsy or gross resection of tumor mass.

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