

# Atypical presentation of bronchogenic carcinoma with humeral metastasis

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## ABSTRACT

Bronchogenic carcinoma often manifests with some atypical symptoms which delay the diagnosis of malignancy. The primary manifestation of lung cancer with pathological fracture of humerus due to skeletal metastasis is very rare. We hereby report such a case in an elderly nonsmoker male who initially presented with nontraumatic painful swelling of right arm which was found to be due to humeral fracture. However, initial management by the orthopedic surgeon over 3 months did not provide adequate relief. On subsequent evaluation, chest X-ray showed a right hilar mass. Further radiologic imaging and a guided biopsy from lung mass confirmed an adenocarcinoma. Fine needle aspiration from humeral osteolytic lesion also confirmed metastatic deposit. This case highlights the importance of suspecting pathological fracture while dealing with nontraumatic fracture, especially in elderly patients, which avoids the diagnostic delay.

**Key words:** Bronchogenic carcinoma, humeral metastasis, pathological fracture, skeletal metastasis

## INTRODUCTION

Although bronchogenic carcinoma mostly presents with different respiratory symptoms, sometimes they can manifest with features suggestive of distant metastasis. Approximately, 58% of newly detected lung cancers are found to have distant spread at the time of diagnosis as per a large French prospective epidemiological study.<sup>[1]</sup> Furthermore, skeletal metastasis is not unusual in lung cancer, and the axial skeleton is more often involved than the extremities. Apart from lung cancer, other epithelial tumors such as breast and prostatic malignancies also commonly result into skeletal involvement. However, literature describing humeral metastasis in lung malignancy as an initial presentation is scarce. Here, we report such a case of humeral metastasis in an adenocarcinoma of lung which initially manifested as a pathological fracture.

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## CASE REPORT

A 76-year-old nonsmoker male presented with painful swelling of right upper arm since 3 months along with restricted movement of the same limb due to pain. There was neither a history of trauma to the affected region nor any history of prior fracture. He did not have any comorbidity. He was conservatively managed outside by an orthopedic surgeon for right humerus fracture without any significant improvement and therefore, was referred to our hospital for further management.

On review of history, he complained of mild right-sided chest pain for 1 month without any history of fever, hemoptysis, or breathlessness. He also had anorexia for 1 month without any significant weight loss. He denied any history of abdominal pain, altered bowel habit, difficulty in urination, hematuria, or bone pain elsewhere in the body. Regarding past illness, he had pulmonary tuberculosis 20 years back and since then, he had an intermittent cough with mucopurulent expectoration.

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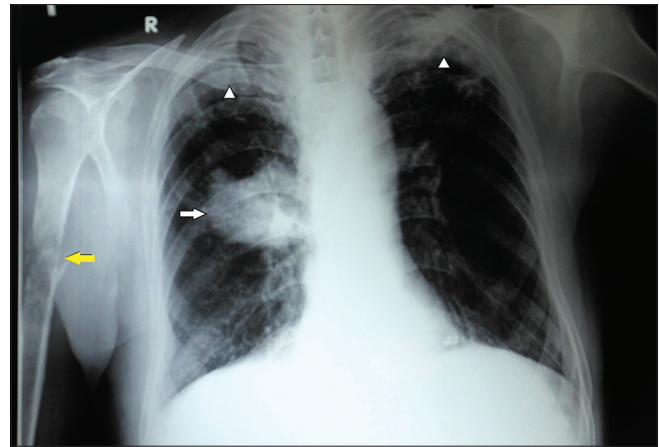
On examination, mild pallor and clubbing of fingers were noted without any palpable lymphadenopathy. The right upper arm was swollen, tender, and warm with edematous overlying skin. Examination of other systems was within normal limit. Routine hemogram and biochemical investigations were normal except for anemia (hemoglobin 9.8 g/dl). However, chest X-ray (posteroanterior view) showed a right mid-zone mass lesion with an irregular margin close to hilum. A transverse fracture of the right humerus was noted in its upper part with an irregular margin. Furthermore, bilateral nonhomogeneous opacity was noted in the apical region of lung [Figure 1].

A contrast-enhanced magnetic resonance imaging of right humerus described a large, ill-defined, infiltrating, heterogeneously enhancing, and centrally necrotic mass lesion in the metaphyseal region of right humerus with associated pathological fracture and adjacent soft tissue edema. Subsequently, contrast-enhanced computed tomography (CT) of thorax revealed a large lobulated mass (67 mm × 53 mm) in the right upper lobe of lung. One small pulmonary nodule was noted at left lower lobe. Reticular opacity was detected at both upper lobes suggesting fibrosis with traction bronchiectasis, possibly from prior pulmonary tuberculosis. No pleural effusion or pleural thickening was found although small right hilar lymphadenopathy was noted. It also demonstrated fracture of right humerus with gross swelling of surrounding soft tissue [Figure 2].

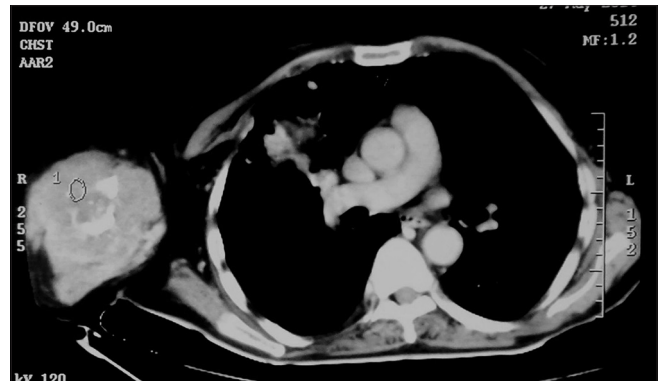
Next, CT-guided Tru-Cut biopsy was done from lung mass which revealed predominantly complex papillary structures having fibrovascular cores within alveolar space along with cuboidal to columnar lining cells having high nuclear to cytoplasmic ratio, hyperchromatic nuclei, and prominent nucleoli suggestive of well-differentiated adenocarcinoma [Figures 3 and 4]. Fine needle aspiration cytology from osteolytic lesion further confirmed the metastatic adenocarcinomatous deposit. Abdominal ultrasonography revealed no metastatic deposit, ascites, or lymphadenopathy. Therefore, a final diagnosis of adenocarcinoma of lung with pulmonary and skeletal metastasis (Stage IV disease) was made, and he was put on palliative chemotherapy with cisplatin and etoposide, and palliative radiotherapy to humeral osteolytic lesion. With bisphosphonate, analgesic and above conservative management, patient temporarily improved symptomatically; however, he died due to his illness after the fifth cycle of chemotherapy.

## DISCUSSION

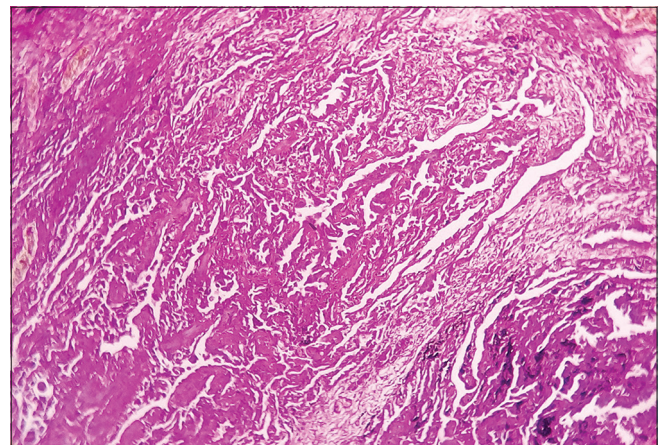
The skeletal spread has been reported in 36% cases of bronchogenic carcinoma in postmortem examination which indicates the bone is a preferred site for metastasis.<sup>[2]</sup>



**Figure 1:** Chest X-ray (PA) showing right hilar mass (indicated by white arrow) with right humeral fracture (indicated by yellow arrow) along with bilateral apical nonhomogeneous opacity (indicated by arrowheads)

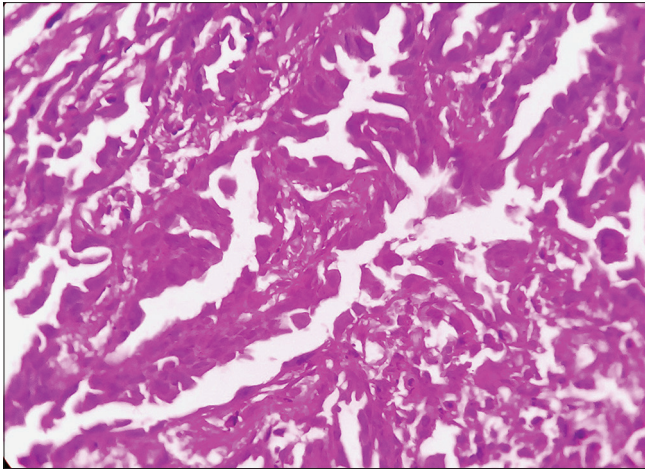


**Figure 2:** Fracture of right humerus with adjacent soft tissue swelling visible in computed tomography thorax



**Figure 3:** Photomicrograph shows adenocarcinoma, predominantly having intra-alveolar papillary pattern of growth in a nonmucinous background. Lepidic pattern is also seen in few areas (H and E, ×100)

The destruction of bone by metastatic spread eventually weakens the bone and results in pathological fracture, especially in weight-bearing joints like vertebrae. A Japanese study by Sugiura *et al.* among 118 cases of lung cancer with bone metastasis supports this fact of more frequent



**Figure 4:** Histopathology showing papillae lined by low columnar to cuboidal cells having hyperchromatic nuclei with cellular hobnailing (H and E,  $\times 400$ )

involvement of axial skeleton as spinal metastasis occurred in 42% cases in that series.<sup>[3]</sup> However, humeral metastasis was found in only 1% cases in that study which signifies the rarity of this currently reported case.

A recent French study of over 55 patients with nonsmall cell lung cancer (NSCLC) with inaugural bone metastasis described presentation with pathological fracture in only 7.2% of cases.<sup>[4]</sup> Our patient also presented with pathological fracture at the very beginning, which is not a usual presentation as per this French study. On the other hand, such an atypical presentation may delay the lung cancer diagnosis as the mean duration of skeletal symptom before diagnosis is 5 months in this series. The diagnosis of NSCLC was delayed by more than 3 months in our patient as well.

The most common type of malignancy described in this French series was adenocarcinoma, accounting for 78.2% of cases, followed by large cell and squamous cell carcinoma.<sup>[4]</sup> The majority of cases were reported to be adenocarcinoma (83 of 118 cases) in above-mentioned Japanese study as well.<sup>[3]</sup> Our patient also had an adenocarcinoma which is corroborating with the more common scenario as mentioned in these two studies. However, a recent case report from India described an osteolytic humeral metastasis from an asymptomatic squamous cell carcinoma of lung.<sup>[5]</sup> Although breast carcinoma is the most common malignancy to produce humeral metastasis, similar manifestation has also been recorded in multiple myeloma, prostatic carcinoma, renal cell carcinoma, and rarely with follicular carcinoma of thyroid,<sup>[6]</sup> cholangiocarcinoma,<sup>[7]</sup> and cervical carcinoma<sup>[8]</sup> as well.

Prognosis of such pathological fracture is very poor as normal bone healing by callus formation does not occur, and only an excellent orthopedic fixation can achieve proper healing. Some data suggested that surgical techniques using either an intramedullary device with cement or a prosthesis,

replacing proximal humerus may provide good pain relief, function restoration, and improvement of the quality of life.<sup>[9]</sup> Similar conclusion has also been made by Chen *et al.* in their study of eight cases of humeral pathological fracture.<sup>[10]</sup> Supportive treatment with an opioid analgesic and palliative local radiotherapy may provide symptomatic relief, and our subject was managed only with these supportive measures; orthopedic fixation of the fracture was not attempted because the patient was already bed-ridden and was unable to do his daily activities. Overall prognosis of such cases is very poor with median survival of only 9 months (range 1–98 months).<sup>[9]</sup>

## CONCLUSION

The possibility of skeletal metastasis should be kept in mind while dealing with any nontraumatic fracture, especially in elderly people, even when there is no symptom suggestive of malignancy elsewhere in the body. A thorough search for primary malignancy needs to be done in such cases to avoid delay in the diagnosis.

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### Conflicts of interest

There are no conflicts of interest.

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