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# Pancoast Tumor: The Overlooked Etiology of Shoulder Pain in Smokers

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**Conflict of interest:** None declared

**Patient:** Male, 60-year-old  
**Final Diagnosis:** Lung cancer  
**Symptoms:** Shoulder pain  
**Medication:** —  
**Clinical Procedure:** —  
**Specialty:** Oncology • Pulmonology

**Objective:** Mistake in diagnosis

**Background:** Shoulder pain is a common complaint in general practice and typically has an orthopedic or rheumatological etiology. However, it may be the presenting symptom of a serious underlying condition, such as lung cancer.

**Case Report:** A 60-year-old man with a 30 pack-year history of smoking presented with worsening right shoulder pain over the last 6 months. He had no respiratory symptoms or weight change. He was seen at several general practice clinics and treated for a rotator cuff injury. However, his pain became severe, to the point that it affected his activities of daily living. A shoulder X-ray revealed opacity in the right apical zone. After a thorough investigation, the patient was found to have lung cancer with local invasion and intracranial metastases. However, in light of the advanced stage of the disease, a palliative approach was taken. The patient remained on multiple oral analgesics for the control of his pain.

**Conclusions:** The present case shows that common symptoms such as shoulder pain can be indicative of serious underlying pathology. Physicians should remain alert and maintain a high index of suspicion for Pancoast tumor in patients who are heavy smokers. Furthermore, a chest X-ray needs to be performed in elderly patients and smokers with shoulder pain.

**MeSH Keywords:** Lung Neoplasms • Pancoast Syndrome • Shoulder Pain

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## Background

Musculoskeletal complaints are a major public health problem worldwide and remain a leading cause of morbidity [1]. It is estimated that approximately 20% of consultations in general practice are related to musculoskeletal conditions [2]. Shoulder pain is the third most common musculoskeletal complaint among patients seeking medical care [3]. The etiology of shoulder pain typically is orthopedic or rheumatological. Acromioclavicular joint separation, glenohumeral joint dislocation, rotator cuff tears, and fractures are among the most common causes of acute shoulder pain [4]. However, shoulder pain can be an indicator of significant medical conditions, including myocardial infarction, hepatobiliary diseases, and lung cancer.

Lung cancer is among the most common malignancies and is a leading cause of cancer deaths worldwide [5]. Cigarette smoking is the main risk factor for lung cancer and accounts for 90% of all cases [6]. Here, we describe the case of a former smoker with lung cancer and intracranial metastases who presented solely with shoulder pain.

## Case Report

A 60-year-old man presented to the Emergency Department with a complaint of gradually worsening of right shoulder pain. The pain occurred throughout the day and he rated it as 7 out of 10 on the severity scale. He also reported that the pain had started to affect his sleep and quality of life. It was non-radiating, burning in nature, not relieved by simple analgesics, and was not associated with weakness or numbness.

The patient's shoulder pain had started 6 months before presentation with no history of preceding trauma. He was seen by several general practitioners, who believed that his pain was related to his manual work and diagnosed him with rotator cuff injury. They prescribed several analgesics and the patient also received physiotherapy. However, these measures failed to provide him with any relief.

The patient was otherwise healthy and he did not have a history of chest pain, shortness of breath, cough, headache, or seizures. He had no change in appetite or weight and his medical and surgical history was non-contributory. However, he had a 30 pack-years history of smoking cigarettes, although he had stopped smoking 2 years ago.

On examination, the patient's blood pressure was 110/70 mmHg, heart rate 90 beats/min, respiratory rate 14 breaths/min, temperature 37.0°C, and oxygen saturation 98% on room air. He was not cachectic or pale and there was no lymphadenopathy or clubbing. Examination of the shoulders



Figure 1. Right shoulder X-ray showing apical lung opacity.

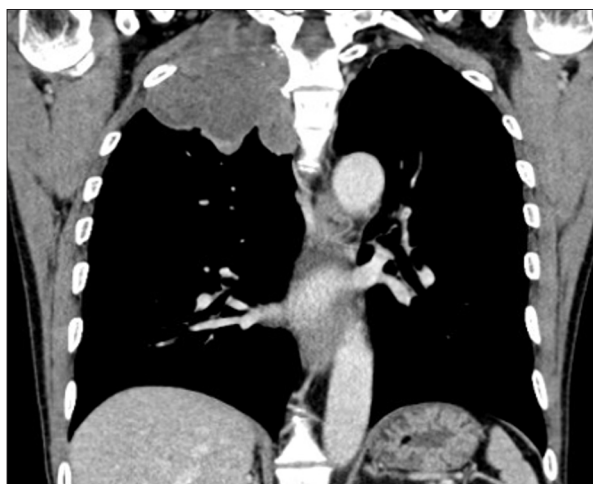
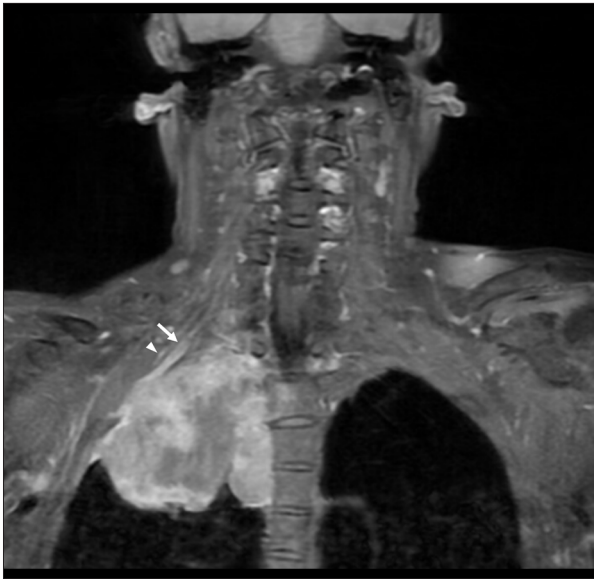


Figure 2. Coronal CT image showing a mass lesion in the right upper lobe apex with chest wall invasion.

revealed no deformity or muscle atrophy. He had a limited range of motion in his right shoulder due to pain. The rest of the examination, including cardiorespiratory and neurological examinations, was normal.

The patient underwent a shoulder X-ray, which showed apical opacity in the right lung that was highly suspicious for malignancy (Figure 1). Therefore, an urgent thoracic computed tomography (CT) scan was performed, which demonstrated a 10.5×10.5×8.0-cm necrotic mass in the right upper lobe, with chest wall and mediastinal invasion (Figure 2). The mass caused direct destruction of the first and second ribs posteriorly. For further evaluation, the patient underwent magnetic resonance imaging, which revealed a lobulated heterogeneous mass invading the middle and inferior trunks of the right brachial plexus (Figure 3).



**Figure 3.** Coronal MRI image showing the mass invading the inferior (arrow) and middle (arrowhead) trunks of the right brachial plexus.

The patient underwent a CT-guided biopsy and histopathological examination of the specimen revealed a poorly differentiated carcinoma. A subsequent staging CT revealed multiple lesions scattered within the cerebral and cerebellar hemispheres with associated edema, consistent with metastatic disease (Figure 4). The patient's bone scan, however, did not reveal any evidence of metastasis.

Given the advanced stage of the disease, a palliative approach was taken. The patient was given the option of a regional nerve block to manage his shoulder pain; however, he refused and remained on multiple oral analgesics, including paracetamol 1 g 3 times/day, tramadol 100 mg 3 times/day, and amitriptyline 10 mg/day. Two weeks later, the patient started to experience

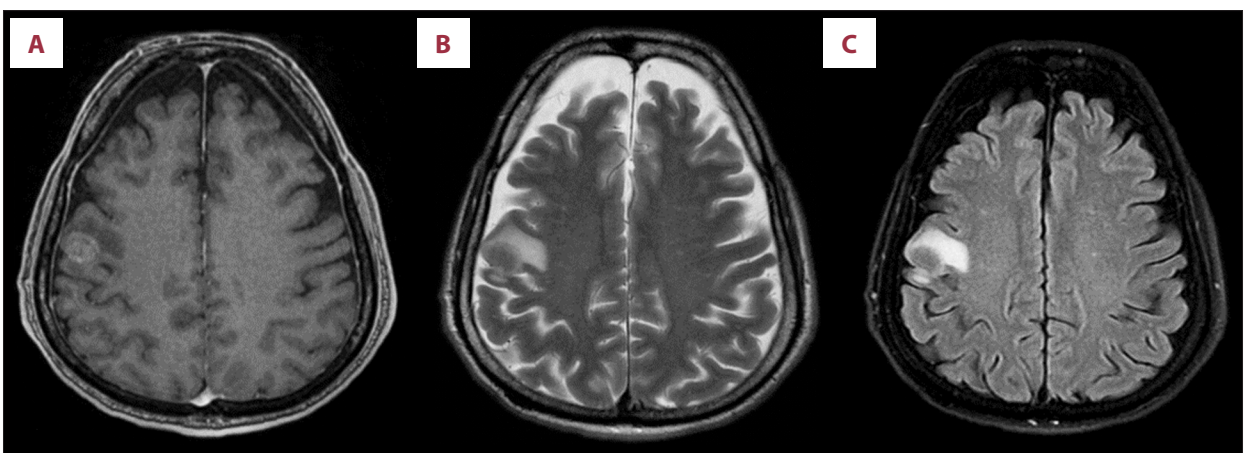
frequent headaches and was confined to a wheelchair due to gait instability. There was a change in his voice and he exhibited typical signs of Horner syndrome, including partial ptosis and miosis. The palliative treatment was continued, with adjustments in the prescribed medications.

## Discussion

We have described a patient with metastatic lung cancer who presented solely with shoulder pain and was thought to have a musculoskeletal injury. He was misdiagnosed as having a rotator cuff injury because of his age and history of doing manual work. Because the patient did not complain of any respiratory symptoms, attribution of his symptoms to a musculoskeletal condition during the clinical encounters was not considered unusual. Hence, the present case could exemplify a negative consequence of “doctor shopping” behavior.

Superior pulmonary sulcus tumor, or Pancoast tumor, is uncommon and accounts for 3–5% of lung carcinomas [7]. Because of its distinct anatomical location, Pancoast tumor may present with characteristic clinical features that result from its local invasion of the brachial plexus and stellate ganglion [7]. Diagnosis of Pancoast tumor is often delayed and it is often mistaken for a musculoskeletal disorder affecting the shoulder region, which is what happened in the present case [8]. Moreover, chest X-ray is normal in only 1.7% of patients with Pancoast tumors [9]. Therefore, these tumors can be diagnosed easily using a simple investigation.

The differential diagnosis of shoulder pain is broad. It includes gastrointestinal, neurological, cardiological, and rheumatological conditions [10]. A careful history and physical examination are needed to reach the correct diagnosis. In the present case, the constant nature of the patient's shoulder pain and



**Figure 4.** Axial MRI images showing right parietal lesion at the gray-white matter junction with enhancement in T1 post-contrast (A) and florid edema in T2 (B) and FLAIR (C) representing hematogenous metastasis.

its interference with activities of daily living pointed away from a musculoskeletal etiology.

Lung cancer has a wide range of clinical manifestations, which can result from intrathoracic effects of the tumor, extrathoracic spread, or paraneoplastic phenomena. The most common presenting symptoms associated with the intrathoracic effects include cough (55%), dyspnea (45%), and pain (38%) [11]. Superior vena cava syndrome is seen in up to 10% of patients with small cell carcinoma [12]. Furthermore, lung cancer can spread to any part of the body and the presenting symptoms can be related to metastatic spread. Paraneoplastic phenomena are frequently associated with lung cancer and reported in up to 10% of cases [13]. These phenomena include a variety of endocrine, neurological, hematological, and rheumatological syndromes [13].

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## Conclusions

The present case demonstrates that common symptoms such as shoulder pain can be indicative of serious underlying pathology. Physicians should remain alert and maintain a high index of suspicion for Pancoast tumor in patients who are heavy smokers. Furthermore, a chest X-ray needs to be performed in elderly patients and smokers with shoulder pain.

## Conflict of interest

None.