

CASE REPORT

Case Report: Diagnostic Dilemma in 69-Year-Old Male with Radiating Right Shoulder Pain with Past History of Potts Spine

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Himanshu Gupta, Mudit Vashistha, Kush Patel. Case Report: Diagnostic Dilemma in 69-Year-Old Male with Radiating Right Shoulder Pain with Past History of Potts Spine. Ind J Emerg Med. 2026; 12(3): 148-154.

ABSTRACT

Background: Referred shoulder pain is a well-recognized clinical symptom that may originate from thoracic, abdominal, diaphragmatic, or musculoskeletal pathology. In elderly patients with underlying spinal disease, atypical presentations can create diagnostic uncertainty and delay definitive management. Pleural-based lesions associated with pleural irritation may occasionally manifest predominantly as shoulder pain due to diaphragmatic and phrenic nerve involvement. Distinguishing infectious or inflammatory aetiologies from malignancy is especially important in such cases.

KEYWORDS

• Referred Shoulder Pain • Right Shoulder Pain • Pott's Spine Sequel

INTRODUCTION

Shoulder pain is among the most common musculoskeletal complaints encountered in clinical practice and emergency medicine¹; global studies estimate the lifetime prevalence of shoulder pain to range between 7% and 30% in the general population, with prevalence increasing significantly with advancing age.²

Elderly patients commonly present with degenerative, inflammatory, or referred causes of shoulder pain, making diagnostic evaluation particularly challenging.³

In India, musculoskeletal pain disorders contribute substantially to outpatient visits and emergency department consultations.⁴ Community-based Indian studies have

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➤ Received: 08-06-2026 ➤ Accepted: 12-07-2026



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reported shoulder pain prevalence ranging from approximately 10–20% among adults, especially in elderly and occupationally active populations.⁴ Urban hospital-based studies have further demonstrated that shoulder pain is a major contributor to orthopedic and rehabilitation consultations, particularly among patients older than 60 years.⁵

Common orthopaedic conditions include rotator cuff injury, adhesive capsulitis, osteoarthritis, cervical radiculopathy, and acromioclavicular joint disease.⁶ However, referred pain from intrathoracic pathology should always be considered when clinical examination fails to identify a primary shoulder abnormality.⁷ Thoracic causes such as pleural inflammation, lower lobe pneumonia, pleural effusion, pulmonary embolism, apical lung tumors, and pleural-based lesions may irritate the diaphragmatic pleura and produce shoulder pain through phrenic nerve-mediated pathways.^{7,8}

Pleural-based lesions are diagnostically challenging because they may mimic malignancy radiologically while clinically presenting with non-specific symptoms such as chest discomfort, dyspnea, or referred pain.¹¹ Elderly patients with chronic inflammatory conditions, tuberculosis, or spinal infections such as Pott's spine may develop atypical thoracic manifestations.¹² In such patients, distinguishing between malignant and non-malignant pleural disease is critical, as imaging findings alone may not reliably differentiate infectious, inflammatory, or neoplastic etiologies.¹¹ Pleural fluid cytology, microbiological studies, and clinico-radiological correlation therefore play an essential role in evaluation.^{11,13}

The present case describes a 69-year-old male with a history of Pott's spine who presented primarily with right shoulder pain radiating toward the abdomen. Imaging revealed an ill-defined pleural-based soft tissue density lesion in the basal segment of the right lower lobe with mild pleural effusion, initially raising suspicion for pulmonary malignancy. However, pleural fluid examination was negative for malignant cells, highlighting the importance of considering non-malignant pleural pathology in patients presenting with referred shoulder pain.

CASE PRESENTATION

A 69-year-old male presented to the emergency department with persistent radiating pain in the right shoulder. The pain was insidious in onset, progressively worsening in nature, and radiated toward the right upper abdomen. There was no history of trauma, heavy exertion, or prior intrinsic shoulder pathology. The patient denied fever, productive cough, hemoptysis, significant dyspnea, chest pain, jaundice, vomiting, or other abdominal complaints.

His past medical history was significant for Pott's spine (tuberculous spondylitis), which had been surgically managed approximately 12 years earlier. Considering the atypical nature of pain and the background history of tuberculosis, further evaluation for thoracic and pleural pathology was undertaken.

On physical examination, PR- 78 bpm, regular, BP- 112/74 mmHg, SPO₂- 99% on room air, RR- 18 per minute, Random blood sugar was 98 mg/dl. Local examination of the right shoulder revealed no swelling, erythema, deformity, or localized tenderness. Both active and passive ranges of motion of the shoulder joint were preserved, making primary musculoskeletal pathology less likely. Abdominal examination was unremarkable.

Baseline hematological and biochemical investigations were largely within normal limits, except for mild hypoalbuminemia suggestive of chronic inflammatory status.

Table 1: Laboratory Investigations

Investigation	Value
Hemoglobin (Hb)	12.0 g/dL
Total Leukocyte Count (TLC)	8.8 ×10 ³ /μL
Platelets	187 ×10 ³ /μL
Total Bilirubin	0.65 mg/dL
Indirect Bilirubin	0.43 mg/dL
Direct Bilirubin	0.22 mg/dL
Total Protein	5.5 g/dL
Albumin	3.2 g/dL
Globulin	2.3 g/dL
Blood Urea	11.88 mg/dL
Serum Creatinine	0.75 mg/dL
LDH	85 U/L
ESR	29 mm/hr

Table 2: Pleural Fluid Analysis

Parameter	Value
Pleural differential count	90% lymphocytes
Pleural ADA	55 U/L
Microbiology	Negative AFB / KOH
Pleural fluid cytology	Negative for malignant cells

RADIOLOGICAL INVESTIGATIONS

**Figure 1A:** August 2025**Figure 1B:** April 2026

Chest imaging demonstrated persistent right-sided reticular opacities predominantly involving the mid and lower lung zones. Comparison with imaging performed six months earlier revealed that these abnormalities

were already present at that time (Figure 1 A); however, the current radiograph shows marked progression with increased density and more irregular ("shaggy") appearing opacities on the right side (Figure 1 B)

HRCT and CECT Thorax Findings

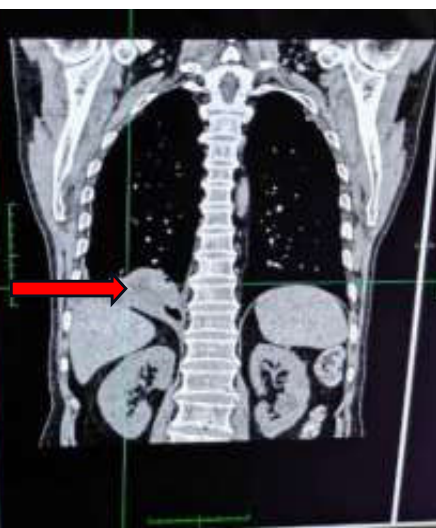
**Figure 2A:****Figure 2B:****Figure 2C**



Figure 3A:

Figure 3B:

Figure 3C:

Figure 2 & 3 suggests ill-defined heterogeneous pleural-based soft tissue lesion in basal segment of right lower lobe extending to right hemidiaphragm

Table 3: Summary of Abnormal Findings and Clinical Significance

Radiological Finding	Description
Pleural-based lesion	Ill-defined heterogeneous pleural-based soft tissue lesion in basal segment of right lower lobe extending to right hemidiaphragm
Internal characteristics	Minimal necrosis with linear calcification within lesion
Pleural effusion	Mild right-sided pleural effusion
Additional pulmonary finding	Small soft tissue density nodule in superior segment of right lower lobe
Radiological differential diagnosis	1. Infective etiology (more likely) 2. Neoplastic lesion

Table 4: Summary of Laboratory and Pleural Fluid Findings and Clinical Significance

Abnormal Finding	Value	Clinical Significance
Pleural lymphocytosis	90% lymphocytes	Suggestive of chronic inflammatory or tuberculous pleural effusion
Elevated pleural ADA	55 U/L	Supports diagnosis of tuberculous pleural effusion
Mild hypoalbuminemia	3.2 g/dL	Indicates chronic inflammatory state
Elevated ESR	29 mm/hr	Consistent with chronic inflammation
Pleural-based lesion involving hemidiaphragm	HRCT/CECT finding	Possible source of diaphragmatic pleural irritation causing referred shoulder pain
Minimal necrosis and calcification	HRCT/CECT finding	Favors chronic infective etiology such as tuberculosis
Mild pleural effusion	HRCT/CECT finding	Indicates pleural involvement
Negative pleural fluid cytology	No malignant cells detected	Reduces likelihood of pleural malignancy

DISCUSSION

Referred shoulder pain occurs because of shared neural pathways between visceral structures and somatic sensory dermatomes.⁸ The phrenic nerve, originating from cervical roots C3–C5, supplies sensory innervation to the diaphragmatic pleura, pericardium, and diaphragm.^{8,10} Irritation of these structures may therefore produce pain perceived in the ipsilateral shoulder region.⁸ Classically, right shoulder referred pain is associated with hepatobiliary conditions such as acute cholecystitis, hepatic abscess, biliary colic, and subphrenic abscess.⁹ However, thoracic causes remain an important but

underrecognized source of referred shoulder pain.^{7,16}

Pulmonary and pleural pathologies capable of producing referred shoulder pain include pleural effusion, lower lobe pneumonia, pulmonary embolism, pleural thickening, bronchogenic carcinoma, and pleural-based lesions.^{7,17} In these conditions, pain originates from irritation of the diaphragmatic pleura rather than the shoulder joint itself. Consequently, patients may present with isolated shoulder pain despite minimal respiratory symptoms, leading to delayed diagnosis.^{15,17}

In the present case, persistent right shoulder pain in the absence of local shoulder pathology suggested a non-musculoskeletal etiology. The patient's history of Pott's spine was clinically relevant, as tuberculosis remains a major public health concern in India and pleural tuberculosis is a common form of extrapulmonary disease.^{12,18,19} Although pleural tuberculosis usually presents with fever, dyspnea, chest discomfort, or pleuritic pain, atypical presentations may occur and can mimic other conditions.^{12,20}

Radiological evaluation demonstrated an ill-defined pleural-based lesion involving the basal segment of the right lower lobe with extension to the right hemidiaphragm. Minimal necrosis and calcification favored a chronic infective process, although malignancy remained an important differential diagnosis because pleural-based lesions frequently mimic bronchogenic carcinoma or metastatic disease.^{7,21,22}

Differentiating infective pleural lesions from neoplastic disease can be challenging because both may present with pleural thickening, pleural effusion, and soft tissue masses.⁷ Tuberculous pleural disease is a recognized radiological mimic of pleural malignancy.¹⁵ In this patient, negative pleural fluid cytology reduced the likelihood of malignant pleural disease, while lymphocytic predominance and elevated ADA strongly supported tuberculous pleural effusion.^{13,23,24} ADA remains one of

the most useful diagnostic biomarkers for tuberculous pleural effusion, particularly in endemic regions, with values above 40 U/L demonstrating high diagnostic accuracy.^{24,25} The ADA value of 55 U/L in our patient therefore strongly favored a tuberculous etiology. Negative AFB staining did not exclude tuberculosis, as pleural disease is frequently paucibacillary.^{12,19}

Another notable finding was the progressive nature of the radiological abnormalities. Serial imaging demonstrated persistent right-sided reticular opacities with interval worsening over six months. Such chronic unilateral pleural and parenchymal changes are more suggestive of chronic inflammatory, granulomatous, or neoplastic disease than an acute transient infection.^{7,21} In conjunction with the patient's previous tuberculous history and pleural fluid findings, a chronic tuberculous or fibro-inflammatory process was considered the most likely diagnosis.^{12,19}

The mechanism of pain in this patient was most likely related to irritation of the diaphragmatic pleura by the pleural-based lesion. Sensory fibers from the diaphragmatic pleura travel through the phrenic nerve to cervical roots C3–C5, which also innervate the shoulder region.^{7,21} Consequently, pleural inflammation may be perceived as shoulder pain despite the absence of intrinsic shoulder pathology.¹⁶

Table 5: Differential Diagnosis of Referred Right Shoulder Pain

Differential Diagnosis	Mechanism / Pathophysiology	Typical Clinical Features	Important Diagnostic Clues	Relevance to Referred Right Shoulder Pain
Rotator cuff tear / tendinopathy	Degeneration or tear of rotator cuff tendons causing local inflammation	Pain during abduction, night pain, weakness while lifting arm	Positive impingement tests, restricted active movement	Usually localized shoulder pathology
Adhesive capsulitis	Capsular fibrosis and chronic inflammation	Progressive stiffness and painful restricted movement	Restricted active and passive movement	Pain usually localized to shoulder
Cervical radiculopathy	Compression of cervical nerve roots	Neck pain radiating to shoulder or arm, paresthesia	MRI cervical spine, positive Spurling test	Can mimic referred shoulder pain
Acute cholecystitis	Diaphragmatic irritation via phrenic nerve	Right upper quadrant pain, fever, nausea	Murphy sign, ultrasound findings	Classical cause of referred right shoulder pain
Pleural effusion	Irritation of diaphragmatic pleura	Dyspnea, pleuritic chest pain, cough	Chest X-ray or CT showing effusion	Frequently produces referred shoulder pain
Pleural-based lesion	Inflammatory or infiltrative pleural pathology	Vague thoracic discomfort, shoulder pain	CECT thorax showing pleural lesion	Important non-abdominal cause
Lower lobe pneumonia	Basal lung inflammation extending to pleura	Fever, cough, pleuritic pain	Chest imaging with consolidation	Can present primarily with shoulder pain
Tuberculous pleuritis	Tubercular inflammation involving pleura	Fever, weight loss, chronic cough	Lymphocytic pleural fluid, ADA elevation	Important in tuberculosis-endemic regions
Pulmonary embolism	Pulmonary infarction causing pleural irritation	Sudden dyspnea, tachycardia, pleuritic pain	CT pulmonary angiography	Occasionally presents with isolated shoulder pain

This case highlights the importance of considering thoracic and pleural causes in patients presenting with unexplained shoulder pain. Careful clinical evaluation, appropriate imaging, and correlation with pleural fluid analysis are essential to avoid missed diagnoses. Recognition of pleural irritation as a cause of referred shoulder pain may facilitate earlier diagnosis, particularly in tuberculosis-endemic regions where chronic pleural tuberculosis remains an important differential diagnosis.

CONCLUSION

This case highlights an uncommon presentation of pleural-based thoracic pathology manifesting predominantly as persistent referred right shoulder pain. While right shoulder pain is frequently attributed to musculoskeletal or hepatobiliary causes, clinicians should also maintain a high index of suspicion for thoracic and pleural etiologies, particularly in elderly patients with atypical symptoms and unremarkable local shoulder examination findings.

Referred shoulder pain secondary to diaphragmatic pleural irritation occurs through phrenic nerve-mediated pathways (C3–C5) and may present even in the absence of significant respiratory or abdominal symptoms. Although abdominal causes such as cholecystitis and subphrenic pathology are classically associated with right shoulder referral pain, pleural inflammation, pleural-based lesions, pleural effusion, and lower lobe pulmonary pathology should remain important differential considerations.

In this patient, the combination of chronic progressive unilateral thoracic imaging findings, pleural-based lesion involving the right hemidiaphragm, lymphocytic pleural effusion with elevated ADA, and negative malignant cytology favored a chronic infective pleural process over malignancy. The case further emphasizes the importance of correlating radiological findings with clinical history and pleural fluid analysis, especially in tuberculosis-endemic regions.

From an emergency medicine perspective, unexplained shoulder pain should not be approached solely as an orthopedic complaint. Careful systemic evaluation and appropriate thoracic imaging may help identify potentially

significant intrathoracic pathology at an earlier stage. Recognition of pleural irritation as a cause of referred shoulder pain can prevent delayed diagnosis and improve clinical decision-making in patients presenting with atypical thoracic disease

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