

Missed Glenoid Fracture in the Emergency Department: A Case Report and Strategies for Improved Detection

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Abstract

Glenoid fractures, though rare, pose diagnostic challenges in emergency settings due to their subtle radiographic presentation. This case report details a 38-year-old male who presented following a motorcycle collision with right shoulder pain and restricted mobility. Initial anteroposterior (AP) radiographs were interpreted as negative, leading to delayed diagnosis. Persistent symptoms prompted repeat imaging, including a Grashey view (true AP projection), which revealed an anterior glenoid fracture. Subsequent CT confirmed a comminuted intra-articular fracture with posterior subluxation, necessitating surgical fixation. The case underscores the limitations of standard shoulder radiographs in detecting glenoid injuries, particularly in high-energy trauma. Key lessons include the critical role of specialized views (e.g., Grashey) and advanced imaging (CT) when clinical suspicion persists despite negative initial studies.

Furthermore, delayed orthopedic referral and systemic gaps in imaging protocols highlight the need for multidisciplinary collaboration and standardized ED pathways to mitigate missed diagnoses. This report advocates for heightened clinical vigilance, protocolized imaging, and provider education to reduce long-term morbidity associated with glenoid fractures, such as chronic instability and early osteoarthritis.

Introduction

The glenohumeral joint, a highly mobile but inherently unstable articulation, relies on dynamic stabilizers (rotator cuff muscles) and static restraints (glenohumeral ligaments, labrum, and joint congruity) to maintain stability. The glenoid fossa, a shallow concavity on the lateral scapula, serves as the socket for the humeral head. Its morphological variability and shallow depth predispose it to fractures during high-energy

trauma or axial loading, though isolated glenoid fractures remain rare, accounting for only 10–20% of scapular fractures. Glenoid fractures are diagnostically challenging due to their subtle radiographic presentation, often obscured by overlapping structures or inadequate imaging protocols. Since Harris and Harris first highlighted missed scapular fractures in 1988, advancements in imaging have improved detection; however, Emergency Departments (EDs) continue to face challenges in identifying these injuries promptly. This case report underscores the consequences of delayed diagnosis and advocates for standardized imaging protocols and multidisciplinary collaboration to reduce missed fractures in acute settings.

Clinical History

Presentation and Initial Assessment

A 38-year-old male presented to the ED following a motorcycle collision on February 23, 2023. He reported right shoulder pain and swelling after landing on his right side. Vital signs were stable (BP 152/83 mmHg, HR 93 bpm, SpO₂ 99%). Physical examination revealed significant right deltoid swelling, with severely restricted active and passive shoulder motion. Initial radiographs (anteroposterior [AP] view) were interpreted as unremarkable (**Figure 1**), and the patient was discharged with instructions for reassessment in four days.

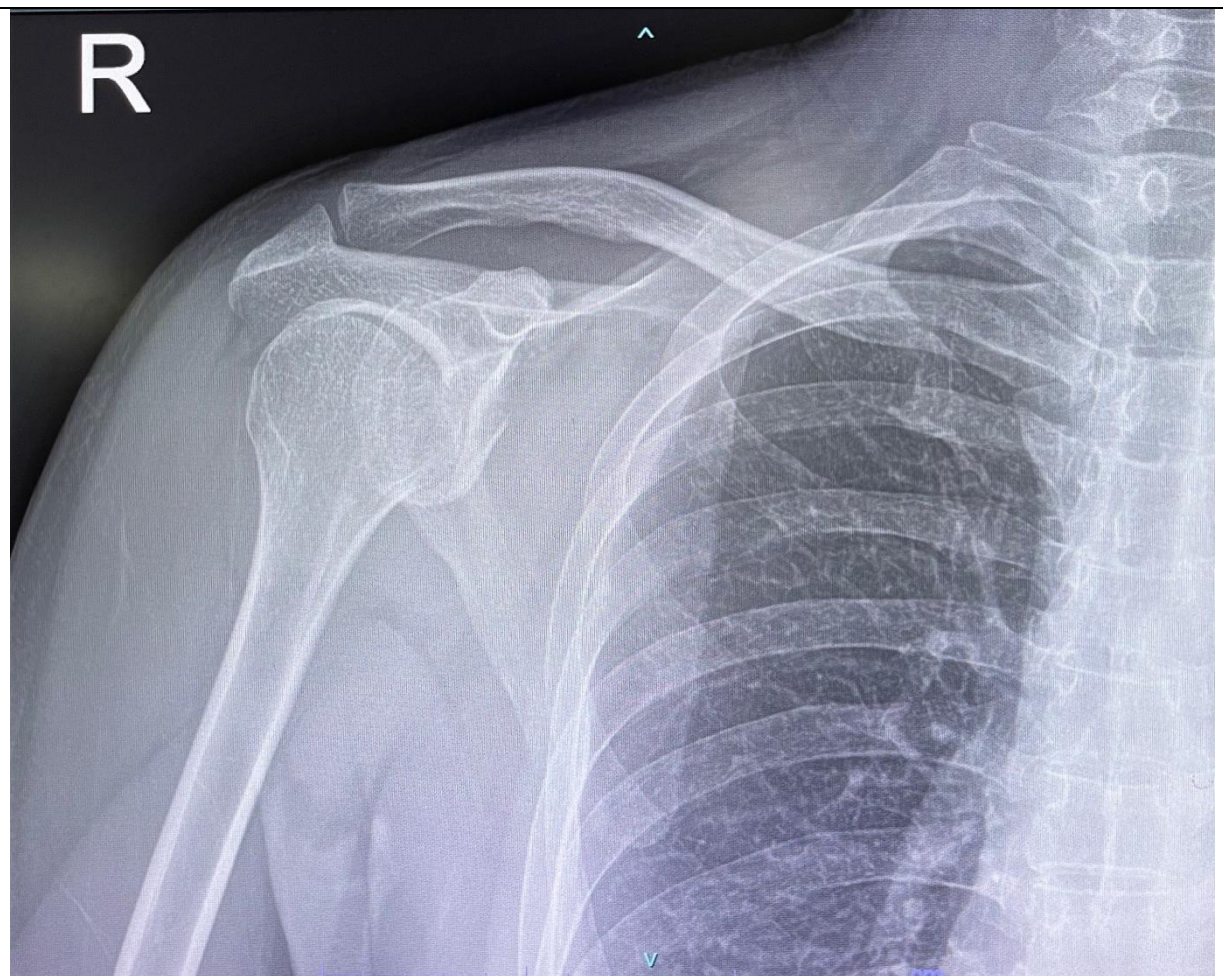


Figure 1

Follow-Up and Delayed Diagnosis

On February 27, persistent pain and limited mobility prompted repeat radiography (AP view), which raised suspicion for a glenoid fracture (Figure 2). Orthopedic referral was initiated, but follow-up was delayed until August 7, 2023, when the patient reported unchanged symptoms. A Grashey view (true AP projection) confirmed an

anterior glenoid fracture (Figure 3). Subsequent CT imaging revealed a comminuted intra-articular fracture involving the anterior and posterior glenoid, with posterior subluxation and intra-articular hematoma (Figures 4–6). Surgical fixation was performed, and the patient recovered uneventfully.

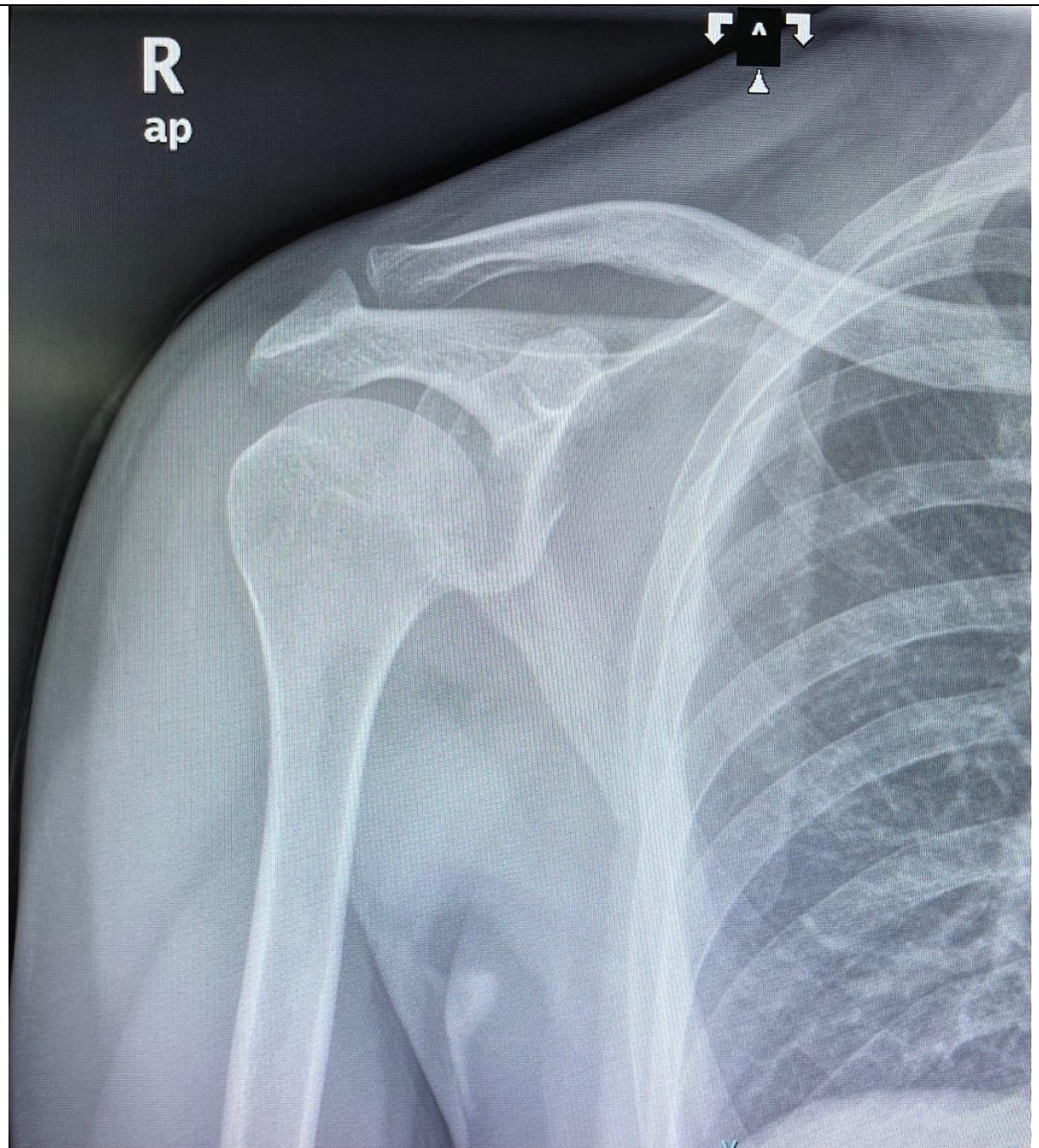


Figure 2

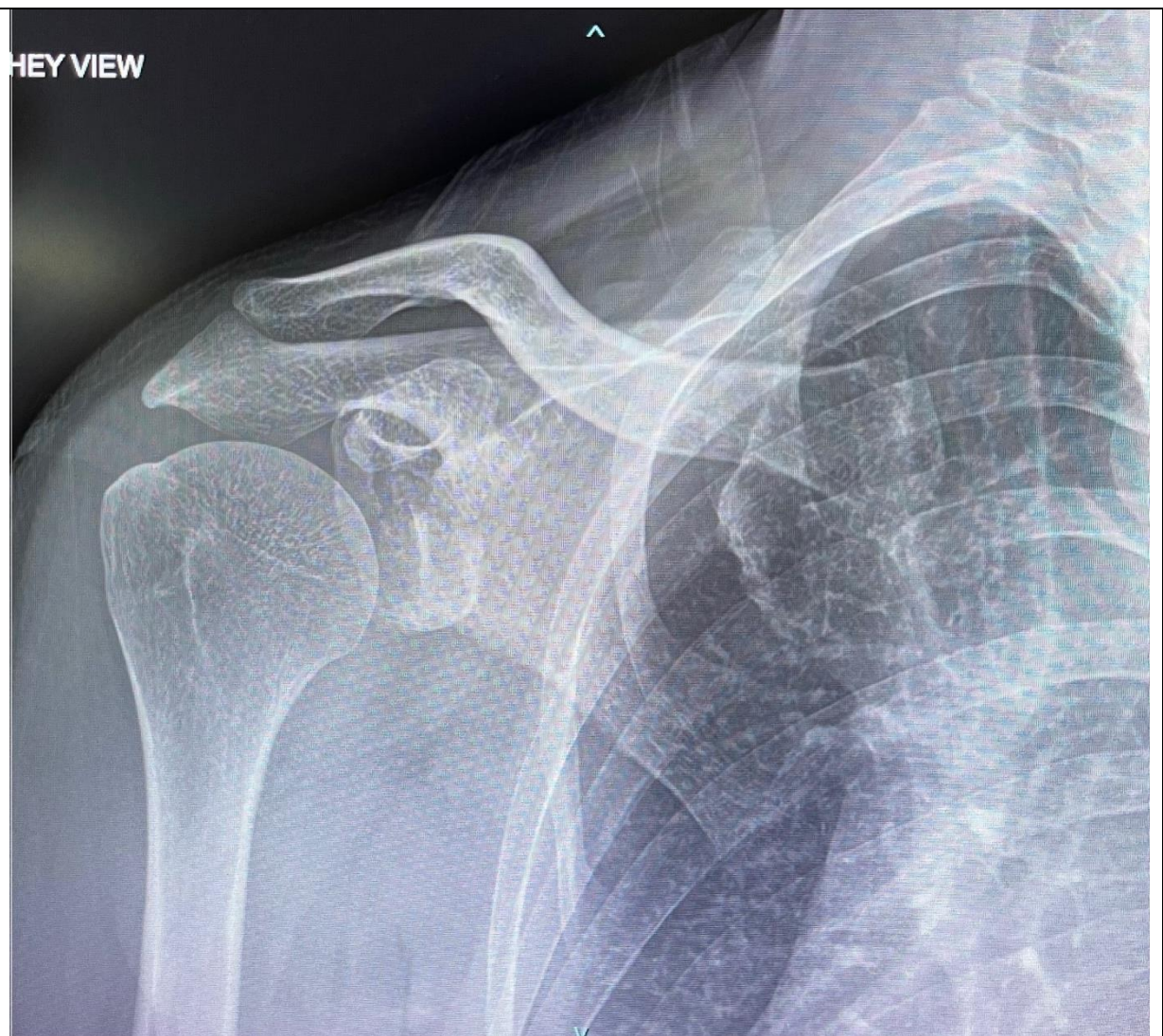


Figure 3: (Grashey view).



Figure 4



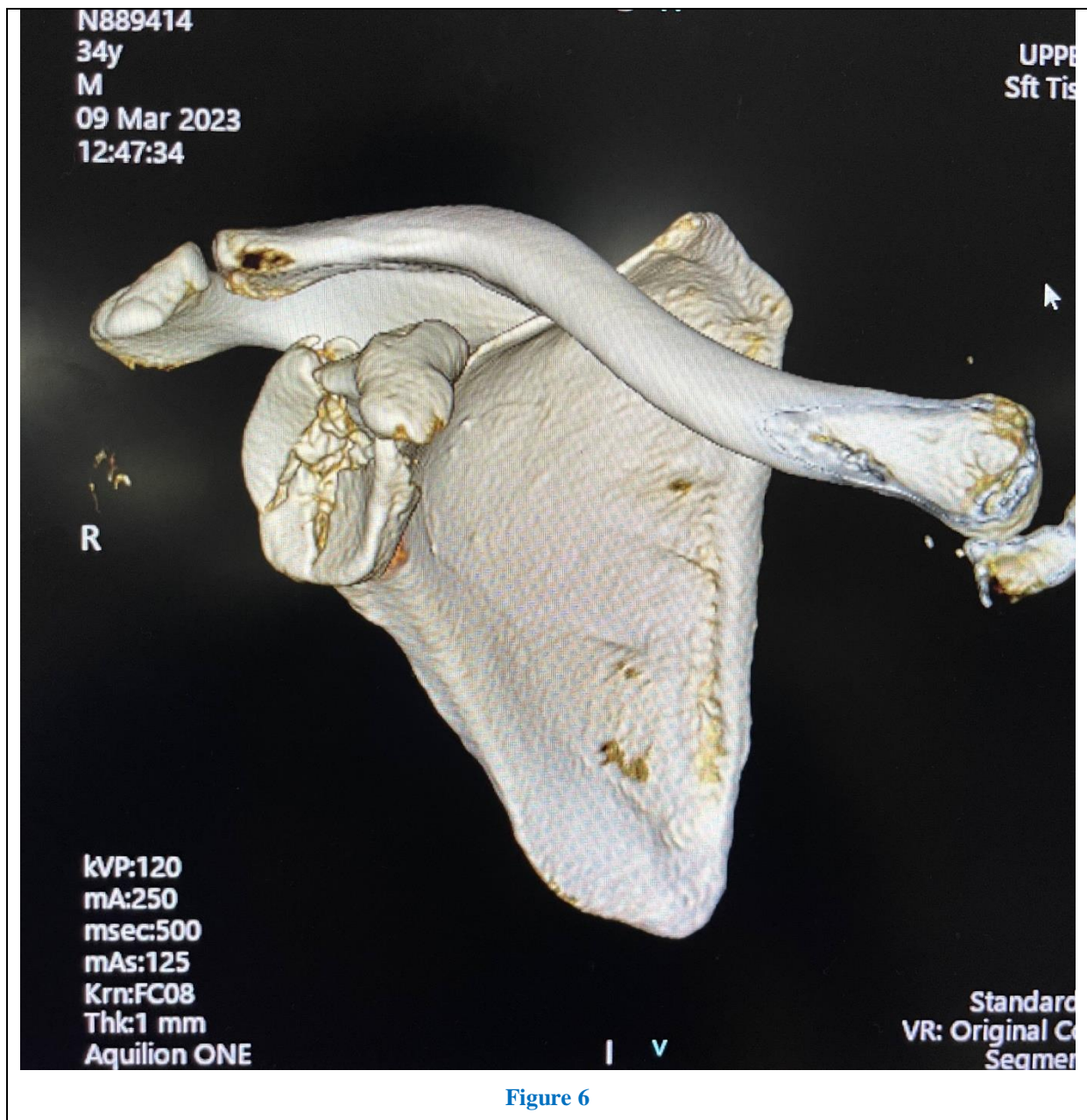


Figure 6

Discussion

Diagnostic Challenges in Glenoid Fractures

Glenoid fractures are rare (1% of scapular fractures) but carry significant morbidity if undiagnosed. As demonstrated in this case, standard AP radiographs lack sensitivity for detecting subtle fractures due to overlapping osseous structures. The Grashey view, which aligns the X-ray beam parallel to the glenohumeral joint, optimizes visualization of the glenoid rim and articular surface. Despite its utility, this projection

is underutilized in EDs, contributing to delayed diagnoses [1-4].

Role of Advanced Imaging

CT with 3D reconstruction remains the gold standard for characterizing glenoid fractures, particularly for assessing displacement, comminution, and intra-articular involvement. In this case, CT revealed extensive damage not apparent on initial radiographs, underscoring its necessity when clinical suspicion persists despite negative plain films.

Clinical and Systemic Implications

Missed glenoid fractures risk complications such as chronic instability, malunion, and early-onset osteoarthritis. This case highlights systemic gaps, including:

- ❖ **Inadequate Imaging Protocols:** Overreliance on suboptimal AP views in the ED.
- ❖ **Delayed Referrals:** Prolonged intervals between suspicion and specialist evaluation.
- ❖ **Educational Deficits:** Need for ED staff training on high-risk injury patterns and appropriate imaging.

Strategies for Improvement

- ❖ **Standardized Imaging:** Implement Grashey views for suspected glenoid injuries.
- ❖ **Multidisciplinary Pathways:** Expedite orthopedic and radiology collaboration for equivocal cases.
- ❖ **Clinical Awareness:** Educate providers on mechanisms (e.g., high-energy trauma,

axial loading) and exam findings (ecchymosis, restricted rotation) associated with glenoid fractures.

Conclusion

Glenoid fractures demand a high index of suspicion, tailored imaging, and prompt referral to mitigate long-term disability. This case reinforces the limitations of conventional radiographs and advocates for protocolized use of Grashey views and CT in EDs. Multidisciplinary collaboration and continuous education are critical to reducing diagnostic delays and improving patient outcomes.

References

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