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RESEARCH ARTICLE

Functional Outcome Improved by Early Diagnosis and Surgical Management in Case of Posterior Dislocation of Shoulder

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Abstract: ***Background***: Shoulder posterior dislocation is a rare condition that frequently goes undiagnosed at first presentation. Electrical injury is an especially uncommon cause. A successful functional recovery requires prompt detection and the right surgical intervention. ***Case Presentation:*** A 24-year-old male electrician developed gradually worsening pain and restricted movement in his left shoulder four weeks after sustaining an electrical shock. Examining the shoulder revealed that it was stuck in internal rotation and could not rotate externally. A posterior glenohumeral dislocation and a reverse Hill-Sachs lesion affecting over one-third of the anteromedial articular surface of the humeral head were verified by MRI, while plain radiographs displayed the well-known "lightbulb sign." Surgical treatment was implemented due to the amount of joint surface involvement and the delayed diagnosis. To lessen the chance of recurrent posterior instability, the McLaughlin surgery was carried out, which involved detaching the subscapularis tendon and transferring it into the reverse Hill-Sachs defect. Two weeks after surgery, rehabilitation with increasing range-of-motion and strengthening activities was started. ***Results:*** The patient made a full recovery, returning to routine activities and regaining a nearly normal range of motion. The instability was effectively treated, and more joint injury was avoided. ***Conclusion:*** This case illustrates that posterior shoulder dislocation following electrical trauma, though rare and often overlooked, can be effectively treated with the McLaughlin technique if identified in time. Early suspicion and timely intervention are vital, since outcomes are closely linked to the interval between injury and management. This report highlights the need for clinicians to consider posterior dislocation in patients presenting after electrical injuries and supports surgical repair when significant articular involvement is present.

Keywords: Shoulder Dislocation; Electrical Injuries; Orthopedic Procedures; Treatment Outcome; Tendon Transfer; Hill-Sachs Lesion; McLaughlin Procedure; Early Diagnosis.

INTRODUCTION

Posterior shoulder dislocation represents a rare but clinically significant injury, accounting for only 2-5% of all glenohumeral dislocations.[1] Despite the glenohumeral joint being the most commonly dislocated joint in the body, posterior dislocations pose unique diagnostic and therapeutic challenges due to their atypical presentation and tendency toward delayed recognition.[2,3]

The clinical significance of posterior shoulder dislocation extends beyond its rarity, as these injuries are frequently misdiagnosed at initial presentation. Studies indicate that up to 79% of cases are not recognized until they become chronic and the shoulder becomes locked, resulting in significant delays in appropriate treatment.[4,5] This diagnostic delay occurs despite highly suggestive clinical findings and represents what McLaughlin famously described as a "diagnostic trap" due to the injury's uncommon nature and potential for oversight by unwary clinicians.[6]

The pathophysiology typically involves forceful internal rotation of the arm combined with adduction, often resulting from high-energy trauma, seizure activity, or electrical injuries. The mechanism frequently produces associated injuries including reverse Hill-Sachs lesions (affecting 40-90% of locked posterior dislocations), rotator cuff tears, and capsulolabral damage, which significantly influence treatment decisions and outcomes.[7,8]

Early recognition and prompt reduction remain critical factors in achieving optimal functional outcomes. When diagnosed acutely, simple posterior dislocations can often be managed with closed reduction followed by appropriate immobilization. However, delayed diagnosis leads to progressive articular damage, increased technical difficulty of reduction, and the need for more complex surgical interventions.[5,9] A delay in diagnosis allows the humeral head defect to enlarge over time, making shoulder reduction progressively more challenging and predisposing the joint to deformity and subsequent arthritis [10].

The management of posterior shoulder dislocations ranges from conservative treatment for acute cases to complex reconstructive procedures for chronic locked dislocations. Treatment selection depends on multiple factors including the duration of dislocation, extent of articular surface involvement, patient age, and

functional demands.[11] Recent literature emphasizes that early surgical intervention yields superior outcomes compared to conservative management, particularly in younger, active patients, and that delays in treatment make subsequent stabilization more technically demanding due to capsular elongation and progressive labro-ligamentous injury.[12]

This case report describes a patient with posterior shoulder dislocation managed through prompt diagnosis and surgical intervention, underscoring the need for clinical vigilance in such rare injuries and the positive outcomes associated with timely treatment.

Case Presentation:

Patient Information

After suffering an electrical injury, a 24-year-old man had been experiencing increasing discomfort and limited movement in his left shoulder for four weeks when he came to our emergency room. The patient stated that he had experienced an electrical shock while working as an electrician four weeks before to presentation, which caused him to experience shoulder pain right away.Initially, the pain was manageable and attributed to muscular strain from the involuntary muscle contractions during the electrical exposure. However, over the subsequent weeks, the patient experienced progressive worsening of pain intensity, particularly with attempted shoulder movement, prompting him to seek medical attention.

Clinical Presentation

The patient presented with a visual analog scale rating of 8/10 for significant, ongoing shoulder discomfort that worsened with every shoulder mobility effort. He stated that he was unable to carry out everyday tasks like lifting goods, reaching aloft, or brushing his hair due to severe functional impairment. The patient disputed that the afflicted extremity was weak, tingly, or numb. His medical history was essentially ordinary, with no history of seizure disorders or other neurological diseases, and he had no prior history of shoulder injuries, dislocation, or surgery.

Upon examination, the patient had his left arm locked in internal rotation and adduction and showed signs of discomfort. The anterior shoulder was flattened, the posterior humeral head was noticeably prominent, and the typical deltoid shape was gone. In contrast to the opposing side, the coracoid process was more noticeable. The humeral head was palpated posterior to the glenoid cavity. External rotation, abduction, and forward flexion were the most uncomfortable and limited shoulder motions. The patient was unable to place his hand behind his back or across to the opposite shoulder, nor was he able to externally rotate his shoulder past neutral. With palpable radial and ulnar pulses and appropriate capillary refill, neurovascular evaluation verified that feeling was retained throughout both peripheral nerve areas.

Diagnostic Workup

Anteroposterior and lateral projections of the shoulder were captured on plain radiographs. The humeral head was spherical and symmetrical in the anteroposterior film, exhibiting the distinctive "lightbulb sign," which is indicative of stable internal rotation and the lack of the typical asymmetric shape associated with outward rotation. The lateral scapular Y-view verified the humeral head's posterior displacement with respect to the glenoid cavity. In light of these results and the high clinical suspicion of posterior dislocation, magnetic resonance imaging (MRI) was carried out in order to identify concomitant soft-tissue involvement and offer a more thorough assessment of the amount of damage.

Nearly 30% of the anteromedial articular surface of the humeral head had a posterior glenohumeral dislocation and a reverse Hill-Sachs lesion, which were verified by magnetic resonance imaging. A posterior glenoid labral rupture with capsulolabral damage and a considerable joint effusion were among the other findings. In keeping with the mode of damage, edema was also observed in the subscapularis muscle. There were no proximal humeral or glenoid rim fractures seen. There was no sign of full-thickness rips in the rotator cuff tendons.

Image 1: Pre-operative Plain Radiographs

Anteroposterior (AP) radiograph of the left shoulder demonstrating the classic "lightbulb sign" with the humeral head appearing rounded and symmetrical due to fixed internal rotation, indicating posterior shoulder dislocation. Note the loss of normal humeral head asymmetric contour typically seen with external rotation.

Image 2: Pre-operative MRI Findings

Figure 2A: Axial T2-weighted MRI scan depicting posterior translation of the humeral head in relation to the glenoid cavity, consistent with posterior glenohumeral dislocation.

Figure 2B: Sagittal T2-weighted MRI scan illustrating a reverse Hill–Sachs impaction defect involving nearly 30% of the anteromedial surface of the humeral head. Associated findings include joint effusion and evidence of capsulolabral disruption.

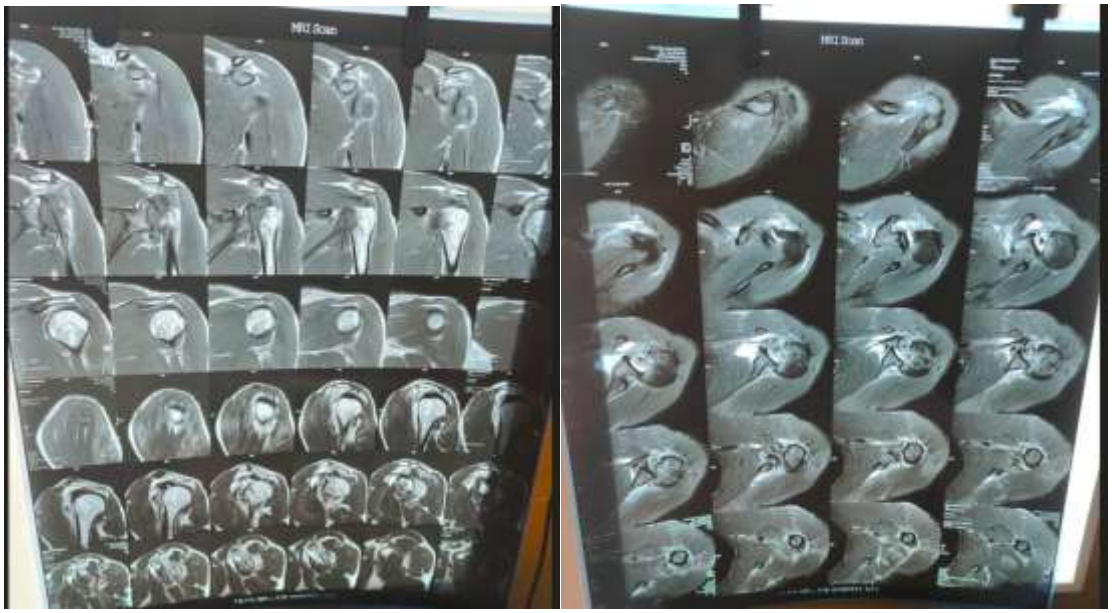


Image 3: Pre-operative Clinical Assessment

Management

Closed reduction was considered unsuitable and likely to fail because to the four-week delay in diagnosis and the existence of a large reverse Hill-Sachs lesion with locked posterior dislocation. The decision to continue with surgical intervention utilizing the McLaughlin technique was taken after a detailed conversation with the patient regarding treatment alternatives, risks, and expected outcomes. The patient was placed in a beach chair and the treatment was carried out under general anesthesia. The posterior dislocation with impaction of the humeral head on the posterior glenoid rim was confirmed by exposing the shoulder joint via a deltopectoral technique.

In order to prevent recurring posterior subluxation, the McLaughlin procedure—which involves separating the subscapularis tendon from the smaller tuberosity and transferring it into the reverse Hill-Sachs defect—was successfully completed. To provide stable fixation, non-absorbable sutures and bone anchors were used to bind the tendon. Intraoperative range of motion testing showed a steady decrease with the restoration of external rotation and the removal of posterior translation after glenohumeral joint reduction and subscapularis transfer. The deltopectoral gap was then filled in layers after the capsule was restored.

Image 4:Intraoperative Surgical Procedure - McLaughlin Technique

Figure 4A: Intraoperative image through the deltopectoral approach showing exposure of the glenohumeral joint, with clear visualization of the posterior dislocation and the reverse Hill–Sachs defect on the humeral head.

Figure 4B: Operative field demonstrating detachment of the subscapularis tendon from the lesser tuberosity in preparation for its transfer into the reverse Hill–Sachs defect.

Figure 4C: Completed McLaughlin procedure showing the subscapularis tendon transferred and secured into the humeral head defect with bone anchors, effectively filling the reverse Hill-Sachs lesion.

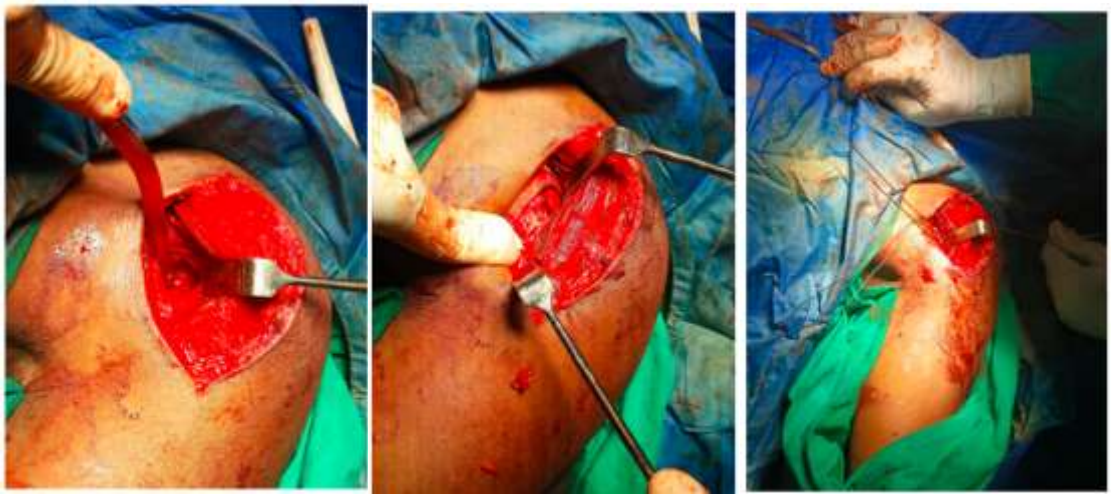
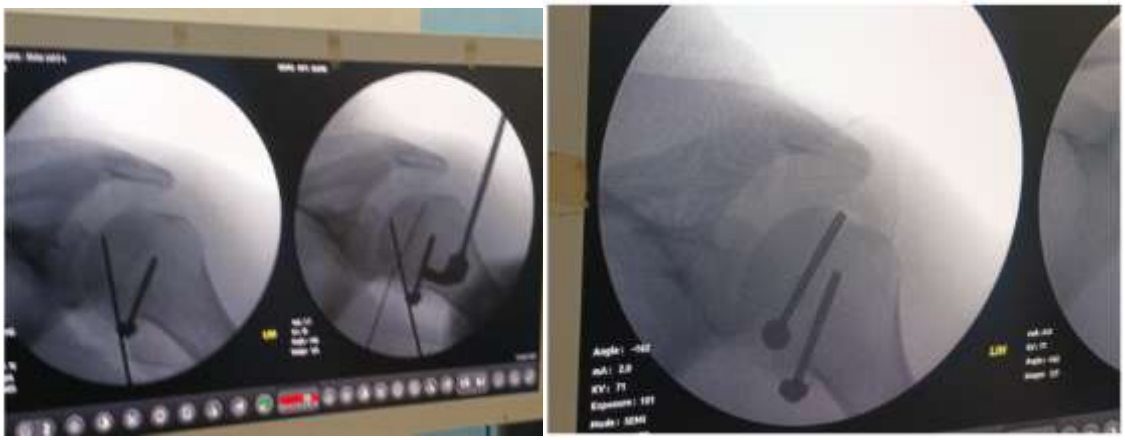


Image 5: Intraoperative Confirmation of Surgical Success

Figure 5A: Intraoperative fluoroscopic anteroposterior view confirming successful reduction of the glenohumeral joint following the McLaughlin procedure, with restoration of normal anatomical alignment.

Figure 5B: Intraoperative lateral fluoroscopic view demonstrating the humeral head properly positioned within the glenoid fossa, confirming elimination of the posterior dislocation and stable joint reduction.



Post-operatively, the patient was placed in a shoulder immobilizer in slight external rotation to protect the repair and prevent recurrent dislocation. The patient tolerated the procedure well without complications and was discharged on postoperative day one with appropriate pain management and follow-up instructions. A structured rehabilitation program was initiated at two weeks post-surgery, beginning with passive range of motion exercises and progressing to active and strengthening exercises over the subsequent months.

Image 6: Post-operative Plain Radiographs

Post-operative anteroposterior radiograph of the left shoulder following McLaughlin procedure, showing successful reduction of the glenohumeral joint with restoration of normal anatomical alignment. The humeral head is now concentrically reduced within the glenoid fossa.

Image 7:Post-operative Clinical Assessment after 3 months

Image 8: Post-operative Clinical Assessment after 1 year

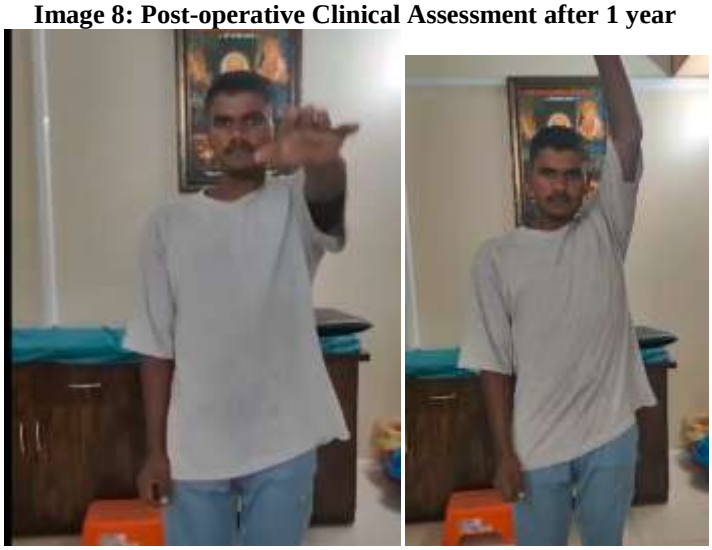
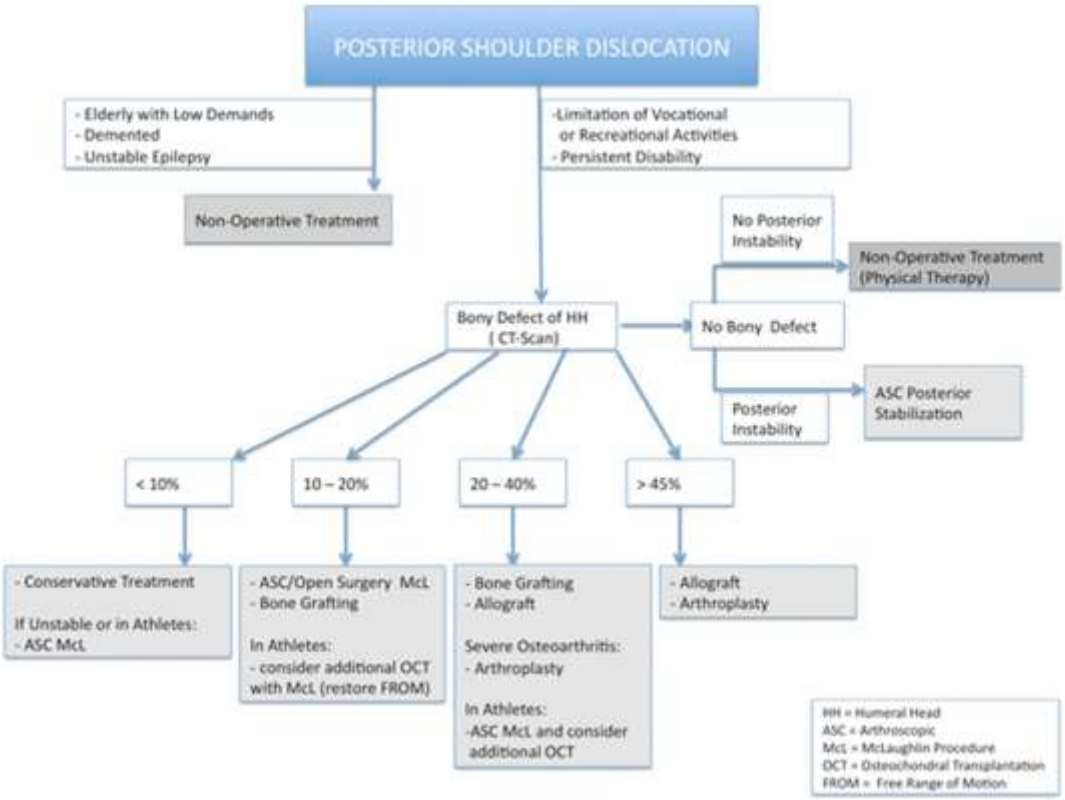


Image 9:Treatment algorithm for posterior shoulder dislocation (PSD) according to contemporary orthopaedic literature



DISCUSSION

Our case represents a successful example of early surgical intervention for posterior shoulder dislocation following electrical injury, demonstrating the importance of prompt diagnosis and appropriate treatment selection. The four-week delay in diagnosis, while suboptimal, still allowed for favorable outcomes through the McLaughlin procedure, consistent with recent literature emphasizing the critical role of timing in posterior shoulder dislocation management.

Although it is uncommon, electrical damage is a well-established mechanism causing posterior shoulder dislocation in the literature. Less than 5% of posterior shoulder dislocations are caused by electrical traumas, according to Ketenci et al. The mechanism is similar to seizure-induced dislocations and involves forceful internal rotation, flexion, and adduction of the shoulder due to strong muscle contractions. [13] This mechanism was supported by our patient's presentation, underscoring the significance of keeping a high index of suspicion for shoulder injuries after electrical mishaps. Due to the unique conditions of the electrical exposure, our unilateral case did not exhibit the bilateral character of electrical injury-induced dislocations that have been documented in other case studies. [14]

The four-week delay in diagnosis in our case falls within the timeframe commonly reported in the literature. Multiple studies have demonstrated that posterior shoulder dislocations are frequently missed, with up to 79% of cases not recognized until they become chronic.[3,4] This diagnostic challenge stems from the subtle clinical presentation and the potential for normal-appearing anteroposterior radiographs, as the humeral head may appear appropriately positioned within the glenoid despite the posterior dislocation. Our case exemplifies the "lightbulb sign" on plain radiographs, a classic finding that should prompt further evaluation with axillary views or advanced imaging.

The presence of a reverse Hill-Sachs lesion involving approximately 30% of the articular surface in our patient necessitated surgical intervention, as closed reduction would likely have been unsuccessful and potentially harmful. This aligns with current treatment algorithms suggesting that defects involving more than 25% of the articular surface require surgical management.[7,9] The McLaughlin procedure was selected as the most appropriate intervention, involving subscapularis tendon transfer into the humeral head defect to prevent recurrent posterior instability.

The McLaughlin method has shown promising results for locked posterior shoulder dislocations in recent systematic evaluations. A thorough analysis by Berk et al. shown that this method is linked to positive clinical and radiographic results with low rates of complications, especially when the amount of time between injury and surgery is kept to a minimum. [15] These conclusions are supported by our example, as the favorable result was probably influenced by the very early intervention at four weeks. Delays longer than six months are linked to noticeably lower functional results

and a higher risk of glenohumeral degenerative joint disease, according to the systematic analysis.

Comparative studies have provided valuable insights into the effectiveness of the modified McLaughlin procedure. A retrospective study by Cohen M et al. demonstrated significant improvements in functional outcome measures, with Constant-Murley scores improving from 22 ± 2.4 preoperatively to 65 ± 21.5 postoperatively ($P < 0.001$).[16] Similarly, Xiong et al. reported improvements in Constant-Murley scores from 46.00 ± 4.47 to 86.20 ± 5.36 ($P < 0.001$) following modified McLaughlin procedures.[17] These studies consistently demonstrate that functional outcomes depend primarily on the duration of dislocation and extent of articular injury, supporting our decision for early surgical intervention.

The choice between classic and modified McLaughlin procedures has been debated in recent literature. The modified approach, involving osteotomy of the lesser tuberosity with attached subscapularis, theoretically provides superior bone-to-bone healing compared to tendon-to-bone healing in the classic technique.[18] However, comparative studies have shown similar functional outcomes between both approaches, suggesting that surgical expertise and patient-specific factors may be more important than the specific technique chosen.[19] Our successful outcome with the classic McLaughlin procedure supports the continued viability of this approach when performed appropriately.

The development of arthroscopic techniques for the McLaughlin procedure has expanded treatment options, potentially reducing surgical morbidity while maintaining effectiveness. Bernard M et al. described arthroscopic modifications that allow complete visualization of the glenohumeral joint and simultaneous treatment of associated soft tissue injuries.[20] While our case was managed through open surgical approach, the availability of minimally invasive options may influence future treatment decisions, particularly in younger patients or those with less severe articular damage.

Electrical injury-specific considerations in posterior shoulder dislocation management have received limited attention in the literature. The few reported cases suggest that outcomes following electrical injury may be favorable when treated appropriately, with several case reports demonstrating successful conservative or surgical management.[21,22] Our case adds to this limited body of evidence, demonstrating that electrical injury mechanism does not appear to negatively impact surgical outcomes when appropriate treatment is provided.

The importance of early diagnosis cannot be overstated, as multiple studies have demonstrated the progressive nature of articular damage in untreated posterior dislocations. Robinson and Aderinto described this as a continuum where the humeral head defect becomes progressively larger and the shoulder becomes increasingly difficult to reduce, ultimately leading to joint deformity and arthritis.[3] Our case illustrates that even with a four-week delay, surgical intervention can still achieve favorable outcomes, though earlier diagnosis would have been preferable.

Long-term follow-up studies have shown that successful surgical treatment of posterior shoulder dislocations can prevent the development of significant glenohumeral arthritis and maintain functional capacity. Haritinian et al. reported that patients treated with McLaughlin procedures, even with significant delays in diagnosis, achieved satisfactory functional outcomes with average subjective shoulder values of 86.4 ± 11.1 and normalized Constant-Murley scores of 90 ± 8.3.[19] However, their study also confirmed that delays beyond six months are associated with poorer outcomes and increased complications.

Our case demonstrates the successful application of established surgical principles to a relatively uncommon injury mechanism. The favorable functional outcome achieved supports the current treatment algorithms for posterior shoulder dislocation and emphasizes the critical importance of early diagnosis and appropriate surgical intervention. The case also highlights the need for increased awareness among emergency physicians and primary care providers regarding the potential for posterior shoulder dislocation following electrical injuries.

CONCLUSION

This case report demonstrates that early diagnosis and prompt surgical management using the McLaughlin procedure can achieve excellent functional outcomes in posterior shoulder dislocation following electrical injury, even with a four-week diagnostic delay. The successful treatment of a 30% reverse Hill-Sachs lesion through subscapularis tendon transfer emphasizes the importance of maintaining high clinical suspicion for this frequently missed injury and selecting appropriate surgical intervention based on lesion size and timing. The case supports current literature advocating for surgical management of locked posterior dislocations with significant articular surface involvement and reinforces the principle that functional outcomes are optimized when treatment is initiated as early as possible, ideally within six months of injury.

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