Posterior Shoulder Dislocation: A Rare Case Report and Review of the Literature

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ABSTRACT

Posterior shoulder dislocation is a unique finding in the orthopedics field. Although it is rarely found, this condition is one that must be considered in the presence of acute shoulder pain. Most clinicians often miss this diagnosis on initial examination; therefore, imaging radiographs are often needed to confirm the diagnosis. Unfortunately, insufficient radiographic assessment can be the greatest pitfall in establishing an accurate diagnosis. Multiple radiographic projections, including anteroposterior view, scapular Y view, and the axillary view, are important to achieve an accurate diagnosis. In this study, we present a middle-aged patient with a pain and trauma history on the shoulder. Anteroposterior radiographic examination revealed an atypical finding. Fortunately, additional radiographic projections were successful in establishing the proper diagnosis of posterior shoulder dislocation. This study also presents a comprehensive review of the keys in the recognition and treatment of the injury.

Keywords: Shoulder, posterior dislocation, middle age, rare case.

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I. INTRODUCTION

A posterior shoulder dislocation (PSD) is a rare form of orthopedic injury, with an estimated incidence of less than 4% of all shoulder dislocations in the emergency department. Most clinicians (60-79%) failed to establish an accurate diagnosis of PSD on initial examination [1]. The high incidence of complications from this injury makes early detection important in preventing long-term comorbidities [2]. Posterior shoulder dislocation is classified into the simple type and complex type. A simple dislocation occurs in the presence of a humeral head impression fracture or different degrees of reverse Hill-Sachs lesions. Whereas, in complex type, the fracture line may extend to the humeral neck of the shaft and involve the surrounding tuberosities [3].

Rouleau *et al.* reported that diagnosis PSD requires a high level of suspicion and appropriate imaging. Multiple projection radiographs have been shown to minimize the risk of missed diagnosis of PSD [4]. Here, we present a middle-aged patient with a clinical case of PSD and the relevant literature review regarding diagnosis making and management of this rare entity.

II. PRESENTATION OF CASE

A 47-year-old male visited our emergency department with a chief complaint of pain on the right shoulder after falling two hours before arrival. Upon initial inspection, the patient showed posterior shoulder protrusion with a marked loss of the anterior deltoid contour and prominent coracoid process. The arm was locked in an internally rotated position with 90° flexion at the elbow, slightly adducted, and limited external rotation. Patient was unable to do passive external rotation and abduction. The neurovascular examination was intact, including axillary nerve testing. His vital signs were within normal range.

Radiographic x-ray imaging with an anteroposterior (AP) view (Fig. 1 A) was performed on the locked arm position. The result appeared to be normal without any appearance of typical signs, including the light bulb and *Trough Line* signs. Therefore, we requested an additional scapular Y view and axillary view radiography (Fig. 1 B and Fig. 1 C). The results were suggestive of posterior shoulder dislocation. Subsequently, we informed and sought for patient's consent to perform closed reduction under general anesthesia using 200 micrograms of fentanyl and 100 milligrams of propofol intravenously.

Fig. 1. (A) X-ray photo showing the anteroposterior view of the right shoulder with no suggestive finding of posterior shoulder dislocation. At the time the photo was taken, the patient's arm was locked in an internally rotated position. This arm positioning contributed to the normal appearance on the anteroposterior x-ray projection; (B) Scapular Y view of the right shoulder showing posterior glenohumeral dislocation. Normally, the humeral head should overlap the center of the intersection point of the coracoid process, acromion, and the body of scapular spine (Y shape); (C) Axillary view of the right shoulder showing posterior glenohumeral dislocation without reverse Hills-Sachs lesion.

Closed reduction under general anesthesia was performed with longitudinal and lateral traction on the arm to preserve the humeral head. After closed reduction, the patient was immobilized using 20° external rotation-abduction braces. We also post-treatment AP view radiograph (Fig. 2) showing normal results. Further follow-up revealed no complaints and a normal passive range of motion. The patient was discharged and followed the outpatient orthopedic control visit.

Fig. 2. The anteroposterior view radiograph after closed reduction procedure with patient's arm in an externally rotated position.

III. DISCUSSION

The shoulder is the most common dislocated joint in the human body. There are three main types of dislocation regarding the direction of the humeral head displacement, i.e., anterior, inferior, and posterior [5]. An appropriate diagnosis of PSD is rare and difficult to establish. It is often missed because of insufficient radiographic findings because of a posteriorly locked humeral head [5]. As found in our case, anteroposterior view x-ray initially showed normal findings. The patient could obtain inadequate treatment if the clinician

did not become aware of performing an additional multiple projections x-ray examination. Figueiredo *et al.* suggested that some signs in AP view radiographs might be unreliable and not be found on the initial assessment. The study recommends performing the axillary view projection because a single AP view alone may lead to a misdiagnosis of the injury [6]. Paparoidamis *et al.* explained that appropriate physical and radiologic examination should be highly focused to confirm the diagnosis, which is frequently missed or delayed in up to 79% of the cases [7].

It is crucial to identify the first occurrence of the symptoms, the exact location, and the timing of dislocation episodes. The mechanism of injury and the nature of any behavior that aggravates the condition should also be determined. Careful visual inspection of the shoulders is needed to suggest PSD findings, i.e., an internally rotated arm with a prominent coracoid process, posterior fullness in the axilla, and loss of deltoid contour. Mimura *et al.* emphasized that the internally rotated arm is a particular characteristic to indicate PSD [8]. Specific tests in diagnosing PSD can be considered, such as *Kim's Test*, which shows the sensitivity of 80% and specificity of 90%. The *Jerk Test*, posterior apprehension test, and stress test are also helpful to measure the stability and dislocation tendency [9].

Radiographic imaging is highly required to confirm the diagnosis of PSD. Unfortunately, insufficient assessment possibly becomes the greatest pitfall in establishing an accurate PSD diagnosis. Multiple projections, i.e., the anteroposterior view, scapular Y view, and the axillary view, are commonly recommended. Although the AP view is sometimes unreliable, it may visualize a light bulb sign [4]. Several signs that indicate PSD on the radiograph results, such as: (1) *Moloney's line* disruption, which is delineated by the inferolateral scapular margin to the medial proximal humeral shaft, and internal rotation of the humerus; (2) light-bulb appearance of the humeral head; (3) vacant glenoid sign of the empty anterior glenoid fossa; (4) rim sign of over 6 mm margin between the anterior glenoid rim and humeral head; and (5) *Trough Line* sign, which indicates impacted humeral head [10]. Contrary, the result on the AP view radiograph

showed normal findings, which was probably due to the patient's restriction on external rotation movement.

Multiple projections on the radiograph, i.e., the axillary and scapular Y view, were helpful in confirm PSD. Robinson *et al.* also suggested additional Velpeau views to improve the accuracy of the PSD diagnosis in the emergency department [11]. Scapular Y view is recognized as the most clinically significant view to diagnose PSD. In a normal shoulder, this view shows the humeral head lying at the center of a "Y" shape, formed by the intersection between the coracoid process and acromion superiorly and the scaphoid body inferiorly. The posterior displacement of the humeral head to the anatomical "Y" position is seen among individuals with PSD [2]. Axillary view offers a great visualization of the glenoid to evaluate possible fracture from the impaction of the humeral head into its surface [12]. On the inconclusive findings, Yasil *et al.* recommended using computed tomography (CT), especially if the patient feels excruciating pain with movement, so axillary view radiographs could not be performed. If there are no pathological findings on the AP view radiograph, then the axillary view alone is sufficient to establish the PSD diagnosis. However, if the patient is unable to perform abduction for the axillary view radiograph, then a Velpeau view radiograph may be used instead [8], [13].

In our case, we treated the patient by performing closed reduction under general anesthesia. Theoretically, closed reduction is indicated based on the degree of impression fracture damage on the articular surface. It is the treatment of choice for PSD if there is only less than 20% articular surface defect on the humeral head. The open reduction is preferred when the defect is more than 25%, making it difficult to achieve stability of the glenohumeral joint when closed reduction is performed. [8]. A study by Duralde *et al.* reported a low recovery rate (30%) in patients undergoing closed reduction under general anesthesia with a humeral head defect. [14]. On the other hand, Guehring *et al.* recommended conservative treatment for defect size less than 25%; retrograde chondral elevation, antegrade cylindrical graft or graft of the iliac bone crest with an open approach for defect size 25-40%; and shoulder prosthesis for defect more than 40% [15]. Rouleau *et al.* suggested rehabilitation protocol after PSD reduction with 20° external rotation-abduction braces for four weeks to aid healing of the posterior capsule. Codman's Pendulum and elbow range of motion (ROM) exercise three times per day is encouraged. At the fourth week, unlimited progressive ROM is initiated as well as isometric posterior rotator cuff strengthening. Non-contact sports are considered three months after reduction [4].

The prognosis of PSD based on clinical function depends on the duration and the extent of the articular shoulder injury. The greater the duration and extent of injury, the more unsatisfactory the prognosis becomes. Persistent shoulder pain, recurrent instability, non-union, avascular necrosis, stiffness of the joint, and scapulohumeral arthrosis are some complications that can occur among PSD patients [16].

IV. CONCLUSION

Posterior shoulder dislocation is a diagnostic challenge that requires thoughtful awareness by the treating physicians. A comprehensive history, physical examination, and multiple projections on radiographic imaging improve the accuracy of the PSD diagnosis and prevent delays in treatment. Closed reduction under general anesthesia can be considered an appropriate treatment choice in the absence of articular surface damage. It provides satisfactory results for middle-aged patients with low demands activity.

REFERENCES

- [1] W. Xu, L. X. Huang, J. J. Guo, D. H. Jiang, Y. Zhang Y, H. L. Yang, "Neglected posterior dislocation of the shoulder: a systematic literature review," *J. Orthop. Translat.*, vol. 3, no. 2, pp. 89-94, Mar 2015.
- [2] S. E. Williams, A. J. Hackett, C. Jensen, M. L. Riddle, "Posterior shoulder dislocation during morning PT: a case report," *Military Medicine*, vol. 184, no. 3-4, pp. e302-e305, Mar-Apr 2019.
- [3] H. W. H. Angela, C. C. Y. Stephen, H. Y. Fong, "Surgical approaches, pitfalls and outcomes of posterior fracture dislocation of the shoulder-a critical review," *J. Orthop. Traumatol. Rehabil.*, vol. 17, no. 2, pp. 61-65, Dec 2013.
- [4] D. M. Rouleau, J. Hebert-Davis, C. M. Robinson, "Acute traumatic posterior shoulder dislocation," *J. Am. Acad. Orthop. Surg.*, vol. 22, no. 3, pp. 145-152, Mar 2014.
- [5] N. Aydin, M. E. Kayaalp, M. Asansu, B. Karaismailoglu, "Treatment options for locked posterior shoulder dislocations and clinical outcomes," *EFFORT Open Rev.*, vol. 4, no. 5, pp. 194-200, May 2019.
- [6] A. Figueiredo, A. Pinto, L. C. Real, C. Alegre, R. Cabral, F. Fonseca, "Posterior fracture-dislocation of the shoulder: an often unrecognized traumatic injury," *Orthop. Traumatol. Spor. Med. Int. J.*, vol. 1, pp. 8-11, May 2018.
- [7] G. Paparoidamis, E. Iliopoulos, A. A. Narvani, O. Levy, E. Tsiridis, I. Polyzois, "Posterior shoulder fracture-dislocation: a systematic review of the literature and current aspects of management," *Chin. J. Traumatol.*, vol. 24, no. 1, pp. 18-24, Feb 2021.
- [8] T. Mimura, K. More, Y. Matsusue, N. Tanaka, Y. Nishi, M. Kobayashi, "Closed reduction for traumatic posterior dislocation of the shoulder using the 'lever principle': two case reports and a review of the literature," *J. Orthop. Surg. (Hong Kong)*, vol. 14, no. 3, pp. 336-339, Dec 2006.
- [9] H. C. Backer, S. E. Galle, M. Maniglio, M. P. Rosenwasser, "Biomechanics of posterior shoulder instability – current knowledge and literature review," *World J. Orthop.*, vol. 9, no. 11, pp. 245-254, Nov 2018.
- [10] Z. T. Kokkalis, I. D. Iliopoulos, G. Antoniou, T. Antoniadou, A. F. Mavrogenis, E. Panagiotopoulos, "Posterior shoulder fracture-dislocation: an update with treatment algorithm," *Eur. J. Orthop. Surg. Traumatol.*, vol. 27, no. 3, pp. 285-294, Apr 2017.
- [11] C. M. Robinson, F. Orth, M. Seah, "The epidemiology, risk of recurrence, and functional outcome after an acute traumatic posterior dislocation of the shoulder," *J. Bone Joint Surg. Am.*, vol. 93, no. 17, pp. 1605-1613, Sep 2011.
- [12] M. Kowalsky, W. N. Levine, "Traumatic posterior glenohumeral dislocation: classification, pathoanatomy, diagnosis, and treatment," *Orthop. Clin. North. Am.*, vol. 39, no. 4, pp. 519-533, Oct 2008.
- [13] O. Yesil, T. C. Ozturk, S. E. Cevik, O. Guneyysel, "Which comes first in posterior shoulder dislocation: x-ray or computed tomography?," *J. Acad. Emerg. Med. Case Rep.*, vol. 3, no. 1, pp. 12-14, Jan 2012.
- [14] X. A. Duralde, E. F. Fogle, "The success of closed reduction in acute locked posterior fracture-dislocations of the shoulder," *J. Shoulder Elbow Surg.*, vol. 15, no. 6, pp. 701-706, Oct 2006.
- [15] M. Guehring, S. Lambert, U. Stoeckle, P. Ziegler, "Posterior shoulder dislocation with associated reverse Hill-Sachs lesion: treatment options and functional outcome after a 5-year follow up," *BMC Musculoskelet. Disord.*, vol. 18, no. 442, pp. 1-7, Nov 2017.
- [16] A. Castagna, G. Delle Rose, M. Borroni, N. Markopoulos, M. Conti, L. Maradei, et al., "Modified MacLaughlin procedure in the treatment of neglected posterior dislocation of the shoulder," *Chir. Organi. Mov.*, vol. 93, suppl. L, pp. S1-S5, Apr 2009.