Reconstruction of a Chronic Posterior Dislocation of the Shoulder using a Limited Posterior Deltoid-splitting Approach: A Case Report

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Learning Point of the Article:
Chronic posterior shoulder dislocation is a rare and easily missed injury. Although rarely used, posterior bone block procedure may be a useful procedure for the management of these types of cases. The limited posterior deltoid splitting approach can provide adequate exposure of posterior glenoid. The posterior bone block procedure has provided satisfactory stability both in intraoperative and perioperative period in this case.

Abstract

Introduction: Chronic posterior dislocation is a very rare injury. Various methods have been described for its treatment. This report describes a rare case of post-traumatic chronic posterior dislocation of the shoulder. Posterior bone block procedure performed through a limited posterior deltoid splitting approach was used with good surgical outcomes. The bone block procedure for chronic posterior dislocation is rarely described in the literature.

Case Report: A 30-year-old male presented with complaints of pain on movement of the left shoulder and inability to lift the arm overhead for the past 5 months, following a fall from a moving train on his left shoulder. He had been treated conservatively with no improvement in symptoms. On clinical examination, there was a loss of deltoid contour with painful and restricted abduction and external rotation. The shoulder joint could be reduced by bringing the arm in 90° of abduction in the scapular plane. The anteroposterior radiograph showed a positive light bulb sign and a malunited fracture greater tuberosity. Magnetic resonance imaging revealed a reverse Hill-Sachs lesion with intact rotator cuff. Unlike a classical chronically dislocated joint, the shoulder joint was not stiff in this position. The reduction of the joint was not maintained in the resting position of the limb. Hence, the joint could be reduced intraoperatively, and reduction maintained with a posterior bone block procedure, without any need for further soft-tissue releases. A tricortical iliac crest bone graft was used as the bone block.

Conclusion: Chronic posterior dislocation of the shoulder is a rarely reported entity, which can be easily missed in clinical examination. The limited deltoid splitting approach is a safe approach with excellent exposure of posterior glenoid rim. Posterior bone block procedure is a viable reconstructive option in treating cases of chronic posterior dislocation.

Keywords: Shoulder dislocation, deltoid-splitting approach, chronic dislocation, bone block, case report.

Introduction
Posterior dislocation of the shoulder accounts for 2–5% of all shoulder dislocations [1]. They are more common in injuries related to epileptic fits, electric shock, and substance abuse. Whereas anterior shoulder dislocations are easily diagnosed and treated, posterior shoulder dislocations may sometimes be missed on initial presentation. This is frequently because of inadequate radiographic examination or lack of experience in their interpretation. Chronic posterior dislocation is different from recurrent posterior instability which is more commonly discussed in the literature. Recurrent posterior instability may or may not be associated with trauma and requires completely different management.

Chronic posterior dislocation is a very rare injury. Various methods have been described for the treatment of chronic posterior dislocations, such as arthroplasty [2, 3, 4], posterior glenoid bone block [5, 6, 7], glenoid osteotomy [8], rotational osteotomy of the humerus [9], or transfer of lesser tuberosity.
Treatment may also depend upon the reducibility, amount of bone loss on the humeral head or glenoid, and duration of dislocation. Only a few cases of treatment using posterior bone block in glenoid have been described in literature before. This case report aims to discuss the use of the posterior deltoid splitting approach for posterior glenoid bone block procedure using iliac crest bone graft.

**Case Presentation**

A 30-year-old male, right hand dominant manual laborer presented with pain on movement of the left shoulder and inability to lift the arm overhead for 5 months. He gave a history of fall from a moving train and landing on the front of his left shoulder. The patient was managed conservatively elsewhere as a case of fracture of the greater tuberosity. There was no improvement in shoulder function with time. There were no other medical or surgical comorbidities. He was unable to continue his job as a laborer.

On clinical examination, there was a loss of deltoid contour. Internal rotation was up to 40°, and external rotation was not possible. Abduction was painful and was restricted beyond 90°. The humeral head could be palpated posteriorly in the axilla (Fig. 1). The shoulder joint could be reduced by bringing the arm in 90° of abduction in the scapular plane. Once the joint was reduced, block to external rotation and abduction was gone, and further external rotation up to 30° and abduction to 130° could be achieved. The reduction could not be maintained though, and the joint dislocated again on bringing the arm back to the neutral position. Thus, the joint was in a state of chronic dislocation in neutral position but was reducible.

**Imaging**

The anteroposterior radiograph showed a light bulb-like appearance of the humeral head and a malunited fracture of the greater tuberosity (Fig. 2). The computed tomography scan confirmed a posteriorly dislocated humeral head with no bone loss in the humeral head or glenoid (Fig. 2). A reverse Hill-Sachs lesion was seen on the humerus. Magnetic resonance imaging revealed an intact rotator cuff (Fig. 3).

**Surgical procedure**

The patient was positioned in the lateral position with side supports. Shoulder and the
Rehabilitation

Postoperatively arm was braced for 6 weeks in a shoulder brace in 20° abduction and 20° external rotation. Passive forward elevation of the shoulder was allowed after 1 week. Active exercises were started at 6 weeks and strengthening exercises were started at 3 months.

Follow-up

The patient regained a painless full range of motion after 3 months with no signs of instability. He could get back to his job after 6 months. The patient maintained his functional status at 2 years follow-up and no radiological or functional complications were seen.

Discussion

This patient had chronic posterior dislocation of shoulder with a fracture of the greater tuberosity. But unlike a classical chronically dislocated joint, it was not stiff in this position. The reduction of the joint was possible but was not maintained in the resting position of the limb. Hence, the joint could be reduced intraoperatively, and reduction maintained with a posterior bone block procedure, without any need for further soft-tissue releases. The greater tuberosity fragment had united in an acceptable position and the rotator cuff was found to be intact. There was no bony defect in the glenoid. There was a reverse Hill-Sachs lesion in the humerus, but the reduction was stable without the need to address this lesion. Posterior capsule of the shoulder joint was stretched out and its repair would not be enough to maintain reduction [12]. Bone-block procedure augments the arc of the articular surface of glenoid. This works in a way similar to bone block procedures for anterior shoulder instability by increasing the effective surface of the glenoid [13]. The posterior deltoid splitting approach, which was first described by Wirth in 1993 [14], provides an excellent view of the posterior glenoid neck for placement of the bone block. There is no denervation of the deltoid muscle and it provides an inter-nervous plane between teres minor and infraspinatus muscles. Care must be taken to place the graft flush with the articular surface of glenoid. Intraoperative fluoroscopy is helpful to achieve the correct placement of this graft as the articular surface may not easily be seen with this approach. This technique allows a return to jobs with high demand on the shoulder joint. Problems with this technique may be resorption of the graft and arthritic changes in the joint [12, 15]. At 2 years, this patient had no complications and was back to his work as mechanical labor.

This technique of reconstruction has been reported by only a few authors before in total of nine patients [5, 6, 7]. Aksekili et al. [7] used posterior bone block with iliac crest bone graft in seven patients. At a mean follow-up of 40.6 months, all grafts were found to be incorporated radiologically and good functional outcomes were maintained. In patients with a reverse Hill-Sachs lesion involving more than 20% of the head humeral head bone grafting was also performed. This is the largest reported series on the posterior bone block for chronic posterior shoulder dislocation. This technique has also been used by two other authors with success [5, 6].

Chronic posterior dislocations have also been treated with a modified McLaughlin technique [10, 11], or shoulder arthroplasty [2, 3, 4]. Allograft has also been used in literature for the reconstruction of the humeral head bone defect [7, 16]. These procedures were not considered ideal for this patient as the reduction was stable without addressing the bony defect on the humeral head. A McLaughlin type procedure should work in the setting of a relatively smaller reverse Hill-Sachs lesion. Shoulder arthroplasty or de-rotation osteotomies of humeral

iliac crest were prepared sterile. The posterior approach was used making a straight 8 cm incision starting from a point 3 cm medial to posterolateral acromion extending toward the posterior axillary fold (Fig. 4). Deltoid muscle fibers are split in the line of their direction. Teres minor and infraspinatus muscles were identified and split along their interval. A T-shaped incision was given over thinned out posterior joint capsule and posterior labrum was identified. A 3 cm x 1.5 cm x 1.5 cm tri-cortical iliac crest bone graft was harvested from the ipsilateral iliac crest. The graft is prepared to shape and kept with its surface flush with the posterior articular surface of glenoid. It was fixed with two cannulated 4.5 mm partially threaded cancellous screws, 35 mm and 30 mm, respectively (Fig. 5). The shoulder joint was stable intraoperatively after graft fixation. The posterior capsule was very thin and friable, and it could not be plicated. Fracture in greater tuberosity found to be united. The wound was closed in layers.

Figure 5: Post-operative radiograph showing the placement of bone graft and screws (a). Computed tomogram showing a head centered on the reconstructed glenoid (b).
head should be reserved for patients with a large humeral head defect. In a younger patient needing heavy loading of shoulder joint restorative procedures such as posterior bone block should be considered as the first choice.

Biomechanical studies have shown that even small posterior glenoid bone defects can cause a marked increase in posterior translation of humeral head [8]. This emphasizes the need for bony procedures in case of glenoid defects. Associated injuries such as glenoid erosions, posterior bony Bankart, and reverse hill Sachs lesion should be cautiously looked for. These injuries might give rise to recurrent instability if not treated properly.

Posterior bone block using iliac crest bone graft is an effective technique for the treatment of chronic posterior shoulder dislocation. Although less commonly used, it provides a safe and easy way of joint restoration without any notable complications.

**Conclusion**

Chronic posterior dislocation of the shoulder is a rarely reported entity, which can be easily missed in clinical examination. The limited deltoid splitting approach is a safe approach with excellent exposure of posterior glenoid rim. Posterior bone block procedure is a viable reconstructive option in treating cases of chronic posterior dislocation.

**Clinical Message**

The incision started from a point 3 cm medial to the posterolateral acromion, extending toward the posterior axillary fold. The deltoid muscle was split, teres minor and infraspinatus muscles were identified and split along their interval. A T-shaped incision was given over the posterior joint capsule and posterior labrum was identified. A tricortical iliac crest bone graft was harvested from the ipsilateral iliac crest and fixed with its surface flush with the posterior articular surface of glenoid with two cannulated 4.5 mm partially threaded cancellous screws. Missed chronic posterior shoulder dislocations can be successfully treated with this surgical technique with good results at follow-up.

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