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Treatment of missed posterior dislocation of the shoulder by delayed open reduction and glenoid reconstruction with corticocancellous iliac bone autograft

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Abstract This is a report of a 2-year follow-up of a missed posterior shoulder dislocation treated with open reduction and glenoid reconstruction with corticocancellous iliac bone autograft. In such cases, this treatment option may be an alternative to hemiarthroplasty of the shoulder.

Keywords Posterior shoulder dislocation · Glenoid reconstruction · Delayed treatment

In the literature, the treatment in missed posterior shoulder dislocation is planned according to the impaction fracture of the humerus head that generally occurs simultaneously [1, 2, 3, 4, 5]. We report the case of a patient with posterior instability in missed posterior shoulder dislocation who was treated with open reduction and glenoid reconstruction with a corticocancellous iliac bone autograft.

Introduction

Posterior shoulder dislocations are rare, comprising 5% of all shoulder dislocations [1, 2, 3, 4]. A correct diagnosis on the initial examination requires experience on the part of the surgeon; thus, cases of delayed diagnosis are frequent. In these cases, the risk of subsequent collapse and osteonecrosis of the humeral head is significantly increased. Therefore, the treatment of neglected posterior shoulder dislocations is quite complicated [1, 2, 3, 4]. Although some authors recommend the routine application of a primary prosthesis in cases of delayed diagnosis, reduction is the primary treatment of choice in most cases, and fixation is applied in patients with a fracture [2, 5].

Case report

A 41-year-old male patient presented with complaints of pain and loss of motion in his left shoulder. The patient reported that the severe pain in his left shoulder started 6 months ago when he tried to hold on to some support due to a sudden stopping of the bus. He presented to the emergency department just after the accident. There, he was informed that he had suffered a soft-tissue injury in the left shoulder based on X-ray results and that he should rest while receiving medical treatment. However, since his complaints did not improve, he went to an orthopedic clinic and was prescribed a similar treatment. During the physical examination, the left shoulder of the patient was fixed in internal rotation. Some sort of fullness was present in the posterior shoulder, and the acromion was clearly anterior. No neurovascular problem was present in the left shoulder. In the roentgenographic examination of the anteroposterior shoulder X-ray, no pathology was observed, but posterior shoulder dislocation was present in the axillary view of the left shoulder. Accordingly, CT and three-dimensional (3D) CT were performed on the left shoulder of the patient. In light of the examination results, the diagnosis was confirmed (Fig. 1). After all the examinations were completed, the patient was operated on.

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Surgical technique

A posterior longitudinal incision was made under general anesthesia. Later, the joint capsule was identified between the infraspinatus and teres minor muscles and opened transversely. A reverse Hill-Sachs lesion in the humeral head and the minimal lesion in the glenoid posterior were identified. After release of the soft-tissue contractures, traction was performed while the arm was in adduction, and reduction was achieved by manually lifting the humerus head into the glenoid. Since full stability was not acquired after the reduction, a corticocancellous graft taken from the iliac wing was fixed into the area in the glenoid part with two spongy screw washers. After the stability of the humerus head was checked, the capsule was closed, and all anatomic layers were properly closed.

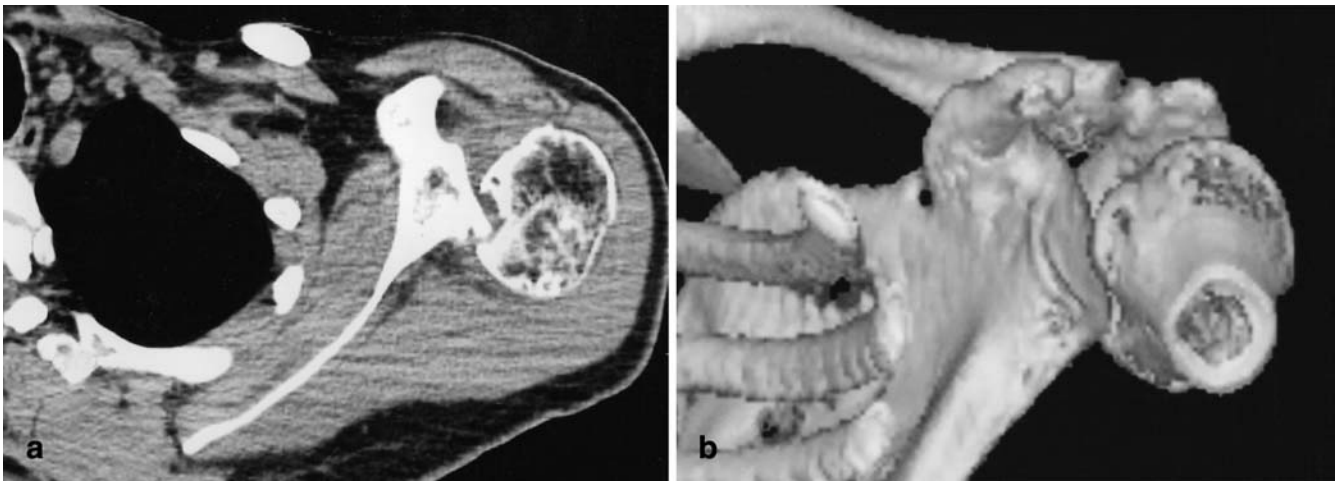


Fig. 1 **a** Axial CT scan made 6 months after the injury. The humeral head fragment is posteriorly dislocated. **b** Preoperative three-dimensional CT image of the patient

Postoperative management

The patient was given a sling, and his left shoulder was immobilized for 3 weeks. On the CT obtained on the first postoperative day, the graft was in the appropriate position (Fig. 2). At the end of 3 weeks of immobilization, the patient underwent postoperative physiotherapy and a rehabilitation program. Physical examination revealed an asymmetry in scapular positioning posteriorly that indicated protection of the scapula and shrugging of the left shoulder during attempted arm evaluation. Soft tissue and skin mobility around the incision area was restricted. The patient reported pressure-type pain in the incision area of his left shoulder at rest, generated all through the shoulder area with activities like exercises during evaluation and/or abduction. He could not sleep on his involved side. The intensity of the pain rose as the activity level increased with upper extremity motions in the initial examination at the end of the 3rd week. The pain intensity score at rest was 5 on the visual analogue scale, and it was 9 during activity.

The active flexion range was 30°, and it was the same for abduction, while there was no active motion in internal and/or external rotation. The standard grading system (0–5) for measuring muscle strength could not be used due to his severe pain, muscle spasm, and dysfunction in the early stage.



Fig. 2 The position of the graft is appropriate on postoperative CT

A modified Lawton's Scale was used to assess his daily activities [6, 7]. The patient needed assistance in all activities requiring hand use such as dressing and self-care activities as well as toilet and transferring activities.

The initial phase of rehabilitation primarily aims at reducing the symptoms. In the first 2–3 weeks, repairing and restoring passive flexion and abduction were the main aim. The rehabilitation program involved cold and/or heat, electrotherapy, massage and manual therapy, and exercises. Interferential current therapy was performed with Endomed 582 ID (Enraf, Nonius Co.) as B3 component (frequency 4000 Hz and amplitude modulation frequency 50 Hz) for vascularization.

Mobilizations for glenohumeral, scapulothoracic, acromioclavicular and sternoclavicular joints to restore normal joint play and functional massage facilitate muscle relaxation in manual therapy. Proprioceptive neuromuscular facilitation techniques were also applied for muscle re-education and maintenance of a range of motion [8]. Active-assisted range of motion was initiated at 6 weeks, and active range of motion began at 8 weeks. Isometric exercises with submaximal contraction were commenced at 10 weeks. Strengthening exercises with small weights and light therrabands for the shoulder girdle muscles were instituted after 12 weeks. The patient was examined monthly and every 2 months, and was given a home exercise program in the follow-up.



Fig. 3 Axial CT scan made 24 months after the procedure. Glenohumeral reduction has been maintained, and there is good incorporation of the graft, and no evidence of osteonecrosis of the humeral head



Fig. 4a-c Shoulder movements of the patient

Follow-up

At the end of a 24-month follow-up period, glenohumeral reduction had been maintained, and there was good incorporation of the graft and no evidence of osteonecrosis of the humeral head on CT (Fig. 3). The Constant Score was 96. Shoulder flexion was as follows: active 150 deg, passive 158 deg, external rotation active 45 deg, passive 50 deg, and the thumb reached as far as the upper thoracic spine (Fig. 4).

Discussion

The diagnosis of posterior shoulder dislocation is difficult and requires experience in these type of conditions; thus, missed posterior shoulder dislocations are frequent. In addition, traumatic posterior shoulder dislocation is accompanied by impression fractures of the humerus head [1, 2, 5, 9, 10, 11, 12, 13, 14].

Many methods have been suggested for the treatment of chronic posterior shoulder dislocation since the first de-

finition by McLaughlin [14]. Michos and Michaelides [4] transferred the subscapularis tendon into the defect in two patients with missed posterior dislocation using the method defined by McLaughlin [14]. In both cases, stabilized and functional shoulder movements were observed after the McLaughlin procedure. Dervin et al. [11] modified the McLaughlin procedure and transferred the subscapularis tendon just medial of the bicipital groove.

Hawkins et al. [2] applied closed reduction, transferring the subscapularis tendon and lesser tuberosity as well as hemiarthroplasty and total shoulder arthroplasty in patients with locked posterior dislocation of the shoulder. With regard to their 40 cases of locked posterior shoulder dislocation, Hawkins et al. [2] reported that an essential feature of the dislocation is an association with an impression fracture of the articular head, as described by McLaughlin. However, Hawkins et al. [2] noted that rarely, in shoulders with a long-standing dislocation, there is extensive erosion of the anterior or, more commonly, the posterior margin of the glenoid fossa, and then a bone graft will help provide an adequate bed for the glenoid component. On the other hand, in these chronic posterior dislocation cases

which involve the glenoid, hemiarthroplasty is generally applied.

Checchia et al. [15] evaluated the surgical treatment of acute and chronic posterior fracture-dislocations of the shoulder and reported good and excellent results in patients treated as late as 2 years after the lesion. They also reported that after 2 years the results tended to be fair. Although they do not recommend total shoulder arthroplasty as a treatment option for inexperienced surgeons, Cheng et al. [16] claim that total shoulder arthroplasty is reliable as it decreased the patients' level of pain, improved the range of motion, and significantly improved the level of function in their own series.

In our chronic posterior shoulder dislocation patient, there was a large reverse Hill-Sachs lesion in the humeral head as stated in the literature [2]. Furthermore, a minimal bony defect was present in the glenoid posterior margin. To achieve stability, which was not provided by open reduction, the glenoid posterior was reconstructed with an iliac bone autograft, and the posterior glenoid surface was enlarged, avoiding posterior dislocation and locking in the reversed humeral head defect.

The anterior approach is widely used in these cases, which is another point to emphasize. This procedure would fail if conducted through the anterior approach, especially in those cases where posterior plication is necessary. However, concerning hemiarthroplasty, it was stated that if necessary, the posterior part of the capsule can be plicated through the anterior approach after the humeral head is osteotomised and before the components are inserted [2].

Another surgical method reported for the treatment of locked posterior dislocation of the shoulder is rotational osteotomy of the shoulder [13, 17]. Keppler et al. emphasized that rotational osteotomy is an effective procedure, particularly in patients with shoulder dislocations with healthy articular cartilage and a humeral head defect involving less than 40% of the articular surface who are able to participate in an active rehabilitation program, because it restores the glenohumeral congruity [17].

Problems associated with the hardware and arthrosis are the most frequently encountered complications of the surgical interventions in patients with missed posterior dislocation of the shoulder [1, 2, 3, 4, 5, 10, 11, 12, 13, 14, 15].

In the preoperative evaluation of chronic posterior shoulder dislocation cases, the general condition and needs of the patient, the size of the impression defect, and the experience of the surgeon are quite significant as well as changes in the glenoid components. If any operation is planned involving the glenoid, the posterior approach may be the most appropriate choice. On the other hand, Cheng et al. [16] described the use of a secondary posterior inci-

sion facilitating the extrication of the humeral head in addition to the primary anterior deltopectoral incision.

In this case we presented, the glenoid was reconstructed with a graft. The functional result of this patient is quite good. In such cases, this treatment option may be an alternative to hemiarthroplasty of the shoulder.

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