

Reconstruction of the articular surface of the humeral head after locked posterior shoulder dislocation: a case report

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Abstract Posterior dislocations of the glenohumeral joint are extremely rare (2–4% of all shoulder dislocations) and often associated with bone or ligamentary injuries. Though the reverse Hill-Sachs lesion is a common injury associated with posterior shoulder dislocation, there have been only few articles describing specific treatments for this type of humeral head defect. This article describes the successful operative treatment of an acute locked posterior shoulder dislocation by reconstructing the articular surface of the humeral head with the use of autologous bone graft taken from the iliac crest. The patient was doing quite well with no complaints, good range of shoulder motion and no recurrence of posterior shoulder dislocation despite several epileptic seizures, 1.5 years after surgical reconstruction of the anatomy of the humeral head. His right shoulder function revealed to be “excellent” or “good”, assessed with an absolute Constant Score of 76 points and a relative Score of 88% when compared with an age- and sex-matched normal population.

Keywords Locked posterior shoulder dislocation · Reverse Hill-Sachs lesion · Redislocation · Operative treatment · Bone grafting

Introduction

Posterior shoulder dislocations are extremely rare and occur in 2–4% of all shoulder dislocations [1, 2, 5, 8, 16,

18, 20, 29]. They usually occur secondary to violent muscle contractions associated with seizures, electric shock or extreme trauma [3, 21, 25].

Typical osseous injuries following shoulder dislocation are the common (reverse) Bankart lesion or (reverse) Hill-Sachs lesion [10, 24, 30]. Untreated, they might lead to the locking of the humeral head behind the glenoid with subsequent posterior redislocation.

Treatment recommendations for posterior dislocations vary and depend on the size of the humeral head defect, the degree of instability, the duration of dislocation and the functional demand of the patient [30]. Surgical options are the elevation and supporting of the defect with cortico-cancellous bone chips [17, 22], as performed in our case, the transfer of the lower tubercle (McLaughlin’s procedure) [24] or the subscapularis tendon (Neer’s modified method) into the defect, subcapital rotational osteotomy (Weber’s procedure) [28, 32, 33] of the proximal humeral head or arthroplasty [4, 17].

Case report

A 42-year-old man suffered from a grand mal seizure while he was taking a walk.

Routine radiographs of the right shoulder (AP and lateral view) revealed no visible joint space. In the lateral view, the humeral head projected behind the glenoid as a sign of posterior shoulder dislocation.

After the images had been obtained, closed reduction followed by traction of the right arm under general anesthesia was performed. While passively moving the shoulder under anesthesia, after internal rotation and subsequent external rotation, it came to a palpable locking of the humeral head with redislocation of the humeral head in the posterior direction. These findings led to the clinical suspicion

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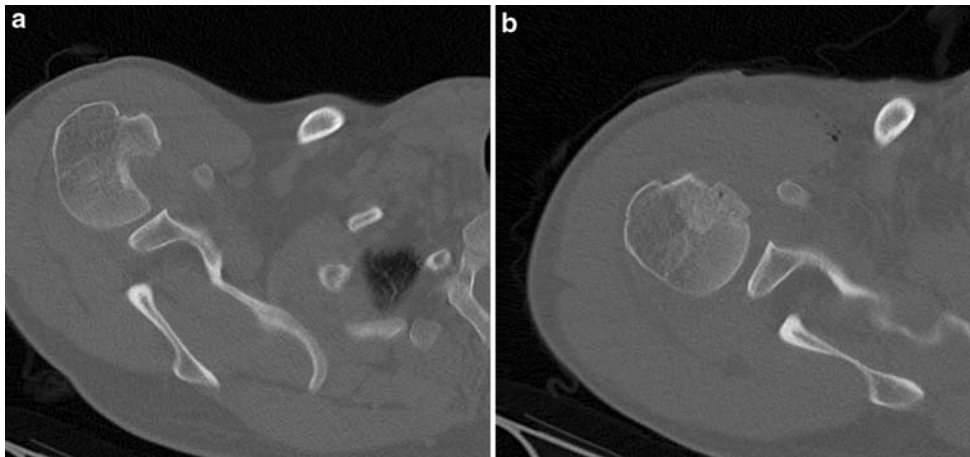


Fig. 1 **a** Preoperative transversal CT scan of the right shoulder. **b** Postoperative transversal CT scan of the right shoulder

of an engaging reverse Hill-Sachs lesion with locking of the humeral head into the posterior rim of the glenoid. To confirm this suspicion, transaxillary in addition to routine radiographs and computed tomography were obtained post-reductionally (Fig. 1a).

The size of this reverse Hill-Sachs defect was measured via the computed tomography scans (Fig. 1a) and was expressed as a percentage of the projected total articular surface according to which it involved 30%.

Because of the instability linked with the huge and engaging reverse Hill-Sachs lesion, the indication for operative treatment was immediately made. Due to the young age of the patient, the decision was taken to reestablish the anatomy of the humeral head by surgery.

Operative technique

The patient was placed in beach-chair position with his right arm in maximal external rotation. The procedure was performed under general anesthesia.

Using a deltopectoral approach, the subscapularis tendon was exposed and the subscapularis tendon was cut through 1 cm medially to its insertion. The anterior glenohumeral capsule was opened by a longitudinal incision to visualize the humeral head and the massive reverse Hill-Sachs lesion (Fig. 2). Just below the latter mentioned lesion, beyond the articular surface, a small osteotomy window was created underneath the insertion of the rotator cuff with the help of a chisel.

After lifting the depressed cartilage by an elevatorium and via the latter mentioned created access, the remaining cancellous defect due to the elevation of the fracture zone was then filled with autogenous bone graft and cancellous bone chips (Fig. 3), which had been taken from the right iliac crest. After reconstruction of the bony anatomy, multiple loosened chondral flakes were refixed with ethipins and

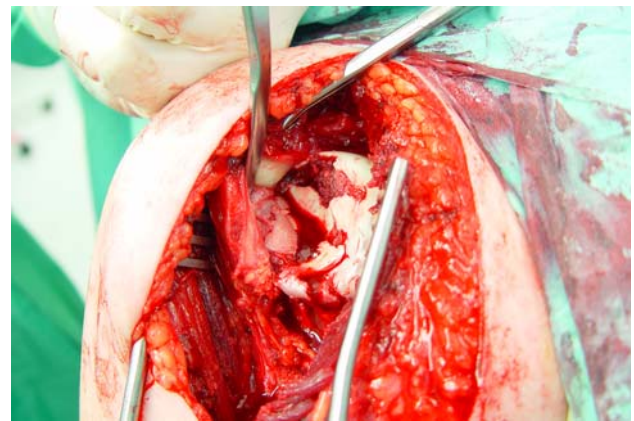


Fig. 2 Intraoperative view of reversed Hill-Sachs lesion prior to reduction

fibrin glue (Fig. 3) and the fracture zone was sealed with fibrin glue as well to restore the cartilage surface.

Finally, the anterior articular capsule was closed and the subscapularis tendon refixed. In the last step, a subcutaneous suture and a skin closure were carried out.

Postoperative treatment

Postoperatively, the right shoulder was immobilized in a shoulder sling in neutral rotation for 3 weeks. Supervised physical therapy with gentle pendulum exercises was promptly started. Six weeks after surgery, free range of shoulder motion was begun. Sports activities were prohibited for 6 months altogether.

Postoperative results

Comparing the pre- (Fig. 1a) and postoperative CT scans (Fig. 1b) of the right glenohumeral joint with each other,

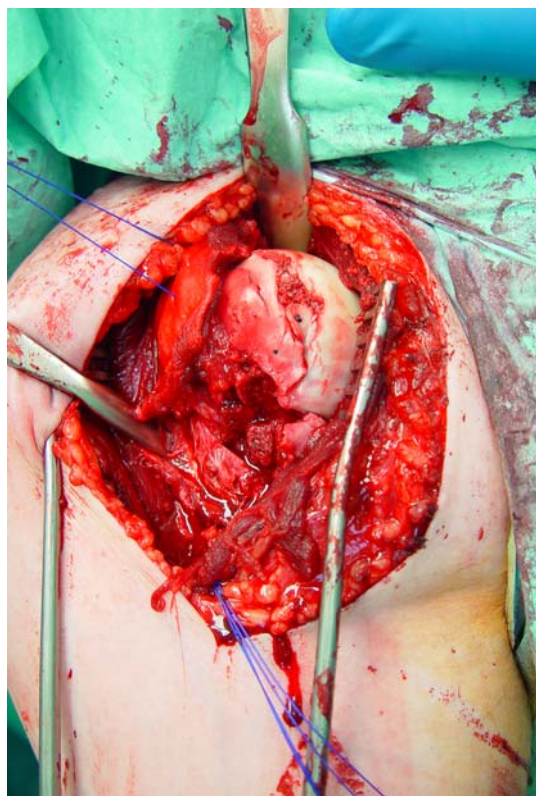


Fig. 3 Reversed Hill-Sachs lesion filled with cancellous bone graft: The multiple loosened chondral flakes are refixed with ethipins and fibrin glue

it becomes obvious that the humeral head whose former defect made up for approximately one-thirds of the total articular surface has regained its full size and shape.

In the 18 months-follow up-examination, the patient had achieved excellent functional results with his right shoulder. The active ranges of motion measured 150° in forward elevation (Fig. 4a) and 150° in abduction (Fig. 4b). The MRI scans obtained 18 months (Fig. 5a, b) after surgery, confirmed the regular contour of the humeral head and the incorporation of the bicortical autogenous bone graft into the former defect zone. Furthermore, the MRI did not visualize any hyaline cartilage lesions at the site of the former reverse Hill-Sachs lesion. When asked for a subjective assessment of his right shoulder function, 18 months after surgery, the patient described it as “good” and reported that he was very satisfied with the results.

At the same time the functional outcome was assessed according to the Constant Score [6, 7, 31]. The absolute Constant Score achieved by our patient was 76 points, while the relative Constant Score as assessed with the scoring system of Constant and Murley was 88% when compared to that of an age- and sex-matched normal population.

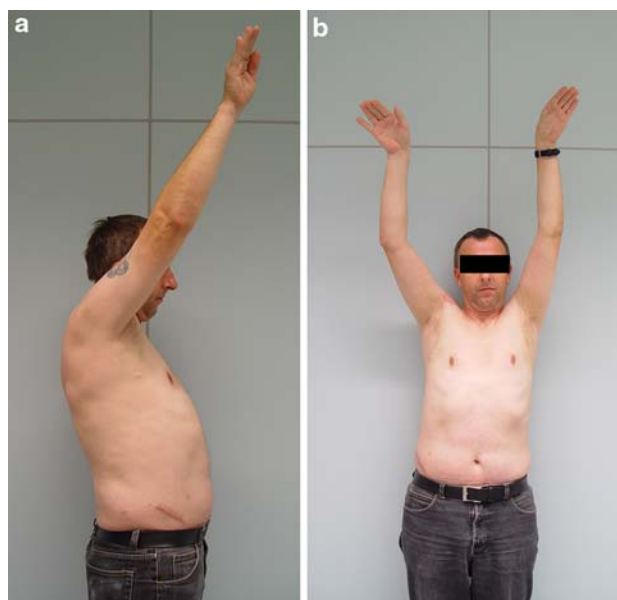


Fig. 4 a Range of motion 18 months postoperatively: forward elevation. b Abduction

Discussion

Although the reverse Hill-Sachs defect is considered to be the main component of recurrent instability in posterior shoulder dislocation, there is no standard accepted treatment of this lesion. Literature has reported an increased recurrent instability rate, postoperative pain, and a significant decrease in functional level after surgical treatment of posterior dislocation when compared to operative treatment of the more commonly seen anterior dislocation [11, 14, 15, 26, 27].

The recognized options for the treatment of locked posterior dislocation of the shoulder are dependent on the size of the anteromedial defect of the humeral head, the degree of instability and the duration of dislocation [13, 30].

McLaughlin [24] recommended the transfer of the subscapularis tendon into the defect to prevent recurrence of glenohumeral instability [13]. Hughes and Neer [19] modified McLaughlin’s subscapularis transfer and transferred the lesser tuberosity with its attached subscapularis tendon into defects ranging in size between 20 and 40% of the articular surface. Many contemporary authors have also recommended Hughes’ and Neer’s procedure for posterior impaction injuries [13]. Hawkins et al. [17] concluded that the transfer of the lesser tuberosity could be recommended if the shoulder had been dislocated for not more than 6 months and if the humerus had a defect of 20–45%. The Literature has also described the subcapital rotational osteotomy of the proximal part of the humerus according to Weber [28, 32]. However, all these operative techniques

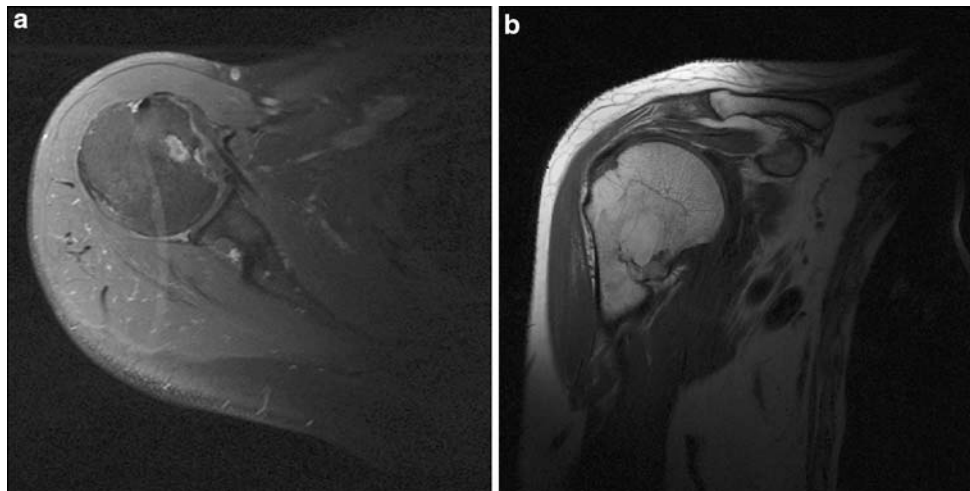


Fig. 5 **a** Transversal MRI scan obtained 18 months after surgery. **b** Sagittal MRI scan obtained 18 months after surgery

alter the humeral joint anatomy. In this way, these skeletal anatomy-changing techniques lead to a limitation of internal rotation and may complicate future prosthetic reconstruction.

For defects involving more than 40% of the articular surface, total arthroplasty or hemiarthroplasty have been considered necessary [4, 12, 17, 19, 23].

In Gerber's and Lambert's study of 1996 [13], excellent long-term results of reconstruction of the humeral head with allogeneic bone in four patients who had a chronic posterior dislocation of the shoulder with an anteromedial defect of the humeral head involving at least 40% of the articular surface had been achieved.

Duralde and Fogle [9] recommend a conservative therapy in patients with acute locked posterior fracture dislocations of the shoulder by closed reduction and immobilization via a shoulder splint in neutral rotation for 6 weeks. They observed near-normal shoulder function in 6 of 7 patients with former humeral head defects ranging from 18 to 32% of the articular surface. However, we decided for an operative treatment for the following reasons.

Due to the fact that the posterior dislocation was accompanied by a large engaging defect of the humeral head, a high extent of instability could be observed. To avoid redislocations, it becomes necessary to maintain the arm in 10° to 20° of external rotation. A conservative treatment as described by Duralde and Fogle would render this extremely difficult. The shoulder function of our patient, 18 months after surgery with an absolute Constant Score of 76 points and a relative score of 88% adapted to gender and age in decades is to be graded as "excellent" or "good".

Taking these results, the above-mentioned studies, and the disadvantages of alternative surgical techniques into consideration, the use of cortico-cancellous grafts to fill Hill-Sachs defects not larger than 40% of the articular sur-

face seems to be a very effective treatment. Our case led to good functional results with hardly any limitation of motion and no recurrence of shoulder instability despite several postoperative grand mal seizures.

Conclusion

Even patients with large reversed Hill-Sachs lesions can be successfully treated with bone grafting. In contrast to other techniques, the anatomy of the humeral head is restored, which may be advantageous for shoulder function and for possible later surgical procedures.

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