Treatment of Locked Posterior Shoulder Dislocation With Bone Defect

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Abstract

Locked posterior shoulder dislocation is an uncommon condition and is associated with a reverse Hill-Sachs lesion in 50% of cases. The condition is likely to occur in cases of violent trauma, seizures, or electric shock. Unrecognized dislocation with humeral head fracture affects joint function and humeral head vascularity and may lead to chronic instability, osteonecrosis, and osteoarthritis. A group of 12 patients, including 10 men and 2 women, with neglected locked posterior shoulder dislocation with a reverse Hill-Sachs lesion were treated with the modified McLaughlin technique. The added bone graft from the iliac crest was impacted in the defect and fixed with screws. Mean follow-up was 30 months (range, 24-48 months). The range of forward flexion was 150° to 175° (average, 165°), external rotation ranged from 60° to 80° (average, 75°), internal rotation ranged from 40° to 60° (average, 50°), and average abduction was 150° (range, 145°-160°). The modified University of California Los Angeles (UCLA) scoring system was used for postoperative clinical evaluation. Total UCLA scores immediately postoperatively ranged from 22 to 28 points (average, 26.5 points) and averaged 30 points (range, 28-33 points) at last follow-up. No recurrence of dislocation occurred during the follow-up period. Of the study patients, 10 returned to their previous job and 2 modified their manual work. The modified McLaughlin technique with added iliac crest bone graft to fill the defect and prevent humeral head deformity is a successful technique for the treatment of patients with chronic locked posterior shoulder dislocation. [Orthopedics. 2017; 40(3):e501-e505.]

Posterior shoulder dislocation is rare, and in most cases, it occurs secondary to violent trauma, seizures, or electric shock. Approximately 50% of these dislocations are associated with reverse Hill-Sachs lesions. Hill and Sachs described the lesion in an anterior shoulder dislocation caused by engagement of the humeral head into the glenoid edge and located posteroinferiorly in the head. A reverse Hill-Sachs lesion, which is an impaction fracture of the anteromedial aspect of the humeral head, may be overlooked in up to 60% of cases.

Delay in diagnosis may be caused by late presentation of patients, associated humeral fractures in elderly patients, failure to recognize the lesion, and inadequate imaging. Unrecognized dislocation with humeral head fracture affects joint function and humeral head vascularity, which may lead to chronic instability, osteonecrosis, and osteoarthritis. Anatomically, posterior shoulder dislocations are classified according to the position of the humeral head after the dislocation. The commonly used classification is based on the time elapsed between the dislocation and the diagnosis. The condition is considered acute when it is diagnosed less than 6 weeks after the dislocation and chronic when it is diagnosed more than 6 weeks after the injury.

Another factor that affects decision making is the size of the humeral head impression fracture. Different surgical options have been described, including the technique proposed by McLaughlin. The authors are from the Orthopedic Surgery Department, Zagazig University, Zagazig, Sharkya, Egypt. The authors have no relevant financial relationships to disclose. Correspondence should be addressed to: Yousuf M. Khira, MD, Orthopedic Surgery Department, Zagazig University, Zagazig, Sharkya 44519, Egypt (yousufmkk@gmail.com). Received: September 5, 2016; Accepted: February 7, 2017. doi: 10.3928/01477447-20170308-07
and rotational osteotomy of the proximal humeral head. Other procedures include either autogenic or allogenic cancellous bone graft and arthroplasty. This study reports the results of open reduction and humeral head defect reconstruction with the Hawkins et al modification of the McLaughlin technique via transference of the subscapularis muscle attachment with the lesser tuberosity augmented by bone graft from the iliac crest fixed with screws.

**Materials and Methods**

This prospective study was conducted at Zagazig University Hospitals after approval of the ethical committee for research was obtained, in accordance with the ethical standards of the 1964 Declaration of Helsinki and its later amendments.

At the study institution, 12 patients with neglected locked posterior shoulder dislocation and a reverse Hill-Sachs lesion were treated between May 2011 and November 2015. Mean patient age was 26 years (range, 22-36 years). The study group included 10 men and 2 women. The right shoulder was affected in 9 patients, and the left shoulder was affected in 3. All patients reported pain with limited external rotation. The cause of trauma was a fall from height for 5 patients; sports injury for 4 patients, epileptic seizure for 2 patients, and electric shock for 1 patient. Time between dislocation and diagnosis ranged from 4 weeks to 3 months, with a mean of 8 weeks. Of the patients, 4 had an arm sling and had received medical treatment; 5 had undergone physical therapy for a primary diagnosis of frozen shoulder; and 3 had a delay in seeking medical care. Mean follow-up was 30 months (range, 24-48 months).

All patients underwent preoperative physical and neurologic clinical evaluation. Of the 12 patients, 2 had an axillary nerve injury. Average forward flexion was 70° (range, 60°-90°). External rotation was limited (wherein the arm is internally rotated and locked in this position and external rotation from position 0 is not allowed), and average internal rotation was 25° (range, 20°-30°). All patients underwent preoperative plain shoulder radiographs (anteroposterior, axillary, and scapular views) as well as preoperative and postoperative computed tomography scans. The mean size of the reverse Hill-Sachs lesion was 40% from the humeral head (range, 30%-45%) (Figure 1).

**Surgical Technique**

All patients underwent surgery under general anesthesia in the beach chair position with the operated side hanging outside the operative table to obtain full arm extension. The deltopectoral approach was used in all cases. After the lower fibers of the pectoralis major were released to expose to the inferior aspect of the subscapularis muscle attachment with the lesser tuberosity augmented by bone graft from the iliac crest fixed with screws.
tion of the dislocation was achieved with lateral distraction and external rotation. Then the debris in the joint was debrided. The defect was reconstructed with a bone graft from the iliac crest covered by the lesser tuberosity. The attached subscapularis was fixed with 2 cannulated screws measuring 4 mm (Figure 2). Under fluoroscopy, the stability of the shoulder was evaluated intraoperatively for range of motion in all directions. The wound was closed in layers over the suction drain. Immobilization of the shoulder was achieved with a pouch arm sling in 30° abduction and neutral rotation for 6 weeks. From 2 weeks to 1 month, patients were allowed only passive external rotation exercises without internal rotation. From 6 to 12 weeks, physical therapy was initiated, including passive, active assisted, and progressively active range of motion and exercises to strengthen the rotator cuff. Postoperative function was evaluated with the modified University of California Los Angeles (UCLA) scoring system.

RESULTS

Clinically, functional outcome was evaluated according to the modified UCLA scoring system. Total postoperative UCLA scores ranged from 22 to 28 points (average, 26.5 points), and scores averaged 30 points (range, 28-33 points) at last follow-up. Six patients had excellent results (range, 30-35 points). These patients had a stable shoulder with no pain and near-normal range of motion. They could perform daily activities such as lifting, pushing, and throwing. Four patients had good functional outcome (range, 26-30 points). These patients had a stable shoulder with mild discomfort, but showed no need for medication. They had elevation and internal or external rotation of up to 75% of the normal side and mild to moderate limitation of daily activities and sports. Two patients had fair results, and they had epileptic seizures and moderate joint stiffness (21-25 points). Those patients had moderate pain and needed occasional medication. They had approximately 50% capability of elevation, overhead activity, and lifting. Moderate instability with positive apprehension of the arm in the extended position also was observed. Internal or external rotation was limited to 50% of the normal side. No recurrence of dislocation occurred during the follow-up period. In terms of employment, 10 patients returned to their previous job and 2 modified their manual work. Range of motion was improved at final follow-up. Forward flexion ranged from 150° to 175° (average, 165°), external rotation ranged from 60° to 80° (average, 75°), internal rotation ranged from 40° to 60° (average, 50°), and average abduction was 150° (range, 145°-160°) (Figures 3-4). Average time to union and incorporation of the bone of the defect was 12 weeks (range, 10-16 weeks).

DISCUSSION

Locked posterior shoulder dislocation is usually overlooked and is associated with a humeral head impression fracture. The injury is uncommon, and anteroposterior plain radiographs of the shoulder cannot provide a clear diagnosis. Lack of correct diagnosis and clinical examination can lead to delay in treatment. An axillary view and computed tomography scan with 3-dimensional reconstruction can lead to the diagnosis of fracture of the humeral head and additional fractures. Treatment differs according to the defect size and its percentage from the humeral head, degree of instability, and time elapsed since the injury. Hawkins et al modified the McLaughlin technique for subscapularis tendon transfer by including the lesser tuberosity with the tendon of the subscapularis muscle.
and fixing it with a screw to fill the defect in the humeral head. The current study found that the defect in the humeral head was larger than the lesser tuberosity. An iliac crest graft was obtained and impacted below the lesser tuberosity to reshape the humeral head and avoid deformity. Studies have reported screw breakage or loosening as hardware problems,\textsuperscript{17,18} and some authors have recommended the use of nonabsorbable sutures instead of screws.\textsuperscript{19}

In the current study, fixation with screws was effective and avoided hardware problems. Patients had close follow-up, and full activity was not allowed until radiologic union of the transferred lesser tuberosity was achieved. In addition, the cancellous bone from the iliac crest with good impaction aided in bony union and consolidation. None of the patients needed screw extraction.

Limitations

Limitations of this study include the small number of patients and the short follow-up period. The findings are comparable to those of other studies that used the modification of subscapularis tendon transfer with the addition of the bony lesser tuberosity. Results were fair for 2 patients who had epileptic seizures and moderate joint stiffness.

Conclusion

The modified McLaughlin\textsuperscript{9} technique with added iliac crest bone graft to fill the defect and prevent humeral head deformity was used successfully for the treatment of patients with chronic locked posterior shoulder dislocation. Bone consolidation and union occurred in all cases, and none of the patients needed removal of hardware. No recurrent instability was detected during the follow-up period. The study was limited by the small number of cases and the relatively short follow-up period.

References