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Clinical case

Acute bilateral posterior dislocation of the shoulder: One-stage reconstruction of both humeral heads with cancellous autograft and cartilage preservation

Luxation glénohumérale postérieure aiguë traumatique bilatérale: reconstruction chirurgicale précoce avec conservation du cartilage et autogreffe cortico-spongieuse

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Abstract

We present a case of bilateral posterior shoulder dislocation after an epileptic seizure. The anterior humeral-head impression fracture was 60% of the articular surface on the right shoulder and 30% on the left shoulder. We performed an early one-stage reconstruction of both humeral heads. A cancellous autograft was used on the left side and an iliac cortico-cancellous autograft on the right side, with preservation of the patient's cartilage. Three years later, the clinical and morphological results were excellent. The discussion focuses on surgical options that range from conservative treatment with excision of the damaged cartilage to immediate hemiarthroplasty. This case is original because of the preservation of the patient's cartilage during reconstruction.

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Keywords: Shoulder; Dislocation; Posterior; Acute; Reconstruction; Autograft; Preservation; Cartilage

Résumé

Les auteurs rapportent un cas de luxation bilatérale glénohumérale secondaire à une crise convulsive. Une reconstruction de la tête humérale par conservation du cartilage natif soutenu par autogreffe iliaque réalisée précocement a permis d'obtenir un résultat clinique et morphologique excellent à trois ans de recul. La discussion porte essentiellement sur les options décrites dans la littérature qui vont du traitement conservateur avec sacrifice du cartilage natif endommagé au remplacement prothétique d'emblée. L'originalité de ce cas repose sur la reconstruction avec conservation du cartilage natif.

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Mots clés : Épaule ; Luxation ; Postérieure ; Aiguë ; Reconstruction ; Autogreffe ; Préservation ; Cartilage

1. Introduction

Whereas anterior shoulder dislocation is the most common of all joint dislocations, posterior shoulder dislocation is rare

(accounting for less than 2% of shoulder dislocations) [1–4]. A late diagnosis frequently occurs due to limited awareness of symptoms, which are less obvious than with anterior dislocations.

Bilateral posterior dislocation is exceedingly rare. In the few reported cases, various treatment combinations were used, including autograft reconstruction, allograft reconstruction and unilateral or bilateral hemiarthroplasty [1–7]. We found few reports of treatment that preserved the patient's cartilage. Gerber reported a case of acute posterior dislocation with an

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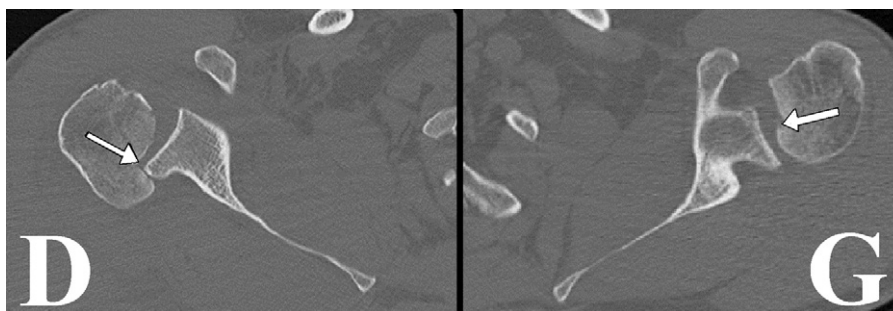


Fig. 1. Preoperative computed tomography of both shoulders. Anterior impression defects (McLaughlin fracture or reverse Hill-Sachs lesion) are visible on both humeral heads. The percentage size of the humeral impression fracture is 30% for the left side and 60% for the right side.

impression fracture treated by elevation of the cartilage and filling the bone defect with cancellous autograft [8]. Modi et al. also reported a unilateral case of humeral head reconstruction preserving the native cartilage. The defect was filled with tricalcium phosphate bone graft substitute [9].

We present a case of acute bilateral posterior dislocation treated by one-stage reconstruction using a cancellous autograft on the left side and an iliac cortico-cancellous autograft on the right side with preservation of the patient's cartilage.

2. Case report

A 46-year-old right-handed man with epilepsy experienced a generalized seizure, which was immediately treated with intravenous antiepileptic drugs. Within a few hours after resolution of the seizure, the patient complained of pain and functional impairment in both shoulders. The physical examination showed that both arms were held in adduction and medial rotation. Lateral rotation was completely abolished. The neurological and vascular examination was normal. Standard anteroposterior, lateral, and axillary x-ray showed posterior dislocation of both shoulders. A computed tomography (CT) of both shoulders was performed in emergency (Fig. 1). On the left shoulder, an anterior impression fracture involving about 30% of the cartilage surface was visible. On the right side, the CT revealed a posterior dislocation of the shoulder with an anterior impression fracture affecting about 60% of the cartilage surface. The posterior glenoid rim was intact on both sides.

First the epilepsy was treated by the neurologists. Then, we performed a one-stage autograft reconstruction of both humeral heads, using autograft with preservation of the patient's cartilage. The procedure was performed within 24 hours under general anesthesia with the patient in the beach-chair position. The deltopectoral approach was used on both sides. Before opening the joint, we carefully divided the subscapularis muscle vertically, at about 2.5 cm from the humeral insertion to facilitate repair at the end of the procedure. On both sides, the impression fracture was gently elevated using a spatula, while maintaining physical continuity with the rest of the articular surface. The defects under the reduced surfaces were filled with autografts. The autograft was solely cancellous bone for the left shoulder. For the right shoulder, the defect was filled with

cancellous bone and a tricortical wedge from the iliac crest. Careful contouring of the grafts ensured excellent primary stability after press-fit implantation. Then, each reduced surface was fixed using two headless cannulated screws (CHOC, Montauban, France) buried into the cartilage (Fig. 2).

Both shoulders were immobilized in neutral rotation for six weeks after which the patient started an intensive rehabilitation program.

After 3 years, the patient resumed former occupational and sports activities. He reported no pain or instability. Motion range was similar on both sides: abduction, 90°; flexion, 170°; lateral rotation, 30°; and medial rotation to L4. The Constant score was 88/100 for the left shoulder and 84/100 for the right shoulder [10]. CT showed consolidation with autograft incorporation and an appropriate position of the screws on both sides. The humeral heads were spherical and there was no sign of osteonecrosis, osteoarthritis nor subluxation (Fig. 3).

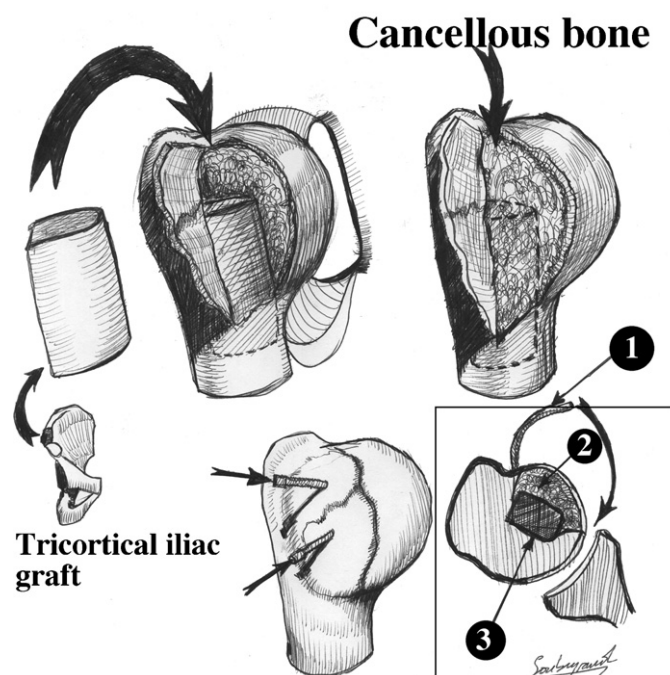


Fig. 2. The previously impressed cartilage surface is now continuous with the rest of the humeral head. Tricortical wedge from the ipsilateral iliac crest. Tricortical wedge implanted into the defect.

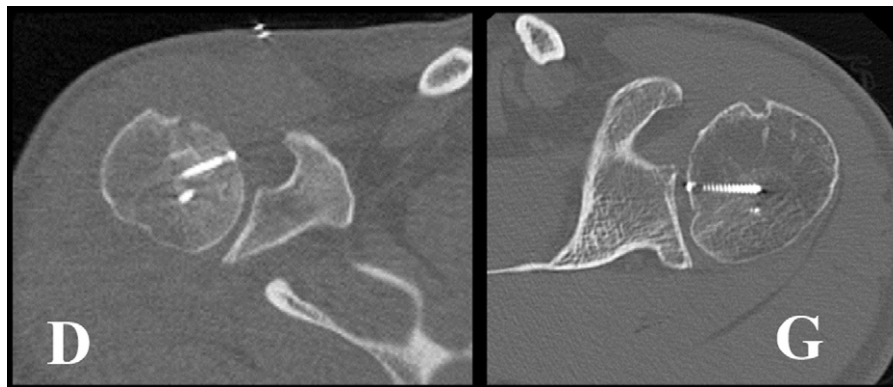


Fig. 3. Computed tomography 3 years after surgical reconstruction. The fractures are consolidated and the autografts are incorporated with screws in the appropriate position. Both humeral heads are spherical without any sign of osteonecrosis, osteoarthritis nor subluxation.

3. Discussion

Posterior dislocations of the shoulder are rare and frequently misdiagnosed [11,12]. The main causes are seizures and high-energy indirect trauma to the shoulder in medial rotation. During seizures, posterior dislocation is caused by violent contraction of the medial rotator muscles (latissimus dorsi, teres major, pectoralis major, and subscapularis), which are stronger than the lateral rotators (teres minor and infraspinatus) [11,12].

CT is the most accurate imaging technique to assess bone damage. There is always an impression defect in the anteromedial portion of the humeral head (McLaughlin fracture or reverse Hill-Sachs lesion), often with a defect in the glenoid [1,2].

Surgery was mandatory for our patient given the size of the defect on both humeral heads. In previously reported cases, the impression defect was usually treated by hemiarthroplasty or by reconstruction confined to the impressed surface. Hemiarthroplasty is usually recommended when the impression defect is larger than 50% [4–6,13]. Humeral head reconstruction can be achieved by filling the defect with the subscapularis tendon (with or without the lesser tuberosity) [2,13] or with a piece of femoral-head allograft [7]. For patients with bilateral dislocation, one side can be treated with hemiarthroplasty and a piece of the resected humeral head used to reconstruct the other side [4,14]. Humeral derotational osteotomy has been suggested to prevent the humeral-head impression from contacting the glenoid at any point of the shoulder motion [15].

Several treatment decisions had to be made regarding the right shoulder of our patient. The first was to decide whether hemiarthroplasty was required and the second, if reconstruction was chosen instead, whether the impressed cartilage should be preserved. Our decision to perform reconstruction with cartilage preservation on both sides was made for several reasons: surgery was performed early, the patient was young, and he did not present any risk factor of impaired healing or osteonecrosis (e.g. diabetes mellitus, smoking, alcohol abuse, or hematological disease). The risk of persistent posterior instability and humeral head necrosis increases with the size of

the impression defect. For our patient, the defect was larger on the right side (60%) than on the left (30%). In consequence, a tricortical graft was used for the right shoulder, while the left shoulder was filled with cancellous bone only. For impression fracture exceeding 50% of the articular surface, hemiarthroplasty is usually recommended. The very good clinical and morphological results obtained for the right shoulder encourage the possibility of conservative surgery in severe lesions. Nevertheless one should keep in mind that this technique of reconstruction cannot be performed if the cartilage is severely damaged or comminuted. Therefore, a unipolar prosthesis must be available in the operation room.

4. Conclusion

Bilateral posterior dislocation of the shoulder is exceedingly rare. When performed early, conservative reconstruction of the humeral head is possible even when the defect is larger than 50%. Furthermore, if reconstruction fails, the anatomic conditions for secondary hemiarthroplasty are favorable.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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