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Allograft reconstruction of segmental defects of the humeral head associated with posterior dislocations of the shoulder

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Summary Six men underwent operative management of defects of the humeral head involving at least 40% of the articular surface, following posterior dislocation of the humeral head. The cause of dislocation was a grand mal seizure in three and a fall in three cases. In five cases the dislocation was reduced under general anaesthesia, and in all the posterior dislocation recurred early. Time between dislocation and surgery ranged from 7 to 8 weeks. The defect in the head, revealed by CT, was filled with an allogeneic segment of humeral head contoured to restore the spherical shape. All the patients returned to their occupation 4 months later. The mean duration of follow-up was 62.6 (60—68) months. At discharge, four of the men had no complaints of pain, instability, clicking or catching; two had pain, clicking, catching and stiffness. Radiographs and CT revealed no failures of fixation or of incorporation of the allograft. In four cases the contour and volume of the graft were maintained, but in the two with a bad clinical result, flattening and collapse of the graft and osteoarthrosis were observed. If the procedure fails, prosthetic reconstruction should be simple because the skeletal anatomy has not been distorted.

Introduction

Posterior fracture-dislocations are rare, approximately 60% are missed initially[4—6] and almost 50% are associated with fractures of the surgical neck of the humerus. Treatment has been based on the size of the articular defect. Transfer of the lesser tuberosity with its attached subscapularis tendon into the defect of the humeral head has been recommended for posterior impaction injuries involving as much as 30 or 40% of the humeral head,[4] but this procedure alters the skeletal anatomy of the proximal part of the humerus and can limit internal rotation and complicate future prosthetic reconstruction.

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For defects involving more than 40% of the articular surface, the treatment of choice is hemiarthroplasty.[2] Osteochondral allografting of humeral head defects that involve 40% of the articular surface has been successfully used in chronic locked posterior[3,2] and anterior[7] dislocations. To our knowledge the largest published series is that of Gerber and Lambert,[3] who reported good results in three cases and a bad result in one case where avascular necrosis of the humeral head developed. Later, Gerber reported[2] a series of nine people treated with the same method; the result was good in seven cases and bad in two.

The purpose of this paper is to report the long-term results of reconstruction of the humeral head with allogeneic bone for six people who had a posterior dislocation of the shoulder with an anteromedial defect of the humeral head involving at least 40% of the articular surface.

Materials and methods

Between 1998 and 2002, six men underwent operative management of defects of the humeral head that involved at least 40% of the articular surface, following posterior dislocation of the humeral head. None of the men had a previous history of shoulder disorder. The cause of the dislocation was a grand mal seizure in three cases and a fall in three cases. For five patients the dislocation was reduced under general anaesthesia. CT was performed after reduction to evaluate the lesion in the humeral head. The arm was immobilised in a sling in neutral rotation for 4 weeks and, after this, rehabilitation was started. In all cases the posterior dislocation recurred early, during the 3 weeks following the start of rehabilitation. The sixth man presented 6 weeks after a fall onto the left shoulder, and radiographs revealed a posterior fracture-dislocation of the shoulder. CT showed that in all cases between 40 and 50% of the articular surface had been affected.

The period of time between dislocation and surgery ranged from 7 to 8 weeks. Surgery was performed using a deltopectoral approach. The defect of the head was filled with a frozen allogeneic segment of humeral head contoured to restore the spherical shape, and was fixed with three or four Herbert screws; one 4-mm cancellous screw was added in one case (Fig. 1). The anterior capsule and subscapularis were repaired in their anatomical positions. The arm was kept at the side, in neutral rotation, for 4 weeks. Passive and active ranges of motion were started from 4 to 6 weeks following surgery, respectively.

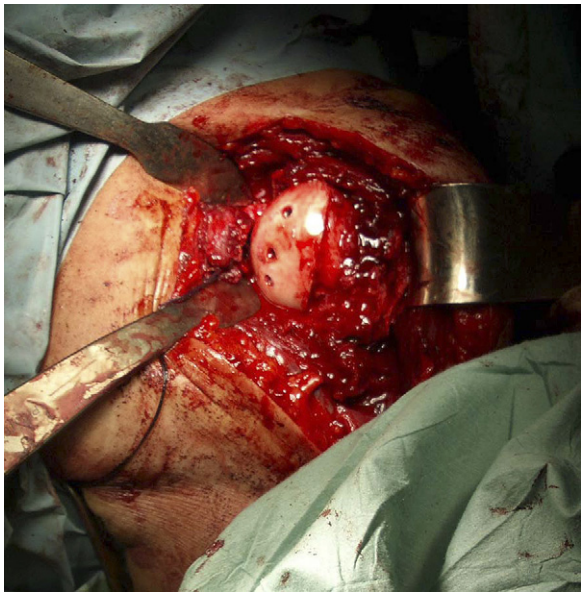

Figure 1 Intraoperative photograph showing filling of the defect with allograft.

Results

We had no early or late infections, non-unions at the graft-host junction or joint instability. All the men returned to their occupation 4 months after surgery. All the cases were evaluated at a mean of 62.6 (60–68) months after the operative procedure, using the Constant and Murley score, and all were assessed clinically and also by plain radiography and CT. Four men had no complaints of pain, instability, clicking

Table 1 Range of motion and Constant score at final follow-up examinations

Patient	Age (years)	Follow-up (months)	Forward elevation (°)	Lateral elevation	External rotation	Internal rotation	Constant score
1	34	60	160	160	90	90	100
2	36	62	170	160	90	90	100
3	29	64	140	140	80	80	90
4	33	68	160	140	90	80	96
5	28	62	80	80	50	50	40
6	30	60	80	75	55	55	45