



Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en



Original article

Reverse shoulder arthroplasty with glenoid bone grafting for anterior glenoid rim fracture associated with glenohumeral dislocation and proximal humerus fracture

R. Garofalo^{a,*}, F. Brody^b, A. Castagna^c, E. Ceccarelli^c, S.G. Krishnan^b

^a Shoulder Service, F. Miulli Hospital, Acquaviva delle fonti, Km 4 strada per Santeramo, 70026 BA, Italy

^b The Shoulder Center Baylor, University Medical Center, Dallas, USA

^c Shoulder and Elbow Unit IRCCS, Humanitas Institute, Milan, Italy

ARTICLE INFO

Article history:

Received 22 March 2016

Accepted 16 September 2016

Keywords:

Bone graft
Reverse
Shoulder arthroplasty
Glenoid
Fracture
Dislocation

ABSTRACT

Background: Large fractures of the anterior glenoid rim can result in persisting instability and osteoarthritis of the glenohumeral joint. When this fracture is associated with a glenohumeral dislocation and proximal humerus fracture could be a concern. The goal of this paper was to evaluate the clinical and radiological outcomes and complications of reverse shoulder arthroplasty (RSA) and glenoid bone graft in cases with a significant anterior glenoid fracture associated with a proximal humerus fracture.

Hypothesis: RSA and step bone graft harvested from proximal humeral head could be a viable option in the treatment of this complex injury.

Design: Retrospective case series.

Material and methods: Twenty-six patients underwent RSA and glenoid bone graft in a single stage procedure were evaluated at an average 32 months postoperatively. There were 18 women and 8 men with a mean age of 68.5 years (range 63–75 years). Reverse shoulder arthroplasty with a contoured glenoid bone graft placed underneath the baseplate using humeral head autograft was utilized in all cases. Clinical outcomes were evaluated with range of motion, Constant score and self-reported subjective outcome rated as excellent, good, fair or poor. Radiographic evaluation was performed to evaluate for baseplate displacement or loosening, bone graft union, resorption or collapse.

Results: At final follow-up, average active elevation was 135° (range 110°–145°), abduction 122° (range 60°–160°), and external rotation 30° (range 0 to 45°). The mean Constant score was 68.2 (range 54–83). The clinical results were rated as excellent by 15 patients, good by 9, and fair by 2. Radiographic evaluation showed the disc of cancellous bone graft healed without any signs of graft resorption or migration in all 26 cases. No reoperation was performed on any patient in this series.

Discussion/Conclusion: RSA with glenoid bone grafting produces satisfactory short-term outcomes with acceptable complication rates for treatment of patients greater than 60 years old with proximal humerus fractures associated with an anterior glenoid rim fracture. Further studies are necessary to determine the extended viability of this procedure.

Level of evidence: III.

© 2016 Elsevier Masson SAS. All rights reserved.

1. Introduction

It is generally accepted that large fractures of the anterior glenoid rim can result in persisting instability and osteoarthritis of the glenohumeral joint [1,2]. Maquiera et al. showed that patients with a large (more than 5 mm) and displaced more than

2 mm, antero-inferior glenoid rim fractures could obtain satisfactory results with conservative management if post-reduction radiographs demonstrated a concentrically reduced glenohumeral joint [3]. On the other hand, Rowe and Zarins reported a greater incidence of recurrent instability or secondary osteoarthritis in patients with glenoid rim fractures associated with proximal humerus fracture [4].

There are two particular clinical situations in whom the treatment of an anterior glenoid fracture associated with an anterior shoulder dislocation could be very difficult. These two situations are the association with a complex proximal humerus fracture (PHF) or

* Corresponding author. Tel.: +00393286516796.
E-mail address: raffaegarofalo@gmail.com (R. Garofalo).

with a two-part fracture in patients with a long history of degenerative rotator cuff tear.

The treatment of displaced PHF, particularly in elderly patients can be very challenging. Open reduction and internal fixation series reported a higher risk of potential complications including loss of reduction/malunion, nonunion, and osteonecrosis [5]. Furthermore, many patients after 65 years old had a degenerative long-standing rotator cuff tear that typically start to decompensate after a PHF, or after a shoulder dislocation.

Hemiarthroplasty (HA) has been considered the standard of care for complex PHF, particularly in patients younger than 70 years. Nevertheless, HA for fracture remains a challenging procedure with unpredictable functional outcomes; furthermore, persistent anterior instability in case of associated anterior glenoid rim fracture could be a concern.

In case of patients with a history of degenerative well compensated rotator cuff tear, who presented a two part fracture (involving the greater tuberosity), an isolated treatment of glenoid rim fracture and greater tuberosity fixation, cannot restore a functional shoulder joint.

Recently, reverse shoulder arthroplasty (RSA) has emerged as an alternative option for the treatment of acute, comminuted proximal humeral fractures in elderly patients [6–9]. RSA has been also considered the gold standard in the treatment of patients with a non functional shoulder related to degenerative, not repairable rotator cuff tear [10–12]. A commonly cited contraindication to RSA is a significant glenoid defect resulting in inadequate bone stock for glenoid component fixation [13]. Anterior glenoid fracture associated with an anterior shoulder dislocation and instability could potentially reduce the glenoid bone stock, and as a result RSA could be contraindicated because of a possible failure of glenoid component fixation.

The goal of this paper is to report a series of patients who underwent a primary RSA because of a significant anterior glenoid fracture associated with a proximal humerus fracture. Cancellous humeral head autograft was used to match the anterior glenoid defect. Clinical and radiographic follow-up at an average of 32 months is reported. The hypothesis is that this surgical technique could be a viable option in the treatment of this complex injury.

2. Materials and methods

From January 2008 and March 2012, 26 consecutive patients underwent RSA and glenoid bone graft in a single stage procedure. There were 18 women and 8 men with a mean age of 68.5 years (range 63–75 years). Patients presented with either a 3 or 4-part proximal humerus fracture, or with a two part fracture associated with a head splitting, or a two part proximal fracture involving the greater tuberosity associated with an history of painful shoulder related to a degenerative long-standing rotator cuff tear. All the patients sustained a traumatic anterior shoulder dislocation associated with an anterior glenoid rim fracture. For diagnostic evaluation, plain radiographs and non-contrast CT scan with 3D reconstructions were obtained in all the patients. Imaging revealed an anterior-inferior fracture of the glenoid comprising greater than 22% of the anteroposterior length of the glenoid as compared with controlateral uninjured side. CT scan was also useful to evaluate the fatty infiltration of the subscapularis and of the infraspinatus muscle in case of two part fracture associated with a history of painful shoulder related to degenerative rotator cuff tear.

Patients underwent surgery at an average of 3 weeks following the initial injury (range 5 days–2 months). Clinical and radiographic follow-up was performed on all patients at an average of 32 months postoperatively (range 24–38 months). Clinical outcome included Constant score and range of motion in elevation in the

scapular plane, abduction, external rotation and internal rotation. Patients were asked to grade their subjective outcomes as excellent, good, fair, or poor. Radiographic evaluation with an anteroposterior view in neutral rotation and Bernageau view were performed. Radiographic examination focused on the presence of baseplate displacement or loosening, bone graft union, resorption or collapse. Glenosphere and baseplate fixation was graded in a manner previously described as stable, at risk, or loose [7]. Radiographs were also used to judge the presence of scapular notching using the grading system of Sirveaux et al. [14].

This was a retrospective study approved by the Institutional Review Board of our institute through a declaration of acknowledgment (n. 21/2014), and all subjects gave informed consent to undergo to this type of surgery and to be included in this study.

2.1. Surgical technique

All surgery was performed in a modified beach chair position on a standard operating room table with the head elevated between 20–30 degrees and the ipsilateral scapula supported. In all cases we used either an Aequalis™ Reversed II or Ascend flex reverse shoulder arthroplasty (Tornier, Edina, MN). In particular we use the ascend flex in 4 cases. In two cases we use a long PTC stem, whether in the other two cases we use a standard short stem. These last two cases were the patients with a two part fracture where the fragment of greater tuberosity was a very small fragment. A deltopectoral approach was used. The biceps tendon was tenodesed to the upper border of the pectoralis major in all cases. In case of 3–4 parts proximal humeral fracture, after removal of the humeral head fragment, four No. 5 non-absorbable sutures were placed through the infraspinatus and teres minor at the bone-tendon junction to control the greater tuberosity fragment. The lesser tuberosity and attached subscapularis was also identified and tagged as well for later repair around the prosthesis. In cases of glenoid fracture and a two-part proximal humerus fracture associated with a degenerative long-standing rotator cuff tear, subscapularis tendon, when present, was tagged and detached prior to humeral head dislocation. In all cases, the cancellous autograft was harvested from humeral head using a dedicated instrumentation similar to one previously reported [15]. In cases associated with a 3–4-part fracture, the entire piece of the fractured humeral head was used. The graft was then shaped with an anterior step to match the defect related to anterior glenoid bone fracture (Fig. 1). It was inserted along the lengthened central peg of the baseplate. The length of the central post anchored in the native glenoid was at least 10 mm in all cases.

The glenoid was then prepared. The drilling of central hole for baseplate was oriented so to increase anchorage length and purchase in the native scapula as much was possible. Because of anterior glenoid fracture drilling was often done with some anteversion. This was done in a fashion to capture as more glenoid bone as possible; excessive anteversion should be avoided to reduce the stress on the anterior part of the glenoid bone graft. In all cases a 25 mm diameter baseplate was implanted and fixed with 4 screws. Compression screws were used in the anterior and posterior holes. The anterior compression screw was used to fix the anterior part of bone graft to the scapular neck. Locking screws were used in the superior and inferior holes. A 25 mm length post was used in all cases to ensure the length of the central post anchored in the native glenoid was at least 10 mm.

Once the baseplate was fixed, the glenosphere was then implanted in a standard fashion. The humerus was exposed and prepared with hand reamers until there is gentle cortical resistance. A humeral trial is then placed. Appropriate height of the humeral implant in cases of associated proximal humerus fracture was determined preoperatively based on a previously described technique [16]. This measurement was confirmed intraoperatively.

Download English Version:

<https://daneshyari.com/en/article/5711132>

Download Persian Version:

<https://daneshyari.com/article/5711132>

[Daneshyari.com](https://daneshyari.com)