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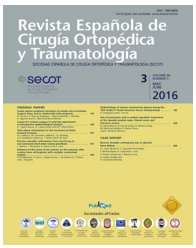

CASE REPORT

Reverse shoulder arthroplasty due to glenoid bone defects☆

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KEYWORDS
Reverse shoulder arthroplasty;
Glenoid defect;
Bone graft

Abstract
Objective: Reverse shoulder arthroplasty is becoming a useful tool for many diseases of the shoulder. Any severe glenoid bone defect may affect the fixing of the glenoid component. The aim of this paper is to evaluate the medium-term outcomes of reverse shoulder arthroplasty associated with a glenoplasty.
Materials and methods: A retrospective study was conducted on 5 patients from our hospital, selected due to glenoid defects of different aetiology. All of them where treated with reverse shoulder arthroplasty associated with glenoplasty with bone graft.
Results: The minimum follow-up was one year (mean 30.4 months). All grafts were radiologically integrated, with no signs of resorption or necrosis being observed. At 12 months, the Constant score was 66.75 and the mean EVA score was 1.
Discussion: Glenoplasty surgery is technically demanding for restoring original bone size in patients with glenoid structural defects, enabling a reverse shoulder arthroplasty to be implanted. Thus improving both the function and clinical outcomes in selected patients with glenohumeral pathology and providing them with a solution.

PALABRAS CLAVE
Prótesis invertida de hombro;
Defecto glenoideo;
Injerto óseo

La artroplastia invertida de hombro ante defectos óseos glenoideos

Resumen
Objetivo: La artroplastia invertida se está convirtiendo en una herramienta útil para afecciones muy variadas en el hombro. Un defecto óseo importante de la glena puede afectar a la

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fijación del componente glenoideo. El propósito de nuestro estudio es evaluar a medio plazo los resultados de la artroplastia invertida de hombro asociados a una glenoplastia.
Material y métodos: Se realizó un estudio retrospectivo de 5 pacientes de nuestro hospital con defectos glenoideos de distinta etiología que fueron tratados mediante artroplastia invertida de hombro asociada a glenoplastia.
Resultados: El seguimiento mínimo de estos pacientes fue de un año (con una media de 30,4 meses). Todos los injertos estaban radiológicamente integrados, sin observarse signos de resorción o necrosis. A los 12 meses el test de Constant era de 66,75 de media y el EVA medio era de 1.
Discusión: La glenoplastia es una intervención de alta demanda técnica que consigue restaurar el remanente óseo en pacientes con defectos estructurales, permitiendo así implantar una artroplastia invertida. De esa forma podemos mejorar la función y la clínica en pacientes con diversas afecciones glenohumerales, proporcionándoles una solución.

Introduction

The indications for anatomical as well as reverse shoulder arthroplasty have increased in number for different pathological processes[1,2] (posttraumatic arthritis, rheumatoid arthritis, arthropathy of the rotator cuff, fracture in 4 fragments in the elderly . . .). Arthroplasty improves pain and function in these patients.[3] Apart from the technical difficulty inherent in the implantation of the prosthesis, bone defects in the glenoid may also prevents the proper connection of the implant, increasing the possibility of failure of the surgical operation.[4]

The aim of this paper is to present an evaluation of the medium-term clinical, radiological and functional results in 5 patients operated using reverse shoulder arthroplasty with associated glenoplasty and also to evaluate the integration of the bone graft used.

Material and methods

We performed a transversal retrospective study of 5 patients (2 men and 3 women), with an average age of 72.6 years (range 64–85) operated from December 2009 to February 2013. They all presented important glenoid bone defects with different causes: 2 changes of prosthesis (previous partial prosthesis with wear of the glenoid bone and periprosthetic fracture, and change due to septic mobilisation of the previous reverse prosthesis), anterior dislocation fracture in 4 fragments (a Bankart lesion that could not be synthesised due to excessive comminution) and 2 deep luxations (one anterior and one posterior). Glenoplasty was performed in all of them (3 with a humeral head autograft and 2 with an allograft from the tissue bank) together with a reverse shoulder arthroplasty of the Delta XTEND™ Reverse Shoulder System type (DePuy Orthopaedics Inc, a Johnson & Johnson company, Warsaw, U.S.A.). The minimum follow-up time was 12 months (with an average of 30.4 months).

The passive and active mobility of the operated shoulder and homolateral elbow was evaluated using the weighted Constant–Murley test[5,6] for functional evaluation. This took place after a 12 month follow-up. Test scores were grouped in bands and several categories were established, from ''excellent'' with a score of at least 80 points, to ''good'', ''mediocre'' or ''poor'' when the score was 50 points or less. Constant's test as approved by the Spanish Shoulder and Elbow Society was used to evaluate strength. In this strength (up to a maximum of 25 points) is calculated, if there is no isometric dynamometer, by repeating abduction 3 times with a weight (of up to 12.5 kg) and multiplying this weight by 2.

A CT scan was performed on all of the patients to evaluate the osteointegration of the graft. A radiologist specialising in musculoskeletal imaging and an orthopaedic surgeon who were both independent of the study confirmed the absence of resorption, radiotransparent lines or graft descent. Subjective evaluation used the visual analogue scale (VAS score) and a personal satisfaction test.

All of the patients were operated under general anaesthesia in the beach chair position with a deltopectoral approach to the shoulder.[7] The first step was to prepare the humerus, cutting off the humeral head in the cases in which it was conserved and removing the previous prosthesis in the others. Once this was done there was a complete view of the cavity and glenoid defect. The remaining glenoid bone was abraded together with the defect to be covered until a suitable bed had been created (Fig. 1A and B).

After this the graft was prepared following the technique of Iannotti et al.[8] PMMA cement in a malleable state was applied onto the defect to obtain a mould; when it started to set and before it hardened completely it was removed. A ruler was used to mark the reference points that would serve as guides for sculpting the graft into the right shape. Depending on availability, dried humeral head was used in 3 cases while an allograft from the tissue bank was used in 2 cases (Fig. 1E and F).

A small jigsaw was used for this together with a cylindrical rasp. The graft was then placed on the area of the defect to be covered and affixed using 2.4 mm cortical screws under compression (2 or 3, depending on each case). These screws are unnecessary in restricted (Walch A2) central defects as they are easily fixed when anchoring the metaglene. Nevertheless, in peripheral (Walch B2) defects we consider that they should be used to improve the fixing of the graft and prevent it from moving during rasping and the positioning of the metaglene.