



Original Article

Outcomes of non-arthroplasty surgical treatment of proximal humeral head fractures[☆]

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ABSTRACT

Objective: This study aimed to assess the outcomes of patients with humeral head fractures treated by reduction and osteosynthesis.

Method: A total of 53 shoulders (52 patients) with humeral head fractures were operated between October 1996 and December 2009. Patients previously treated with primary arthroplasty and/or those who had less than two years follow-up were excluded. A total of 34 shoulders of 34 patients were therefore reassessed. In the sample studied, 23 patients were male and mean age was 47 years. Cases were assessed based on the UCLA score.

Results: Mean post-operative follow-up was 50 months. Twelve patients evolved with excellent outcome, seven good, five regular, and ten with poor outcome (55.8% satisfactory and 44.2% unsatisfactory outcomes). Mean UCLA score was 26 points. Mean post-operative range of motion measurements was 117° elevation, 36° LR and L1 MR. At the immediate post-operative radiography, anatomic reduction was evident in 17 patients (50%). Necrosis was detected in 18 patients, six Grade II and 12 Grade III cases. Female gender and anatomically reduced fractures were statistically better at UCLA scale ($p = 0.01$ and $p = 0.0001$ respectively). **Conclusions:** Female patients had a higher mean UCLA score than male patients ($p = 0.01$). Anatomically reduced fractures had higher UCLA scores ($p = 0.0001$) and lower necrosis rate ($p = 0.0001$). Reconstruction of humeral head fractures had a satisfactory outcome in 55.8% of cases and should be indicated in young and active patients.

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Resultados do tratamento cirúrgico não artroplástico das fraturas da epífise proximal do úmero

R E S U M O

Palavras-chave:
Epífises/lesões
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Ombro/cirurgia
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Objetivo: Avaliar os resultados dos pacientes com fraturas epifisárias tratados com redução e osteossíntese.

Método: Entre outubro de 1996 e dezembro de 2009 foram operados 53 ombros (52 pacientes) com fraturas epifisárias. Foram excluídos os pacientes tratados com artroplastia primária e/ou que tinham seguimento inferior a dois anos. Foram reavaliados 34 ombros de 34 pacientes, 23 do sexo masculino, com média de 47 anos. A avaliação foi feita com a escala da UCLA.

Resultados: O tempo de seguimento pós-operatório médio foi de 50 meses. Doze pacientes evoluíram com resultados excelentes, sete bons, cinco regulares e dez maus (55,8% de resultados satisfatórios e 44,2% de insatisfatórios). O escore UCLA teve média de 26 pontos. As médias de mobilidade pós-operatória foram de 117° de elevação, 36° de RL e L1 de RM. No RX pós-operatório imediato, verificamos a redução anatômica em 17 pacientes (50%). A necrose foi constatada em 18 pacientes, seis grau II e 12 grau III. Sexo feminino e fraturas reduzidas anatomicamente foram estatisticamente melhores na escala da UCLA ($p=0,01$ e $p=0,0001$ respectivamente).

Conclusões: O sexo feminino teve um valor médio do UCLA superior ao sexo masculino ($p=0,01$). As fraturas reduzidas anatomicamente obtiveram UCLA superior ($p=0,0001$) e um menor índice de necrose ($p=0,0001$). A reconstrução das fraturas epifisárias levou a resultados satisfatórios em 55,8%, deve ser indicada para pacientes jovens e ativos.

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Introduction

Proximal humeral head fractures (PHHF) are rare and their treatment is always a challenge for the orthopedic surgeon, due to the complexity of the fracture lines and high complication rates.¹⁻⁴

Neer³ considers them as part of the group of fracture-dislocations, because a surface of the articular fragment is compressed or fragmented against the glenoid cavity and the rest is incongruent with it. He subdivided fracture-dislocations into two types: impaction and those with an epiphyseal line.^{3,5} In the first, impaction, the articular surface sinks due to compression of the humeral head against the edge of the glenoid at the time of dislocation, regardless of direction: anterior (Hill-Sachs lesion) or posterior (MacLaughlin lesion).³ The second type are the head fractures of the humerus with epiphyseal line (epiphyseal fractures), caused by the impact of the humeral head against the glenoid cavity, which fragments the articular surface (Fig. 1).³ These are usually associated with three- and four-part fractures, are related to high-energy trauma, and usually occur in young patients.^{2,3,6,7} They are characterized by great involvement of blood supply to the humeral head and its fragments; therefore, they often evolve into necrosis.³

Gerber et al.⁸ included epiphyseal fractures in the set of complex fractures, defining them as fractures in which the cephalic segment is highly offset, with greatly impaired vascularization, presenting a higher risk of osteonecrosis and collapse of the humeral head. In addition to epiphyseal fractures, this group includes two-part fractures

of the anatomical neck and three- and four-part fracture-dislocations.⁷

There are some reports in the literature of isolated cases in which the authors comment on the rarity of the injury.^{6,9} Chesser et al.² described eight patients with epiphyseal fracture, three of whom underwent open reduction and internal fixation (ORIF). Gerber et al.⁷ treated 32 complex fractures using ORIF; only two were classified as epiphyseal, which had a good outcome.

Some authors indicate hemiarthroplasty as the treatment of choice for epiphyseal fractures, due to technical difficulties in achieving an anatomic reconstruction of the bone and of maintaining such reconstruction through osteosynthesis. Furthermore, ORIF in this kind of fracture progresses with high complication rates, including malunion, pseudarthrosis, and osteonecrosis.^{1,3,5,10-14} Hemiarthroplasty leads to satisfactory results to the patient regarding pain improvement, but usually there is loss of lifting strength and decreased range of motion, i.e., it is observed that the functional outcome of arthroplasties for the treatment of fractures is generally unsatisfactory.^{10,15}

This study aimed to evaluate the results of patients treated with ORIF of the PHHF.

Methods

Between October 1996 and December 2009, the Shoulder and Elbow Group, Department of Orthopedics and Traumatology, Santa Casa de Misericórdia de São Paulo – Fernandinho Simonsen Pavilion, a tertiary referral hospital for severe cases, operated on 53 shoulders of 52 patients with epiphyseal

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