



Review Article

Impacted valgus fractures of the proximal humerus[☆]



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ABSTRACT

Impacted valgus fractures of the proximal humerus are considered to be a special type fracture, since impaction of the humeral head on the metaphysis with maintenance of the posteromedial periosteum improves the prognosis regarding occurrences of avascular necrosis. This characteristic can also facilitate the reduction maneuver and increase the consolidation rate of these fractures, even in more complex cases. The studies included were obtained by searching the Bireme, Medline, PubMed, Cochrane Library and Google Scholar databases for those published between 1991 and 2013. The objective of this study was to identify the most common definitions, classifications and treatment methods used for these fractures in the orthopedic medical literature.

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Fratura impactada em valgo do úmero proximal

RESUMO

A fratura impactada em valgo do úmero proximal é considerada um tipo especial de fratura, pois a impactação metafisária da cabeça umeral, com manutenção do periosteio pósteromedial, melhora seu prognóstico quanto à ocorrência de necrose avascular. Essa característica pode, ainda, facilitar a manobra de redução e aumentar o índice de consolidação dessas fraturas, mesmo nos casos mais complexos. Os estudos incluídos foram pesquisados nas bases de dados Bireme, Medline, PubMed, Cochrane Library e Google Scholar publicados de 1991 a 2013. O objetivo deste estudo foi identificar a definição, classificação e os métodos de tratamento dessas fraturas mais usados na literatura médica ortopédica.

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Introduction

Impacted valgus fractures of the proximal humerus have been defined and classified using different concepts in the orthopedic medical literature, and different treatments have been described. The angular parameters used for defining the diagnosis (Fig. 1) and the management applied have differed in most studies.¹⁻⁵ This lack of consensus in the literature may give rise to failure in prognostic evaluations on these fractures and influence the choice of treatment method.

These fractures have received attention that differentiates them from other complex fractures of the proximal humerus, because of their better prognosis with regard to surgical reduction, consolidation and occurrences of avascular necrosis.¹⁻¹⁴

The mechanism for these fractures consists of axial trauma to the abducted upper limb, with direct impaction between the humeral head and the glenoid cavity, and consequent impaction and posteromedial displacement (dorsal tilting of the head) because of its physiological anatomical conformation in retroversion.^{1,2,8,10,12} In this specific type of fracture, with metaphyseal bone impaction, the posteromedial periosteum of the humeral head (i.e. the medial hinge) may be maintained. Consequently, the posterior humeral circumflex artery (which passes through this region) may also be maintained. The blood supply to the humeral head may be preserved (Fig. 2).^{1-3,6,8-13} This may give rise to avoidance of the most frequent complication of complex fractures of the proximal humerus: avascular necrosis. The incidence of this complication is 21-75% in four-part fractures and 8-26% in situations of

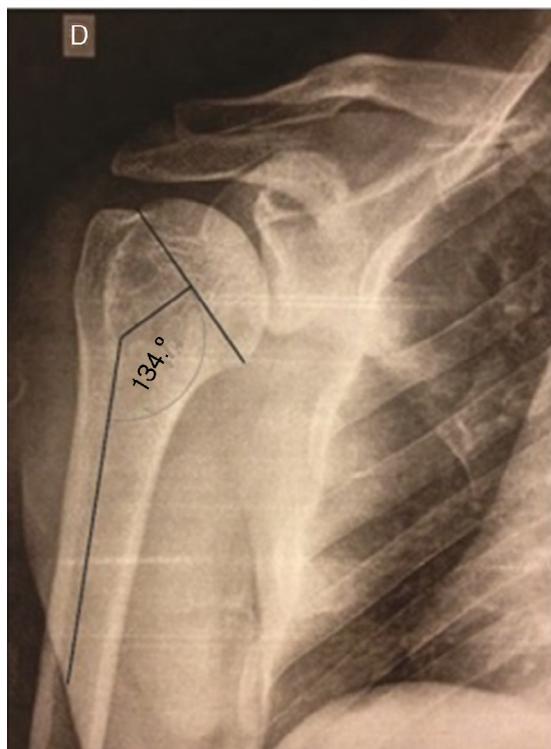


Fig. 1 – Radiograph showing measurement of the cervicodiaphyseal angle of the proximal humerus, i.e. the angle between the anatomical neck and the axis of the humeral diaphysis.

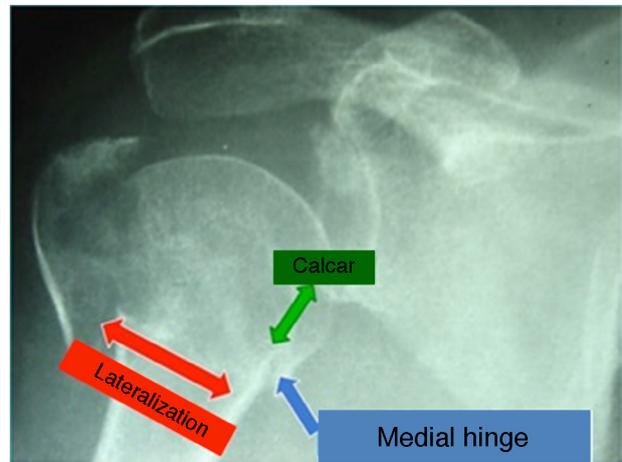


Fig. 2 – Anteroposterior radiograph of the right shoulder showing valgus impacted fracture of the proximal humerus.

valgus impact.¹¹ Maintenance of this medial hinge may also help in fracture reduction, since it serves as a support point (fulcrum) for the humeral head to return to its varus position, without losing contact with the metaphyseal region of the diaphysis.^{1-3,6-8} These characteristic factors may lead to a higher consolidation rate for these fractures, compared with other complex fractures of the proximal humerus.^{1,2,6,7}

In deciding between conservative and surgical treatment for valgus impacted fractures of the proximal humerus, the following important factors need to be taken into account: physiological age, comorbidities, work activities, sports activities, demand, smoking, osteoporosis, patient cooperation, time elapsed since the fracture, surgeon's experience and the fracture pattern described.^{1,2,5,11} Among the surgical treatments, the options that have been described are: closed reduction with percutaneous fixation, open reduction with internal fixation using a locked plate (Fig. 3), screws, metal wires and/or nonabsorbable threads and arthroplasty.¹⁻¹³

Furthermore, regarding surgical treatment, in reducing these impacted fractures, significant bone failure may occur below the humeral head. The cavity that thus forms can be filled with repositioned tubercles from this bone or by means of an autologous, autogenous or synthetic bone graft, in order to avoid loss of reduction.^{1-3,7,11}

The aim of this study was to identify the definitions, classifications and treatment methods for valgus impacted fractures of the proximal humerus that have been most used in the orthopedic medical literature.

Methods

A review of the orthopedic medical literature was conducted in the Regional Medical Library (Biblioteca Regional de Medicina, Bireme), Medline, PubMed, Cochrane Library and Google Scholar databases. This review covered articles published between 1991 and 2013, and it used combinations of the following search terms: fracture of the proximal humerus, valgus impaction, classification and treatment. Studies were selected

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