

Multifocal humeral fractures



A. Maresca^a, R. Pascarella^{a,*}, C. Bettuzzi^b, L. Amendola^b, R. Politano^a, R. Fantasia^a,
M. Del Torto^a

^a Unità di Ortopedia e Traumatologia Ospedali Riuniti di Ancona, Italy

^b Unità di Ortopedia e Traumatologia Ospedale Maggiore Bologna, Italy

ARTICLE INFO

Keywords:

Humeral fractures
Bifocal
Classification
Multifocal

ABSTRACT

Introduction: Multifocal humeral fractures are extremely rare. These may affect the neck and the shaft, the shaft alone, or the diaphysis and the distal humerus. There is no classification of these fractures in the literature.

Materials and methods: From 2004 to 2010, 717 patients with humeral fracture were treated surgically at our department. Thirty-five patients presented with an associated fracture of the proximal and diaphyseal humerus: synthesis was performed with plate and screws in 34 patients, and the remaining patient had an open fracture that was treated with an external fixator.

Results: Mean follow-up was 3 years and 3 months. A classification is proposed in which type A fractures are those affecting the proximal and the humeral shaft, type B the diaphysis alone, and type C the diaphysis in association with the distal humerus. Type A fractures are then divided into three subgroups: A-I, undisplaced fracture of the proximal humerus and displaced shaft fracture; A-II: displaced fracture of the proximal and humeral shaft; and A-III: multifragmentary fracture affecting the proximal humerus and extending to the diaphysis.

Discussion: Multifocal humeral fractures are very rare and little described in the literature, both for classification and treatment. The AO classification describes bifocal fracture of the humeral diaphysis, type B and C. The classification suggested in this article mainly concerns fractures involving the proximal and humeral shaft.

Conclusions: A simple classification of multifocal fractures is suggested to help the surgeon choose the most suitable type of synthesis for surgical treatment.

© 2013 Elsevier Ltd. All rights reserved.

Introduction

There are numerous articles in the literature that describe the classification and treatment of humeral fractures, when these are divided into proximal, diaphyseal and distal segment [2,4,5,7,8,10,12–15,17]. However, bifocal or combined humeral fractures are very rare and little described [3,11,16]. There are no clear indications in the literature about which surgical treatment should be performed in patients with multifocal fractures and there are no data from clinical trials or randomised controlled multicentre studies.

There are many aspects to be considered in this kind of injury, including the mechanism of trauma and the type of treatment. Fractures of the proximal humerus typically occur in elderly patients with low-energy trauma, whereas diaphyseal fractures

typically occur in young patients with high-energy trauma [1,6,9]. Fractures of the distal humerus occur in both the elderly and the young. Fractures of the proximal humerus are often treated conservatively, while those involving the diaphysis or the distal humerus usually require surgical treatment. In addition, there are plates available for the proximal humerus and plates for the diaphysis, but in the case of associated fractures, hardware is required to stabilise both humeral segments.

A classification is therefore proposed for multifocal humeral fractures, particularly those involving the proximal portion and the shaft, which can help the surgeon choose the most suitable type of synthesis for surgery. The multifocal fractures of the humerus are divided as follows: type A is fractures that affect the proximal and the humeral shaft, type B the diaphysis alone, and type C the diaphysis in association with the distal humerus. Type A fractures are then divided into three subgroups: A-I, undisplaced fracture of the proximal humerus and displaced shaft fracture; A-II: displaced fracture of the proximal and humeral shaft; and A-III: multifragmentary fracture affecting the proximal humerus and extending to the diaphysis (Fig. 1).

* Corresponding author. Tel.: +39 0715964489/3358119947;
fax: +39 0715964480.

E-mail address: raffaele.pascarella@libero.it (R. Pascarella).

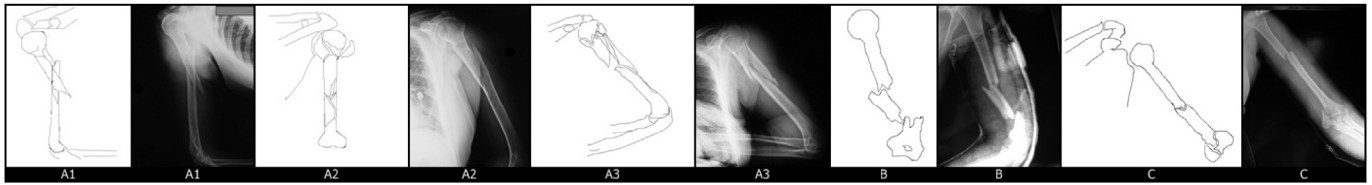


Fig. 1. Purpose of classification previously described.

Three surgical options are available: external fixation, intramedullary nail and plate. External fixation is difficult to perform as the grip on the proximal portion can be problematic or impossible, particularly in elderly patients. This method is indicated only for patients who have severely exposed fractures. Intramedullary nail and plates are more useful options (Fig. 2).

The aim of this study is to propose a new classification for multifocal humeral fractures to give an indication for their treatment. Treatment of multifocal fractures involving the diaphysis alone or the diaphysis and distal humerus are already standardised and are not discussed in this paper.

Materials and methods

From 2004 to 2010, 717 patients with humeral fracture were treated surgically at our department. Thirty-five of these patients (4.8%) presented with an associated fracture of the proximal and diaphyseal humerus. There were 18 male and 17 female patients with a mean age of 64 years (range 33–93 years). According to the classification we propose, fractures were divided into: Type A-I 20 cases (57.1%), Type A-II 3 cases (8.5%), and Type A-III 12 cases (34.2%).

One patient presented with a post-traumatic paralysis of the radial nerve. One patient with a third degree open fracture underwent reduction with external fixator. Open reduction and stabilisation was performed using Philos® plates with angular stability in 19 cases and straight plates in the remaining 16 cases. Intramedullary nails were not used.

Results

All 35 patients were reviewed with a mean follow-up of 3 years and 3 months (range 2 years 3 months to 6 years 6 months).

The mean time of consolidation was 5 months. Major complications were one case of loosening of the fixation 30 days after surgery, one case of pseudarthrosis and one case of radial nerve palsy.

The patient with loosening of the plate underwent removal of the hardware, new reduction and fixation with plate and medial cortical homeoplastic bone graft. The patient with pseudarthrosis underwent removal of the hardware, excision of the pseudarthrosis tissue, reduction and internal fixation with plate and medial cortical homeoplastic bone graft. The radial nerve palsy recovered spontaneously within 6 months.

The range of motion was evaluated using the University of California, Los Angeles (UCLA) shoulder rating score and the Mayo Elbow Performance Score (MEPS). Results were respectively: good/excellent in 31 and 30 patients, and fair/poor in 4 and 5 patients (Fig. 3). A total of 94.7% of patients were satisfied with the outcome.

Discussion

Bifocal and multifocal humeral fractures are very rare and little described in the literature, both for classification and treatment. The AO classification describes bifocal fracture of the humeral diaphysis, type B and C [17]. The classification suggested in this article mainly concerns fractures involving the proximal and humeral shaft. Treatment of multifocal fractures involving the diaphysis alone or the diaphysis and distal humerus are already standardised and are not discussed in this paper.

Bifocal diaphyseal fractures can be treated with plate and screws or intramedullary nailing. In fractures involving both the shaft and distal humerus, the fractures are usually treated separately, using two different approaches.

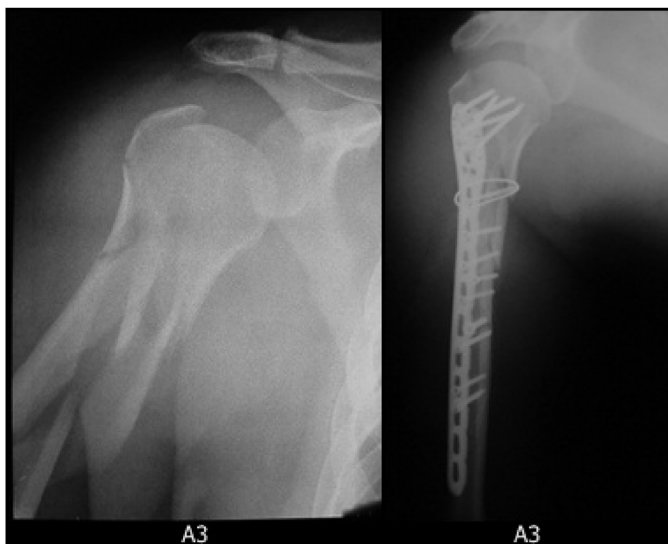


Fig. 2. A3 fracture treated with plating (Philos®).

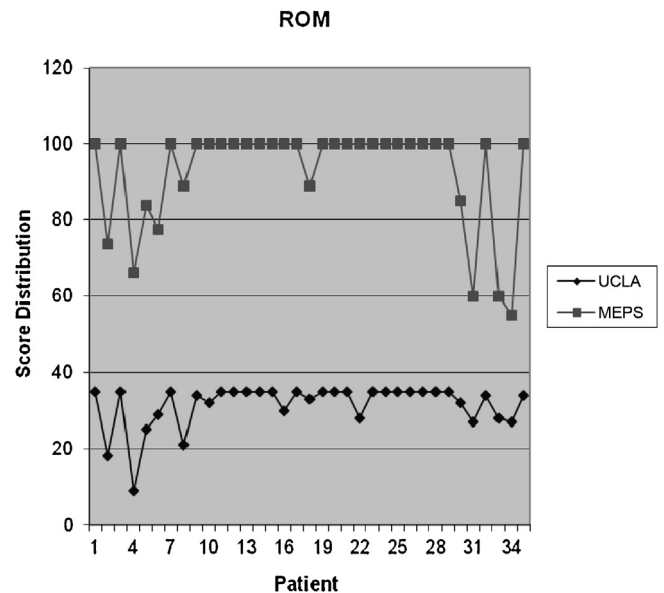


Fig. 3. UCLA and MEPS evaluation of Range of Motion of the shoulder.

Download English Version:

<https://daneshyari.com/en/article/3239600>

Download Persian Version:

<https://daneshyari.com/article/3239600>

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