



## Is primary total elbow arthroplasty safe for the treatment of open intra-articular distal humerus fractures?



Michael S. Linn, Michael J. Gardner, Christopher M. McAndrew, Bethany Gallagher, William M. Ricci\*

Orthopaedic Trauma Service, Washington University School of Medicine, St Louis, MO, USA

### ARTICLE INFO

#### Article history:

Accepted 17 July 2014

#### Keywords:

Trauma  
Total elbow arthroplasty  
Distal humerus fracture  
Infection  
Geriatric trauma

### ABSTRACT

**Objectives:** Total elbow arthroplasty (TEA) is a viable treatment for elderly patients with distal humerus fracture who frequently present with low-grade open fractures. This purpose of this study was to evaluate the results of a protocol of serial irrigations and debridements (I&Ds) followed by primary TEA for the treatment of open intra-articular distal humerus fractures.

**Methods:** Seven patients (mean 74 years; range 56–86 years) with open (two Grade I and five Grade 2) distal humerus fractures (OTA 13C) who were treated between 2001 and 2007 with a standard staged protocol that included TEA were studied. Baseline Disabilities of the Arm, Shoulder and Hand (DASH) scores were obtained during the initial hospitalization, and the 6- and 12-month follow-up visits. Elbow range of motion (ROM) measurements were obtained at each follow-up visit.

**Results:** Follow-up averaged 43 (range 4–138) months. There were no wound complications and no deep infections. Complications included one case of heterotopic ossification with joint contracture, one olecranon fracture unrelated to the TEA, and two loose humeral stems. The average final ROM was from 21° (range 5–30°) to 113° flexion (range 90–130°). DASH scores averaged 25 at pre-injury baseline and 48 at the most recent follow-up visits.

**Conclusions:** TEA has become a mainstream option for the treatment of distal humerus fractures which are on occasion open. There is hesitation in using arthroplasty in an open fracture setting due to a potential increased infection risk. The absence of any infectious complications and satisfactory functional outcomes observed in the current series indicates that TEA is a viable treatment modality for complex open fractures of the distal humerus.

© 2014 Elsevier Ltd. All rights reserved.

### Introduction

Total elbow arthroplasty (TEA) has become a viable treatment alternative for elderly patients with distal humerus fractures. Initially indicated for end-stage arthritis of the elbow, the indications have expanded to include complex fractures of the distal humerus [1]. Multiple previous studies have shown that TEA has equivalent or improved outcomes compared with open reduction and internal fixation for these fractures in select patient populations [2,3]. Elbow arthroplasty after fracture is made more

complicated by the fact that these patients, often elderly, may have very poor soft tissue coverage around the elbow, “paper-thin” skin, and not infrequently present with low-grade open fractures. In open fracture situations, theoretically, TEA has an increased risk of wound and deep infectious complications [4]. Previous studies of TEA for fracture have included patients with low-grade open fractures, but to our knowledge no studies have evaluated infectious outcomes exclusively in patients with open fractures [1].

Unlike distal humerus fractures, open fractures of the hip and proximal humerus are rare, yielding exceedingly little evidence for the safety of performing an arthroplasty in the setting of open fracture. The purpose of this study was to evaluate the results of a protocol of debridement followed by primary TEA for the treatment of open intra-articular distal humerus fractures in elderly patients.

\* Corresponding author at: Washington University School of Medicine, Department of Orthopaedic Surgery, 660 South Euclid Avenue, Campus Box 8233, St Louis, MO 63110, USA. Tel.: +1 314 747 2811; fax: +1 314 747 2599.

E-mail addresses: [gardnerm@wudosis.wustl.edu](mailto:gardnerm@wudosis.wustl.edu) (M.J. Gardner), [ricciw@wustl.edu](mailto:ricciw@wustl.edu) (W.M. Ricci).

## Materials and methods

### Patients

A retrospective analysis was performed on eight patients with open distal humerus fractures who were treated between 2001 and 2009 with total elbow replacement (Fig. 1). TEA was considered for physiologically elderly patients who also had fractures with articular comminution, poor bone quality such that stable fixation was compromised, or preexisting elbow arthritis. One patient sustained injuries to the head and was lost to follow-up leaving a study group of two men and five women with a mean age of 74



**Fig. 1.** Injury radiographs depicting an interarticular distal humerus fracture, AP (a) and Lateral (b).

years (range 56–86 years). All patients were older than 70 years of age except one 56-year-old male who had TEA indicated for his fracture because of associated joint arthrosis from rheumatoid arthritis. The majority of patients (five) were injured in ground-level falls, two were involved in motorcycle accidents, and one had an approximately 12-foot fall from a ladder (Table 1).

### Fractures

The open fractures were classified with the Gustilo–Anderson system with two Grade I and five Grade II fractures [5]. Radiographically, all distal humerus fractures were classified as 13C utilizing the Orthopaedic Trauma Association (OTA)/AO system [6]. The decision for treatment with TEA was based on the perception that the degree of articular comminution or the bone quality would not allow for primary open reduction and internal fixation.

### Treatment

All patients were treated with a standard protocol that included TEA (Coonrad–Morrey, Zimmer, Warsaw, IN, USA). The protocol included emergent operative irrigation and debridement (I&D) upon presentation followed by repeat I&D and TEA when the wounds were stable. A previously described and standard operative technique for prosthesis implantation was followed (Fig. 2) [7].

The average time from fracture until TEA was 6 days (range 2–19). Two patients with Grade II open fracture underwent I&D, definitive wound closure, hospital discharge, and semi-elective TEA at 9 and 19 days after fracture, respectively. The other five patients had TEA within 4 days of injury during their index hospital admission. The timing for definitive internal fixation after low-grade open fracture is generally immediate or within several days. The decision to perform TEA followed this same rationale in the majority of cases. Open fractures were treated urgently with I&D. Short delays to TEA were primarily related to the availability of surgeons experienced with TEA. Longer delays in two patients were related to other logistical issues. For the two patients with semi-elective TEA, antibiotics were administered upon presentation and continued until 48 h after wound closure. They were also administered perioperative antibiotics surrounding their TEA (preoperatively and continued 24 h postoperatively). The other five patients had antibiotics administered upon presentation and continued until 48 h after TEA. Elbows were splinted for 1–2 weeks after TEA to facilitate wound healing, then physical therapy was initiated for range of motion (ROM) and strengthening.

### Follow-up and outcomes

Patients were evaluated with routine postoperative follow-up for an average of 43 (range 4–138) months. Baseline (pre-injury) functional outcome scores (DASH) were obtained during the initial hospitalization and again at the 6- and 12-month follow-up visits. Elbow ROM measurements were obtained at each follow-up visit. Complications, particularly infections, were extracted from the medical record.

### Results

There were no wound complications and no deep infections. Other complications included one case of heterotopic ossification with joint contracture, one olecranon fracture and two loose humeral stems identified in long-term follow-up. The olecranon fracture occurred after a secondary fall, was minimally displaced, and was successfully treated nonoperatively. The patient with a

Download English Version:

<https://daneshyari.com/en/article/6083876>

Download Persian Version:

<https://daneshyari.com/article/6083876>

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