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Functional outcomes after nonoperative management of fractures of the proximal humerus

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Background: Prospective follow-up data after nonoperative treatment for fractures of the proximal humerus are scarce. We studied functional outcomes and rates of complication and failure after conservative management of these common injuries.

Materials and methods: Consecutive patients aged older than 18 years presenting to the emergency department of a large district hospital with an isolated, closed proximal humeral fracture considered suitable for functional treatment by the surgeon on charge were enrolled in a prospective, externally monitored observational study. Surgeons were free to reduce the fracture and to prescribe any type of sling or brace. Active follow-up after 12 weeks, 6, and 12 months included plain radiographs, Constant score, and Disabilities of Arm, Shoulder and Hand (DASH) score.

Results: We enrolled 160 patients (118 women; mean age, 63.3 ± 14.8 years), and 124 completed 1-year follow-up. There were 85, 71, and 4 AO 11 A, B, and C fractures, and 75 one-part, 60 two-part, 23 three-part, and 2 four-part and head-splitting fractures. After 1 year, the mean difference in Constant scores between the injured and contralateral shoulder was 8.2 (95% confidence interval [CI], 6.0-10.4). The mean difference in 1-year DASH scores to baseline assessment was 10.2 points (95% CI 7.3-13.1 points). The risk of delayed and nonunion was 7.0% (95% CI, 3.6%-12.3%). Four patients subsequently underwent surgical fixation, and 5 had arthroscopic subacromial decompression.

Conclusion: This study may provide reference values for future investigations and stresses ceiling effects that will make it difficult to demonstrate a significant advantage of surgical over nonoperative treatment in patients with proximal humeral fractures.

Level of evidence: Level 4; Prospective case series without a control group.

Keywords: Proximal humeral fracture; functional treatment; Constant score; Disabilities of the Arm, Shoulder and Hand

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Fractures of the proximal humerus and the humeral head are most common injuries worldwide.[4] The reported incidence rates range from 21/100,000 person-years in Japanese men to 221/100,000 person-years in Swedish

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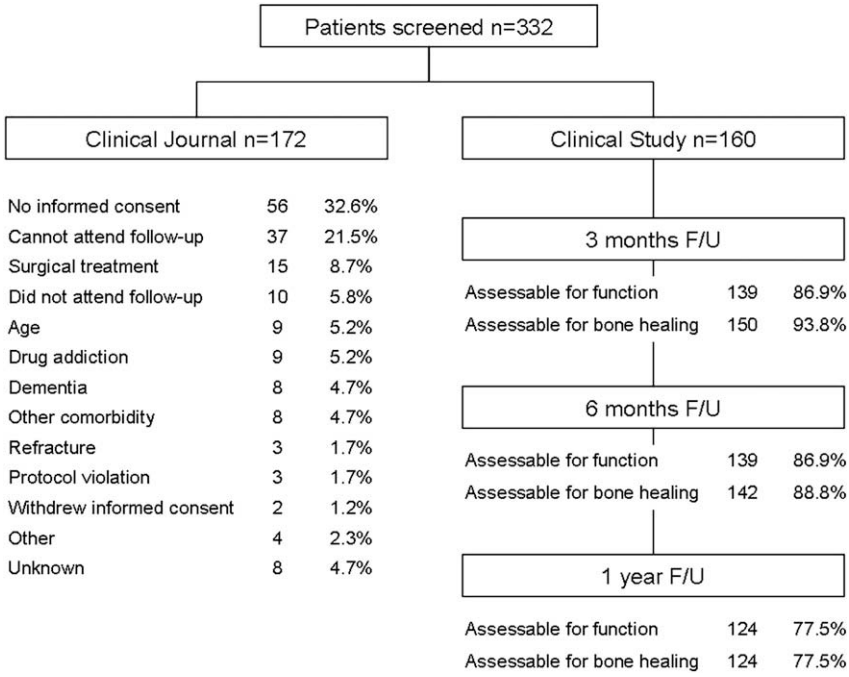

Figure 1 Patient selection procedure and completeness of follow-up.

women.[11] According to current projections, every 20th woman at 65 years of age will sustain a fracture of the proximal humerus in her remaining life time.[1]

The availability of modern orthopedic implants, such as locking plates with excellent biomechanical stability even in osteoporotic bone, may have contributed to the trend toward surgical treatment of these fractures. Internal fixation restores the anatomy of the proximal humerus but requires hospitalization and is associated with the risk for implant-related complications. Functional therapy with short immobilization, followed by an accelerated physiotherapy protocol, is a simple, convenient, noninvasive, ubiquitously available, and efficient management option. Court-Brown et al[5-7] observed good to excellent clinical results (as assessed by the Constant score) in nonoperatively treated impacted valgus and varus fractures. Apart from these series, however, little is known on physical recovery and deficits after conservatively treated fractures of the proximal humerus.

We prospectively assessed the function of the upper extremity in a large cohort of patients who were assigned to nonoperative treatment of a proximal humeral fracture. Our primary objective was to obtain robust reference values for the Constant score and the Disabilities of the Arm, Shoulder, and Hand (DASH) instrument in this common clinical setting. Further objectives were to evaluate the duration of sick leave, complications, and treatment failures and to model possible risk factors and predictors of shoulder function 1 year after the fracture event.

Materials and methods

The local Institutional Review Board (York Research Ethics Committee, UK [Reference No. YREC 02/11/006)] approved the study, and all patients provided written informed consent.

Study design and entry criteria

All patients with a radiographically proven, closed fracture of the proximal humerus admitted to the emergency department of a large district hospital in the United Kingdom, who were considered suitable for primary nonoperative management by the physician on charge, were asked to participate in this investigation.

We excluded skeletally immature patients, patients presenting to the hospital 10 days or more after injury, patients with open fractures or multiple trauma and preexisting illness affecting the function of the upper limb, such as multiple sclerosis, paraplegia, and others. Also excluded were patients with a history of drug or alcohol abuse and those who were deemed unlikely to cooperate or attend all scheduled study visits.

Baseline documentation

On admission, patient demographics (ie, gender, age, profession, dexterity, smoking, concomitant diseases, and medication) and injury characteristics (ie, accident type, energy level of trauma, concomitant injuries, fracture classification) were recorded. Patients were asked to rate their upper limb function 1 week before the accident to determine their baseline DASH score using the extended 3-modular questionnaire.[13] Normalized DASH scores range from 0 (perfect function) to 100 (functionless extremity/joint).