SCIENTIFIC ARTICLE

Complications Associated With Operative Versus Nonsurgical Treatment of Distal Radius Fractures in Patients Aged 65 Years and Older

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Purpose To compare complication rates for distal radius fractures treated operatively versus nonsurgical in patients older than 65 years. We hypothesized that surgical intervention would improve fracture alignment, but it would be associated with more complications and equivalent functional outcomes when compared with the nonsurgical group.

Methods Patients (operative, n = 129) and controls (nonsurgical, n = 129) were identified from a prospective clinical and operating room database. They were matched on fracture severity (AO-A/B/C1 vs AO-C2/C3), sex, age, and energy of injury. Data on complications were extracted from medical charts using a validated complications checklist, and radiologic data were collected for all patients. Functional outcomes (Patient-Related Wrist Evaluation) at 1 year were available in only a subset of patients. We determined differences in complication and reoperation rates using a chi-square test.

Results A significant number of patients experienced complications in the operative group (operative = 37 of 129; nonsurgical = 22 of 129). The most common complication was median neuropathy (n = 8 operative; n = 14 nonsurgical), followed by surgical site infections (n = 16 operative; 12 of 16 were pin site infections) and complex regional pain syndrome (n = 4 operative; 3 nonsurgical). The complication rate in patients treated with volar plate was 22% (16 of 74), for dorsal plate it was 50% (2 of 4), for external fixation it was 42% (16 of 38), and for percutaneous pinning it was 23% (3 of 13). The number of patients requiring reoperations was similar in both groups (11 [9%] operative; 7 [5%] nonsurgical). Our secondary radiologic and functional outcomes demonstrate that despite a higher incidence of malunion in nonsurgical patients (nonsurgical: 69% vs operative: 29%), a subset of patients from both groups (n = 140) had minimal pain and disability at 1 year (Patient-Related Wrist Evaluation operative: 16.9 ± 23.2; nonsurgical: 15.7 ± 17.5).

Conclusions In a study matching fracture severity, sex, age, and energy of injury, we found that elderly patients with distal radius fractures who underwent surgery had higher complication rates than those treated nonsurgically. *(J Hand Surg Am. 2014;39(7):1280–1286.*

Type of study/level of evidence Therapeutic III.

Key words Complications, distal radius fracture, elderly, function, matched cohort.

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Although distal radius fractures (DRFs) are common injuries, little has been written about the associated complications.[1] In particular, literature concerning complications associated with the treatment of DRFs in the elderly is limited. Few studies consider complication rates as their primary outcome. Chung and colleagues[2] compared complication rates after volar locked plating of DRFs; however, they included a wide age range of patients and were not focused on the elderly population. In 2010, Egol and colleagues[3] compared functional outcomes in elderly patients with DRFs treated operatively and nonsurgically, using a case-control design. They did not identify differences in Disabilities of the Arm, Shoulder, and Hand scores (their primary outcome) or complication rates between patients treated operatively and nonsurgically; however, the complication rate was a secondary outcome and there were no formal a priori power studies to indicate whether they had the ability to detect a difference in this group. Furthermore, a systematic validated complications checklist was not used to collect information on complications, and so minor complications may have been missed.

The primary purpose of this study was to compare the complication rate in patients aged 65 years and older whose DRF was treated operatively versus those treated nonsurgically. The secondary purpose was to compare other measures including rates of reoperation, multiple complications, and radiographic and functional outcomes (Patient-Rated Wrist Evaluation [PRWE]). To minimize possible confounders, operatively and nonsurgically treated patients were matched based on fracture severity, sex, age, and energy of injury. We hypothesized that although surgery may result in better radiographic fracture alignment, it would be associated with higher complication rates without a significant improvement in functional outcomes relative to nonsurgical treatment.

MATERIALS AND METHODS

We obtained approval from our institutional research ethics board before reviewing radiology and medical records for all patients aged 65 years and older with a distal radius fracture (question 1) and approval to access data from an existing prospective outcomes study for all patients with 65 years and older (question 2). This was a case-control study in which cases were derived from 2 sources: an operative database and patients who had participated in a prospective study. Controls were derived from patients who participated in a prospective outcomes study (Fig. 1).

The study group (n = 258) consisted of 184 patients (n = 129 nonsurgical, 55 operative) derived from the prospective outcomes study with DRFs occurring between March 1995 and August 2011 and 74 patients (n = 74 operative) from a review of consecutive patients from our operating room database for all surgeons at our center from January 2006 to December 2011. All patients in the study group were reviewed to determine sex, age at the time of injury, treatment (either operatively or nonsurgically), and energy of the injury, which was classified as low (ie, fall from standing height), medium (ie, fall during a sporting event, downstairs, or off a step ladder), or high (ie, motor vehicle accident). Cases (operative patients) and controls (nonsurgical patients) within this database were then matched based on fracture severity (simple fractures were defined as AO type A/B/C1; complex fractures were defined as AO type C2/C3), then sex, then age within 2 years, and finally on energy of injury (low, medium, or high).

To answer question 1, once the operative and nonsurgical study patients were matched, a detailed retrospective review of the health records was carried out on all patients to determine demographic information, hand dominance, existing medical comorbidities, smoking status, fracture treatment details, and posttreatment complications. Two senior trainees (a hand surgery fellow and senior resident) reviewed all prereduction x-rays and classified them according to AO fracture type and subtype.

To answer question 2, we collected available 1-year patient outcomes from the subset of operative (n = 55) and nonsurgical (n = 129) patients who participated in a prospective outcomes database at our institution.

Complications

Patient complications were collected using a validated complications checklist developed by McKay and colleagues[4] to standardize data collection. This checklist includes a classification for all DRF complications and allows for the assessment of severity of each complication. Time from injury and the severity of each complication were recorded. Complications that were transient and resolved with no treatment were graded as minor. Complications requiring nonsurgical medical treatment (ie, steroid injection, antibiotics, physiotherapy, splinting) or further investigations (ie, electromyography studies) were graded as moderate. Complications that led to reoperation were graded as severe. In addition to the total number of complications in study patients, we determined the number of patients experiencing single complications, multiple