Distal Radius Fracture Management: Surgeon Factors Significantly Influence Decision Making

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INTRODUCTION: Distal radius (DR) fractures are common injuries treated by a myriad of surgeons with different backgrounds and specialty specific training. Significant efforts have been made to limit variability in the management of these injuries by establishing comprehensive classification systems and treatment algorithms. Treating surgeons have distinctive subspecialty training, practice settings, years in clinical practice, and volume of DR treated every year. There remains major differences in DR fracture treatment among surgeons, it is our hypothesis that these physician specific variables impact the management of distal radius fractures in addition to patient specific factors.

METHODS: A prospective cohort study was conducted evaluating differences in treatment between *Certificate of Additional Qualification* hand (CAQh) surgeons and board-certified orthopaedic surgeons who take call at level 1 or level 2 trauma centers (non-CAQh). After IRB approval, 30 distal radius fractures were selected and classified (15 AO/OTA type A and B and 15 AO/OTA type C) to create a standardized patient data set. A de-identified presentation displayed radiographic images followed by patient-specific demographics. The data points included were: 1) pre and post reduction radiographs, 2) computed topography (CT) scan images (15 of 30 fractures), 3) patient's age, 4) significant medical comorbidities, 5) patient's manual laborer status, and 6) any associated injuries. The surgeon's fracture management was inquired after each data points with treatment options including nonsurgical and surgical management options. Upon completion of the survey, the surgeon's information regarding their volume of DR fractures treated per year, practice setting (hospital employee or academic/private practice setting), and years post residency/fellowship graduation education were ascertained. Statistical analysis was performed using Chi-squared analysis with a post analysis regression model looking at relative importance of both physician and patient specific factors.

RESULTS: There was a significant difference between CAQh and non-CAQh surgeons regarding the management of distal radius fractures ($p < 0.001$). CAQ hand surgeons are more likely to perform operative fixation than non-CAQ surgeons (90% vs. 66%, $p < 0.001$), and are almost twice as likely to use a dorsal spanning plate (24% vs. 14%, $p<0.001$). Hospital employed surgeons were more likely to change their management based on the patients age (22% vs. 14%, $p=0.001$), which trended to be more commonly from surgical management to nonsurgical management (32% vs. 53%, $p=.057$). Non-hospital employed surgeons also trended to be more likely to apply a dorsal spanning plate (20% vs. 14%, $p=0.07$). Surgeons who independently have either been in practice longer than 10 years or who treat >100 DR fractures per year were more likely to choose surgical intervention and obtain a CT scan in their preoperative planning than surgeons who had been in practice less than 10 years or treat less than 100 DR fractures per year (54% and 50% vs. 39% and 43%, $p<0.001$ and $p=0.042$ respectively). In our regression analysis, the two most influential factors in decision making were the patient's age and medical comorbidities (32% and 18%, respectively); however, physician specific factors are the third most influential in medical decision making, accounting for 17% of the changes in treatment management. Of the physician specific factors, a surgeon's CAQ hand qualification (9%) was the most significant.

DISCUSSION AND CONCLUSION: Physician factors account for about 20% of management decisions. CAQh and more experienced (>10 years in clinical practice and >100 DR fractures treated per year) surgeons are more likely to operate on distal radius fracture. CAQh and non-hospital employed surgeons are more likely to utilize a dorsal spanning plate in their treatment algorithm. The dorsal spanning plate is potentially underutilized by non-CAQ and hospital employed surgeons for fixation of distal radius fractures. Surgeons with more experience are more likely to obtain a CT scan in their preoperative planning and choose surgical intervention as their definitive management. Our study confirms previous notions that a patient's age and medical comorbidities are the most important factors when deciding upon surgical treatment. This study suggests that physician specific variables have a significant impact on decision making and are critical to account for in the development of consistent objective treatment algorithms for distal radius fractures.