SCIENTIFIC ARTICLE

The Influence of Surgeon Age on Distal Radius Fracture Treatment in the United States: A Population-Based Study

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Purpose This study attempted to determine the extent to which surgeon age influences treatment patterns for distal radius fractures (DRFs). We hypothesized that younger surgeons perform open reduction internal fixation (ORIF) for DRFs among elderly individuals more frequently than older surgeons, who employ a wider range of treatment modalities.

Methods We identified 61,314 Medicare beneficiaries who experienced DRFs and the 12,823 surgeons who performed ORIF, external fixation, pinning, or closed reduction on them during 2007. We examined the effect of surgeon age on DRF treatment pattern, controlling for patient characteristics and other surgeon factors using multinomial logistic regression. We then stratified our analysis by American Society for Surgery of the Hand membership to more closely examine the influence of surgeon specialization on the association between surgeon age and DRF treatment.

Results Surgeons aged 40 years and younger were more likely to perform ORIF and less likely to choose external fixation and percutaneous pinning to treat DRFs, compared with older surgeons. Surgeon specialization mitigated this relationship, and American Society for Surgery of the Hand members were more likely to choose ORIF compared with nonmembers. However, surgeon age remained a significant predictor of treatment choice after controlling for other factors and surgeon specialization.

Conclusions Younger surgeons are more likely to perform ORIF for DRFs among Medicare beneficiaries over 65 years of age. Given the lack of evidence supporting any single treatment option for DRF, understanding the factors that drive dissemination of operative techniques may provide insight into treatment disparities within the Medicare population. *(J Hand Surg Am. 2014;39(5):844–851. Copyright © 2014 by the American Society for Surgery of the Hand. All rights reserved.)*

Type of study/level of evidence Therapeutic III.

Key words Distal radius fractures, open reduction internal fixation, surgeon age.

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Despite the prevalence of distal radius fractures (DRFs) in the United States, the optimal treatment for unstable fractures remains unclear.[1,2] Previous research demonstrates that variation in treatment is related to patient attributes such as socioeconomic status, and surgeon characteristics such as specialization in hand surgery.[2–4] Nonetheless, technologic advances in fracture fixation develop at a rapid pace, and it is challenging for surgeons to discern the comparative effectiveness of any single treatment strategy.[5] Understanding the surgeon-related factors that drive variation in practice can provide insight into how new techniques are disseminated into clinical practice and adopted by surgeons into their treatment algorithm.

Physician age is correlated with practice patterns and treatment outcomes for a variety of conditions.[6–13] For example, in a national study, younger physicians were more aggressive in choosing operative treatment in treating orthopedic fractures, compared with older surgeons.[14] Younger surgeons may also be more likely to integrate technologic advances into practice. For example, younger surgeons use laparoscopic techniques more frequently compared with older surgeons, possibly owing to differences in exposure to these techniques during training.[15] The effect of age on treatment patterns and performance is not linear, however, and lack of experience and surgeon youth were also correlated with poorer outcomes.[16,17] Although these age-related differences have been described in a variety of fields, the effect of surgeon age on the management of orthopedic fractures has not been described. For hand surgery, training pathways are variable, and many different types of providers may perform hand surgery. For example, orthopedic, plastic, and general surgeons perform hand surgery procedures. The training and scope of practice for each of these surgeon types can vary widely, and they are represented by different professional organizations. For many upper extremity procedures, each patient and injury pattern is unique, and few procedures have a dogmatic, cookbook approach.

The purpose of this study was to examine the effect of surgeon age on treatment patterns after DRFs among a cohort of Medicare beneficiaries in 2007. We hypothesized that younger surgeons more frequently perform open reduction internal fixation (ORIF) for DRFs, whereas older surgeons more frequently use alternative strategies such as percutaneous pinning, external fixation, or closed reduction and immobilization.

METHODS

Patient sample

Using Medicare MedPAR, Carrier, and Outpatient files, we identified all beneficiaries diagnosed in 2007 with fracture of the distal radius with or without an associated ulna fracture, who underwent ORIF, external fixation, percutaneous pinning, closed reduction and cast immobilization, or splinting within 2 weeks of diagnosis. Only patients who continuously enrolled in Medicare Part A and B were included in the study cohort. Patients who were younger than 65 years of age, were enrolled in a health maintenance organization plan, or had a diagnosis of bone cancer were excluded from the study sample. Owing to potential differences in fracture severity, we excluded all patients whose most invasive fracture treatment was cast immobilization or splinting without closed reduction (Fig. 1). We obtained approval from the institutional review board at our university for conducting the study before accessing the Medicare data.

We obtained demographic information from the Medicare Denominator File, including age, race, sex, and socioeconomic status (SES). The 9-digit residence zip code was used to construct SES according to 2000 United States Census data on income, education, and occupation, based on previously described methods.[18] We examined comorbid conditions using *International Classification of Diseases, 9th Revision*, codes in the index of Elixhauser et al[19] through 2007 for each patient drawn from the MedPAR, Outpatient, and Carrier files. The index is a list of 30 comorbidity conditions associated with increased length of hospital stay, charges, and overall mortality, such as congestive heart failure, chronic pulmonary disease, hypertension, and diabetes. Finally, we examined concomitant injuries occurring on the date of DRF diagnosis, including other fractures, neurologic condition (traumatic brain injury, subdural hematoma, and epidural hematoma), solid organ injury (liver laceration or contusion, spleen laceration or contusion, bowel injury, diaphragmatic rupture, and kidney laceration or contusion), and other injuries (specifically, pneumothorax and hemothorax).

Surgeon sample

We identified physicians managing each patient from the Medicare Outpatient and Carrier files using the Unique Physician Identification Numbers (UPINs). We designated the physician linked with the most invasive treatment within 2 weeks of DRF diagnosis as the surgeon for each patient. Surgeon age in 2007