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Original Article

Variability in orthopedic surgeon treatment preferences for nondisplaced scaphoid fractures: A cross-sectional survey

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ABSTRACT

Purpose: The absence of a best practice treatment standard contributes to clinical variation in medicine. Often in the absence of evidence, a standard of care is developed and treatment protocols are implemented. The purpose of this study was to examine whether the standard of care for the treatment of nondisplaced scaphoid fractures is uniform among orthopedic surgeons.

Methods: A survey of orthopedic surgeons actively practicing in the US or abroad was conducted to elicit preferred treatment strategies for nondisplaced scaphoid fractures. The surgeons were recruited at orthopedic conferences, clinical visits, and via email. The survey included demographic questions along with a short clinical vignette. The option for fracture management included surgical versus nonsurgical treatment. For those who chose nonsurgical treatment, type/duration of immobilization was recorded. Cost analysis was performed to estimate direct and indirect costs of various treatment options.

Results: A total of 494 orthopedic surgeons completed the survey. The preference for surgical treatment was preferred in 13% of respondents. Hand/upper extremity specialists were significantly more likely to operate compared with generalists ($p = 0.0002$). Surgeons younger than forty-five were nearly twice as likely to choose surgery ($p = 0.01$). There was no clear consensus on duration of immobilization as 30% of surgeons chose 6 weeks, 33% selected 8 weeks, and 27% opted for 12 weeks. Total cost of surgery was 49% greater than that of nonoperative treatment. With each additional week of immobilization for nonoperative treatment, the total costs of surgical treatment near that of nonoperative treatment.

Conclusion: There exist clear trends in how specific demographic groups choose to treat the nondisplaced scaphoid fracture. Whether these trends are the result of generational gaps or additional subspecialty training remains difficult to determine, but there is need to pursue a more consistent approach that benefits the patients and the health care system as a whole.

1. Introduction

The scaphoid is the most commonly fractured carpal bone.[1] Scaphoid fractures are estimated to account for up to 90% of carpal fractures and 2–7% of all fractures, occurring mostly among active adolescents and young adults.[2] The scaphoid is vulnerable to injury due to its anatomic position on the radial side of the wrist as the proximal extension of the thumb ray.[3] The primary mechanism of injury is a fall on the outstretched hand with an extended, radially deviated wrist.

Scaphoid fracture may be classified as stable versus unstable using the Herbert classification.[2] The Herbert classification system was intended to identify scaphoid fractures that would benefit most from surgical fixation. It was proposed that unstable fractures should predominantly be treated operatively, while most stable fractures can be treated conservatively. Regardless of fracture

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stability, in order to promote anatomic union and avoid the potentially deleterious sequelae of radiocarpal and midcarpal arthrosis as well as carpal malalignment, it is important that each fracture type be immobilized in a timely manner.[4] For displaced scaphoid fractures, there is a consensus that treatment should be surgical, typically via screw fixation.[3] In contrast, the evidence for treatment of nondisplaced scaphoid fractures remains unclear.[5]

The purpose of this study was to evaluate the preferred treatment methods for nondisplaced scaphoid fractures by surgeons domestically and internationally in an effort to gain understanding of what procedures physicians prefer. We hypothesized that although evidence may be unclear in how to approach the nondisplaced scaphoid fracture, there is a standard of care among orthopedic surgeons whether or not to operate, and how long to immobilize this fracture.

2. Materials and methods

A survey was conducted over ten months from August 2012 to June 2013 to elicit the preferred treatment strategies for a nondisplaced scaphoid fracture. The survey included demographic questions with a short clinical vignette. The vignette included significant past medical history, history of present illness, pertinent physical exam findings, and radiographic images for a patient with a nondisplaced scaphoid fracture (Appendix 1). Participants answered questions regarding their preferred treatment recommendations.

Physicians were recruited at orthopedic conferences, outpatient and inpatient clinical visits, and via email. The surveys were offered in both paper and electronic formats. All participants were orthopedic surgeons currently practicing in the United States or internationally at the time the survey was conducted.

2.1. Statistical analysis

Direct medical costs were estimated using published national Medicare rates for 2014. Medicare reimbursement data to physicians and other individual providers provides an indication of the relative effort, skill, and risk associated with each procedure, overhead expenses, and malpractice insurance. The current procedural terminology codes (CPT) used were 25,622 for nonoperative treatment and 25,628 for surgical treatment. The anesthesia fee schedule for surgical procedures is based on procedure time, which we have assumed to be 2 h for each operative procedure. We assumed that all of the open procedures were conducted at an ambulatory surgical center that is also reimbursed. For this later fee, we relied on the Medicare reimbursement experience of a large facility in the greater Washington DC area. We assumed that the closed procedure was not done in such a facility but used the higher non-facility reimbursement rate since that fee includes the overhead of a physician's office.

Indirect medical costs were estimated using a set of stylized assumptions. We assumed the following indirect costs: 80 min per physician visit, and based on the duration of immobilization or a cast, 15 min per day in activities of daily living, 30 min per week for missed opportunities and assistance from others, and 600 min per week in foregone productivity. The value of time was based on the average annual salary estimated by the Social Security actuaries, which for 2014 is assumed to be $49,372.25.

The assumptions were meant to capture the possibility of missed opportunities; which may arise from medical visits and reduced capacity. The value of this time was based on the estimated average wages used by the Office of the Actuary for Social Security.

A statistical analysis of the data was performed. Univariate analysis was run by applying chi-squared goodness of fit and Fisher exact tests to investigate the differences for categorical variables. A p-value of <0.05 was considered to be statistically significant.

2.2. Ethics, consent and permissions

The Georgetown University Institutional Review Board reviewed and deemed this study exempt on August 31, 2012. All participants gave implied informed consent.

3. Results

Overall, 493 physicians participated in the survey. The survey participants represented a fair reflection of the demographic composition of the field of orthopedics, according to the most recent release of Orthopedic Practice in the US in 2012 by the American Academy of Orthopedic Surgeons (AAOS). Concerning gender, the participants were 93.1% male and 5.9% female (AAOS – 92.9% and 4.9% respectively). In terms of degree of specialization, 30.4% considered themselves general orthopedic surgeons as opposed to 66.1% that subspecialize (AAOS –23% and 77% respectively) [Table 1]. Of the 493 respondents, the distribution of treatment methods for nondisplaced scaphoid fractures varied widely.

3.1. Surgical versus nonsurgical treatment

Surgical treatment was less commonly recommended compared with nonsurgical treatment (13% versus 80.3%) [Fig. 1].

Table 1
Characteristics of the study sample ($n = 493$).

	N	%
Age		
<46	228	46.2%
46–60	167	33.9%
>60	95	19.3%
Other	3	0.6%
Gender		
Male	459	93.1%
Female	29	5.9%
Other	5	1.0%
Setting		
Private practice	320	64.9%
MedSpec clinic	7	1.42%
University	28	5.68%
Other	138	27.99%
Classification		
General ortho surgeon	150	30.4%
Subspecialty orthopedist	326	66.1%
Other	17	3.4%
Subspecialty ($n = 326$)		
Adult reconstruction	14	4.3%
Arthroscopy	3	0.9%
Foot/ankle	60	18.4%
Hand	29	8.9%
Elbow/upper extremity	28	8.6%
Hip/knee/lower extremity	30	9.2%
Joints	26	8.0%
Trauma	24	7.4%
Pediatrics	24	7.4%
Spine	17	5.2%
Sports medicine	59	18.1%
Other	12	3.7%
Country		
United States	346	70.2%
International	147	29.8%
Time with patients (%)		
≤50	76	15.4%
51–75	80	16.2%
>75	323	65.6%