Ambulatory Spine Surgery: A Survey Study

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Global Spine J 2014;4:157–160.

Abstract

Study Design Cross-sectional study.

Objective To assess the current practices of spine surgeons performing ambulatory surgery in the United States.

Methods An electronic survey was distributed to members of the International Society for the Advancement of Spine Surgery. Data were initially examined in a univariate manner; variables with a p value < 0.25 were entered into a multiple logistic regression model. All statistical analyses were performed using the SAS System software Version 9.2 (SAS Institute, Inc., Cary, North Carolina, United States).

Results Overall, 84.2% of respondents performed some manner of ambulatory spine surgery, and 49.1% were investors in an ambulatory surgery center. Surgeon investors in ambulatory surgery centers were more likely to perform procedures of increased complexity than noninvestors, though limited data precluded a statistical correlation. Surgeons in private practice were more likely to perform ambulatory surgery (94.3%; $p = 0.0176$), and nonacademic surgeons were both more likely to invest in ambulatory surgery centers ($p = 0.0024$) and perform surgery at least part of the time in a surgery center ($p = 0.0039$).

Conclusions Though the numbers were too few to calculate statistical significance, there was a trend toward the performance of high-risk procedures on an ambulatory basis being undertaken by those with investment status in an ambulatory center. It is possible that this plays a role in the decision to perform these procedures in this setting versus that of a hospital, where a patient may have better access to care should a complication arise requiring emergent assessment and treatment by a physician. This decision should divest itself of financial incentives and focus entirely on patient safety.

Keywords
- spine surgery
- ambulatory surgery
- complications

Introduction

The performance of ambulatory surgical procedures is on the rise across all surgical fields, ranging from thyroid surgery[1] to cholecystectomy.[2] The field of orthopedic surgery has followed a similar path, with an ever-increasing practice trend of outpatient knee and shoulder arthroscopy[3,4] and more recently lumbar and cervical spine surgery.[5–8] Given these trends, we sought to assess the outpatient spine surgery environment and report the types of cases being performed by those surgeons who perform spine surgery in this setting.

We conducted a survey of spine surgeon members of the International Society for the Advancement of Spine Surgery (ISASS) regarding their experience with ambulatory spine surgery. In so doing, we hoped to characterize the current practice of spine surgeon members of this society, including

received
March 24, 2014
accepted
April 29, 2014
published online
June 9, 2014

DOI http://dx.doi.org/10.1055/s-0034-1378142.
ISSN 2192-5682.

the characteristics of respondents performing ambulatory surgery, the surgical procedures being performed, the setting of ambulatory surgery as well as the associated self-reported complications encountered during the performance of ambulatory surgery.

Materials and Methods

The electronic survey consisted of 25 questions and was distributed to members of the ISASS over a 3-month period from July through September 2012. After this time, the response Web link was disabled. By providing each respondent with a unique link, we avoided multiple responses from a single participant.

For the analysis of factors potentially associated with ambulatory spine surgery, data were first examined in a univariate manner using the Student t test for continuous variables and Fisher exact test for discrete data. For the multivariate analysis, variables with a p value < 0.25 were entered into a multiple logistic regression model, because we interpreted these variables as independent factors associated with the event or outcome of interest, over and above (adjusted for) other potential factors included in the equation. The logistic equation generates p values and odds ratios for each explanatory variable's association with the outcome of interest. For all statistical analysis, data were analyzed using the SAS System software Version 9.2 (SAS Institute, Inc., Cary, North Carolina, United States). The p values were not adjusted for multiple testing and a potential inflation of the type I error.

Results

The number of responses from U.S.-based surgeons totaled 57. We found that 75.4% of respondents were trained in orthopedic surgery, with the remainder having been trained in neurosurgery. In addition, 87.7% of surgeon respondents were spine fellowship trained; 61.4% were in private practice, 31.6% in academic practice, and 7.0% in a hospital employment position. The majority (54.4%) classify themselves as practicing in an urban environment, with 42.1% in a suburban environment and 3.5% in a rural area. 84.2% of respondents performed some manner of ambulatory spine surgery, whether in a hospital or ambulatory surgery center setting. Of the responding surgeons, 49.1% invest in an ambulatory surgery center; of those who perform surgery in such a center, 81.5% are investors; and in those performing ambulatory surgery in a hospital setting only, 21.1% invest in a surgery center (►**Table 1**). Common procedures were single- (performed by 70.8% of surgeons) or multiple-level (41.7%) lumbar microdiskectomy, single- (62.5%) or multiple-level (33.3%) lumbar laminectomy, and one- (54.2%) and two-level (39.6%) anterior cervical diskectomy and fusion. Surgeon investors in ambulatory surgery centers were more likely to perform procedures of increased complexity (i.e., multilevel anterior cervical fusion procedures) than noninvestors (21.4% versus 3.4%); in other words, of those performing such procedures, 85.7% were investors. The numbers in this analysis were too small to perform statistical analysis.

Table 1 Characteristics of survey respondents ($n = 57$)

Characteristic	*n*
Fellowship training	50 (87.7%)
Orthopedic surgeon	43 (75.4%)
Neurosurgeon	14 (24.6%)
Private practice	35 (61.4%)
Academic practice	18 (31.6%)
Hospital employment	4 (7.0%)
Urban environment	31 (54.4%)
Suburban environment	24 (42.1%)
Rural environment	2 (3.5%)
0–5 y in practice	8 (14.0%)
6–10 y in practice	6 (10.5%)
11–20 y in practice	20 (35.1%)
>20 y in practice	23 (40.4%)
Perform ambulatory surgery	48 (84.2%)
Hospital setting	19 (39.6%)
Ambulatory surgery center	10 (20.8%)
Both	19 (39.6%)
Investment in ambulatory surgery center	28 (49.1%)

Surgeons in private practice were more likely to perform ambulatory surgery (94.3%; $p = 0.0176$), and nonacademic surgeons (i.e., those in private practice or community hospital-based) were more likely to invest in ambulatory surgery centers (67.6%; $p = 0.0024$) and perform surgery at least part of the time in a surgery center ($p = 0.0039$; ►**Table 2**). In the univariate analysis, status as an orthopedic surgeon (versus a neurosurgeon) did not correlate with performance of outpatient surgery ($p = 0.5084$), with investment in an ambulatory surgery center ($p = 0.3084$), or with the location of the ambulatory surgery ($p = 0.9798$; ►**Table 3**). Of note, taken together as a group, being in practice for 20 years or less did correlate with the likelihood of investing in a surgery center ($p = 0.0333$; ►**Table 2**). Location of performance of ambulatory surgery did not appear to affect whether the primary surgeon co-operated with another surgeon. Among those performing ambulatory surgery at least sometimes in ambulatory surgery centers, 48.3% reported the availability of 23-hour observation should the patient require it; the remainder indicated that transfer to another facility would be necessary for further care. In addition, 10.3% of surgeons reported a complication that could not be addressed in the ambulatory center environment; 92% noted that in the event of such a complication, there was a protocol in place designed to manage such episodes.

Discussion

Cervical and lumbar spine surgery is being performed more commonly on an ambulatory basis,[5–8] possibly

Table 2 Multivariate logistic regression analyses

	p	OR (95% CI)
Model		
Private practice setting versus performance of ambulatory surgery	0.0176[a]	7.700 (1.427–41.556)
Nonacademic practice setting versus performance of ambulatory surgery at least part time in surgery center	0.0039[a]	11.459 (2.187–60.048)
Nonacademic practice setting versus investment in surgery center	0.0024[a]	9.854 (2.245–43.241)
≤20 y in practice versus investment in surgery center	0.0333[a]	4.050 (1.117–14.675)

Abbreviations: CI, confidence interval; OR, odds ratio.
[a]$p < 0.05$ (statistically significant).

Table 3 Univariate logistic regression analyses: surgeon characteristics versus likelihood of performing ambulatory surgery, location of ambulatory surgery, and investment in an ambulatory surgery center

Variable	Outcome	Perform ambulatory surgery	Ambulatory surgery at least part time in surgery center	Invest in surgery center
Orthopedic specialist		0.5084	0.9798	0.3084
Nonacademic practice setting		0.0219[a]	0.0039[a]	0.0012[a]
Urban practice location		0.4247	0.0466[a,b]	0.2205
≤20 y in practice		0.3174	0.0467[a]	0.0120[a]

[a]$p < 0.05$ (statistically significant).
[b]Based on measurement of suburban rather than urban location.

driven by the development of minimally invasive techniques, which has been shown to minimize immediate postoperative pain and accelerate postoperative recovery.[9–11] Another factor may be surgeon financial incentive when performing the surgery in a physician-owned ambulatory surgery center.[12] This survey was able to provide an overview of the characteristics of surgeons performing surgery on an outpatient basis, the location for the performance of the surgeries, and the types of cases being performed.

Based on the data gathered, practicing as a member of a nonacademic practice correlated with the performance of ambulatory surgery, the utilization of an ambulatory surgery center, and investment in an ambulatory surgery center. Likewise, being in practice for 20 or fewer years and being a member of a nonacademic practice correlated with investment in an ambulatory surgery center.

Finally, as noted above, though the numbers were too few to calculate statistical significance, there was a trend toward performance of both surgery in ambulatory surgery centers and procedures associated with increased risk (i.e., multilevel anterior cervical fusion procedures) on an ambulatory basis being undertaken largely by investors in an ambulatory center. Given the financial incentives involved in an ambulatory surgery center, it is possible that this plays a role in the decision to perform these procedures in this setting versus that of a hospital, where a patient may have better access to care should a postoperative complication arise requiring emergent assessment and treatment by a physician. Of some concern is that 8% of surgeons performing spinal procedures did not have a mechanism for dealing with complications that could not be managed in the ambulatory surgery center. Last, 10.3% of surgeons identified complications that could not be handled in their center.

Limitations to our study include those inherent to survey studies (sampling error, nonresponse error, coverage error) and a relatively small number of respondents. Ideally, a study such as ours would include survey distribution to a wider range of spine surgeon professional societies, providing a more thorough and accurate analysis of the patterns of performance of spine surgery in the ambulatory setting. The authors undertook this study not with the intention of criticizing the use of ambulatory surgery centers for spine surgery as a whole, but with the hope that this study will serve to open discussion on the types of procedures that can be safely performed in an ambulatory surgery center. This discussion should divest itself of financial incentives and focus entirely on patient safety and mechanisms to deal with complications that cannot be managed in ambulatory centers.

Disclosures
The authors did not receive grants or outside funding in support of their research or for preparation of this manuscript. This manuscript does not require approval from our

institution's Institutional Review Board. This manuscript does not describe the use of medical device(s)/drug(s).

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