

Higher Body Mass Index (BMI) and Low-Volume Surgeons Confer Increased Operative Complications in Anterior Spinal Exposures

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Background

Anterior spinal exposures performed by spine or vascular surgeons have a known complication rate of 2-11%. We present the largest single institution experience of anterior spinal exposures performed by Acute Care Surgeons.

The purpose of this study was to characterize the incidence of vascular and visceral injuries during spinal exposures and to identify risk factors contributing to operative complications during the exposure. We hypothesized that patients with a BMI >30 as well as low-volume surgeons (<20 operations) would have an increased complication rate.

Methods

All consecutive patients who underwent an anterior spinal exposure (thoracic or lumbar) by one of our six acute care surgeons over a five-year period (January 1, 2010-November 1, 2015) were included. A retrospective chart review was conducted examining demographics, pertinent history, laboratory values, operative findings and outcomes.

Demographics including indication for surgery, history of previous spinal surgery, age, gender and BMI were collected. Operative reports were reviewed for all intraoperative complications. Outcomes including return to OR, hospital and intensive care unit length of stay (LOS), 30-day mortality and re-admission were recorded. The Student's t-test with $\alpha = 0.05$ was used to determine statistical significance (GraphPad Prism v5.00, San Diego, CA).

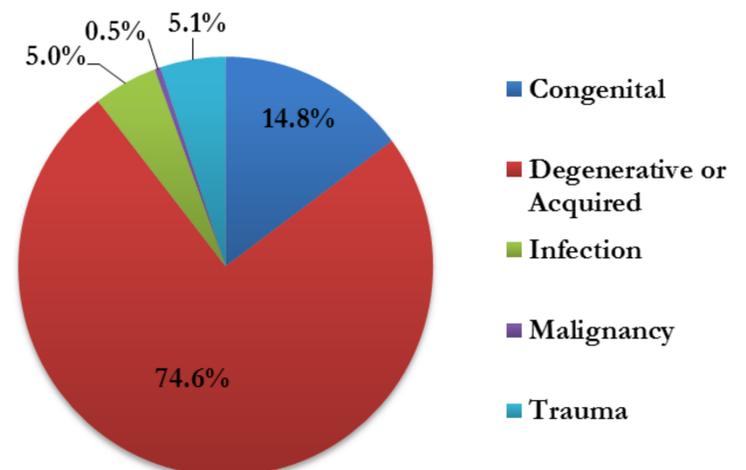
Results

1,170 patients underwent an anterior spinal exposure during the study period. Average BMI for the study population was 29.0 ± 6.3 . The median age at operation was 54.7 ± 12.7 (range 18-87) and 55% (n=643) of patients were female. Most exposures were performed at the lumbar level (88.1%). Average intensive care unit and hospital length of stay (LOS) were 4.8 ± 5.1 days and 7.6 ± 8.2 , respectively. 30-day mortality was low at <1% (n=7). About 10% of patients were re-admitted to the hospital within 30 days of their initial discharge.

Demographics		
Age		54.7 ± 12.7
Gender (n=1170)	Male (n=527)	45.0%
	Female (n=643)	55.0%
Race (n=1156)	White (n=997)	86.25%
	African American (n=99)	8.56%
	Hispanic (n=31)	2.68%
	Asian (n=7)	0.61%
	Unknown/Other (n=22)	1.90%
Exposure Level (n=1156)	Lumbar (n=1018)	88.1%
	Thoracic (n=138)	11.9%
BMI		29.0 ± 6.3
ASA Score (n=1141)	1 (n=59)	5.2%
	2 (n=534)	46.8%
	3 (n=524)	45.9%
	4 (n=23)	2.0%
Hospital LOS (days)		7.6 ± 8.2
ICU LOS (days)	(n=696)	4.8 ± 5.1
30-day Mortality (n=1170)	% Alive at 30 days (n=1063)	99%
	% Dead at 30 days (n=7)	0.60%
Re-admitted within 30 days (n=1170)	Yes (n=113)	9.66%
	No (n=1057)	90.3%

There were fifty-six major complications recorded: 43 vascular injuries, 10 returns to the operating room for bleeding and 3 visceral injuries, including two ureteral injuries and one lung laceration.

Indication for Spine Surgery



The major indication for surgery was degenerative or acquired disease (74.6%), followed by congenital disease (14.8%), followed by infectious and traumatic etiologies (5% each). Less than 1% of patients had malignancy as their primary disease process.

Complications

	Number (n=)	Total %
Total Complications (n=95)	95	8.12%
Vascular (n=43)		
Iliac Vein	39	3.33%
Arterial Injury	4	0.34%
Visceral Injury (n=3)		
Ureteral	2	0.17%
Lung	1	0.09%
Return to OR (n=10)		
Bleeding/Hematoma	9	0.77%
Bowel Obstruction	1	0.09%
Minor (n=36)		
Peritoneal Tear	35	2.99%
Diaphragmatic Injury	1	0.09%
Miscellaneous (n=3)		
DVT	2	0.17%
Rib Fracture	1	0.09%

Patients who experienced vascular complications tended to have a higher BMI (31.2 ± 7 versus 28.9 ± 6.3 , $p=0.02$). Low-volume surgeons had a higher rate of operative complications than high-volume surgeons ($21.6\% \pm 4.8\%$ versus $8.7\% \pm 3.8\%$, $p=0.04$). Age, gender, indication for procedure and previous history of spinal surgery did not confer a greater risk of operative complications.

Conclusions

In this, the largest single institution experience of anterior spinal exposures performed entirely by Acute Care Surgeons, we demonstrate a vascular complication rate of 3.5%, comparable to the published rate by spine or vascular surgeons. Obesity (BMI >30) confers a slightly higher risk for vascular injury. The overall risk of all operative complications increases when the exposure is performed by a low-volume surgeon. We recommend exposures be performed by a dedicated cadre of experienced acute care surgeons. Further study is required to determine the minimum number of mentored cases required before surgeons can achieve acceptably low complication rates.