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Assessing Variability in In-Hospital Complication Rates Between Surgical Specialties for Patients Undergoing Posterior Cervical Decompression and Fusion

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Learning Objectives

1) State what significant differences exist in in-hospital complication rates between orthopedic and neurological surgeons performing PCDF
2) Identify areas where each discipline can help the other improve their care of PCDF patients

Introduction

- Posterior cervical decompression and fusion (PCDF) is regularly performed by orthopedic and neurological surgeons
- Recent literature has cited differences in surgical opinion, practice patterns, and outcomes between these two specialties [1-3]
- As PCDF has a relatively high rate of complications compared to other cervical fusion procedures [4], the influence of surgical specialty on complication rates requires evaluation

Methods

- All patients undergoing PCDF by a spine surgeon at a single institution from 2006-2016 and in NSQIP from 2007-2015 were queried by CPT code
- Cohorts were created by primary surgeon specialty
- In-hospital complication rates were compared between specialties using bivariate and multivariate analyses

Results

- Orthopedic surgeons had a significantly higher proportion of patients with bleeding requiring transfusion in both the institutional sample (15% vs. 9.0%) and the national sample (11% vs. 6.2%)
- In the national sample, orthopedic surgeons were 1.7 times as likely to encounter an in-hospital complication than neurological surgeons (95% CI: 1.4 - 1.9; p<0.0001)

Table 1. Cohort Demographics

	Single Institution (n=1,221)			NSQIP (n=11,116)		
	Neurological Surgery (n=683)	Orthopedic Surgery (n=538)	p-value	Neurological Surgery (n=8,706)	Orthopedic Surgery (n=2,410)	p-value
Mean Age (SD)	58.53 (13.71)	58.43 (12.76)	0.89	61.11 (12.93)	60.16 (13.31)	0.002
Sex (male)	392 (57.39%)	332 (61.71%)	0.13	5,201 (59.74%)	1,380 (57.26%)	0.03
Mean ASA Status (SD)	2.63 (0.64)	2.45 (0.64)	<.0001	2.68 (0.64)	2.6 (0.66)	<.0001

Table 2.1. Comparison of In-Hospital Complication Rates by Specialty - Single Institution

	Orthopedic Surgery in NSQIP (n=2,410)	Neurological Surgery in NSQIP (n=8,706)	p-value
Airway Complications	26 (1.08%)	102 (1.17%)	0.71
Bleeding Requiring Transfusions	269 (11.16%)	538 (6.18%)	<.0001
Myocardial Infarction	6 (0.25%)	33 (0.38%)	0.34
Pulmonary Embolism	8 (0.33%)	31 (0.36%)	0.86
Cardiac Arrest	9 (0.37%)	25 (0.29%)	0.50
Cerebrovascular Accident	7 (0.29%)	19 (0.22%)	0.52
Deep Vein Thrombosis	9 (0.37%)	66 (0.76%)	0.04
Pneumonia	30 (1.24%)	137 (1.57%)	0.24
Renal Failure	2 (0.08%)	9 (0.1%)	1
Would Dehiscence	0 (0.00%)	9 (0.1%)	0.22
Surgical Site Infection	3 (0.12%)	18 (0.21%)	0.60
Sepsis	18 (0.75%)	67 (0.77%)	0.91
Septic Shock	17 (0.71%)	28 (0.32%)	0.009
Urinary Tract Infection	22 (0.91%)	89 (1.02%)	0.63
Death	10 (0.41%)	45 (0.52%)	0.53

Table 2.2. Comparison of In-Hospital Complication Rates by Specialty - NSQIP

	Orthopedic Surgery at a Single Institution (n=538)	Neurological Surgery at a Single Institution (n=683)	p-value
Airway Complications	0 (0.00%)	8 (1.17%)	0.01
Bleeding Requiring Transfusions	78 (14.5%)	62 (9.08%)	0.003
Myocardial Infarction	3 (0.56%)	5 (0.73%)	1
Pulmonary Embolism	4 (0.74%)	0 (0.00%)	0.04
Cardiac Arrest	3 (0.56%)	7 (1.02%)	0.53
Cerebrovascular Accident	0 (0.00%)	2 (0.29%)	0.51
Deep Vein Thrombosis	0 (0.00%)	4 (0.59%)	0.14
Pneumonia	4 (0.74%)	29 (4.25%)	0.0002
Renal Failure	6 (1.12%)	15 (2.20%)	0.15
Would Dehiscence	0 (0.00%)	0 (0.00%)	1
Surgical Site Infection	0 (0.00%)	3 (0.44%)	0.26
Sepsis	1 (0.19%)	5 (0.73%)	0.24
Septic Shock	0 (0.00%)	1 (0.15%)	1
Urinary Tract Infection	6 (1.12%)	8 (1.17%)	0.93
Death	0 (0.00%)	2 (0.29%)	0.51

Table 3. Odds of Having an In-Hospital Complication by Surgical Specialty

Patient Population	Odds Ratio (95% CI)	P-value	Odds Ratio Adjusting for Age, Sex & ASA Status (95% CI)	P-value
Single Institution	1.14 (0.85 - 1.55)	0.38	1.29 (0.95 – 1.75)	0.11
NSQIP	1.5 (1.31 – 1.71)	p<.0001	1.66 (1.44 – 1.9)	p<.0001

Conclusions

- When examining a large, national sample, this study demonstrates that orthopedic surgeons are more likely to encounter in-hospital complications than neurological surgeons when performing PCDF
- This difference was not present at the single institution, where spinal surgery is approached from an inter-disciplinary standpoint and two-surgeon spinal surgery is prevalent
- The point of this study is to encourage inter-disciplinary collaboration to decrease in-hospital complications and improve patient outcomes for patients undergoing PCDF

References

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