Comparative analysis of the Impacts of 30-day Perioperative Complications on Patient-Reported Outcomes following Multilevel Anterior versus Posterior Cervical fusion

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Introduction

The impact of perioperative complications on Patient Reported Outcomes (PRO) following anterior versus posterior cervical fusion has not been well studied. Thus, this study assesses the differences in the effects of 30-day perioperative complication on PROs and minimal clinically important differences (MCID) after anterior versus posterior cervical fusion.

Method

- Adult patients who underwent anterior or posterior cervical fusion at 3 or more levels between 2014 and 2020 were analyzed.
- Each group was sub-divided based on the occurrence and severity of perioperative complication: no complication versus minor versus major.

Study cohort

Anterior group (n = 146)
- No complication subgroup (n = 102)
- Minor complication subgroup (n = 36)
- Major complication subgroup (n = 8)

Posterior group (n = 55)
- No complication subgroup (n = 36)
- Minor complication subgroup (n = 13)
- Major complication subgroup (n = 6)

Analysis

- Primary outcome obtained at **preop**, **3-mos**, **1-yr**, and **last follow-up**: disability status (NDI, mJOA), pain intensity (NRS neck & arm), and functional outcome (SF-12 MCS & PCS) and minimal clinically important differences (MCID)
  - Within group comparison
  - Between group comparison
- Multivariable regression analysis adjusting for covariates with p < 0.1 was performed

Result

Complications	Anterior group (n = 146)	Posterior group (n = 55)	P value
Any complication	**82 (56.2)**	**22 (40.0)**	**0.041**
Any perioperative complication	44 (30.1)	19 (34.5)	0.184
Any major complication	8 (5.5)	6 (10.6)	0.178
VA injury	1 (0.7)	0	
Prolonged intubation	2 (1.4)	0	
Superficial wound infection	0	1 (1.3)	
Deep wound infection	0	1 (1.3)	
Symptomatic wound seroma	0	1 (1.3)	
C5 palsy	1 (0.7)	1 (1.3)	
C5/6 palsy	1 (0.7)	2 (2.6)	
Respiratory failure/re-intubation	2 (1.4)	0	
Stroke	2 (1.4)	0	
Myocardial infarction	1 (0.7)	0	
Any minor complication	42 (28.8)	15 (27.3)	0.834
Intraoperative transfusion	1 (0.7)	2 (3.6)	
Delirium	1 (0.7)	2 (3.6)	
Durotomy	4 (2.7)	1 (1.8)	
Urinary retention	21 (14.4)	8 (14.5)	
SIADH	3 (2.1)	2 (3.6)	
Acute kidney injury	2 (1.4)	1 (1.8)	
Uncomplicated pneumonia	1 (0.7)	0	
Dysphagia requiring NG tube	12 (8.2)	0	
Hoarseness	6 (4.1)	0	
New atrial fibrillation	0	1 (0.7)	

Within-Group Analysis: no complication vs major vs minor

	PROs	MCID
ANTERIOR GROUP	No significant difference	No significant difference
POSTERIOR GROUP	No significant difference	No significant difference

Between-Group Analysis: Anterior vs posterior group

	PROs	MCID
MAJOR COMPLICATION SUBGROUP	No significant difference	No significant difference
MINOR COMPLICATION SUBGROUP	No significant difference	No significant difference
NO COMPLICATION SUBGROUP	Anterior patients without complications had better improvement in **3-month NDI** (Coefficient 11.2 p=0.019)	Anterior patients without complications higher odds of achieving MCIDs for the **3-month mJOA** (OR 2.0 p=0.039)

References

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Conclusion

- Perioperative complication following anterior or posterior cervical fusion did not predict changes in PROs or the achievement of MCID in the anterior or posterior group.
- PRO may not fully differentiate the full extent of the impact of perioperative complication following anterior versus posterior cervical fusion.
- In subsets of patients without complication, anterior compared to posterior patients had improved NDI scores at 3 months with significant proportion of patients achieving MCID for mJOA at 3 months.

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