



Introduction

C2 fractures accounting for more than 20% of all cervical fractures. Recognition and proper managements of cervical fractures is necessary given that as high as 33% of all upper cervical spine injuries associated with neurologic deficit. The treatment approach for C2 fracture includes Occipitocervical (O-C) and C1-C2 fusion techniques, each with its distinct advantages and disadvantages. In this study, we evaluate 30-day surgical outcomes and the overall efficacy of C1-C2 fusion versus O-C fusion for patients with C2 fractures.

Methods

- The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was queried to determine 30-day outcomes following surgery for C2 fractures in adults between 2005 and 2016.
- Demographics, operative factors, and postoperative events were analyzed, including return to the operating room rate, readmission rate, and deaths.

Results

- 165 patients were identified in the population.
- A majority of the patients (142, 86.1%) had independent functional status, although 133 (80.6%) had an ASA classification ranging from 3-5, representing relatively poor preoperative health.
- The most common medical comorbidity was hypertension (101, 61.2%), followed by smoking (37, 22.4%), diabetes (21, 12.7%), and COPD (18, 10.9%).
- There were no statistically significant demographic and comorbidity differences between C1-C2 and O-C fusion.
- A significantly greater proportion of O-C (9.1%) versus C1-C2 fusion (1.7%) returned to the operating room (odds ratio 6.465, Confidence Interval 1.079-38.719, $p=0.0410$).
- The length of operation approached statistical significance ($p=0.0531$) between the two groups, with O-C fusion group having a longer average length of operation (196.4 minutes) versus the C1-C2 group (164.0 minutes).

Conclusions

This study provides a snapshot of the risk profiles for C1-C2 and O-C fusions for C2 fracture, showing statistically significant risk of reoperation in O-C fusion when compared to C1-C2 fusion. Future randomized trials are needed to explore a preferred technique to improve patient outcomes.

Learning Objectives

By the conclusion of this session, participants should be able to:

- Compare the advantages and disadvantages of C1-2 and occipitocervical (OC) fusion techniques for C2 fractures.
- Characterize comorbidities and risk factors predictive of reoperation and readmission for C1-2 and OC fusions.
- Identify the higher reoperation rate and length of operation in OC fusion versus C1-2.

Table 1

Postoperative events	Total	Surgical procedure		Univariate <i>p</i> value	Multivariate analysis	
		C1-C2 fusion	O-C fusion		t-test	Odds ratio
Readmission*	10	6 (5.45%)	4 (10.0%)	0.4579		
Return to OR	6	2 (1.7%)	4 (9.1%)	0.0440	6.465	1.079 - 38.719
Death (30 days)	3	3 (2.5%)	0	0.5655		
Length of stay, days (mean ± SD)	7.0 (+8.1)	6.6 (+8.5)	7.8 (+7.1)	0.4104		
Length of Operation, minutes (mean ± SD)	172.6 (+74.2)	164.0 (+58.9)	196.4 (+102.6)	0.0531		
Any complication	33	22 (18.2%)	11 (25.0%)	0.3329		
Bleeding Requiring Transfusion	17	12 (9.9%)	5 (11.4%)	0.7767		
Pulmonary						
Ventilator dependence >48 hours	6	5 (4.1%)	1 (2.3%)	1.0000		
Unplanned reintubation	5	3 (2.5%)	2 (4.6%)	0.6101		
Pneumonia	4	2 (1.7%)	2 (4.6%)	0.2891		
Urinary tract infection	5	3 (2.5%)	2 (4.6%)	0.6101		
Wound						
Deep incisional surgical site infection	3	1 (0.8%)	2 (4.6%)	0.1737		
Superficial surgical site infection	1	1 (0.8%)	0	1.0000		
Hematologic						
Deep vein thrombosis	2	2 (1.7%)	0	1.0000		
Pulmonary embolism	1	1 (0.8%)	0	1.0000		
Sepsis	2	0	2 (4.6%)	0.0699		
Stroke	1	1 (0.8%)	0	1.0000		

 SD: Standard Deviation
 *Data from 2011-2016 (n=150)

Postoperative events and complications for patients undergoing surgery for C2 fracture

