Incidence of surgical rib fixation at chest wall injury society collaborative centers and a guide for expected number of cases(CWIS-CC1)

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OBJECTIVE

Surgical stabilization of rib fractures (SSRF) improves outcomes in certain patient populations. The Chest Wall Injury Society (CWIS) began a new initiative to recognize centers who epitomize their mission as CWIS Collaborative Centers (CWIS-CC). We sought to describe incidence and epidemiology of SSRF at our institutions.

INTRODUCTION

Rib fractures are prevalent in the trauma population and affect at least 350,000 people each year in the US. This injury can result in prolonged pain, prolonged hospitalization, pneumonia, morbidity, the need for mechanical ventilation and potential long-term disability.

The surgical stabilization of rib fractures (SSRF) involves the surgical implantation of plates across the fracture site to hold the ribs in the correct anatomical position while they heal. SSRF has been shown to be highly beneficial for patients with severe rib fractures, demonstrating that they have a shorter hospital stay, a shorter recovery and are able to return to baseline activity faster than historical controls who did not have the operation.

METHODS

A retrospective registry evaluation of all patients (age > 15 years) treated at international trauma centers from 1/1/20 to 7/30/2021 was performed. Variables included: age, gender, mechanism of injury, injury severity score, abbreviated injury severity score (AIS), emergency department disposition, length of stay, presence of rib/sternal fractures, and surgical stabilization of rib/sternal fractures. Classification and regression tree analysis (CART) was used for analysis

RESULTS

Table 3 Injury severity and ED disposition for patients with rib fractures

	No SSRF ($n=5794$)	SSRF ($n=499$)	p value
Age	56 ± 21	58 ± 16	0.354
Male	67% (3860)	73% (384)	0.002
Blunt	96% (5554)	100% (495)	< 0.001
ED disposition			< 0.001
Ward	52% (3022)	29% (142)	
ICU	38% (2172)	67% (323)	
OR	3% (197)	4% (18)	
Home	5% (251)	0% (0)	
Transferred	0% (6)	0% (0)	
Died	2% (109)	0% (0)	
Other	1% (37)	3% (16)	
HLOS	4 (2–7)	9 (6–15)	< 0.001
ICULOS	0 (0–2)	2 (0–6)	< 0.001
Ventilator days	0 (0–0)	0 (0–1)	< 0.001
ISS	14 (9–22)	17 (13–24)	< 0.001
AIS head	0 (0–2)	0 (0–1)	0.381
AIS face	0 (0–1)	0 (0–1)	0.770
AIS neck	0 (0–0)	0 (0–0)	0.044
AIS thorax	3 (2–3)	3 (3–4)	< 0.001
AIS abdomen	0 (0–0)	0 (0–1)	0.015
AIS spine	0 (0–2)	0 (0–2)	0.010
AIS upper extremity	0 (0–2)	1 (0–2)	< 0.001
AIS lower extremity	0 (0–1)	0 (0–2)	0.025
AIS external	0 (0–1)	0 (0–0)	< 0.001
AIS other	0 (0–0)	0 (0–0)	0.513

ICU intensive care unit, *OR* operating room, *ED* emergency department, *HLOS* hospital length of stay, *ICULOS* intensive care unit length of stay, *ISS* injury severity score, *AIS* abbreviated injury severity score

RESULTS

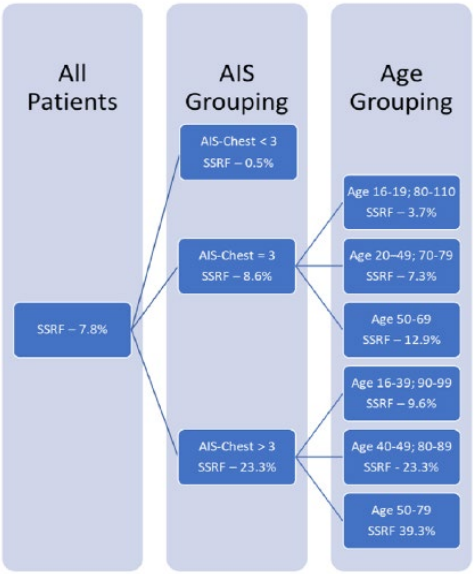

Fig. 1 Classification and regression tree model of the Incidence of surgical stabilization of rib fractures
AIS: Abbreviated Injury Score

CONCLUSIONS

Based on our historical rates of SSRF, the anticipated rate of SSRF can be calculated based on number of rib fractures, AIS-Chest, and age. The disproportionate rate of SSRF in patients age 50–69 with AIS-Chest 3 and age 50–79 with AIS-Chest > 3 should be further investigated as lower frequency of SSRF in the other age ranges may lead to care inequities.

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