

The PIC Score Over Triage Patients to the ICU

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Abstract

- Rib fractures are often reported to be the cause of high morbidity and mortality in trauma patients.
- The goal of this study was to determine if a modified PIC score (Pain, incentive spirometry, cough) could be used to triage patients with isolated rib fractures to the ICU.
- While patients with lower PIC scores were more likely to have longer ICU LOS ($p < .001$).
- Our data suggests PIC score is a poor predictor of patients requiring ICU care and leads to increased ICU utilization.

Introduction

- Rib fractures are one of the most common injuries occurring with blunt thoracic trauma occurring in 20-35% of patients¹
- Rib fractures are associated with high morbidity (48% complication rate) and mortality (22% of older adults)².
- In this study we are looking at preventable complications that are reversible by early triage.
- The primary complications that are evaluated include prolonged length of stay (LOS) in the hospital, pneumonia (PNA)⁵, respiratory difficulties, prolonged narcotic use and mortality.⁶⁻⁹
- Pain due to rib fractures adversely affects pulmonary functions and morbidity, which is why analgesia is very important.^{21,22} There are many scoring systems that have been used to identify rib fracture patients at high risk for complications but many lack correlations with an individualized pulmonary physiology.

Methods

- We performed a retrospective cohort study of patients using the National Trauma data bank (NTDB).
- Subjective Identification: Patients >18 y old with acute isolated rib fractures who were admitted from January 2019 to August 2020
- Exclusion criteria were younger than 18, and upon admission intubation, respiratory failure or altered mental status rendering patient unable to participate in incentive spirometry

Incentive Spirometry	Pain	Cough
4- above goal volume (>1500cc) 3-goal to alert volume 1 (750-1500cc) 2- below alert volume (<750cc) 1- unable to perform	3-controlled 2-moderate 1-severe	3-Strong 2-Weak 1- Absent

Figure 1: Modified PIC scoring system

Characteristic	ICU Admit No	ICU Admit Yes	p-value
Opioid meds given: No. (%)	132 (97.8)	121 (96.0)	0.414
Avg MME total 1 st 2 days: (Mean ± SD) Min, Max	56.8 ± 46.9 0, 241	70.1 ± 53.3 0, 254	0.034*
Total Hospital LOS (Mean ± SD) Min, Max	4.6 ± 4.0 1, 27	6.0 ± 4.7 1, 41	0.009*

Table 1: Opioid use and Hospital LOS in rib fracture patients admitted to ICU vs. hospital floor

Characteristic	ICU Admit No	ICU Admit Yes	p-value
Number of Patients	136	126	---
PIC Score 1 (Mean ± SD) Min, Max	6.5 ± 1.4 3, 9	5.3 ± 1.4 3, 9	<0.001*
PIC Score 1: No. (%)			<0.001*
≤ 4	11 (8.1) 26 (19.1)	41 (32.5) 33 (26.2)	
5	99 (72.8)	52 (41.3)	
≥ 6			
PIC Score 1: No. (%)			<0.001*
3	1 (0.7)	8 (6.4)	
4	10 (7.4)	33 (26.2)	
5	26 (19.1)	33 (26.2)	
6	26 (19.1)	27 (21.4)	
7	35 (25.7)	15 (11.9)	
8	29 (21.3)	9 (7.1)	
9	9 (6.6)	1 (0.8)	

Table 2: PIC scores in relation to ICU admission

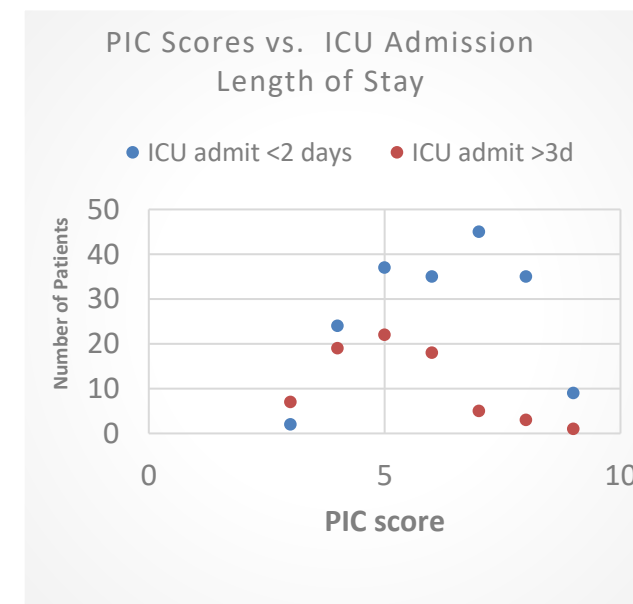


Figure 2: PIC scores vs. ICU Admission LOS

Results & Discussion

- Patients with multiple rib fractures have poorer outcomes, particularly elderly patients who are more immunocompromised and have risks of respiratory complications and infections.²⁶
- In this study, PIC scores do not significantly predict ICU need and may falsely increase patient's length of stay in the ICU. Patients that were admitted to the ICU had a variety of PIC scores including 41.3% of patients with PIC score >6 and there was no correlation of ICU stay and PIC score on admission.
- PIC scores were also not statistically correlated with mortality ($p=0.593$), need for upgrade care ($p=0.213$), or need for ventilator care ($p=0.631$). Patients admitted to the ICU also had a higher narcotic usage (70.1 vs 56.8 MME, $p=.034$).
- ICU LOS is also an important topic because it has been associated with an increase in the risk of complications and comes at a higher cost^{29,30}. There was no significant change in need for upgrade care to ICU from hospital floor with patients that have lower PIC scores

Conclusion

- In conclusion, the PIC score solely cannot predict ICU stay and treatment regimen for patients with rib fractures. Those who have a lower PIC score may still be able to go to hospital floor and avoid ICU admission but clinical correlation needs to be considered