Chest Wall Injury Society

Title of Presentation

BENDING THE LEARNING CURVE: ACHIEVING FASTER PROFICIENCY WITH INTRATHORACIC SURGICAL STABILIZATION OF RIB FRACTURES

Background

Surgical stabilization of rib fractures (SSRF) is used to restore chest wall integrity after trauma. Two primary SSRF techniques exist - intrathoracic and extrathoracic plating. This study compares learning curves and target operative times for both techniques at our institution.

Methods

A retrospective, single-institution cohort study was conducted at a Level I trauma center to analyze the learning curves of SSRF. 11 attending surgeons performed the extrathoracic technique and nine performed the intrathoracic technique from May 2015 to September 2025. 471 cases were assessed, and operative times were averaged across each surgeon's cases. Plating time and exposure/closure times are reported. Net cumulative sum (CUSUM) analyses with Savitzky-Golay filtering were performed to find proficiency points, while target times were found using two-sided CUSUM analyses. Statistical significance was determined using the Mann-Whitney U test.

Results

Surgeons demonstrated faster proficiency acquisition with the intrathoracic technique. When no co-surgeon was present, plating proficiency occurred after 7 cases for the intrathoracic approach and 17 cases for the extrathoracic approach. The target time per plate was achieved at 16:12 min/plate for the intrathoracic technique and 17:32 min/plate for the extrathoracic technique ($p<0.01$). For exposure/closure times, proficiency occurred after 33 cases for the intrathoracic approach and 71 cases for the extrathoracic approach. Target exposure/closure times were 79:05 min for the intrathoracic approach and 74:17 min for the extrathoracic approach ($p=0.027$).

Conclusion

Intrathoracic SSRF demonstrated more rapid proficiency in both rib plating and exposure. Once proficiency has been attained, operative times are expected to align with the target times and show continuous improvement towards mastery. These findings can help establish a framework to guide expectations when onboarding new surgeons with these techniques.

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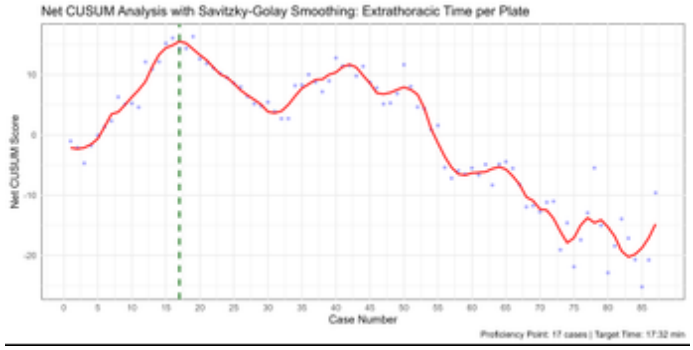

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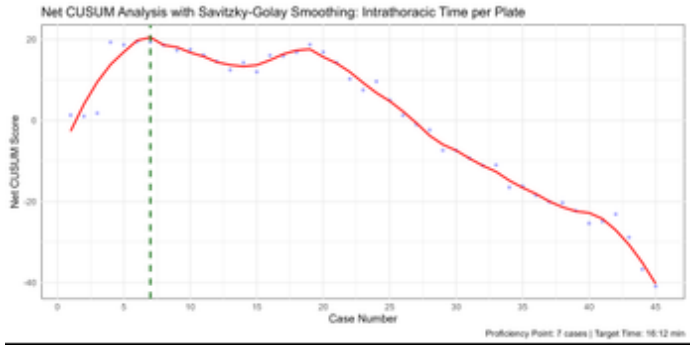

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