

Optimizing the Modified Bernie Norwood Criteria with History of Anticoagulation: A National Analysis of Very Early (< 24 hrs.) Versus Later VTE Prophylaxis in the Trauma Population

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Introduction

TBI patients are administered VTE prophylaxis (VTE PPX) to prevent VTE rates, which should be considered within the first 72 hours of the traumatic incident. The Parkland Modified Bernie Norwood Criteria (mBNC) is used to guide providers in the timing of VTE PPX; however, this guideline does not define very early (\leq 24 hours) VTE PPX timing in the moderate to high-risk categories.² Further, the mBNC does not consider pre-existing anticoagulant therapy into the algorithm.

Objective

This study sought to evaluate the effectiveness and in-hospital mortality among trauma patients who were administered very early VTE PPX in the low, moderate, and high-risk mBNC groups. using the mBNC.

Methods

Retrospective review of TQIP data including demographics, injury categories in-hospital complications, morbidity, ICD10 procedure codes with timing, comorbidity (anticoagulation or bleeding disorder) and in-hospital mortality.

Study Period
2017-2021

Inclusion
Blunt Isolated TBI Adults, Received LMWH, UFH or IVC Filter, No Missing Times

Analysis
Descriptive Statistics with Multicollinearity Test and Logistic Regression

Results

Logistic Regression Associated with In-Hospital Mortality Without Comorbid History of Anticoagulation or Bleeding

mBNC	Effect	OR	95% C.I.	P-Value
Low-Risk	Early \leq 24h	.30	.23-.39	<.01
	Mid > 24h	.35	.30-.41	<.01
Mod-Risk	Early \leq 24h	.79	.62-1.00	.05
	Mid > 24h	.57	.50-.66	<.01
High-Risk	Early \leq 24h	1.55	.96-2.51	.06
	Mid > 24h	1.35	1.13-1.62	<.01

Logistic Regression Associated with In-Hospital Mortality With Comorbid History of Anticoagulation or Bleeding

mBNC	Effect	OR	95% C.I.	P-Value
Low-Risk	Early \leq 24h	.36	.25-.51	<.01
	Mid > 24h	.30	.24-.37	<.01
Mod-Risk	Early \leq 24h	.67	.46-.97	.03
	Mid > 24h	.52	.43-.62	<.01
High-Risk	Early \leq 24h	2.11	1.06-4.18	.03
	Mid > 24h	1.39	1.10-1.75	<.01

Discussion

Our study (N=99,078) supports existing literature that the early initiation of chemical VTE prophylaxis can be safely and effectively performed in low-risk patients in prevention of VTE complications. This includes patients with a pre-existing history of anticoagulation, providing valuable support to this body of literature

Conclusion

This study reports effectiveness in preventing VTE and mortality, with the absence of neurosurgical procedures only in the low-risk mBNC group regardless of anticoagulation or bleeding history. Early VTE PPX in the high-risk group prevents VTE; however, associates with a higher likelihood of mortality.

References

1. American College of Surgeons Trauma Quality Improvement Program. Best Practices in the Management of Traumatic Brain Injury. Committee on Trauma. 2015.
2. Pastorek R, Cripps M, Bernstein I, et al. The Parkland Protocol's Modified Berne-Norwood Criteria predict two tiers of risk for traumatic brain injury. J Neurotrauma. 2014;31(20):1737-1743.



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