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Effect of Coagulopathy on Outcomes in Traumatic Intracerebral Hemorrhage Patients from Nationwide Database

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Learning Objectives

- Identify the role coagulopathies play in management of traumatic intracerebral hemorrhage (ICH)
- Recognize how coagulopathy affects traumatic ICH outcomes
- Understand the importance of stratifying treatment in traumatic ICH

Introduction

- Traumatic intracerebral hemorrhage (ICH) accounts for 13-35% of traumatic brain injury (TBI) and is a major cause of death and disability [1]
- ICH is commonly complicated by coagulopathy, often leading to poorer outcomes such as hematoma expansion and mortality [2]
- An increasingly aging population means more people are taking OACs (e.g. warfarin) [3]
- Current guidelines involve withdrawal of anticoagulant agent and administration of replacement factors [4]
- There have been no recent large-scale studies assessing outcomes of traumatic ICH patients with coagulopathies

Methods

- The American College of Surgeons Trauma Quality Improvement Program (ACS-TQIP) data set was queried for the years 2010 through 2015
- Descriptive statistics were run to characterize patients with a noted bleeding disorder compared to those without a coagulopathy
- Univariate analysis using chi-square and Student's t-tests were used to assess outcomes and multivariable regression analyses were run to compare outcomes while controlling for relevant comorbidities and demographics

References

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3. Barnes GD, Lucas E, Alexander GC, Goldberger ZD. National Trends in Ambulatory Oral Anticoagulant Use. Am J Med. 2015;128(12):1300-1305.e2.
4. McMillian WD, Rogers FB. Management of prehospital antiplatelet and anticoagulant therapy in traumatic head injury: a

Results

Table 1. Characteristics of patients with ICH from 2010-2015

	No Bleeding Disorder (n=1591)	Bleeding Disorder (n=96)	p-value
Age*	51.5 (21.0)	70.7 (13.7)	<0.0001
Sex (male)	1135 (73.2%)	60 (62.5%)	0.02
Race			0.03
White	1136 (73.2%)	84 (87.5%)	
Black	144 (9.3%)	4 (4.2%)	
Asian	36 (2.3%)	0	
Other	142 (9.2%)	6 (6.3%)	
Injury Severity Score*	16.75 (8.7)	16.98 (7.62)	0.80
GCS Score			0.23
13-15	1026 (66.2%)	71 (74.0%)	
9-12	185 (11.9%)	7 (7.3%)	
<9	340 (21.9%)	18 (18.8%)	

*data presented as mean (SD)

Table 2. Comorbidities of patients with ICH from 2010-2015

Comorbidities	No Bleeding Disorder (n=1591)	Bleeding Disorder (n=96)	p-value
Congestive Heart Failure	37 (2.4%)	10 (10.4%)	<0.0001
Current Smoker	265 (17.1%)	7 (7.3%)	0.01
History of CVA	32 (2.1%)	6 (6.3%)	0.008
Diabetes	138 (8.9%)	22 (22.9%)	<0.0001
Functionally Dependent	21 (1.4%)	6 (6.3%)	0.0002
Hypertension	398 (25.7%)	66 (68.8%)	<0.0001
Chronic Obstructive Pulmonary Disease	80 (5.2%)	18 (18.8%)	<0.0001
History of Dementia	41 (2.6%)	6 (6.3%)	0.04

Table 3. Outcomes and complications of patients with ICH from 2010-2015

Complication	No Bleeding Disorder (n=1591)	Bleeding Disorder (n=96)	p-value
Any Complication	619 (39.9%)	32 (33.3%)	0.2
Pulmonary Complication	155 (10.0%)	14 (14.6%)	0.15
Clotting Complication	64 (4.1%)	6 (6.3%)	0.32
Infective Complication	156 (10.1%)	15 (15.6%)	0.08
Wound Complication	10 (0.6%)	0	1
Length of Stay*	9.68 (11.7)	11.51 (11.5)	0.16
Days in the ICU*	6.05 (7.3)	7.30 (9.8)	0.3
Days on a Ventilator*	7.38 (8.0)	9.45 (8.6)	0.24

*data presented as mean (SD) with patients who died removed from analysis

Table 4. Backwards selection modeling for complications and death in patients with ICH

Bleeding Disorders		
	OR (95% CI)	p-value
Mortality[1]	1.57 (0.72-3.42)	0.26
Complications[2]	1.62 (0.93-2.80)	0.08
Craniotomy[3]	0.41 (0.05-3.09)	0.39

1. Controlled for age, sex, injury severity score, GCS Score, diabetes, psychiatric illness, drug use
2. Controlled for age, sex, injury severity score, GCS score, alcohol use, diabetes, drug use,
3. Controlled for age, injury severity score, GCS score

Conclusions

Our results suggest that current methods for reversing pathological coagulopathy work effectively insofar as mitigating adverse effects of the coagulopathy itself as seen by the similar outcomes among ICH patients