

Incidence and Risk Factors for Development of Pulmonary Emboli in Severe Traumatic Brain Injury

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Introduction

Pulmonary emboli (PE) are a significant source of morbidity and mortality trauma patients. The use of chemical prophylaxis to prevent deep venous thrombosis (DVT) and subsequent PE is still controversial given its risk of causing increased intracranial hemorrhage expansion. In the present study we evaluated the incidence of PE in severe traumatic brain injury as well as the impact of chemoprophylaxis.

Methods

We conducted a retrospective review of patients who were admitted to a tertiary medical center's Neurosurgical Intensive Care Unit from 2011-2013. Severe traumatic brain injury (TBI) was defined as patients who received invasive intracranial pressure monitoring within 48hrs of admission. Patients who were less than eighteen years of age, had a DVT on admission, pre-existing inferior-vena-cava filter, on chronic anti-coagulation, and death within 72hrs of admission were excluded. Demographic Data, etiology of TBI, hospital and Intensive Care Unit length of stay were all determined. Fisher's exact test was utilized to determine the incidence and mortality of PE with and without chemoprophylaxis. The Mann-Whitney U test was used to determine length of stay.

Results

There were 155 patients who met the study criteria. The incidence of PE was 2.58%. The cohort was mainly composed of white (71.6%), male (76.77%) with mean age of 23.03 +/- 15.79. The majority of TBI were subdural hematomas (62.6%). There was no statistical difference between the patients who developed PE with prophylaxis and without (p = 0.58). Coronary artery disease carried an increased risk of developing PE (p = 0.035)(Table 1). In multivariate logistic regression analysis of PE both length of hospital stay (p = 0.0119) and coronary artery disease (p = 0.0271) were significant. Hospital length of stay was significantly increased by development of a PE (27.82 +/-21.78 vs. 61.24+/- 25.74 days, p = 0.01)(Table 2).

Conclusions

Our data is limited by a low incidence of PE in this cohort of patients, but does show increased risk of PE in patient with coronary artery disease and longer hospital stays. Additionally, development of a PE led to significantly increased length of hospital stays and increased costs.

Learning Objectives

- 1. Incidence of Pulmonary Embolism in Severe Traumatic Brain Injury
- 2. Risk factors for development of PE in severe Traumatic Brain Injury
- 3. Differences in anti-coagulation in development of PE

	Univa	Univariate Odds Ratio of PE		
Predictor	OR estimate	LCL95%	UCL95%	P-Value
Race/Ethnicity (hispanic)	0.000	0.000	5.481	0.576
Race/Ethnicity (other)	0.000	0.000	13.645	1.000
Sex(female)	0.000	0.000	5.046	0.574
HTN	0.000	0.000	3.374	0.312
COPD	0.000	0.000	36.398	1.000
CAD	0.000	0.000	11.961	1.000
Liver_disease	0.000	0.000	19.262	1.000
Renal_disease	0.000	0.000	43.851	1.000
Obesity	4.174	0.074	57.31	0.278
Smoker	0.000	0.000	5.046	0.574
SAH	0.216	0.004	2.76	0.302
EDH	0.000	0.000	7.309	1.000
SDH	0.000	0.000	0.881	0.018
IPH	-	1.575	-	0.008
IVH	1.673	0.031	21.833	0.524
Contusion	1.027	0.019	13.237	1.000
Cerebral_edema	13.443	1.035	725.423	0.023**
DAI	1.673	0.031	21.833	0.524
Progression	0.000	0.000	19.262	1.000
DVT	2.444	0.044	32.361	0.411
Anticoagulation (No)	0.000	0.000	5.659	0.579
IVC filter	4.897	0.383	262.03	0.299

* Other is African American, Asian, and Native American. Relative risks for Hispanic and other are relative to White.

** P-value < 0.05

1. Fisher's exact test.

