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## VENOUS SINUS THROMBOSIS AND TRAUMATIC BRAIN INJURY: IS ANTICOAGULATION SAFE?

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**INTRODUCTION:** Patients with traumatic brain injury (TBI) and concomitant venous sinus thrombosis (VST) present a traditionally difficult decision matrix. No guidelines exist with data driven recommendations on how to manage this situation. We hypothesize that therapeutically anticoagulating patients with concomitant TBI and VST will worsen intracranial bleeding and lead to worse outcomes.

**METHODS:** This is a single-center retrospective review of treatments and outcomes for all trauma patients with both TBI and VST from 2017 – 2022 at our academic, level 1 trauma center. Patients were divided into two groups, those that received therapeutic anticoagulation started and those that did not. The primary outcome was in-hospital mortality. Secondary outcome was worsening radiographic findings after starting therapeutic anticoagulation. All patients' radiographic data were independently reviewed by a blinded radiologist.

**RESULTS:** There were 20 patients with concomitant TBI and VST injuries identified and analyzed. Ten (50%) patients received therapeutic anticoagulation while 10 (50%) did not receive therapeutic anticoagulation during this time. There were no significant differences between the demographics, types of TBI, and types/locations of VST of these two groups. The therapeutic anticoagulation patients were all treated with a heparin infusion. Of the other ten patients, three did not receive any anticoagulation at all, and 7 received aspirin (81mg) only. There was no significant difference in in-hospital mortality between no anticoagulation and anticoagulation groups, respectively (30% vs 20%  $p=0.63$ ). The group that did not receive therapeutic anticoagulation actually had a higher rate of radiographic progression of TBI (71% vs. 0%,  $p<0.001$ ).

**CONCLUSIONS:** The use of therapeutic anticoagulation of VST in patients with concomitant TBI was not associated with radiographic worsening of TBI or mortality.

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## ASSOCIATION OF SMOKING AND HOSPITAL MORTALITY IN CRITICALLY ILL PATIENTS WITH TRAUMATIC BRAIN INJURY

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**INTRODUCTION:** Tobacco smoking before or after traumatic brain injury (TBI) is associated with diminished recovery. Studies have suggested possible neuroprotective effects of nicotine, an element of tobacco smoke, among patients with TBI. However, the population-level association of smoking with in-hospital mortality among critically ill TBI patients is unknown.

**METHODS:** We used a statewide dataset to identify hospitalizations aged  $\geq 18$  years with ICU admission and a diagnosis of an initial encounter for TBI in Texas during 2016 through 2021. Smoking was defined using ICD-10 codes F17.200 and Z87.891. A principal diagnosis of an initial encounter for TBI was identified using ICD code-based Clinical Classification Software Refined Category INJ008. Three models estimated the association between smoking and in-hospital mortality. Multilevel logistic regression with propensity adjustment was the primary analysis approach with propensity score matching and multivariable logistic regression without propensity score adjustment applied as alternative analyses. Additional analyses were completed for patient subgroups, categorizations of hospitalizations, and for the secondary outcome of short-term mortality.

**RESULTS:** Among 62,070 TBI hospitalizations, 9,731 (15.7%) had a history of smoking. Compared to TBI hospitalizations without a history of smoking, those with smoking were older (65.9% vs 52.4% aged  $\geq 65$  years), more often male (65.6% vs 56.0%), more frequently had chronic lung disease (18.5% vs 8.7%) and had lower need of invasive mechanical ventilation (13.6% vs 23.8%) [ $p < 0.0001$  for all comparisons]. Unadjusted in-hospital mortality for TBI patients with and without smoking was 6.0% vs 10.7%. On adjusted analyses, smoking remained associated with lower odds of in-hospital mortality (adjusted odds ratio [aOR] 0.80 [95% CI 0.70–0.91]). The results were similar for alternative modeling approaches, subgroup analyses, sensitivity analyses, and the secondary outcome of short-term mortality.

**CONCLUSIONS:** Smoking was associated, unexpectedly, with markedly lower risk of both in-hospital and short-term mortality among critically ill patients with TBI. Further studies are needed to explore the mechanisms of the apparent "protective" association of smoking in TBI.