

In the trauma setting, targeting the ventricles with a blind freehand technique is challenging due to distorted anatomy. Failure to cannulate lead to multiple passes with a higher risk of complications. **Methods:** A retrospective study from a single institution was conducted using a trauma registry between March-2014 and March-2019 were included. Accuracy of EVD placement was determined using the Kakarla grading system **Results:** 224 TBI patients with total of 241 EVDs were performed, 211 met our criteria. Among them, Grade-1 (optimal placement) was achieved in 39.3%, Grade-2 (suboptimal in non-eloquent tissue) in 21.8% and Grade-3 (suboptimal in eloquent tissue) in 38.9%. A total of 74 EVDs were inserted in the intensive care unit, while 137 EVDs were inserted in the operating room. Our accuracy for ICU insertions was 50%, 25.7%, 24.3% for Grades 1, 2 and 3 respectively, while our OR insertion accuracy was 33.6%, 19.7%, and 46.7% **Conclusions:** EVD is commonly performed, yet a substantial rate of inaccuracy is reported. This highly suggests the need to improve accuracy, possibly with the adjunct of image-guided techniques, to further optimize catheter placement

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Off-road vehicle fatalities and alcohol in patients with major traumatic brain injury: the risk of impaired driving

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Background: Intoxicated patients injured in off road vehicle (ORV) crashes have higher rates of traumatic brain injury (TBI) and intensive care unit (ICU) admission, as well as prolonged ICU length of stay. This study evaluated the impact of alcohol intoxication on mortality among major TBI patients injured in off-road vehicle crashes. **Methods:** A retrospective analysis (2002-2014) of off-road vehicle injuries in Nova Scotia resulting in major TBI was performed. ORVs included ATVs, snowmobiles, and dirt bikes. A logistic regression model was constructed to test for in-hospital mortality and adjusted for age, Abbreviated Injury Scale (AIS) Head, Injury Severity Score, and blood alcohol concentration (BAC). **Results:** There were 176 drivers and passengers of off-road vehicles. Overall mortality was 28%. BAC testing was performed in 61% patients; 85% of pre-hospital deaths were BAC positive (mean BAC=31 ± 17.39 mmol/L) and 70% in-hospital deaths were BAC positive (mean BAC=26 ± 23.12 mmol/L). After adjusting for confounders, high injury severity and intoxication increased the likelihood of in-hospital mortality. **Conclusions:** These findings demonstrate that alcohol intoxication is a significant risk factor for mortality among off-road vehicle collisions; for every mmol/L change in BAC, there was a 10% increase in the chance of in-hospital mortality.

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Impact-detecting helmets as indicators of concussion and blood brain barrier integrity in university football players

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Background: Repetitive sub-concussive head impacts have been associated with changes in brain architecture and neurological symptoms. In this study, we examined the association between repetitive sub-concussive impacts, impact burden, and blood brain barrier (BBB) integrity in university football players. **Methods:** 59 university football players were followed over the 2019 season. Athletes with diagnosed concussion and those sustaining impacts that alerted a sideline impact monitor (relayed by ferroelectric helmet sensors) underwent dynamic contrast-enhanced MRI (DCE-MRI) within one week of injury/alert, and 4 weeks following initial incident. **Results:** Helmets recorded 2648 impacts over 48 cumulative hours. 8 concussions occurred during the 2019 season (2.82 per 1000 activity hours). On average, athletes with a diagnosed concussion had 55.3 impacts to the front sensor, compared to 14.1 in non-concussed athletes. Athletes who consented to DCE-MRI (n=5) had 10.78% BBB-D within a week of concussion/alert, and 6.77% BBB-D at 4-weeks. **Conclusions:** We show quantification of BBB integrity relative to head impact burden for the first time. This preliminary study highlights the potential of impact-detecting helmets to provide relevant impact characteristics and offers a foundation for future work on neurological consequences of repetitive sub-concussive impacts.

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Transcranial Doppler Based Continuous Assessment of Cerebrovascular Reactivity in Adult Traumatic Brain Injury: A Scoping Review of Associations with Outcomes

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Background: Disruption in cerebrovascular reactivity following traumatic brain injury (TBI) is a known phenomenon that may hold prognostic value. Transcranial Doppler (TCD) has been employed to evaluate cerebrovascular reactivity following injury utilizing a continuous time-series approach. **Methods:** A systematically conducted scoping review of the literature on the association of continuous time-domain TCD based indices of cerebrovascular reactivity, with outcomes following moderate and severe TBI was performed. Multiple databases were searched