

Brain Imaging Assessment of Intubated Traumatic Brain Injury Patients With and Without Delirium and Hematoma Location

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Introduction

Traumatic Brain Injury (TBI) can have devastating effects on neuropsychiatric functioning. 50% of TBI patients develop delirium in the first 4 days after TBI. Delirium is known to prolong intubation, is associated with worse functional outcomes, and long-term cognitive impairments. However, the neuroanatomical basis for delirium in patients with TBI is currently uncertain.

We tested the hypothesis that brain injury location is predictive of delirium in patients with TBI.

Methods

This IRB approved study utilized a retrospective chart review that included 132 charts of individuals with TBI intubated in the neurocritical care setting. Patients were divided into 2 groups: delirium versus no delirium (identified using ICD code) and their brain imaging results were reviewed for injury location.

Table

Delirium Injury Location and Characterization	N	Percent
Bilateral	26	0.54
Left Only	13	0.27
Right Only	7	0.15
Neither	2	0.04
Frontal Lobe	32	0.68
Epidural	4	0.09
Subdural	22	0.47
Subarachnoid	24	0.51
Intraparenchymal	19	0.40

Results

There were 48 intubated TBI patients with delirium evaluated. The average age was 47 years old and majority were male (81%). Brain imaging showed majority of hematomas were located in the frontal lobe (68%) and 44% of these injuries were bilateral. Overall, 54% of patients with delirium had bilateral injury, regardless of TBI location. 13 patient (27%) had left sided only injury and 7 (15%) had right sided only injury. Other injury locations seen involved subdural (n=22, 47%), subarachnoid (n=24, 51%), intraparenchymal (n=19, 40%) and epidural (n=4) regions.

80 intubated TBI patients without delirium were evaluated. The majority had injury located in the frontal lobe (47%). 13 patients (17%) were left sided only and 25 (33%) were right sided only. Other injury locations seen were subdural (n=32, 40%), subarachnoid (n=25, 31%), combination SDH and SAH (n=13), and epidural (n=4).

Brain imaging assessment (hematoma location):

A total of 32 patients had frontal lobe involvement to their TBI, which accounted for 68% of intubated TBI patients with delirium. Further assessing frontal lobe injuries, the majority of those with frontal lobe injuries were affected bilaterally, n=21 (44%). Those with left-side only frontal injury were n=13 (27%) and with right-sided only were n=4 (8.5%).

Thus, in the delirium group, majority of unilateral injuries were left sided only (n=13, 27%) compared to 7 (15%) right only injuries. In the non-delirium group, majority were right sided (n=25, 33%), compared to 13 (17%) left.

Discussion

While their study included a broader population than TBI alone, Naidech et al found that right sided lesions predominated in patients with intracerebral hemorrhages and delirium. In our preliminary analysis, injury location for TBI patients with delirium were predominantly left sided, while the non-delirium group was mostly right sided.

Conclusion: Prospective studies are needed to see if left sided injury in TBI is an increased risk factor for delirium.

References

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