BIG Kids: Utilizing the Brain Injury Guidelines in a Pediatric Trauma Center

Allison McNickle, MD; Stephanie Jones, DO; Judith Ben Ari, MD; Stephanie Streit, MD; Mais Yacoub, MD; Dina Bailey, BSN, RN, CSTR; Douglas Fraser, MD

BACKGROUND

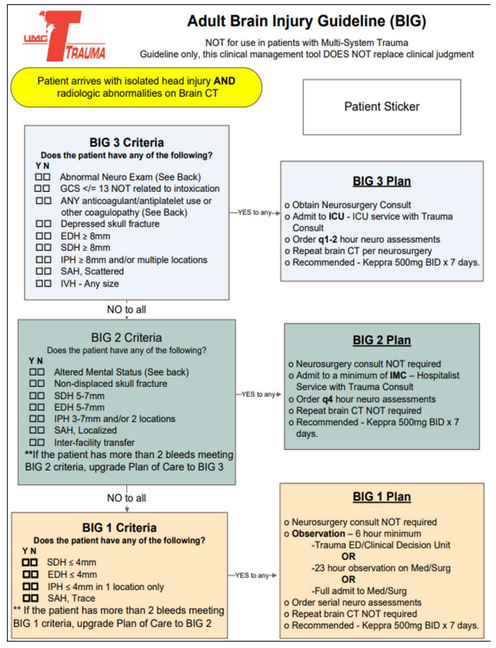
- Brain Injury Guidelines (BIG) were developed to stratify the severity of traumatic brain injuries (TBI) based on history, neurologic exam and initial CT imaging (Joseph et al, JTACS 2014)
- The guidelines provide an algorithm for admission, repeat CT imaging and neurosurgical consultation based on severity of TBI to optimize resource utilization.
- A study of BIG 1 pediatric TBIs managed without neurosurgical consultation demonstrated safety and efficacy with a reduction in repeat CT scans (Azim et al, JTACS 2017, Schwartz et al, JSR 2020)

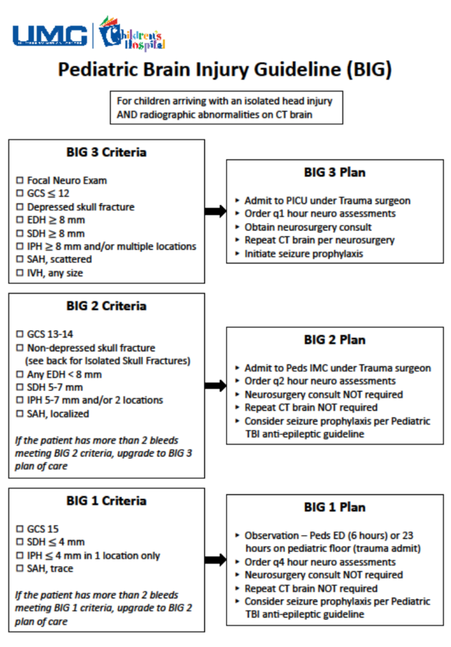
PURPOSE

The purpose of this study was to evaluate the impact of implementing pediatric-specific BIG criteria (pBIG) for our isolated pediatric TBIs.

METHODS

- TBIs were queried from the University Medical Center Level II Pediatric Trauma Registry from 2017-2020
- Excluded if polytrauma, isolated non-depressed skull fractures, penetrating brain injury, or died prior to admission
- Data included age/gender, type of injury, repeat head CT, neurosurgical consultation, neurosurgical intervention, length of stay and mortality





Results-Demographics and TBIs

	pBIG 1 (n=29)	pBIG 2 (n=104)	pBIG 3 (n=181)
Age, y, mean (SD)	6.0 (6.3)	4.7 (5.4)	4.8 (5.3)
Males, n (%)	12 (41.4)	58 (55.8)	108 (59.7)
Skull fracture, n (%)	--	81 (77.9)	132 (72.9)
Epidural hematoma, n (%)	--	16 (15.4)	34 (18.8)
Subdural hematoma, n (%)	16 (55.2)	59 (56.7)	87 (48.1)
Intraparenchymal hemorrhage, n (%)	1 (3.5)	15 (14.4)	31 (17.1)
Subarachnoid hemorrhage, n (%)	12 (41.4)	21 (20.2)	39 (21.6)
Intraventricular hemorrhage, n (%)	--	--	10 (5.6)

Results-Management and Outcomes

	pBIG 1 (n=29)	pBIG 2 (n=104)	pBIG 3 (n=181)
Repeat head CT, n (%)	2 (6.9)	26 (25.0)	94 (51.9)
Progression on repeat CT, n (%)	0	2 (7.7)	17 (18.1)
No progression, n (%)	2 (100)	24 (92.3)	44 (46.8)
Obtained post-intervention, n (%)	--	--	33 (35.1)
Neurosurgery consult, n (%)	27 (93.1)	100 (96.2)	179 (98.9)
Intervention, n (%)	0	1 (1.0)	49 (27.4)
Hospital-free days, mean (SD)	28.7 (0.7)	27.9 (2.9)	23.3 (9.2)
CT post-discharge, n (%)	0	5 (4.8)	7 (4.2)
ER visit or readmission, n (%)	0	11 (10.6)	11 (6.6)
Mortality, n (%)	0	0	13 (7.2)

RESULTS

A total of 314 children with a mean age of 4.9 years were included. Skull fractures (213, 68%) and subdural hematomas (162, 52%) were the most common injuries. 89 (28%) of children had serial head CT's (2 (7%) pBIG-1, 26 (25%) pBIG-2, 61 (34%) pBIG-3). Neurosurgical consultation was obtained in 306 (98%), with 50 (16%) requiring intervention (1 (1%) pBIG-2, 49 (27%) pBIG-3). Following the proposed pBIG care plan would decrease neurosurgical consults to 181 (58%) and repeat CTs to 63 (20%). Based on the algorithm, 45 (14%) kids would be admitted to a lower level of care and 91 (29%) to a higher level of care.

CONCLUSIONS

Implementation of our pBIG algorithm would decrease use of neurosurgery consultation (41% reduction) and repeat head CT's (29% reduction) without compromising outcomes.

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UMC Trauma Center | 800 Hope Place Las Vegas, NV 89102