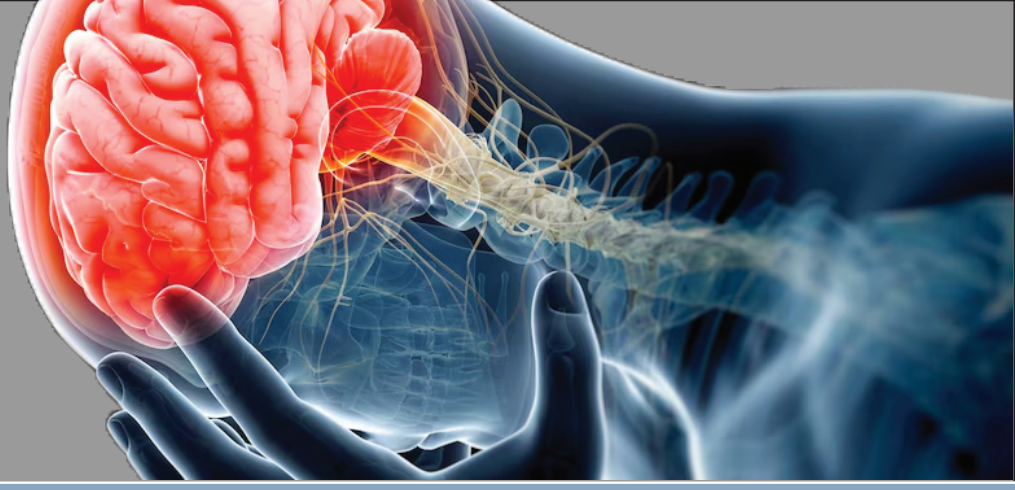
NORTH CAROLINA
STAC
STATE TRAUMA
ADVISORY COMMITTEE

STATEWIDE IMPLEMENTATION OF GUIDELINE FOR MANAGEMENT OF MINOR TRAUMATIC BRAIN INJURY IN ADULTs



Information for Emergency Medicine Providers

Recent literature has demonstrated the safety of managing adult patients with minor traumatic brain injury (mTBI) less intensely than traditional algorithms. Minor injuries with minimal change in the level of consciousness have been monitored without neurosurgical consultation or follow-up head CT scan with equivalent clinical outcomes. Advantages include the reduction in need for transfer due to neurosurgical specialty availability and the sparing of the patient and family from dislocation from community-based support. Several institutions in North Carolina have instituted some form of systems based practice change with the evolving science with reported excellent system and patient outcomes. A sub group of the NCCOT/STAC research committee has been tasked with generating recommendations surrounding this issue for statewide guidelines.

Joseph et al (2014) defined guidelines based on patient history, physical examination, and initial CT scan to identify which adult patients required transfer to a tertiary trauma center for neurosurgical consultation versus a period of observation. They defined three categories of brain injury: BIG-1 through BIG-3 (Table 1). They proposed that patients with minor brain injuries (BIG-1) be observed for 6 hours without neurosurgical consult or repeat CT scan. BIG 2 injuries represented moderate brain injuries, requiring inpatient admission for observation, but without neurosurgical consult or repeat head CT scan. BIG-3 injuries are severe head injuries that require hospitalization, neurosurgical consult, and repeat head CT.

For adult patients with a brain injury (blood seen in the brain), please follow the following guidelines. If no blood is seen on the patient's CT, then the patient has a concussion and concussion guidelines should be followed. Adult patients meeting any criteria in a higher category should be categorized in the higher category.

Table 1: BIG Categorizations and Therapeutic Plans for Patients with CT scan Positive for Blood			
	BIG 1	BIG 2	BIG 3
Mechanism	Blunt	Blunt	Blunt or Penetrating
GCS	15	15	<15
Anticoagulation	No	No	Yes**
Skull fracture	No	Non-displaced (no more than thickness of skull)	Displaced more than thickness of skull
Subdural hemorrhage	≤ 4 mm	5-7 mm	≥ 8 mm
Epidural hemorrhage	No	No	Yes
Intraparenchymal hemorrhage location count	1	≤ 2	≥ 3
Subarachnoid Hemorrhage	Trace (<1 mm in thickness and localized in 1-3 sulci)	Localized (1-3 mm in thickness and more than 3 sulci in 1 hemisphere)	Scattered (>3 mm in thickness or bi-hemispheric)
Intraventricular Hemorrhage	No	No	Yes
Therapeutic Plan			
Admission	6 hr observation ED/OBS	24 hr observation /Admit to Non-trauma center/ Level 3 trauma center	Admit to trauma center Level 1/2
Repeat CT scan	No	No	Yes
Neurosurgeon	No	Yes or teleconsultation	Yes
Contingencies	Could be retained at initial treatment site	Have plan of care in consultation with Level 1 or 2 trauma center for deterioration	
	Provide standardized ED patient discharge instructions and link to post discharge follow up @ 2 weeks after injury with appropriate resources		

*Some institutions may decide to keep patients with GCS-total of 13-14. We are starting conservatively by using GCS-total=15.
**Aspirin alone is not considered anticoagulation at some institutions. .

Radiology templates are being implemented to make results from brain imaging clearer and more consistent. A sample template is below. This template allows quick categorization of the brain injury category based on imaging results, which can then be used by you in conjunction with clinical findings to make a determination of diagnosis and treatment.

Adult patients with BIG-1 injuries are safe to discharge home if they have a GCS of 15, they've completed 6 hours of observation, they have safe transportation home, and a follow-up plan has been established.

If an adult patient has a neurological deterioration, they should be upgraded to BIG-3 and transferred to a facility with neurosurgical resources, preferably a Level 1 or 2 trauma center.

Adult patient discharge instructions drafted for this project will include instructions to the patient on common post-concussion symptoms, symptoms that indicate they should return to the ED, instructions to follow-up with their PCP in 10-14 days, and to limit cognitive and physical activity for 2 weeks or until all symptoms have resolved. Please ensure prior to discharge that the patient has a PCP or has a referral to a PCP who will see them in 10-14 days.

	Radiologic Brain Injury Guideline (BIG) Categorization			
	No traumatic findings	BIG-1	BIG-2	BIG-3
Skull fracture	No	No	Non-displaced	Displaced
Subdural hemorrhage	No	≤ 4 mm	5-7	> 8 mm
Epidural hemorrhage	No	No	No	Yes
Intraparenchymal hemorrhage/Location count	No	≤ 4 mm / 1	5-7	≥ 8 mm / ≥ 3
Subarachnoid hemorrhage	No	Trace (<1 mm in thick-ness and localized in 1-3 sulci)	Localized (1-3 mm in thickness and more than 3 sulci in 1 hemisphere)	Scattered (>3 mm in thick-ness or bi hemispheric
Intraventricular hemorrhage	No	No	No	Yes

Highest BIG category based on imaging findings: _____