

## STATEWIDE IMPLEMENTATION OF GUIDELINE FOR MANAGEMENT OF MINOR TRAUMATIC BRAIN INJURY

Recent literature has demonstrated the safety of managing 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 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 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. Patients meeting any criteria in a higher category should be categorized in the higher category.

<b>BIG Categorizations and Therapeutic Plans for Patients with CT scan Positive for Blood</b>			
	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
Locations	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
<b>Therapeutic Plan</b>			
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	Should have plan of care in consultation with Level 1 or 2 for deterioration	

	Need for standardized ED patient discharge instructions and link to post discharge follow up @ 2 weeks after injury with appropriate resources	
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\*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.

Patients with BIG-1 category brain injuries may be discharged from the ED and referred to you for follow-up care. Their discharge instructions include a recommendation for follow-up after 10-14 days with their primary care provider (PCP), with earlier follow-up if their symptom worsen.

Patients may need referrals to a concussion-trained neuropsychologist or neurologist if symptoms persist after 2-3 weeks. If patients have repeated vomiting (more than once) after discharge, loss of consciousness, seizures, slurred speech, patient may need to return to the ED for evaluation and care.

Patients should be encouraged to rest cognitively and physically for 2-3 weeks and not to return to work or play if they still have symptoms.