JOHNS HOPKINS ALL CHILDREN'S HOSPITAL

Closed Head Injury Imaging Clinical Pathway

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Table of Contents

Updated: June 2021
Owners: Christopher Snyder,MD; Trauma

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Rationale:

This clinical pathway was developed by a consensus group of JHACH physicians, advanced practice providers, and nurses to standardize the management of children with a closed head injury.

Background

Head CT scan is the cornerstone of closed head injury diagnostic evaluation. Radiologic exposure is an equally important consideration. Following the PECARN guidelines will assist in determining risk of significant brain injury and need for head CT.

Diagnosis

Lab tests: Standard trauma labs

Radiologic studies: Head CT

Clinical Management

See Closed Head Injury Clinical Pathway Algorithm.

Emergency Center Management

See Closed Head Injury Clinical Pathway Algorithm for imaging management. If CT head is normal, patient disposition and decisions for further imaging and consultation will be made by the trauma team leader. If CT head is abnormal, see Abnormal Head CT Status Post Closed Head Injury Clinical Pathway for further management and consultation.

Admission

Admission criteria include positive findings on CT scan (with the exception of isolated linear skull fracture), altered mental status or continued signs of post concussive syndrome, or concerns for caregiver competence in continuous assessment and decision making. Decisions regarding admission will be made by the trauma team leader in concert with the EC attending and neurosurgery attending (if applicable).

If patient is admitted, the admitting surgical service will place a routine consult for Neuropsychology as part of the admission orders. Patient will be discussed with the Neuropsychology team to determine optimal timing for their evaluation.

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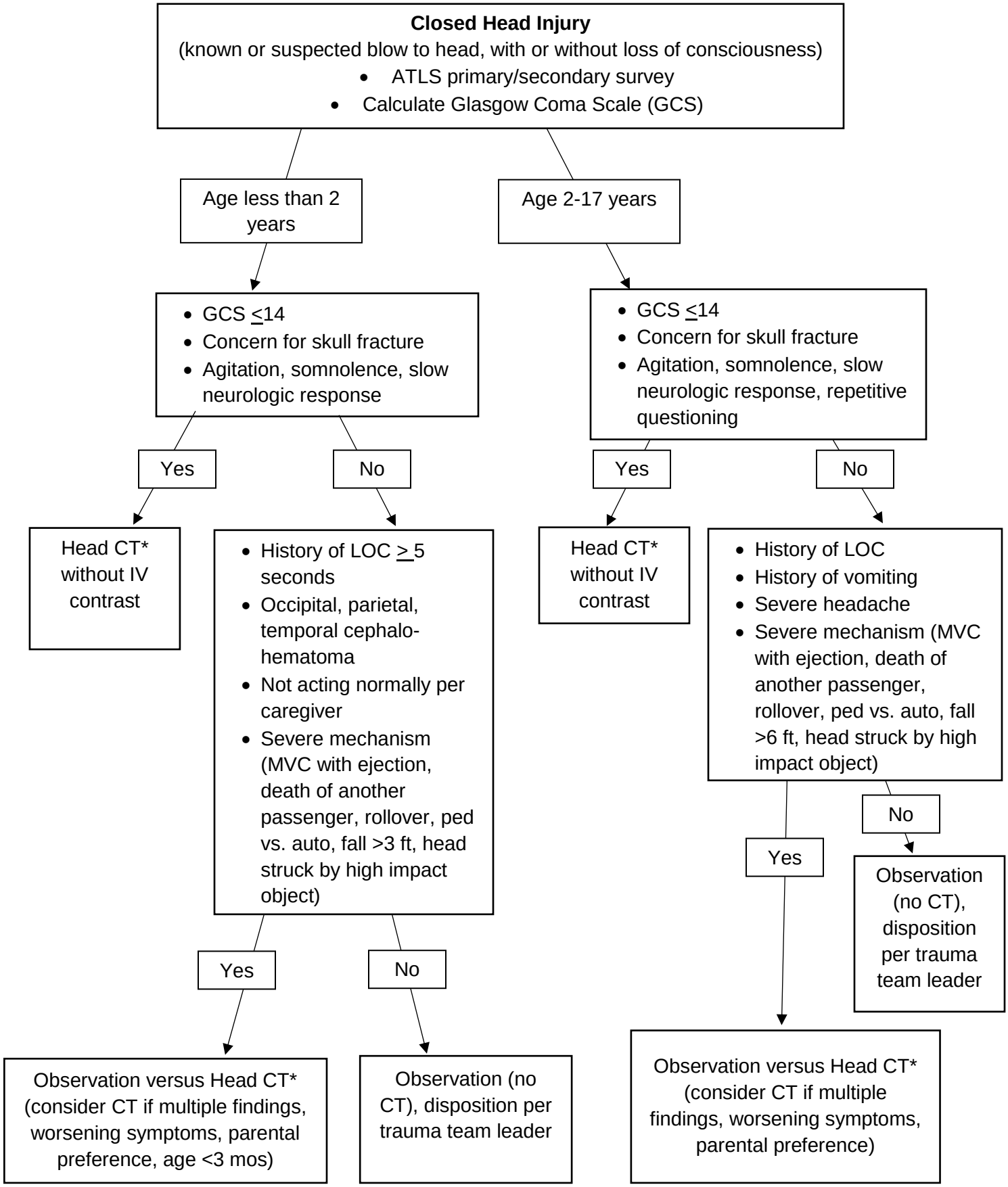

***If results are abnormal, go to [Abnormal Head CT Status Post Closed Head Injury Clinical Pathway]**

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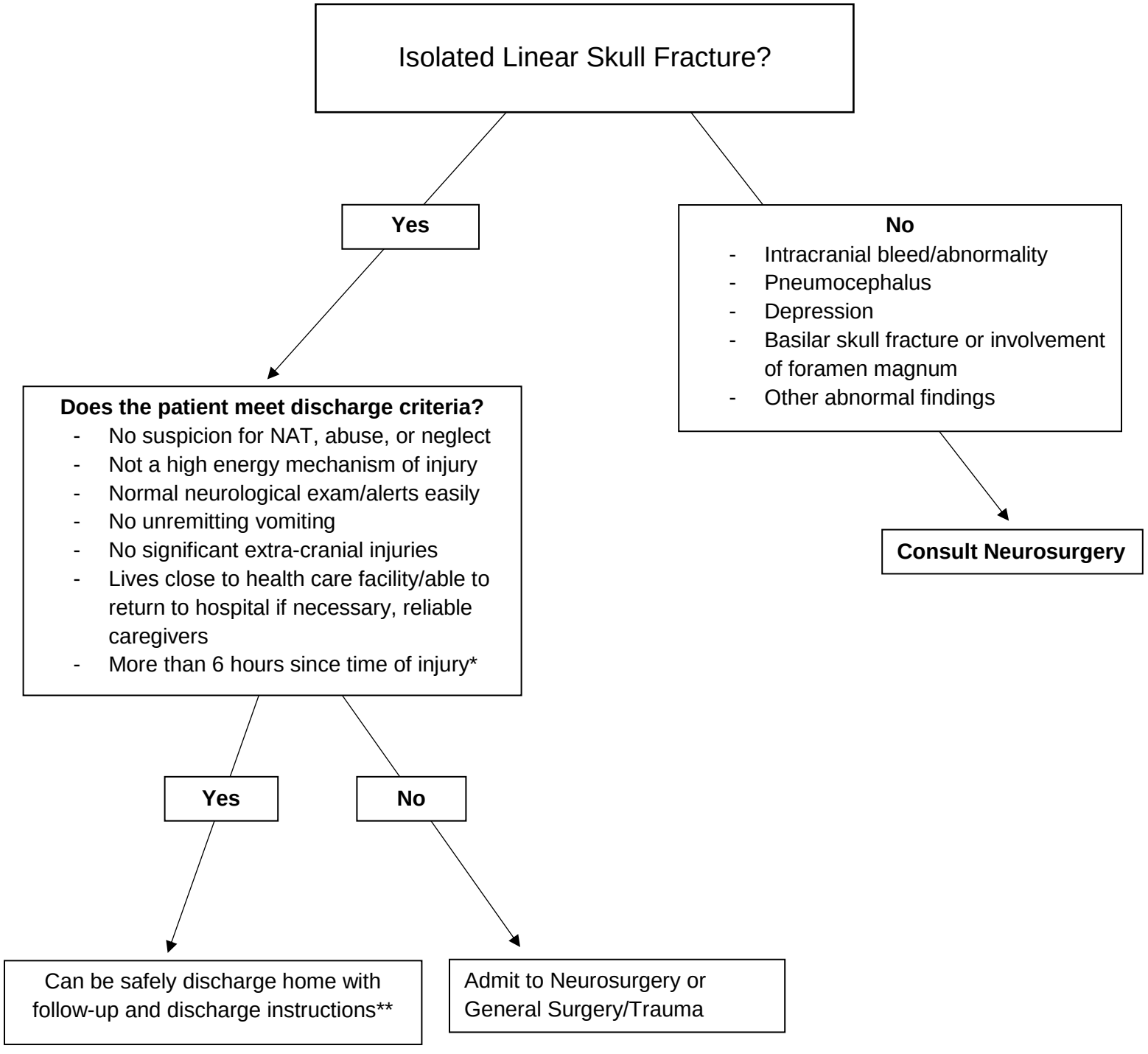
Abnormal Head CT Status Post Closed Head Injury Clinical Pathway



*The six hours of observation from the time of injury can be done at home if legal guardian is deemed reliable by practitioner and patient is neurologically intact.

**Follow-up should be with the patient's pediatrician; Neurosurgery does not follow-up with patients with an isolated linear non-depressed skull fracture. If patient has concussion like symptoms can follow-up with neuropsychology.

Follow-up

Please see the Concussion Management section of Trauma Consults pathway.

Glascow Coma Scale

Eye opening	Spontaneous To voice To pain None		**4** **3** **2** **1**	
Best motor response	Targeted grabbing on request, obeys commands Targeted defense to pain stimulus Flexion to pain stimulus Abnormal flexion to pain (decortication) Extension to pain (decerebration) No motor response to pain		**6** **5** **4** **3** **2** **1**	
Best verbal response	**Non-verbal children (<4 yrs.)**	**Verbal children (> 4 yrs.)**		
	Fixes, follows, recognizes objects and persons, laughs, adequate interaction	Alert, speakswords or sentences normally	**5**	
	Fixes and follows inconsistently, recognition of people uncertain, irritable cry	Confused, dissoriented, speaks incoherently	**4**	
	Arousable at times, cries inconsolable to pain	Inadequate words or sentences, inappropriate words	**3**	
	Motor restless, moans, irritable	Incomprehensible sounds	**2**	
	No response to pain	No response to pain	**1**	
Total GCS score			**15**	

FIGURE 1. Pediatric modification of the Glasgow coma scale (pGCS).

References

American College of Surgeons (2018). ACS TQIP Best practices guidelines in imaging. https://www.facs.org/-/media/files/quality-programs/trauma/tqip/imaging_guidelines.ashx

Eastern Association for the Surgery of Trauma - Management Guidelines https://www.east.org/education/practice-management-guidelines

Journal of Pediatric Surgery (2020) Impact of newly adopted guidelines for management of children with isolated skull fracture. https://www.sciencedirect.com/science/article/pii/S0022346814005715?via%3Dihub

Kupperman, N. PECARN Pediatric Head Injury/Trauma Algorithm https://www.mdcalc.com/pecarn-pediatric-head-injury-trauma-algorithm

Pediatric Modification of Glasgow Coma Scale, Prehospital Emergency Care, July/August 2016, 20(4), pg 494

Outcome Measures:

- Return to the EC/readmission with progressing TBI symptoms

Clinical Pathway Team

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Owner(s): JHACH Trauma Program, JHACH Neurosurgery

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