

JOHNS HOPKINS ALL CHILDREN'S HOSPITAL

Closed Head Injury Imaging Clinical Pathway

Johns Hopkins All Children's Hospital

Closed Head Injury Imaging Clinical Pathway

Table of Contents

1. [Rationale](#)
2. [Background](#)
3. [Diagnosis](#)
4. [Clinical Management](#)
5. [Emergency Center Management](#)
6. [Admission](#)
7. [Closed Head Injury Clinical Pathway](#)
8. [Abnormal Head CT Clinical Pathway](#)
9. [Glasgow Coma Scale](#)
10. [Follow Up](#)
11. [References](#)
12. [Outcome Measures](#)
13. [Clinical Pathways Team Information](#)

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

This pathway is intended as a guide for physicians, physician assistants, nurse practitioners and other healthcare providers. It should be adapted to the care of specific patient based on the patient's individualized circumstances and the practitioner's professional judgment.

Closed Head Injury Imaging Clinical Pathway

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

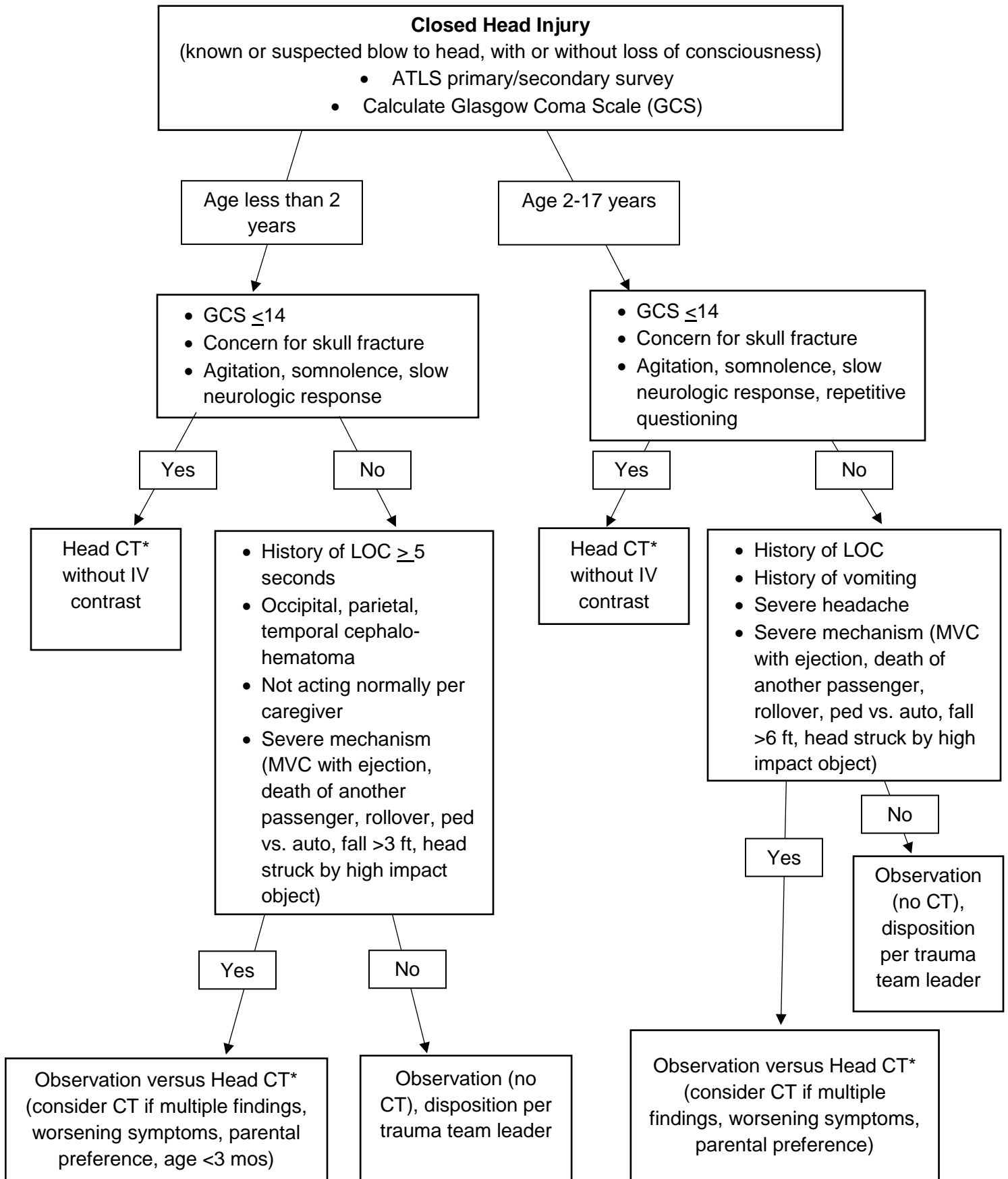
See [Closed Head Injury Clinical Pathway Algorithm](#) for imaging management. If CT head is normal, patient disposition and decisions for further imaging and consultation will be made by the trauma team leader. If CT head is abnormal, see [Abnormal Head CT Status Post Closed Head Injury Clinical Pathway](#)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

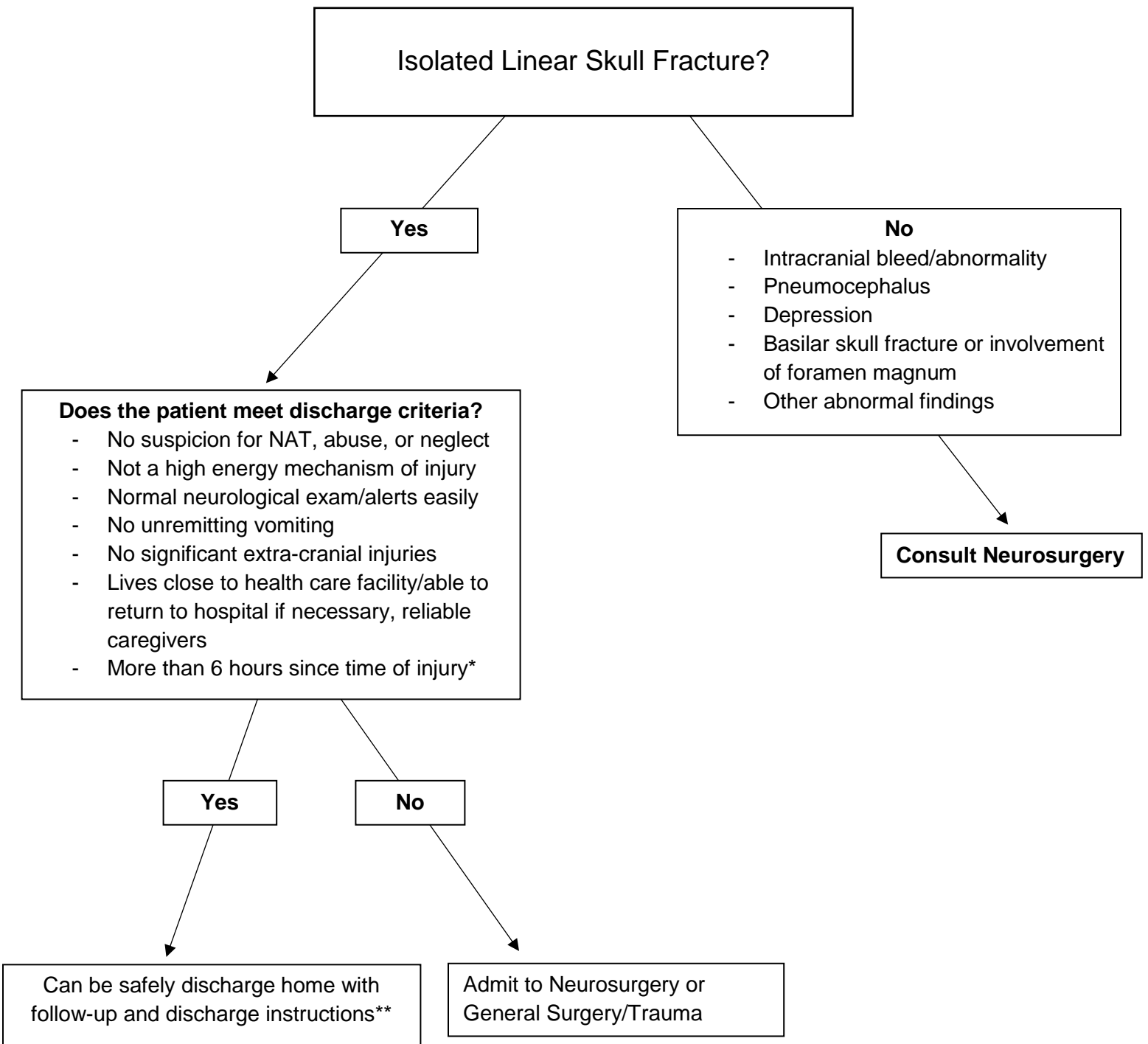
If patient is admitted, the admitting surgical service will place a routine consult for Neuropsychology as part of the admission orders. Patient will be discussed with the Neuropsychology team to determine optimal timing for their evaluation.

Closed Head Injury Imaging Clinical Pathway



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

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](#).

Glasgow Coma Scale

494

PREHOSPITAL EMERGENCY CARE JULY/AUGUST 2016 VOLUME 20 / NUMBER 4

Eye opening	Spontaneous	4		
	To voice	3		
	To pain	2		
	None	1		
Best motor response	Targeted grabbing on request, obeys commands	6		
	Targeted defense to pain stimulus	5		
	Flexion to pain stimulus	4		
	Abnormal flexion to pain (decortication)	3		
	Extension to pain (decerebration)	2		
	No motor response to pain	1		
Best verbal response	Non-verbal children (<4 yrs.)	Verbal children (> 4 yrs.)		
	Fixes, follows, recognizes objects and persons, laughs, adequate interaction	Alert, speaks words or sentences normally	5	
	Fixes and follows inconsistently, recognition of people uncertain, irritable cry	Confused, disoriented, 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>

Outcome Measures:

- Return to the EC/readmission with progressing TBI symptoms

Clinical Pathway Team
Closed Head Injury Imaging Clinical Pathway
Johns Hopkins All Children's Hospital

Owner(s): JHACH Trauma Program, JHACH Neurosurgery

Also Reviewed by:

Trauma program: Christopher Snyder, MD; Katie Deemer, RN Trauma PI Coordinator;
Karen Macauley, RN Trauma Department Director
Emergency Center: Lisa Odendal, MD; James O'Donnell, PA-C

Clinical Pathway Management Team: Joseph Perno, MD; Courtney Titus, PA-C

Date Approved by JHACH Clinical Practice Council:

Date Available on Webpage: February 2020

Last Revised: June 1st 2021 by Dr. Christopher Snyder

Disclaimer

Clinical Pathways are intended to assist physicians, physician assistants, nurse practitioners

and other health care providers in clinical decision-making by describing a range of generally acceptable approaches for the diagnosis, management, or prevention of specific diseases or conditions. The ultimate judgment regarding care of a particular patient must be made by the physician in light of the individual circumstances presented by the patient.

The information and guidelines are provided "AS IS" without warranty, express or implied, and Johns Hopkins All Children's Hospital, Inc. hereby excludes all implied warranties of merchantability and fitness for a particular use or purpose with respect to the information. Johns Hopkins All Children's Hospital, Inc. shall not be liable for direct, indirect, special, incidental or consequential damages related to the user's decision to use the information contained herein.