Suspected Abusive Head Trauma: Initial Management

Children's Mercy KANSAS CITY | Evidence Based Practice

Findings Concerning for Abusive Head Trauma
- Retinal hemorrhages
- Traumatic retinoschisis
- Subdural hematoma with or without skull fracture
- Unexplained intracranial injury
- Unexplained scalp injury or skull fracture
- Cerebral ischemia on neuroimaging

Exclusion criteria:
- Injury due to motor vehicle or bike accident
- Non-abusive injury witnessed by multiple people
- Known injury occurring at birth

Additional Medical Evaluation
(*Based on SCAN recommendations; usually requires admission*)

Laboratory Testing
- Obtain CBC, PT, PTT
- Obtain factor VIII level and factor IX level
- Obtain fibrinogen and D-dimer, if there is history of neurologic compromise
- Review newborn screen

Radiologic Testing
- Obtain MRI/MRV of head and total spine
- Discuss need for sedation/anesthesia with radiology (*avoid sedation if possible*)

Ophthalmologic Exam
- Place Ophthalmology consult for a dilated exam
- Discuss timing of exam with admitting team, as dilation can impact neurologic exams

Reference
Anderst, J., et al. (2022). Evaluation for bleeding disorders in suspected child abuse. *Pediatrics, 150*(4), e2022059276. https://doi.org/10.1542/peds.2022-059276

When a Report is Needed
- A social worker will complete a PAR to document a psychosocial assessment if concern for potential abuse. A PAR is initiated whenever abuse is under consideration. *A PAR does not mean a child protective services report will be made*
- If a mandated reporter believes in good faith there is a reasonable cause to suspect abuse, a hotline report must be made without unnecessary delay to the appropriate state agency and/or law enforcement.

Patient undergoing medical evaluation **following head CT** for suspected abusive head trauma (AHT)

Initial Steps
- Stabilize as needed prior to further evaluation
- If not at Adele Hall, transfer to CMKC Adele Hall ED
- Children with abusive head trauma may have other injuries; therefore, **review the Child Physical Abuse Clinical Pathway and utilize associated Power Plans before continuing**

Does the CT head show an intracranial injury?

No → *Off Pathway.*
A normal CT or CT with skull fracture alone **does not** rule out intracranial injury
- If ongoing concern for AHT, consult SCAN Physician to discuss additional work-up
- If other ongoing neurological concerns, consider differential diagnosis and consult Neurology to discuss additional work-up
- Refer back to Child Physical Abuse Clinical Pathway as needed

Yes

Consult
- Consult Neurosurgery
- Consult Trauma
- Consult Social Work
- Consult SCAN

Review
Review results with SCAN Physician. Additional evaluation may be indicated, based on SCAN recommendations

Update Social Work and request assistance with On-Site Safety Precautions (*1:1 observation and/or visitor restrictions, refer to Abuse/Neglect Process Flowchart for details*)

Communicate
- Clearly communicate process with families
- Provider and Social Work Education
- Ensure closed loop communication with all teams involved

Collaborate with Social Work and determine if a report to child protective services and/or law enforcement is needed

Admit to Trauma Surgery, unless otherwise directed by Trauma

Inpatient Management

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Differential Diagnosis
- Accidental head trauma
- Accidental toxic ingestion
- Birth trauma
- Congenital condition (*e.g., glutaric aciduria - type 1, Menkes disease)*
- Neoplastic condition
- Seizures/epilepsy
- Meningitis/encephalitis
- Focal intracranial infection, refer to *Focal Intracranial Infection Clinical Pathway*
- Stroke, refer to *Stroke Clinical Pathway*
- Obstructive hydrocephalus
- Bleeding disorder
- Vascular abnormalities (*e.g., aneurysm, hereditary hemorrhagic telangiectasia*)

This list is not all inclusive of possible differential diagnoses

Provider and Social Work Education Videos
Conversations about suspected child abuse can be challenging. These 5-minute videos demonstrate effective communication with families.

Available to Children's Mercy providers and social workers through the Child Abuse Toolkit

Abbreviations:
PAR = Patient At Risk Assessment
PICU = Pediatric Intensive Care Unit
SCAN = Safety, Care, and Nurturing

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All children hospitalized for **suspected abusive head trauma** (AHT)

Triage and Acute ICU care, (*e.g. fluids & electrolytes, ICP management, EEG monitoring*) are outside the scope of this pathway. Follow unit specific protocols to stabilize the child and medically manage the traumatic and/or anoxic brain injury.
For Children's Mercy ICU providers, refer to internal "Severe Traumatic Brain Injury Guideline."

Additional Inpatient Management Based on Severity of Injury
When transferring between teams (*Intensive Care, Neurosurgery, Gen Peds, Rehabilitation*) communicate about pending/incomplete action items

Injury Severity based on post-resuscitation Glasgow Coma Scale (GCS)

	Mild (13-15)	**Moderate** (9 -12)	**Severe** (≤ 8)

Consults
Timing can vary based on the child's needs. Some consults may take place in ICU vs Med/Surg
	• Trauma
	• SCAN
	• Social Work
	• Ophthalmology
	• Neuropsychology Service
	• Endocrinology
	• On **case-by-case basis**:
	  • Rehabilitation Medicine
	  • Physical Therapy
	  • Occupational Therapy
	  • Speech Therapy
	  • Neurology
	  • Neurosurgery
		• Trauma
		• SCAN
		• Social Work
		• Neurosurgery
		• Ophthalmology
		• Rehabilitation Medicine
		• Neuropsychology Service
		• Endocrinology
		• On **case-by-case basis**:
		  • Neurology
		  • Physical Therapy
		  • Occupational Therapy
		  • Speech Therapy
			• Trauma
			• SCAN
			• Social Work
			• Neurosurgery
			• Ophthalmology
			• Neurology
			• Rehabilitation Medicine
			• Neuropsychology Service
			• Endocrinology
			• Physical Therapy
			• Occupational Therapy
			• Speech Therapy
			• Audiology (*most appropriate at end of stay*)
			• On **case-by-case basis**:
			  • Palliative Care Team

Seizure prophylaxis and monitoring	**Mild/Moderate** If concern for clinical or subclinical seizure, contact Neurology to consider long-term EEG and/or antiepileptic medications		**Severe** • EEG monitoring for at least 24 hrs • Levetiracetam for minimum of 7 days. *If there are no seizures in 7 days, may discontinue.* • Additional recommendations per Neurology
Endocrine evaluation	**All Levels of Severity** • BMP • Cortisol (8 am), ACTH (8 am), IGF - 1, prolactin • TSH, free T4 • If urine output is > 5 cc/kg/hour over 3 - 4 hours, obtain: serum sodium, serum osmolality, urine sodium, urine specific gravity, urine osmolality		
Additional work-up for suspected abuse	Await SCAN consult recommendations		

Be aware of sub-acute complications such as DI, SIADH, cerebral salt wasting, seizures, obstructive hydrocephalus, autonomic instability

Discharge Preparation

Abbreviations:
DI = Diabetes insipidus
ICP = Intracranial pressure
SCAN = Safety, Care, and Nurturing
SIADH = Syndrome of Inappropriate Antidiuretic Hormone

Contact: EvidenceBasedPractice @cmh.edu
Link to: synopsis and references
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Discharge preparation for patient with suspected AHT

Schedule Follow-Up Visits and Prepare Referrals
Discuss with Care Management several days in advance of discharge, if possible

Follow-Up

All Patients:
- SCAN Clinic in 2 - 3 weeks with repeat skeletal survey obtained at that time
- Primary Care Provider (*recommend contacting the PCP directly to provide update*), establish new primary care provider if needed
- Identify who will manage nutritional status and schedule follow-up accordingly (*e.g., Feeding Clinic*)

As Recommended By Consultants or Based on Indications Below:
- Ophthalmology Clinic
- Neurosurgery Clinic
- Neurology Clinic, if the patient has had seizures
- Rehabilitation Clinic, if there are acute rehabilitation needs (*tone management, neuroirritability, and/or weakness*) or if appropriate for Hammersmith Infant Neurological Examination (*i.e., neuroimaging concerning for eventual developmental delay and cerebral palsy*)
- Developmental Pediatrics, if neither Neurology Clinic or Rehabilitation Clinic follow-up is indicated
- Endocrine Clinic

Referrals
- Early Intervention or Early Childhood, for children who are < 3 years of age with head injury
  - **Kansas**: Infant/Toddler Services
  - **Missouri**: First Steps
- Children's Center for the Visually Impaired for functional vision evaluation and connection with vision resources, if eye/vision findings identified
- Outpatient/Home Health Therapy Services (PT, OT, SLP), if recommended by inpatient therapist or provider
- Nutrition Services

Prepare Caregiver for Discharge

Once placement determined by Child Protective Services:
- Recommend Discharge Planning Family Meeting to ensure clear communication with caregiver(s) assuming care at discharge
- Consider parent/caregiver care stay ("PCU")
- Provide "AHT Diagnosis and Follow-Up Information" handout (*found in Depart*)

Abbreviations:
AHT = Abusive Head Trauma
OT = Occupational Therapy
PT = Physical Therapy
SCAN = Safety, Care, and Nurturing
SLP = Speech Language Pathologist