

Head Trauma Protocols

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The guidelines suggested by the Ministry of Health for evaluation and management of head trauma have limited applicability to children. A number of risk factors for intra-cranial injury (ICI) do not appear on the list and several on the list require significant modification in order to apply them to children. The guidelines also do not address the technical difficulties of performing a head CT in young children and do not consider the role of child abuse in head trauma. Recent published guidelines for the evaluation of children after head trauma separate them into two age groups, (1) 0-2 years old and (2) 2-18 years old.

A number of historical elements are listed as indicating a higher risk of ICI. The patient with a depressed skull fracture, signs and symptoms of basilar skull fracture, focal findings on neurologic examination or hypertension with bradycardia clearly requires an emergent head CT and neurosurgical consultation. The presence of a VP shunt or bleeding diathesis also increases the risk of intracranial bleeding and a head CT is indicated even in the absence of other symptoms of ICI. In children 2-18 years old a GCS of less than 15 is associated with a much higher risk of ICI as compared to a GCS of 15 (3,4) and a head CT should be performed. Loss of consciousness, vomiting, headache, scalp lacerations and seizure have not been demonstrated to be definitive risk factors for ICI in older children (5,6,7,8) or in infants (1, 9,10). Confusion or amnesia is difficult or impossible to assess in infants and young children. In children less than 2 years old, a bulging fontanelle (after head trauma) is highly suggestive of ICI.

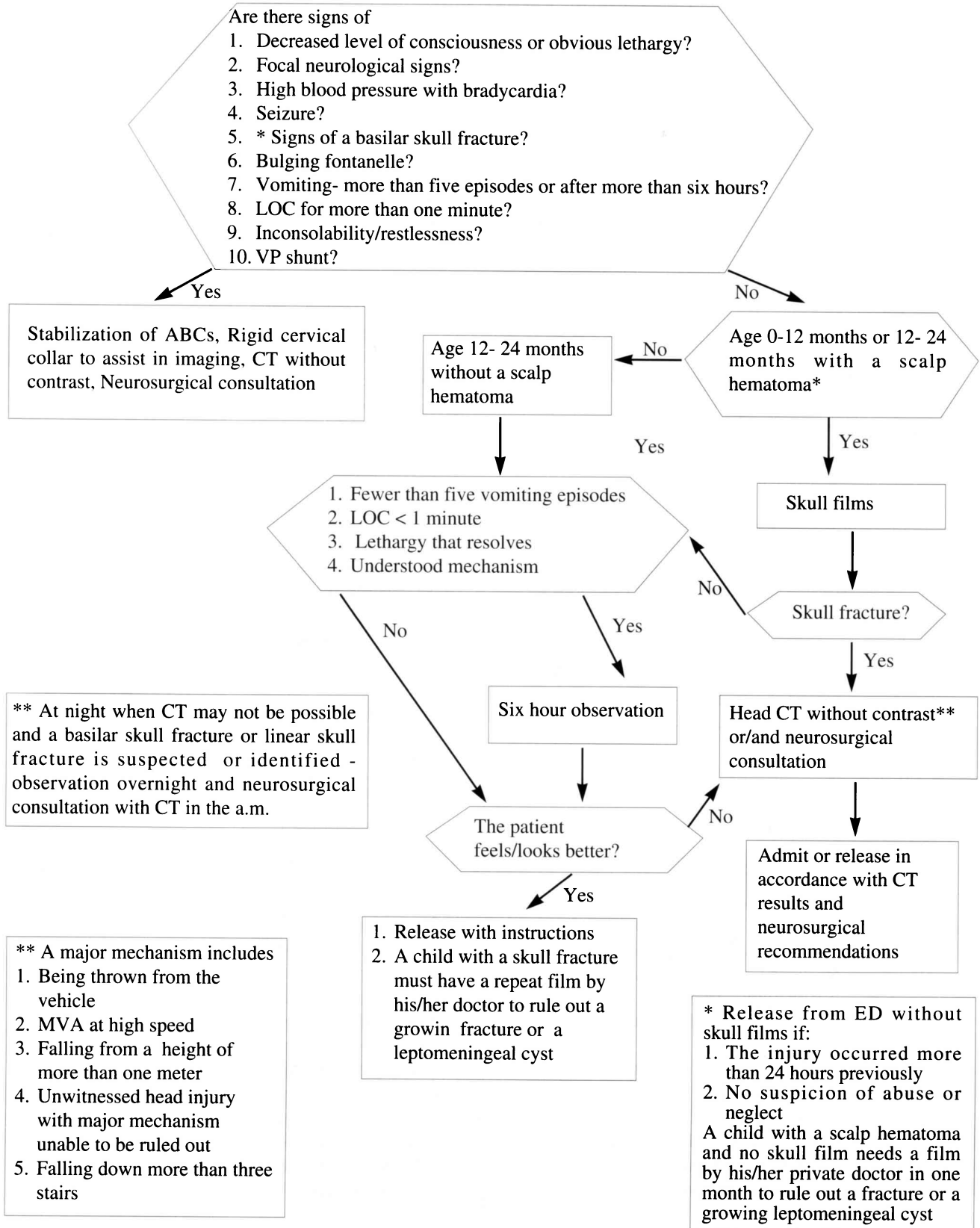
Children less than two years old are at higher risk of ICI. The presence of a scalp hematoma on physical examination may be the most sensitive indicator of ICI. Eighty to 100% of infants with scalp hematomas will have a skull fracture and 15-30% of children with skull fractures have ICI on head CT (1); no other sign or symptom has been shown to be a more consistent predictor of ICI in children aged less than 12 months (11). Parietal and temporal hematomas are frequently associated with skull fractures, whereas frontal hematomas are not (12). Conversely, the absence of a scalp hematoma has a high negative predictive value, particularly in children 12-24 months in age. However, there have been several cases of skull fracture in the absence of scalp hematomas reported in children less than 12 months of age (9,10). Skull radiographs should be obtained in children less than 2 years old with a scalp hematoma and a CT performed if a skull fracture is found. Consideration should be given to obtaining skull radiographs in all children less than 1 year old even in the absence of a scalp hematoma unless the mechanism of injury is trivial.

Performance of a head CT in young children is complicated by the need for sedation. A physician skilled not only in administration of sedative agents but in the management of the pediatric airway in the case of sedation or head trauma complications must accompany the child to the CT. This may be difficult or impossible in the evening or at night. If a head CT cannot be obtained, the patient must be observed in the hospital.

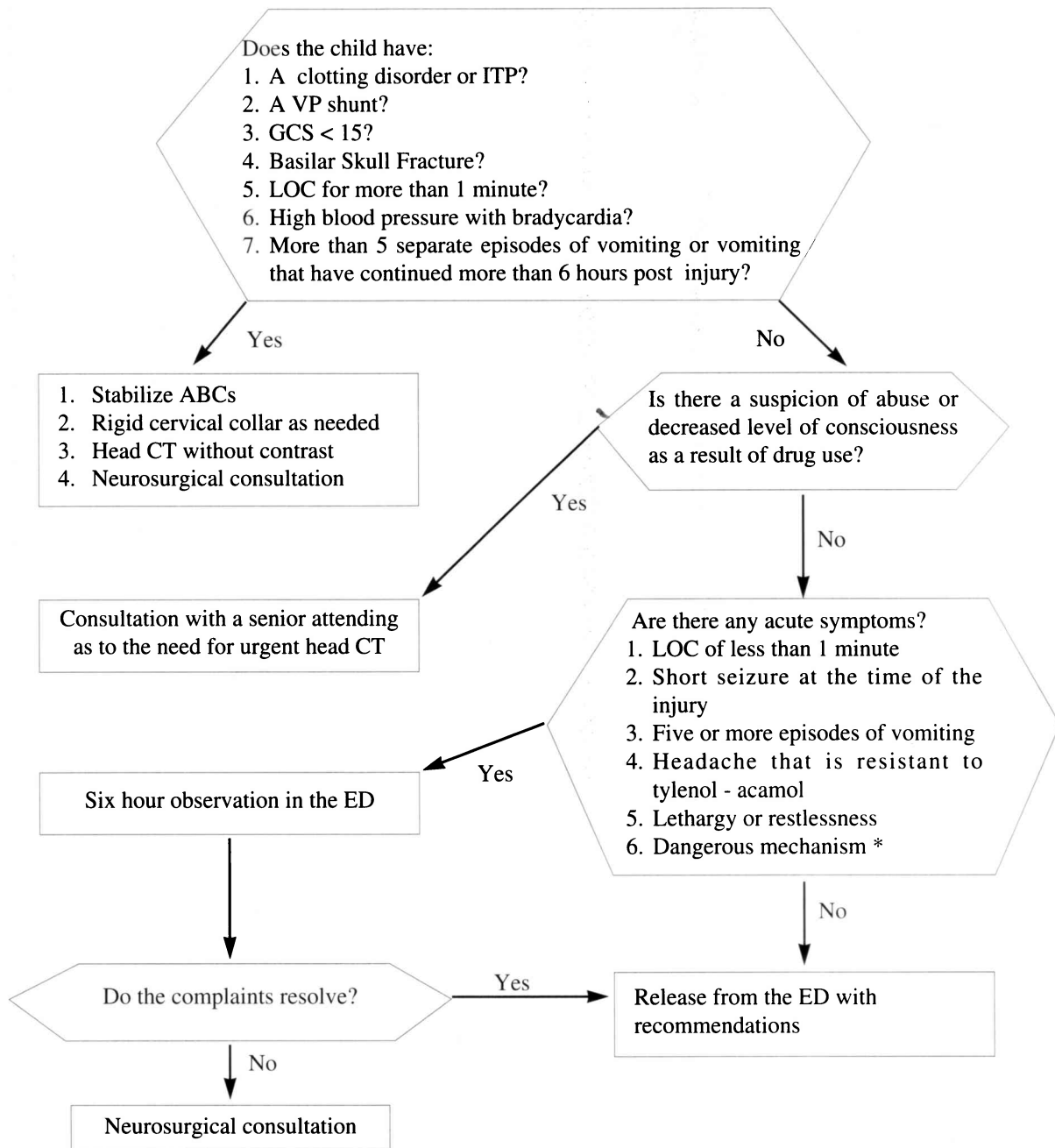
Child abuse is not a rare cause of head injury in children and is not addressed in the Health Ministry guidelines. The history is often absent or suggests minor blunt trauma while the severity of injury suggests serious ICI. Retinal hemorrhages are present in 65-90% of children with head trauma resulting from child abuse. Any child with suspected or proven non-accidental head trauma should have a fundoscopic examination and a head CT scan performed, a social work consultation obtained and be admitted to hospital.

The head trauma protocols currently in use at Schneider Children's Medical Center are presented here. One protocol is for 0-2 year olds and the other for 2-18 year olds. The protocol for 0-2 year old children reflects the higher risk of ICI in younger children, the possibility of occult skull fracture in children less than one year old, incorporates the difficulty of performing a head CT in asymptomatic children with skull fractures, and defines trivial head trauma. Both protocols suggest neurosurgical consultation prior to obtaining a head CT only in questionable cases and expedite ED discharge of asymptomatic and minimally symptomatic children.

Head injury protocol for 0-2 years old



Head injury protocol for 2-18 years old



- Reasons to do a skull film**
1. Penetrating head injury
 2. Possibility of depressed skull fracture
 3. Possibility of foreign body
 4. Consider a sinus fracture

- *Dangerous Mechanism**
1. Falling from a moving vehicle
 2. MVA at high speed
 3. Falling from more than 2 meters (6.4 feet)
 4. An unwitnessed fall that may be from a dangerous mechanism
 5. Falling down more than 3 stairs
 6. Car vs. bicycle

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The Israeli Emergency Room Management of Head Injury Guidelines

Editorial

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Emergency room management of head injured patients is guided by the severity of injury.

The severity of head injury is defined by the initial Glasgow Coma Scale score (GCS). Patients with a GCS of 3-8 are severely injured, patients with scores of 9-13 have moderate head injury and a score of 14-15 defines mild head injury.

The management protocols for severe head-injured patients are very well defined (1,2). After the initial resuscitation according to the ATLS protocols, all patients undergo head CT and are managed in, or should be transferred to, a neurosurgical trauma unit for further care.

Moderate head injury should be managed in the ER according to the same guidelines: All patients should undergo head CT and be admitted for observation until they recover to a GCS of 15.

The highest load on the ER physician comes from managing patients with mild head injury.

Most ERs in Israel encounter dozens of mild head injuries a day and they comprise about 80 % of all head injuries. Most patients with a mild head injury should be managed by the ER team without the assistance of neurosurgeons or neurologist and the "The Israeli Guideline for Emergency Room Management of Head Injury" is most helpful in that respect.