Child with suspected non-accidental injury

Clinical history and physical examination

Plain radiograph
- Skeletal survey if < 2 years old
- Selective radiography if > 2 years old

No history of head injury or focal neurological symptoms & signs

Visceral injury

History of head injury or the presence of focal neurological symptoms & signs

CT brain
- US can detect peritoneal fluid
- Contrast enhanced CT:
  - Hepatic, splenic or pancreatic trauma
  - Intramural haematoma of bowel

CT positive
- Stop
- Bone scan if clinical signs are minimal, clinically suspicious or for further documentation

CT negative or indeterminate

± MRI

MRI especially if focal neurological signs are present
REMARKS

1 General
   1.1 Child abuse is not an imaging diagnosis. The role of imaging is to support the clinical diagnosis of child abuse in the proper clinical and social context and also to assist the evaluation of the severity and extent of injury.

2 Musculoskeletal trauma
   2.1 Skeletal survey includes skull (frontal and lateral), spine (lateral cervical, thoracic and lumbar), chest (frontal including clavicles, and oblique views of bilateral ribs), abdomen (frontal, including pelvis and both hips), upper extremities (frontal humeri, forearms, and hands), and lower extremities (frontal femora, lower legs, and feet).
   2.2 Conventional radiography is the primary imaging examination for musculoskeletal trauma.
   2.3 Avoid 'babygram' as it is diagnostically inadequate.
   2.4 Complete skeletal survey is normally indicated in children less than 2 years of age who have clinical evidence of child abuse, or in infants less than 1 year of age who show evidence of significant neglect and deprivation. In children between 2 years and 5 years of age, the skeletal survey may be tailored according to history and physical examination findings.
   2.5 For children more than 5 years old, skeletal survey is rarely indicated.
   2.6 Bone scans may be considered for children in whom skeletal survey is negative but clinical suspicion of non-accidental injury (NAI) is high. Bone scan is sensitive for the extent of bone injury, acute non-displaced and subtle healing fractures. Its pitfalls include normal uptake around the growth plates leading to difficult identification of metaphyseal-epiphyseal injuries, missed symmetrical fractures, inability to determine the age and type of fracture and relative insensitivity in detecting skull and vertebral body fractures. It should be used as a problem-solving study rather than first line.
   2.7 Role of MRI and US for evaluating skeletal injury in NAI has not been established with reference to prevailing international guidelines and recommendations.

3 Skull trauma
   3.1 Skull radiographs form part of the full skeletal survey for non-accidental injury.
   3.2 In children with head trauma who are at increased risk of intracranial injury, CT is the preferred initial imaging modality and also improves definition of depressed and other complex fractures.
   3.3 Bone scan is unreliable in identifying skull fractures.

4 Intracranial trauma
   4.1 CT is both sensitive and specific in defining acute intra- and extra-cerebral injuries, especially subarachnoid haemorrhage.
   4.2 MRI is useful in the subacute and chronic settings and is superior in detecting subdural haematomas, cortical contusions and shearing injuries. It can determine the age of extra-cerebral fluid collections and timing of intracranial haemorrhage.
   4.3 MRI should be performed in patients whose clinical symptoms are disproportionate to the CT findings.
5 Visceral trauma

5.1 Imaging examinations should be tailored to specific clinical concern.

5.2 Abdominal US is useful to detect peritoneal fluid but is less sensitive than CT to detect solid organ injury.
REFERENCES


4. Caviness AC. Skull fractures in children. In: UpToDate, Post TW (Ed), UpToDate, Waltham, MA; 2014.


