NHS HIOW Designated Doctors for Child Safeguarding. Position statement:
CT head scans and retinal examination in the context of suspected physical abuse.

Version 1: June 2022. Version 2: March 2025

Our position

If physical abuse is suspected in a child under one year of age, neuroimaging and ophthalmological examination should be requested if any of the following are present:

- Any signs of injury to the head, neck, face or scalp
- A history of shaking or head impact injury
- A history of neurological symptoms e.g., seizures, loss of consciousness, apnoea
- Potential signs of neurological compromise including reduced level of consciousness, focal neurological signs, and nonspecific features such as irritability, sleepiness, vomiting, 'fussiness' or 'unwell'.

In general, if neuroimaging is not indicated then neither is retinal examination. Retinal examinations should be carried out as soon as possible and within 24-48 hours of presentation.

In other cases, a CT head scan and ophthalmological examination should *always* be considered. However, the decision not to request these investigations can be made by the lead paediatrician taking into account the specific details of each case. If neuroimaging and retinal examination are not requested, the reasoning should be documented including specific documentation of normal neurology, vital signs and behaviour (including absence of nonspecific signs such as irritability, sleepiness, vomiting, 'fussiness' or unwell) and normal neurological examination, as well as absence of a history of shaking or potential neurological symptoms. Extra care should be taken in assessment of children who are already neurologically compromised.

Neuroradiological imaging in the context of suspected physical abuse

The Royal College of Paediatrics and Child Health (RCPCH) are updating their systematic review on head and spinal injuries. We understand this will include a review of the evidence on neuroimaging in suspected abusive head trauma. Our position statement has been developed whilst awaiting updated national guidance.

UK national guidance on radiological investigation for suspected physical abuse in children,[1] recommends that imaging 'should always include…computed tomography (CT) head scan in children under one year old. This guidance is based on studies from United States hospitals that report high yields for occult injuries on CT head scan (19-37%).[2-5] Two studies from the UK published in 2021 found much lower yields. A paper from Wessex found no occult intracranial injuries suggestive of abusive head trauma in the 363 CT head scans included,[6] and a paper from Cardiff found a yield of 1.7% (2/115) for occult findings once those with skull fractures and head and neck bruising are excluded.[7] We are unaware of any new papers directly addressing indications for neuroimaging in suspected physical abuse since our first position statement. However, a review published in 2023,[8] the papers it cites, a further paper published in 2024,[9] and a recent report from the American Academy of Pediatrics (AAP),[10] point out the importance of recognising mild, non-specific symptoms in the diagnosis of abusive head trauma. Examples of these are irritability, sleepiness, vomiting, 'fussiness' or 'unwell'. The AAP recommends head CT for children 'presenting with acute head injury or neurologic symptoms and concerns for abuse'[11]

Retinal examination in the context of suspected physical abuse

The RCPCH Child Protection Companion[12] states that in suspected physical abuse of children less than two years of age, an ophthalmological examination should be undertaken within 24 hours, or as soon as possible. However, the guidance doesn't include a rationale for retinal examination where neuroimaging is not indicated.

Our interpretation of the 2020 RCPCH systematic review on retinal findings[13] is that there are no papers reporting retinal haemorrhages suspicious for abuse unless there are abnormalities on neuroimaging or neurological findings at presentation. Neurological findings include non-specific signs such as irritability, sleepiness, vomiting, 'fussiness' or 'unwell', and a history of a neurological event.

The American Academy of Paediatrics (AAP) Council on Child Abuse and Neglect updated their guidance on eye examination in 2023.[14] They state that 'ophthalmologic consultation in the setting of suspected abuse is recommended for any child with visible injury to the eye, unexplained alterations of consciousness, intracranial haemorrhage, coagulopathy, or possible medical disease that might mimic abuse'. The Royal College of Ophthalmologists updated their guidance for Ophthalmologists on 'Abusive Head Trauma and the Eye' in 2024.[15] They conclude that, in abusive head trauma, retinal haemorrhages are relatively rare in the absence of encephalopathy or intracranial bleeding. The recent AAP technical report on physical abuse states that: 'retinal examinations are not needed in children evaluated for physical abuse in whom there is an absence of neuroimaging findings or other evidence of head trauma'. [16]

Guidance is consistent in finding that retinal haemorrhages are not a sensitive indicator of abusive head trauma and so cannot be used as a screen for neuroimaging.[13,14,15,17]

Timing of retinal examinations in the context of suspected physical abuse

The RCPCH Child Protection Companion[12] suggests that ophthalmological examination should take place, 'within 24 hours of medical examination' (good practice), 'as soon as possible' (paragraph 9.7.5) or 'within 48 hours of admission' (paragraph 9.7.6). Binenbaum et al[18] studied retinal haemorrhages in paediatric head trauma and found that intra-retinal haemorrhages cleared rapidly, whereas pre-retinal haemorrhages could persist for many weeks. They concluded that eye examinations should be completed as soon as possible, preferably within 24–48 hours of admission so that the patterns could be identified. This conclusion is supported by a by a 2016 review of the literature[19] and a 2018 consensus statement on abusive head trauma from several radiological and paediatric associations.[20] The AAP technical report on physical abuse suggests that the retinal examination should be within 24-36 hours after presentation.[21]

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