

Paediatric Radiology: child abuse imaging in the national spotlight

Editorial

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Keywords:

Child abuse

Safeguarding

Expert witness

Paediatric Radiology: child abuse imaging in the national spotlight

Paediatric Radiology has recently been in the mainstream media, with two articles discussing the diagnosis of abnormal radiological findings in suspected physical abuse.

Suspected physical abuse (also known as child abuse, inflicted injury, previously known as non-accidental injury) is a challenging area in which to work, requiring great care and attention to detail in order to maximise the opportunity to get the correct initial diagnosis. There are clearly significant repercussions for the child and family in diagnostically “getting it wrong”, beyond the immediate medical concerns.

Recent coverage

The Sunday Times recently reported cases in which children were removed from their parents following a provisional diagnosis of physical abuse, based on a radiologist identifying a rib fracture in a child with bruising, and a second fracture in a child with a fractured leg [1,2]. When these cases came to be heard in the family court, an expert radiologist concluded that there was no rib fracture, and the child was returned to their parents. Whilst clearly distressing for the family, the implication was that had a different radiological decision been made initially, the family would have been spared the court process. Some expert Paediatric radiologists and the Royal College of Radiologists (RCR) were asked to contextualise the problem in a follow up article [3].

A recent independent review of children’s social care [4] suggests that the current system may not be serving families particularly well, particularly in regards to risk

assessments of children in potential harm. This has been termed a “runaway train” of child protection investigations, where social workers are deemed “too quick to wade in” in the media [1]. The Sunday Times articles claim that the number of families who have undergone a formal child protection investigation with further action has more than tripled (to almost 135,000 per year), and ‘only’ 400 out of 2000 assessments of young babies under six months (where physical abuse was a possibility) were placed on a child protection plan.

Is the medical process therefore working as it should? Is it helping to safeguard children appropriately, whilst investigations take place (albeit within the existing safeguarding framework), or are there wider concerns about this process which may be triggered by a radiological finding? This is clearly an opportunity to reflect on the series of events which constitute this process and identify those which lie within the radiologists’ domain and those without.

Imaging in SPA

Diagnosing abnormalities such as rib fractures and corner metaphyseal lesions in suspected physical abuse can be challenging [5,6]. Even with the best quality imaging, acquired by experienced radiographers in a compliant child, subtle findings may be missed and / or others mis-interpreted. Training in this area remains a key priority and is recognised as such [7]. The time interval between the first and second parts of the skeletal survey gives an opportunity to evaluate the child further, and identify radiological changes over time, although potentially delaying the diagnosis [8], and other imaging modalities such as chest CT may need to be considered in the first instance.

Radiologists accept that discrepancies occur as a normal part of clinical practice and can occur with all levels of experience, but are typically more frequent in those with less experience. We also recognise that differentiating observational from cognitive errors is important when reviewing potential errors in Radiology Events and Learning Meetings (REALMs) [9]. In the setting of child abuse, both discrepancies can arise in those with limited expertise: identifying rib fractures where they do not exist is a perceptual problem, whereas identifying subdural haemorrhages which are later attributed to birth injury rather than shaking injury is cognitive, although both may initiate the same safeguarding investigations.

Networks for peer support

Awareness of normal variants is clearly important, but access to a specialist paediatric radiologist or neuroradiologist with this specific expertise may be limited. It is logical that a shortage of paediatric radiologists results in reduced access to specialist expertise, which may result in errors. Not all hospitals have access to paediatric radiologists / neuroradiologists 24/7, not all radiologists relish this part of their work, and not all centres are able to refer externally for rapid second opinions [10].

NHS Trusts are not necessarily keen for external second opinion work to be undertaken, as it is not a core part of local service delivery, and there is a perception that this will lead to increased court work for their specialist radiologists (for which there is minimal time and financial recompense to the Trust). With improving digital communication between Trusts, such as the national PACS system in Scotland,

national or regional networks for paediatric imaging should be much easier to establish [10].

Wider safeguarding concerns.

Radiologists are rarely provided with the whole clinical picture. They are, and should be, naive to social circumstances, family background, presence of previous history and any siblings, when reporting radiographs, so as not to bias their findings.

However, the art of clinical radiology is to identify abnormalities and to interpret them correctly in light of the clinical findings; in that regard, safeguarding teams are better placed to investigate further.

Removing a child from their family in a safeguarding setting is not undertaken lightly. A radiologist contributes to, but does not make, these decisions. They are made in conjunction with a group of paediatricians with specific safeguarding expertise, the local authority, social workers, ward nurses and other contributors.

Furthermore, there can be a delay of several months or even years until the case comes to court. Some of this is due to inefficiencies in our medicolegal system which have been reviewed in depth [11], but the availability of experts from a limited pool undoubtedly contributes to the delay, on a background of a chronic shortage of paediatric radiologists in the UK [12]. It should also be recognised that there is a due process in which non-radiological (and non-medical) information is collated, such as parenting assessments or psychological reviews, which by their very nature also take time.

Dealing with Uncertainty

There is also the perennial problem of how to communicate and deal with medical uncertainty. In other areas of paediatric medicine, such as diagnosing a renal tumour, a tissue biopsy is required which proves “definitively” not only that tumour is present, but often gives a subtype and treatment is tailored accordingly. As a bone biopsy is never performed to confirm subtle fractures, and the clinical history may not match the injury identified, there will always be uncertainty regarding the precise mechanism of trauma, that is difficult to gauge or quantify. Whether physical trauma is accidental or deliberate can be impossible to prove in either direction, and child abuse can be interpreted as accidental and vice versa.

Imaging alone cannot determine whether an identified injury has been caused accidentally or otherwise, although there are injuries considered characteristic of physical abuse [6]. There may be disagreements amongst experts even when the case comes to court. In all cases it falls to the court to determine the origin and facts of a case once presented with all the evidence specific for that child, from all the stakeholder parties, including paediatric radiology, neuroradiology, ophthalmology, paediatrics, social workers and other witnesses. In fact, it is not possible to confirm even in the specific cases reported in the media whether abuse took place or not, only that the court came to a balanced judgement on the safety of the child, where the local authority had failed to reach the threshold (on the balance of probabilities) that the child had suffered an abusive event. The inability to reach that threshold does not mean that a child was not abused, and is not evidence of absence of abuse.

Radiologists as expert witnesses

Understanding the context in which a radiologist contributes to this process is not taught at medical school, or during specialist training, and thus leaves many consultants with sufficient experience to give court evidence but naive to the court system. Following recent multidisciplinary meetings between paediatric radiology representations (led by Dr Adam Oates) and the family courts (led by Mr Justice Williams), the BSPR established a working group on imaging in suspected physical abuse [11], and there are now a series of regional combined medical / legal expert committees under the Family Justice Council. Both groups are tasked with demystifying the court experience for medics and improving communication between disciplines [13], as well as encouraging, mentoring and supporting shortage specialities such as paediatric radiologists to consider taking on this work.

Conclusions

Our overriding obligation is to make the most accurate diagnoses possible in children whilst remembering that their safety is paramount. Occasionally that will lead to over-diagnosis, but under-diagnosis can be catastrophic for the child.

Unfortunately, the situation remains that children continue to be physically abused, and whilst imaging can be the first indicator of the severity of the abuse, it remains only a part of the complex pattern of evidence that is eventually put before the court.

Paediatric radiologists must remain alert to the manifestations of physical abuse, and they must feel able to report abnormalities that they think need investigating further, so that Safeguarding Teams and local authorities can make the right judgements on child welfare and suitable places of safety for children and their siblings. The recent

media interest gives us an opportunity to revisit training and mentoring opportunities, regional or network support mechanisms, and understand cross-disciplinary working, with the aim of improving an already stretched service.

Sadly, it is perhaps no surprise that radiologists shy away from offering expert opinion to the courts following recent media portrayal. Even more sadly, this means that these children, the majority of whom cannot speak for themselves, may lose out on an important and highly specialised advocate for their future safety and care.

References

1. Dugan E. My baby was taken away for months over tiny bruises and a fracture that didn't exist. The Sunday Times, 16 May 2021. Accessed 01 July 2021 at <https://www.thetimes.co.uk/article/my-baby-was-taken-away-for-months-over-tiny-bruises-and-a-fracture-that-didnt-exist-0w6v5qzqt>
2. Dugan E. Social Workers too quick to wade in, review finds. The Sunday Times, 13 June 2021. Accessed 01 July 2021 at <https://www.thetimes.co.uk/article/social-workers-too-quick-to-wade-in-review-finds-qttd0763wd>
3. Dugan E. Shortage of infant x-ray experts "causing babies to be taken into care". The Sunday Times, 27 June 2021. Accessed 01 July 2021 at <https://www.thetimes.co.uk/article/shortage-of-infant-x-ray-experts-causing-babies-to-be-taken-into-care-s3w6zl8m9>
4. MacAlister J. The Case for Change: The Independent Review of Children's Social Care. Accessed 01 July 2021 at <https://www.gov.uk/government/groups/independent-review-of-childrens-social-care>
5. Paddock M, Sprigg A, Offiah AC. Imaging and reporting considerations for suspected physical abuse (non-accidental injury) in infants and young children. Part 1: initial considerations and appendicular skeleton. Clin Radiol. 2017 Mar;72(3):179-188. doi: 10.1016/j.crad.2016.11.016.
6. Paddock M, Sprigg A, Offiah AC. Imaging and reporting considerations for suspected physical abuse (non-accidental injury) in infants and young children. Part 2: axial skeleton and differential diagnoses. Clin Radiol. 2017 Mar;72(3):189-201. doi: 10.1016/j.crad.2016.11.015.

7. Leung RS, Nwachuckwu C, Pervaiz A, Wallace C, Landes C, Offiah AC. Are UK radiologists satisfied with the training and support received in suspected child abuse? *Clin Radiol*. 2009 Jul;64(7):690-8. doi: 10.1016/j.crad.2009.02.012.
8. The Royal College of Radiologists & Society of Radiographers. The radiological investigation of suspected physical abuse in children. The Royal College of Radiologists 2017.
9. The Royal College of Radiologists. Standards for radiology events and learning meetings. 2020. BFCR20(1). The Royal College of Radiologists 2016. Accessed 01 July 2021 at <https://www.rcr.ac.uk/publication/standards-radiology-events-and-learning-meetings>
10. Halliday K, Drinkwater K, Howlett DC. Evaluation of paediatric radiology services in hospitals in the UK. *Clin Radiol*. 2016 Dec;71(12):1263-1267. doi: 10.1016/j.crad.2016.05.024.
11. Oates A, Halliday K, Offiah AC, Landes C, Stoodley N, Jeanes A, Johnson K, Chapman S, Stivaros SM, Fairhurst J, Watt A, Paddock M, Giles K, McHugh K, Arthurs OJ. Shortage of paediatric radiologists acting as an expert witness: position statement from the British Society of Paediatric Radiology (BSPR) National Working Group on Imaging in Suspected Physical Abuse (SPA). *Clin Radiol*. 2019 Jul;74(7):496-502. doi: 10.1016/j.crad.2019.04.016.
12. The Royal College of Radiologists. Clinical Radiology UK Workforce census 2020 report. BFCR(21)3. London. The Royal College of Radiologists 2016. Accessed 01 July 2021 at <https://www.rcr.ac.uk/clinical-radiology/service-delivery/rcr-radiology-workforce-census>

13. Williams M et al; President of the Family Division Working Group on Medical Experts in the Family Courts Final Report. October 2020. Accessed 01 July 2021 at <https://www.judiciary.uk/wp-content/uploads/2020/11/Working-Group-on-Medical-Experts-Final-Report-v.7.pdf>