

“Escalation of Critical Radiological Findings”

A mother and her 10-month-old presented to an Emergency Department (ED) at approximately 8pm with a leg injury. At triage it was reported another child had fallen on the child’s leg while crawling behind him. The child had been intermittently crying since the incident and was unable to weight bear.

On assessment at triage the child’s foot appeared to be red with no obvious deformity, however the child screamed when palpated. The child’s observations were ‘Between the Flags’ and a triage category 4 was allocated. The child and mother were sent to the waiting room.

A senior medical officer ordered x-rays of the lower limb under the rapid assessment and treatment model prior to the end of their shift. A Junior Medical Officer (JMO) then assessed the child at approximately 11pm. The history gathered from the mother indicated she was supervising the child playing outside at midday with two other children who were playing tackle football near the child when a 4-year-old slipped and landed on the back of the child’s ankle while the child was crawling.

The child had ongoing pain and irritability throughout the afternoon and evening and was reluctant to weight bear. The mother was concerned the child may have injured their leg and presented to the ED.

On assessment the child was asleep in the mother’s arms. The JMO’s physical assessment indicated the ankle was not obviously deformed or swollen, however was tender at the calcaneus. On palpation the child woke and began crying. The mother was observed by staff to be appropriate and attentive to the child’s needs. The x-rays were reviewed with an ED Registrar in charge of the shift, and it was documented there was no obvious fracture. The impression was that the child had accidentally sustained a soft tissue injury.

A dose of paracetamol was administered, and the child and mother were discharged home around midnight. The mother was advised to administer paracetamol as required for pain and to follow up with their general practitioner (GP) for review, with a plan to return to the ED if there were any further concerns.

The radiologist reported on the child’s x-rays the following morning and entered the findings into the electronic medical record. The x-rays showed irregularity of the distal metaphysis of the tibia and distal fibula, suggestive of metaphyseal fractures. The report was added automatically to a pooled ED message centre in the electronic medical record (eMR).

Ten days following discharge the child was brought into the ED unresponsive. A head computerised tomography (CT) revealed both chronic and acute subdural haematomas. The child was transferred to a paediatric tertiary intensive care unit (ICU) for further management. Sadly, three days later treatment was withdrawn, and the child died.

Investigation:

In this case the child was thought to have a soft tissue injury, resulting from a plausible accident, and was discharged home. The radiologist who reviewed the imaging reported a metaphyseal fracture, however did not consider this injury to be a potential non-accidental injury. Therefore, they did not notify the ED with a phone call as per the Medical Imaging Service’s current local operating protocol. Second level review of the imaging noted the fractures were subtle and would not be expected to be detected by a JMO.

Neither of the doctors who reviewed the child and the x-rays, had ordered the imaging in eMR. As such, the report was not sent to their personal eMR message centre. They were therefore unaware of the abnormal finding within the formal report.

It was identified that the report was available the following day in the pooled ED message centre in eMR. However, the ED did not have a clear process in place to review the pooled ED message centre. As a result, the formal report was not reviewed by a senior medical officer through this safety mechanism. The result was available in the message centre of the senior medical officer who ordered the imaging, however they were on leave following the evening this child presented and follow up of the report findings was not actioned.

Lessons:

The failure to alert staff to actual or potential critical abnormal findings on radiology reports, and the absence of a formal process to review pooled message centre results represent a significant risk to patients who have been discharged from the ED prior to a formal result being available.

Metaphyseal fractures: also known as corner or bucket handle fractures, are suggestive of non-accidental injury. It is thought that these fractures are caused by violent pulling, twisting, or shaking that leads to microfractures in the weaker growing point of the bone. This type of injury occurs almost exclusively in children under 2 years of age because they are small enough to be shaken and are unable to protect their limbs.

Soft tissue injuries: including sprains and strains in children under 12-months of age are uncommon. Children who cannot bear weight or have local bony tenderness after an injury are likely to have a fracture. Some fractures are not easily seen on an x-ray, so treatment is based on clinical features as well as x-rays.

Fractures in child who is not walking: is a red flag for non-accidental injury and needs to be appropriately investigated and escalated.

ED pooled message centres: Senior medical officers in ED should have an established process to ensure pooled

message centres are reliably reviewed in a timely way to ensure all investigations ordered are checked, particularly in an environment such as ED where staff are working shifts and may not return to work for a week or more.

Communication of critical results: message centres can contain multiple pathology and radiology results for numerous patients. For this reason, it is essential that findings consistent with or have potential to be related to non-accidental injury are phoned through to a senior doctor in the ED.

Reporting abnormal radiology findings: where a radiologist identifies findings suggestive of a non-accidental injury, this needs to also be clearly documented in the formal report. For example, *“There is irregularity of the distal metaphysis of the tibia and fibula suggestive of metaphyseal fractures. This may indicate non-accidental injury.”*

Work led by eHealth is underway to strengthen communication of significant radiological findings to support a timely response and improve outcomes for children.

What safety processes do you have in place?

- ❖ Do you have a formal and reliable process for the notification of time critical abnormal findings on radiology reports to the ED or paediatric ward?
- ❖ Do you have a pooled messaging system in eMR **and** who is responsible for actioning time critical results?

Resource: Advice regarding reporting obligations see [NSW Health Prevention and response to violence, abuse and neglect](#)

Reference

[Offial A, Van Rinj RR, Perez-Rossello JM, Kleiman PK. Skeletal imaging of child abuse \(non-accidental injury\). Pediatric Radiol. 2009; 39\(5\):461](#)