Minor injuries… major implications: Watching out for sentinel injuries

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An otherwise healthy two-month-old boy presented to his general paediatrician for follow-up of gastroesophageal reflux disease. His mother reported that since starting ranitidine two weeks earlier, his discomfort following feeds and previously reported excessive crying had both improved. She had no new concerns about the child's health but reported that she had observed a small amount of blood on the infant's crib sheet in the past week, which she could not explain.

On examination, he appeared alert with normal vital signs and had adequate weight gain since his last visit. Cardiovascular, respiratory, abdominal and neurological examinations were within normal limits. The paediatrician made note of a solitary, blue-green bruise on the baby's left anterior thigh, which measured approximately 2 cm in diameter. He inquired about its origin; however, the child's mother stated that she had not noticed it and was unsure of the causal mechanism. There were no other skin findings, bruises or petechiae noted. Examination of the oral cavity was unremarkable. The paediatrician prescribed a three-month supply of ranitidine and recommended routine follow-up with the family physician for well-baby care and immunizations.

One month later, the child was brought to the local emergency department by ambulance after his mother found him unresponsive in his crib, with jerking of his arms and legs. There was no history of recent illness or trauma. On examination, he was pale and lethargic. His heart rate was 118 beats/min and his blood pressure was 86/58 mmHg. He was afebrile, with shallow respirations and an oxygen saturation of 96% on room air. He exhibited tonic-clonic movement of his right upper and lower extremities. His pupils were equal and reactive; however, intermittent nystagmus was noted. An area of soft tissue swelling was palpable at the base of the skull and there were two green bruises on the left cheek.

The child was admitted to the paediatric medical unit. Computed tomography of the head revealed bilateral areas of subdural haemorrhage. His coagulation profile, complete blood count and electrolytes were all normal. Ophthalmological examination demonstrated bilateral extensive and multilayered retinal haemorrhages. Three posterior rib fractures with callous formation were present on skeletal survey. A report was made to the local child welfare authority because of suspected physical abuse and nonaccidental head injury.

LEARNING POINTS

- The word 'sentinel' is derived from 'sentina', which means 'vigilance' in old Italian. A sentinel injury is a visible or detectable minor injury in a precruising child that is poorly explained and, therefore, suspicious for physical abuse (1).
- Clinicians must be vigilant when a bruise or intraoral bleeding is identified in an infant because these may be 'warning injuries' for possible abuse. In a recent retrospective case-control study involving 401 infants <1 year of age, nearly one-third of abused children had a history of ≥1 sentinel injuries. In an age-matched comparison group of children who were not abused, no history of sentinel injury was found (2). The child in the current vignette initially presented with a bruise and a history of blood on the crib sheet, possibly indicative of intraoral bleeding; however, both of these were sentinel injuries.
- Timely recognition and management of a sentinel injury can alter the pattern of escalating child abuse. Children diagnosed with physical abuse often have previous injuries that have been overlooked. In nearly one-third of cases involving confirmed physical abuse, there was a history of recurrent violence toward the infant (2). In the clinical vignette, recognition of the bruise as a sentinel injury and detailed inquiry about the history of blood on the crib sheet may have led to earlier medical evaluation, involvement of a child welfare authority and prevention of additional trauma.
- A Canadian Paediatric Surveillance Program one-time survey of Canadian paediatricians was conducted in February 2015 to evaluate awareness of sentinel injuries and their significance (3). Of 582 respondents, 65% were aware that bruises and intraoral injuries in nonambulatory children are red flags for possible physical abuse. Respondents were more likely to be aware of bruises as sentinel injuries (91.9%) than they were of intraoral injuries (67.2%).
- In the survey, when provided with a clinical vignette describing a two-month-old infant with unexplained intraoral bleeding, 22.1% of respondents replied that they would **not** include child abuse on their differential. In contrast, in a similar clinical vignette describing a two-month-old infant with an incidental finding of a small bruise on physical examination, only 5.1% of respondents failed to include child abuse on their differential.
- Paediatric subspecialists were significantly less likely than general paediatricians to be aware of sentinel injuries as red flags for later serious abuse (adjusted OR 0.57 [95% CI 0.37 to 0.88]; P=0.01). Other important trends included higher awareness with more recent completion of residency, and with additional training in the area of child abuse and neglect.
- Bruises are extremely rare in nonambulatory children. The incidence of bruising is reported to be 0.55% in infants <6 months of age and 1.69% in those <9 months (4). Any bruising in an infant with limited mobility warrants consideration of and

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evaluation for possible child abuse. Investigations to detect occult injuries, such as a skeletal survey, ophthalmological examination and head imaging, should be considered (5).

- In a recent case-control study, 80% of sentinel injuries were bruises, while only 11% were intraoral injuries (2) such as frenulum tears or tongue contusions. Intraoral injuries can occur as a result of aggressive bottle-feeding or an object forced into the mouth. As with bruising, unexplained intraoral bleeding in a precruising child should prompt assessment for possible abuse.
- When a precruising child is found to have bruising or intraoral bleeding on physical examination or according to caregiver report, the clinician should:
  - Consider the possibility of sentinel injury and include nonaccidental trauma on the differential diagnosis.
  - Complete a full physical examination, a detailed medical and social history, and consider the need for additional medical and radiographic investigation.
  - Report any suspicion of abuse to a local child welfare authority, as mandated by provincial legal statutes.

RECOMMENDED READING

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