Physiological periostitis; a potential pitfall

P. de Silva, G. Evans-Jones, A. Wright, R. Henderson

Physiological periostitis is a known radiological finding in infants aged between 1 and 6 months. Two children with physiological periostitis mistaken for non-accidental injury are described. In both these patients only one limb was imaged and failure to image the contralateral limb led to unnecessary skeletal survey and distress for the families.

CASE 1

A 3 month old infant was admitted with a 24 hour history of reluctance to move her right leg. There was no history of trauma, fever, or malaise. A radiograph of the right leg was reported to show a periosteal reaction at the lateral aspect of the femur consistent with a fracture. The parents could not explain the suspected injury and a Child Protection investigation was done which found no pointers to abuse. A skeletal survey showed no other fracture but a similar appearance in the corresponding area of the left femur leading to a revised diagnosis of physiological periostitis (fig 1). The infant’s symptoms did not improve and two days after presentation the following abnormal investigations were obtained: neutrophils 17×10⁹/l, C reactive protein 17 units, erythrocyte sedimentation rate 62 mm/hour. Blood culture was negative.

A radionuclide bone scan showed increased uptake at the lower end of the right femur on day 6 and a radiograph confirmed osteomyelitis (fig 2). On open exploration under anaesthesia, pus was drained from which group C streptococcus was cultured. Following a six week course of antibiotics she made a complete recovery.

CASE 2

A 6 week old baby girl was admitted with a swollen left thigh noted on day of admission, and diarrhoea. There was no history of trauma. Pregnancy and delivery had been uneventful but at the newborn examination a possible vaginal cyst was noted.

On examination she was apyrexial and moving all four limbs normally. Positive findings on examination were a swollen left thigh with no signs of inflammation or bruising and a bulging hymen.

The following abnormal investigations were obtained: D dimer was more than 1000 ng/ml (normal: 0–255 ng/ml), with a normal coagulation screen and a C reactive protein of 44 units. A radiograph of the left femur showed a periosteal reaction. Abdominal ultrasound revealed a haematometocolpos with bilateral hydronephrosis. Doppler studies performed preoperatively showed good arterial and venous flow.

Under general anaesthesia a hymenotomy was performed and the turbid fluid under pressure was drained. The leg swelling resolved following surgery and the repeat ultrasound showed resolution of bilateral hydronephrosis. In view of the suspected fracture of the left femur a skeletal survey was performed, which showed a similar appearance in the contralateral femur, thus making a diagnosis of physiological periostitis and excluding injury. The patient made an uneventful recovery and the leg swelling was explained, by the haematometocolpos pressing on the left common iliac vein.

DISCUSSION

Physiological periostitis is a well documented x ray finding in paediatric radiology. It is commonly seen in long bones and is invariably symmetrical in distribution, although occasionally more prominent on one side than the other. The femora, humeri, and tibiae are affected almost equally, but may be limited to one pair of bones initially. Physiological periostitis is seen in both preterm and term babies aged 1–6 months, and the exact aetiology of this condition is unknown. The new bone is not always concentric in its distribution and is present on only one aspect of the bones in some. There is no consistency as to the site of involvement except in the tibia where the new bone is invariably on the medial aspect. It is always on the diaphysis and usually extends onto the metaphysis to a variable extent, but it has not been observed to reach the end of the metaphysis. Traumatic periosteal new
bone may be bilateral and multiple but there is usually other
evidence of fracture or haematoma. This new bone is uneven
and extends to the end of the metaphysis in some cases. In
infection new bone will not affect multiple bones symme-
trically. Physiological periostitis should be considered in
suspected bone injury with periosteal reaction only in infants
aged 1–6 months.¹

Conclusion
These two children were initially incorrectly suspected of
having been abused, the appearances of physiological
periostitis being mistaken for a fracture until a radiograph
on the opposite side showed identical appearances leading to
the recognition of physiological periostitis (or periostial new
bone).

These two case reports highlight firstly, the importance of
imaging the contralateral limb in this age group when
accidental fracture or osteomyelitis is suspected in order to
avoid unnecessary skeletal survey, and secondly, radiological
findings must be interpreted in the context of clinical
findings so that the risk of serious errors including erroneous
suspicition of child abuse are minimised.

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¹  Keats TE, Anderson MW. Atlas of normal roentgen variants that may simulate

Images in Paediatrics

Home oxygen therapy: beware of birthday cakes

The remains of the burnt oxygen
nasal cannula belonged to a child
with chronic lung disease on home
oxygen therapy (HOT). He had always
celebrated his birthdays with the usual
cake and the appropriate number of
 candles. Admiring his fourth birthday
cake, he lost balance and came too close
to the candles. The nasal cannula went
up in flames. His hair too. His older sister
was cute enough to rip the cannula off his
head. Physically, he only suffered from
nasal second degree burns. His family feels
guilty, even more so since everyone knew
that oxygen was a combustive agent.

Only adult patients have been
reported in the literature to have
suffered from HOT induced burns,
which varied from small superficial
facial lesions to lethal inhalation
injuries.¹ Most of these incidents were
caused by cigarette smoking. Young
children, luckily, do not normally
smoke. They are thus probably less at
risk of oxygen induced burns.

When prescribing HOT to paediatric
patients, physicians should however
remember children’s pleasures: birthday
cakes and candles—and warn parents
accordingly.

Reference
¹  Chang TT, Lipinski CA, Sherman HF. A hazard of
home oxygen therapy. J Burn Care Rehabil
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