CASE REPORT

Slipped capital femoral epiphysis after ipsilateral femoral neck fracture in an 11-year-old girl

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Introduction

Fractures of the neck of the femur account for less than 1% of all paediatric fractures.\textsuperscript{4,13} The complications after this injury are very frequent, the most significant being avascular necrosis.

Slipped capital femoral epiphysis is a well-known disorder of the hip in children that is characterised by displacement of the capital femoral epiphysis from the metaphysis through the physis. In the vast majority of the cases, the aetiology is unknown, although, the condition may be associated with a known endocrine disorder, with renal osteodystrophy, or with previous radiation therapy.\textsuperscript{8–11}

In the literature, delayed separation of the capital femoral epiphysis after a fracture of the femoral neck is very uncommon.\textsuperscript{5,12} We report one such case, which went on to heal with evidence of avascular necrosis.

Case report

An 11-year-old girl sustained a left displaced transcervical fracture of the femoral neck (Delbet’s classification, type II) and head trauma after a motor vehicle accident (Fig. 1). The femoral neck fracture was fixed with two cannulated screws under fluoroscopic imaging by closed means and both screw tips had stopped short of the capital physis (Fig. 2). A hip spica was not applied after the operation and she was then permitted to walk without weight bearing to the involved extremity. She was hospitalised for 4 days then discharged. She experienced increasing pain in the hip at the postoperative 35th day. There was no trauma or uncontrolled weight bearing in the history. Because of unexplained pain in walking, new radiographs were taken, which showed a separation of the capital femoral epiphysis with displacement (Fig. 3). She was a healthy normal girl without any evidence of any endocrine disorder. She had not been on any medication before the injury. The child underwent reoperation. The displaced epiphysis was reduced close by gentle traction with internal rotation and fixed with two cannulated screws after removing the screws inserted earlier for fixation of the femoral neck fracture under fluoroscopic guidance (Fig. 4). She was again permitted to walk without weight bearing and discharged at 3rd postoperative day. Both operative wounds healed without any infection, and there was no evidence of sepsis. At 3 months she was allowed to start partial weight bearing to the operated extremity and full weight bearing at postoperative 5th month. At the postoperative 14th month control, it was detected that...
avascular necrosis of the femoral head occurred (Fig. 5). The girl was re-examined and found that she had 110° of hip flexion, complete extension, abduction and external rotation, and minimally limited internal rotation. There was a limb length discrepancy of 2 cm shortness of left lower extremity. The avascular necrosis had not resulted in significant collapse, and she complained only of mild hip pain during rigorous sporting activity.

Discussion

Fractures of the hip are uncommon in children, but require careful attention because of the incidence of complications such as avascular necrosis, coxa vara, non-union, and premature physeal closure.1,7,14 The association of a delayed separation of the capital femoral epiphysis is distinctly uncommon. We have been able to locate only two reports of this association.5,12 The interval between the initial injury and the epiphyseal separation in the current case was only 5 weeks, and the physeal separation occurred immediately after the child resumed walking. This suggests that the causative factor was not prolonged repetitive loading of an abnormally inclined growth plate seen in the previously reported patient with the malunited femoral neck fracture.12 Because the epiphyseal separation
occurred in a healthy child without any known pre-
disposing factors for a non-traumatic epiphysiolsis,
the initial trauma or the treatment might have in
some way contributed to separation of the capital
epiphysis.

The possible mechanisms for the delayed epiphy-
seal separation in our patient need to be excluded.
First, it is possible that the epiphyseal separation was
related to the technique of internal fixation
employed. Tightening of a cannulated screw, which
did not cross the growth plate, could have weakened
the growth plate as the proximal fragment of the
neck was drawn toward the screw head. Canale and
Beaty² make passing mention of the possibility of
separation of the capital femoral epiphysis if screws
are inserted without tapping while fixing transcer-
vical fractures in children. However, in this case, the
tapping was done. Second, slipped capital femoral
epiphysis may be resulted from a trauma or endocrine
disorder. From the patient's history and laboratory
evaluation, this was not such a case. Thus, the cause
of the epiphyseal separation remains uncertain.

Avascular necrosis is the most devastating com-
plcation following internal fixation of fractures of
the children because of the tenous blood supply to
the femoral head.³ The reported incidence of avas-
cular necrosis after traumatic fracture-separation
of the capital femoral epiphysis varies between 50
and 100%, whereas that following transcervical frac-
ture varies between 18 and 52%.⁴,⁵ The risk of
avascular necrosis may be higher when a transcer-
vical fracture of the neck of the femur is associated
with an epiphyseal separation. Also, the manipula-
tive reduction should be considered a risk factor for
osteonecrosis.

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