CASE REPORT: BEWARE OF ADOLESCENT KNEE PAIN

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The following case illustrates the potentially devastating results arising from delay in diagnosis of a SUFE (slipped upper femoral epiphysis) presenting with knee pain and not hip pain.

HISTORY

A thirteen-year-old girl was brought into the A&E department with loss of function of her right lower limb and severe pain localised to her right knee. She had fallen to the ground on her right side whilst playing at school.

On questioning, she gave a four-month history of pain in her right knee associated with a limp. She had been able to walk. Symptoms were improved by rest and were exacerbated as soon as exercise was resumed. This pattern persisted for ten weeks, with pain even in bed whilst lying down when at its worst. The site of pain around the knee and lower thigh was consistent. Three months earlier the patient's mother noticed that she was walking with her right foot turned outwards.

On inspection at the time of admission, the right lower limb was straight and stiff due to muscle spasm and was held in external rotation. The patient was very apprehensive and examination was difficult. The right knee where she complained of pain was clinically normal.

Hysteria was thought to be her problem and her mother was informed. She was left to settle under observation to be reviewed in an hour's time. By then the patient's pain was perceived in her right upper thigh and groin area. Attention was drawn to her hip which was painful on movement and X-rays were taken. These showed a slipped femoral epiphysis (see Figure 1). This was a severe slip, probably an acute on a chronic slip. In view of the severity of the pain, immediate operative pinning was performed (see Figure 2).

Figure 1

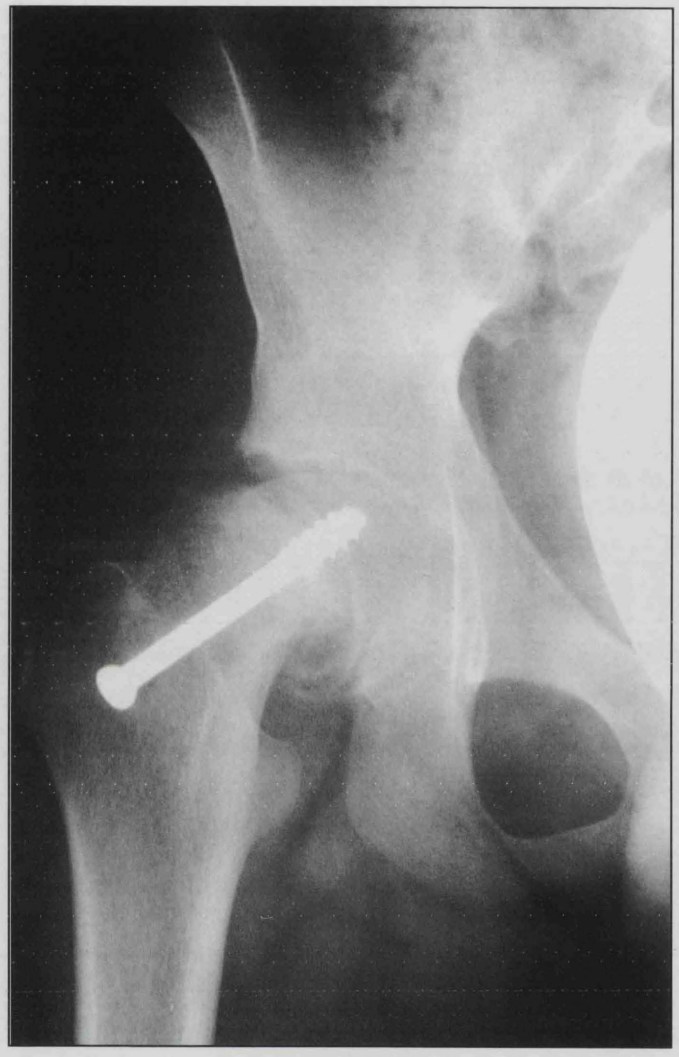

Figure 2

PATHOLOGY AND ETIOLOGY

The proximal femoral epiphysis may become displaced at the growth disc and relative to the neck slips downwards and posteriorly, making the shaft move into adduction and external rotation in relation to the head. It is common in boys (3:2 ratio) and is thought to be caused by an imbalance between growth and sex hormones, hence the classic morphographic types are overweight hypogonadal boys and tall thin girls. The age range is 9-14 years old. It is bilateral in 20% of patients and when unilateral the side of the dominant hand is usually affected first.

CLINICAL FINDINGS

Two varieties of slipped epiphysis are encountered: acute or sudden, and chronic or gradual.

The term acute is often misleading because careful questioning will often reveal that the acute slip is really a final episode in what has been a slow slip with symptoms so slight that they passed unnoticed, as in this case. The acute slip follows an injury of some magnitude, such as a fall, after which the patient is unable to move the hip and experiences severe pain. Clinical signs are identical to those of a subcapital fracture in an adult.

In chronic slipped epiphysis, the child complains of pain, sometimes in the hip or groin, but often only in the thigh or knee – the latter because the femoral nerve supplies both the hip and knee joints and is thus a form of referred pain (Hilton's law). It is often regarded as a sprain and so, unfortunately, disregarded. It soon disappears, only to recur with further exercise. Limp with an out-turned foot also occurs early and is more constant. Pain in the knee may be the only complaint and if the hip is neither examined nor X-rayed in two planes the diagnosis will be missed.

Nowadays the advance of computed tomographic (CT) scanning and magnetic resonance imaging (MRI) allow more accurate diagnoses, treatment and follow-up of epiphyseal injuries. MRI is the investigation of choice in acute complex physeal injuries[1].

TREATMENT AND COMPLICATIONS

The treatment of a pure acute slipped epiphysis is gentle closed reduction without delay by internal rotation and abduction and internal fixation under X-ray control. In chronic slipped epiphysis, which are minimally displaced, reduction is not attempted as it can disrupt the blood supply to the epiphysis, stretching the vessels over new bone. Traction is applied to prevent further slip whilst waiting for surgery if delayed by any other reason.

In theory, open reduction is ideal, if there is severe displacement, but it has a fairly high complication rate from avascular necrosis (27%) or chondrolysis (55%). The safest procedure, therefore, is to fix the head in its displaced position (1.5% complication rate from avascular necrosis and 13% from chondrolysis) and to compensate for the displacement by a subtrochanteric osteotomy when the epiphysis has joined (10% complicating with avascular necrosis of the femoral head after this procedure, and 37% with chondrolysis). Thus the sequelae of slipped epiphysis are coxa vara, avascular necrosis, chondrolysis, leg length discrepancies and osteomyelitis[2]. Chondrolysis has been correlated with unrecognised pin penetration into the hip joint[3]. Consequently, the patient and family should be advised that the prognosis after a badly displaced capital femoral epiphysis is not good. If avascular necrosis or chondrolysis develops, osteoarthritis inevitably occurs early and reconstructive measures after collapse of the femoral head include total hip arthroplasty and hip arthrodesis. Total hip arthroplasty is not a reliable means of providing a longterm painless joint in an active adolescent with one-joint disease. Hip arthrodesis has been shown to be a good alternative treatment for patients who develop avascular necrosis after this injury[4].

In summary, one can say that any slipped femoral epiphysis worse than a minimally displaced one (ie displacement equal to or less than one third of the epiphyseal growth plate diameter) has a very high complication rate and therefore it is important to remember that hip or knee pain in an adolescent could be caused by this tricky condition.

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FURTHER READING

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