AVASCULAR NECROSIS OF THE FEMORAL CAPITAL EPIPHYSIS AFTER TRAUMATIC DISLOCATION OF THE HIP IN CHILDREN*

ROBERT A. HALIBURTON, FREEMAN A. BROCKENSHIRE and JOHN R. BARBER,
WINDSOR, ONTARIO, CANADA

Traumatic dislocation of the hip in children is uncommon. Fineschi (1956) in a careful review of the literature stated that there were about 150 reported cases, of which sixteen were complicated by avascular necrosis of the femoral capital epiphysis. The purpose of this paper is to review the literature on such cases and to report an additional case.

We have been able to review thirteen cases of avascular necrosis of the femoral capital epiphysis after traumatic dislocation of the hip reported by Elmslie (1919),

TABLE I
A SUMMARY OF CASES OF AVASCULAR NECROSIS OF FEMORAL CAPITAL EPIPHYSIS AFTER
TRAUMATIC DISLOCATION OF THE HIP

Author	Year	Age (years)	Sex	Type of dislocation	Interval between injury and reduction	Interval between injury and diagnosis of avascular necrosis (months)
Banks	1941	12	M	Anterior	—	15
Böhler	1957	8	F	Posterior	8 days	12
Chandler and Kreuscher	1932	14	F	Central	—	6
Elmslie	1919	4	M	Posterior	1 week	15
Elmslie	1932	7	F	Posterior	1 week	9
Fairbank	1924	10½	M	Posterior	3 days	7
Goldenberg	1938	10½	M	Posterior	1 week	28
Kleinberg	1939	15	M	Posterior	—	13
Mutschler	1939	13	M	Posterior	—	12
Phemister	1934	14	F	Posterior	—	11
Quist-Hanssen	1945	4	M	Posterior	3 days	8
Rehbein	1922	8	M	Posterior	1 day	12
Watson-Jones	1940	14	F	Posterior	1 day	3

In all cases deformity of the femoral head of the type associated with Perthes' disease developed.

Rehbein (1922), Fairbank (1924), Elmslie (1932), Chandler and Kreuscher (1932), Phemister (1934), Goldenberg (1938), Kleinberg (1939), Mutschler (1939), Banks (1941), Quist-Hanssen (1945), Watson-Jones (1940), and Böhler (1957) (Table I). The age of the patients varied from four to fifteen years. There were eight boys and five girls. The side of the dislocation was stated in only five cases (three right and two left). The dislocation was posterior in eleven patients, anterior in one and central in one. The interval

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between injury and reduction was given in eight case reports: the shortest was one day, the longest eight days. The time interval between the injury and the diagnosis of avascular necrosis varied from three to twenty-eight months. All the patients had consequent radiographic deformity of the head and neck of the femur. The radiographic appearances led early observers to consider a causal relationship between trauma and Legg-Perthes' disease.

FIG. 1

FIG. 2

Figure 1—Initial radiograph before reduction. Figure 2—Immediately after reduction (in plaster).

FIG. 3

Two months later on removal of plaster. There is uniform, increased radio-opacity of the left femoral capital epiphysis, compared with the unaffected side.

CASE REPORT

In July 1958 a seven and a half-year-old boy's left hip was injured when a larger boy fell on him during play. When seen two hours after injury he had severe pain in the hip. The lower limb was held flexed and adducted, and there was a bony prominence in the left buttock. There was no evidence of damage to nerves or vessels. The radiograph (Fig. 1) showed a posterior dislocation of the left hip without fracture. Three hours after injury, under general anaesthesia with sodium pentothal and Flaxedil, the dislocation was reduced by flexion of the hip and knee and traction on the thigh with the pelvis held by an assistant. Reduction was

moderately difficult. The hip was immobilised in a plaster spica in extension and abduction. The radiograph (Fig. 2) showed concentric reduction. Radiographs taken two days, one week and three weeks after the injury showed maintenance of reduction. The plaster was removed after eight weeks. At that time radiographs (Fig. 3) showed uniform, increased radio-opacity of the left femoral capital epiphysis as compared with the unaffected side. A diagnosis of avascular necrosis of the left femoral capital epiphysis was made and the patient was kept in bed. One month later radiographs showed no change in the appearance of the left hip, and the patient was allowed up with crutches and a sling for the affected leg. Two months after

FIG. 4

Five months after dislocation the hip appears normal.

FIG. 5

Appearance of hips one year after the injury.

this there was a full painless range of motion in the left hip, and a radiograph at that time (Fig. 4) showed a normal appearance of both hips. The patient was not allowed to bear weight on the affected leg until six months after the injury. Since then his hip has remained clinically and radiologically normal. The appearance of the hips one year after the injury is shown in Figure 5.

DISCUSSION

The normal vascular anatomy of the femoral capital epiphysis has been described by Trueta (1957). At the age of seven and a half years the proximal femoral epiphysis is supplied

with blood by the lateral epiphysal arteries which enter the epiphysis posteriorly and laterally, and by arteries in the ligamentum teres. That avascular necrosis of the femoral capital epiphysis should occur after posterior dislocation of the hip at this age is not surprising, indeed it is almost to be expected. The patient described developed avascular necrosis of the upper femoral epiphysis after traumatic posterior dislocation of the hip, which was diagnosed eight weeks after injury, despite early and maintained concentric reduction. It is of significance that within five months of the injury the proximal femoral epiphysis regained normal radiographic density without fragmentation or collapse. Replacement of the epiphysis in Legg-Perthes' disease does not occur so rapidly, and usually there is some resultant deformity of the femoral head and neck. Ponseti (1956) believed that avascular necrosis in Legg-Perthes' disease was secondary to a primary pathological process in the epiphysal plate. Legg-Perthes' disease differs fundamentally from avascular necrosis after traumatic dislocation of the hip; in the latter condition the epiphysal plate may be normal and replacement of the epiphysis can occur in a surprisingly short time with adequate treatment.

SUMMARY

1. The case history of a seven and a half-year-old boy who developed increased radiographic density of the femoral capital epiphysis after traumatic dislocation of the hip is presented.
2. The authors have been able to examine the case reports of thirteen similar cases presented in the literature.
3. The case presented is felt to be of interest because avascular necrosis was diagnosed early, and the radiographic appearance of the hip became normal five months after the injury.

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