

TRAUMATIC HIP DISLOCATION IN CHILDHOOD

A Report of 26 Cases and a Review of the Literature

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Twenty-six cases of traumatic hip dislocation in children are presented. Although closed reduction was achieved in most instances, open procedures had to be employed in two cases of soft tissue interposition and in a patient with ipsilateral fracture of the femoral shaft. In 16 patients, with a follow-up averaging 14 years, the incidence of complications (avascular necrosis, coxa magna and arthrosis) was significant. Factors predisposing to abnormal results were delayed reduction and severe trauma. Neither the method of immobilization nor the interval without weight-bearing over 4 weeks were of influence. Principles of treatment are suggested.

Key words: hip; hip dislocation; children

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Traumatic hip dislocation (THD) in childhood is rare. As far as we could determine, no more than 500 cases have been reported. The follow-up, a significant factor, is usually too brief (Funk 1962). Therefore, hip joint behaviour after traumatic dislocation in this age group has not been adequately documented in order to provide defined therapeutic principles.

This report, based on 26 cases collected in our country, and including a review of the world literature, is an attempt to face these problems.

PATIENTS AND METHODS

Twenty-six cases of THD in children under 16 years of age, from our Institute and from private records, were reviewed. Ages ranged from 4 to 15 years, averaging 10 years. Boys were involved three times as often as girls. Injuries were grouped into slight, such as falls from the same level, moderate, such as athletic traumas, and severe. They were slight in 25 per cent of cases and these

occurred predominantly in younger children. The severity of injuries increased with age. Twenty-four dislocations were posterior and two were anterior. Among the posterior cases there were six retroacetabular dislocations; the femur had only suffered a posterior rotatory displacement (Figure 1). There were no fracture-dislocations. In one patient, severely injured, there was a peroneal nerve palsy, and in another an obturator dislocation was associated with an ipsilateral fracture of the femoral shaft (Figure 2).

Diagnosis was made within the first 12 hours in 23 patients, while in the other 3 cases it was delayed over 40 hours. Of these, only one was due to delayed consultation. The interval before reduction was less than 24 hours in 20 cases, and in the other 6 children it ranged from 40 hours to 8 days.

Treatment

Initial attempts at closed reduction, employing the Allis method, were made in all cases. General anaesthesia was used in all patients except two, in whom rachianaesthesia and analgesia were used. These attempts were effective in 23 patients. The remaining three cases underwent open reduction. Two of them had soft tissue interposition:

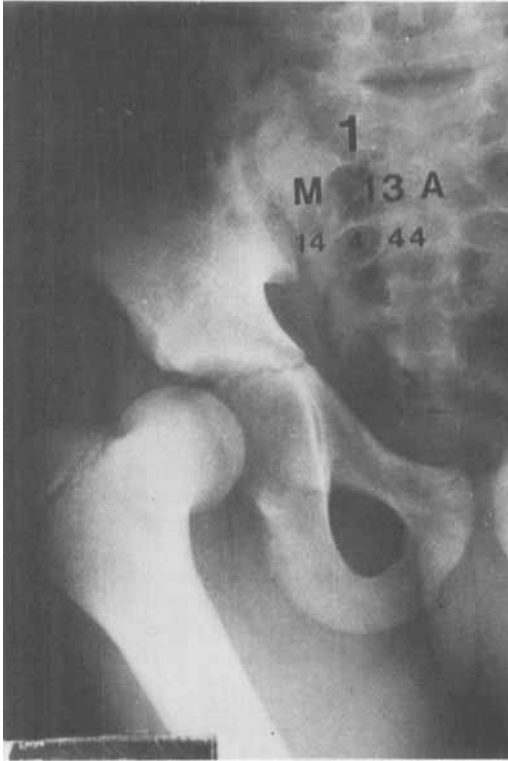


Figure 1. An example of retroacetabular dislocation. The femur has only suffered a rotatory movement, with neither lateral nor altitudinal displacement. Note the concentric projection of the femoral head and acetabulum.

acetabular labrum in one and labrum and capsule in the other. In both cases, X-rays after manipulation showed a greater gap between the femoral head and the acetabulum than on the contralateral side. In the remaining case the femoral fracture made closed manoeuvres inefficient. As to the post-reduction procedure, various methods were employed (bedrest, skin and skeletal traction, cast) from 10 days to 12 weeks, averaging 5 weeks. Except in one case, weight-bearing was permitted without an additional interval.

Complications

Sixteen patients have been followed from 1.5 to 31 years, with an average of 14.5 years, and complications were found in seven. The peroneal nerve palsy remained unchanged 22 years after trauma. In three children whose dislocations were reduced more than 40 hours after injury, avascular necrosis was diagnosed 5, 19 and 20 months later. The injuries were classified as slight, severe and



Figure 2. An exceptional case of obturator dislocation of the hip associated with ipsilateral fracture of the femoral shaft in a girl of 6 years.

moderate, respectively. The first patient was found to have an asymptomatic coxa plana 7 years post-reduction. In the second, arthrosis was present after 5 years and severe after 18 (Figure 3). The other patient had an asymptomatic deformed epiphysis 31 years after injury (Figure 4). One patient developed coxa magna subluxans with a short and wide femoral neck. This was one of the children undergoing open and delayed reduction for soft tissue interposition. Arthrosis was also present in another patient, X-rayed 18 years after his severe injury. The patient with peroneal nerve palsy also showed hip pain and limp at the final evaluation; he refused to be X-rayed, but it may be assumed that his hip is arthrotic.

RESULTS

Only hips followed to skeletal maturity were considered. Gartland's criteria were employed and a hip was judged abnormal if there were pain, limited motion, shortening of the limb or



Figure 3. End result of a dislocated hip, reduced 40 hours after the injury. Avascular necrosis occurred 19 months later. This radiogram, taken 18 years later, shows the deformed femoral head and the degenerative joint changes.



Figure 4. Thirty-one years after dislocation. This was a case reduced by closed procedure 8 days after injury. Avascular necrosis was diagnosed 20 months later. Note the deformed epiphysis and the wide and short femoral neck.

Table 1. Pertinent data of 10 children with THD followed to skeletal maturity

Name	Age (years)	Severity of injury	Interval before reduction (hours)	Reduction procedure	Non-weight-bearing interval (weeks)	Follow-up (years)	Result
NA	4	M	192	C	5	31	A
JP	12	Se	6	C	4	28	N
JM	15	Sl	7	C	4	25	N
MT	6	M	6	C	6	20	N
WA	15	Se	6	C	6	20	N
JN	15	Se	8	C	6	22	A
CP	13	Se	6	C	8	16	N
ES	12	Se	8	C	4	18	A
GG	14	Se	40	C	5	18	A
GP	15	Se	12	C	5	5	N

M = Moderate
 Se = Severe
 Sl = Slight
 C = Closed
 A = Abnormal
 N = Normal

limp, or if there were radiographic abnormalities (Pennsylvania Orthopaedic Society 1968). Ten patients, followed from 5 to 31 years, were in this situation (Table 1). A normal result was obtained in six cases, whilst in four it was abnormal. The factors which appear to have favoured the abnormal results are delayed reduction and severe trauma. Neither initial post-reduction procedures nor the intervals without weight-bearing over 4 weeks influenced the results. There are no findings to indicate whether age or reduction procedure should be considered.

DISCUSSION

THD in childhood occurs predominantly in older boys, which is probably due to their higher traumatic morbidity (Morton 1959, Fischer et al. 1971). Hip dislocation, especially in younger children, may result from slight trauma (Fineschi 1956, Schlonsky & Miller 1973), as in this series, and this might be related to the anatomic characteristics of this age group (Bado, personal communication 1977). Giraud (1927) suggested that anterior dislocations are proportionally more frequent than in adults, but our findings do not confirm this opinion. There were in this series six retroacetabular dislocations: this type, quoted by few authors (Trillat & Ringot

1951, Chavatte 1968, Fischer & Imbert 1969), may cause diagnosis difficulties, as isolated frontal radiograms showing a concentric projection of epiphysis and acetabulum are not always demonstrative. As already mentioned by Piggot (1961) and Schlonsky & Miller (1973), our findings show that fracture-dislocations are exceptional in children, perhaps as a consequence of the particular plasticity of their joints. Associated neurological injuries are rare, but they may lead to poor results. Dislocations associated with femoral shaft fracture, though rare, are remarkable as in more than 50 per cent of previously reported cases dislocation was initially missed, the fracture providing an obvious injury and acting as a corrective osteotomy (Wadsworth 1961, Helal & Skevis 1967).

Closed reduction is usually effective in recent dislocations without fracture. Irreducibility in these cases is rare and it is caused by soft tissue interposition (acetabular labrum, capsule and muscles) as it has also been found by Funk (1962), Fernández (1965), Fordyce (1971) and Pearson & Mann (1973). Only X-rays are definitive for the diagnosis in these cases and open reduction is indicated. If there is associated femoral shaft fracture, closed reduction should be attempted, including certain procedures such as manipulation of the proximal fragment of the femur by means of screws or pins or even after its surgical exposure (Dehne & Immerman 1951, Helal & Skevis 1971, M'Bamalli 1975). Open reduction is required if these measures fail. Post-reduction treatment has been very variable in this series, as in other reports.

Avascular necrosis is a redoubtable complication. As it may be diagnosed until 24 months after injury, the evaluation of its incidence should be made on the basis of cases followed for at least that interval. Necrosis appears to be the result of interference with the extraosseous blood supply at the time of the injury (Cros 1959, Haliburton et al. 1961, Gula 1972). However, alternative mechanisms have been mentioned (Epstein 1973). The essential factor pre-

disposing to necrosis in this series was delayed reduction, and this has also been found by Haliburton et al. (1961), Pennsylvania Orthopaedic Society (1968) and Hammelbo (1976). Another accepted factor is severe trauma (Gula 1972, Epstein 1973). Open reduction has also been mentioned (Funk 1962), but if performed immediately can also be associated with a good prognosis (Schoenecker et al. 1978). Coxa magna, found by few authors (Glass & Powell 1961, Hovellius 1974, Macfarlane & King 1976), may be caused by a physal disturbance, and can also be related to vascular impairment. Arthrosis is the common end result of these complications, though it may also appear in their absence, especially after severe trauma; its incidence seems higher than usually considered. The incidence of post-reduction treatment on complications and end-results is still under discussion. According to this series, the non-weight-bearing period need not be longer than 4 weeks, and this is also the opinion of Pearson & Mann (1973) and Hammelbo (1976).

CONCLUSIONS

Every child with hip or knee trauma (even slight), with multiple injuries or with a femoral shaft fracture should be given a routine X-ray of the pelvis, including lateral hip views. If hip dislocation is present, immediate closed reduction, preferably by the Allis method, is indicated. Manoeuvres should be monitored radiographically to avoid false reductions. Open reduction, although rarely required, is necessary in the case of soft tissue interposition and in dislocations associated with femoral shaft fracture in which closed procedures have failed. Post-reduction treatment may include bedrest, skin traction or a cast for a period of 4 weeks, to allow healing of soft tissue injuries, followed by free weight-bearing. Clinical and radiological examinations should be performed quarterly during the first 2 years and then periodically until maturity to disclose eventual complications.

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