Acta orthop. Scandinav. 41, 476–487, 1970

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CENTRAL DISLOCATION OF THE HIP

The Prognosis with Conservative Management

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Received 25.viii.69

Opinions about the most appropriate treatment of central acetabular fractures vary. Closed versus open treatment has been discussed. On the one hand, there are adherents of a rather strict conservative line, but some authors feel that all dislocated fractures should receive surgery. In respect to conservative treatment, the value of closed reduction has been discussed with a view to the prognosis (Pearson & Hargadon 1962). Opinions are also divided regarding the most suitable form of open treatment. There are adherents of the view that early arthrodesis is the best treatment (Armstrong 1948), whereas Westerborn (1954) recommends early cup arthroplasty. Open reduction and osteosynthesis on broad indications have been proposed in recent years, primarily by the French (Judet, Judet & Letournel 1964).

There are probably two main reasons for existing discrepancies in opinions of treatment and the prognosis in such injuries. One reason is that the relative rareness of these injuries (according to Westerborn they only comprise 5 per cent of all pelvic fractures) makes it difficult for any one hospital to assemble sufficient experience with them. The other reason is that there has never been any unified classification of injuries which was based on pathological-anatomical observations. Therefore, one cannot be certain that the material of different authors is comparable. The great contribution of Judet et al. was to create a pathological-anatomical classification based on a combination of careful radiological examination with multiple projections and operative dissection. They were able to verify, *inter alia*, that a central dislocation may be accompanied by several different types of acetabular fractures. We can only hope that the classification devised by these authors will be accepted as an international standard. They feel that dislocated acetabular fractures should receive surgery, a view which

conflicts with results reported by Rowe & Lowell (1961) and Eichenholtz & Stark (1964), among others. In agreement with the latter authors, we believe that most of these patients have little or nothing to gain by surgery but that there is a group whose only chance of obtaining satisfactory joint function is through operative measures. A prognostic evaluation of a conservatively managed patient material is basic to the ability to select patients suitable for operative therapy. The present material is being presented for this reason, even though, like most previously published materials, it suffers from not having a detailed pathological-anatomical classification. The cases in this series only have one thing in common: the occurrence of a central dislocation of the femoral head.

MATERIAL AND METHODS

The material comprises cases treated in the Stockholm area from 1954–1965.

Central acetabular fractures are generally recorded in the records and in radiological files under the collective designation "pelvic fracture." The simplest method of tracing them proved to be scrutiny of all X-ray films filed under this collective diagnosis. All acetabular fractures with obvious central dislocation of the femoral head were then selected. In this manner, the X-ray films of the seven largest hospitals in Greater Stockholm were combed and patient records could be obtained via radiological reports. Approximately 120 acetabular fractures with

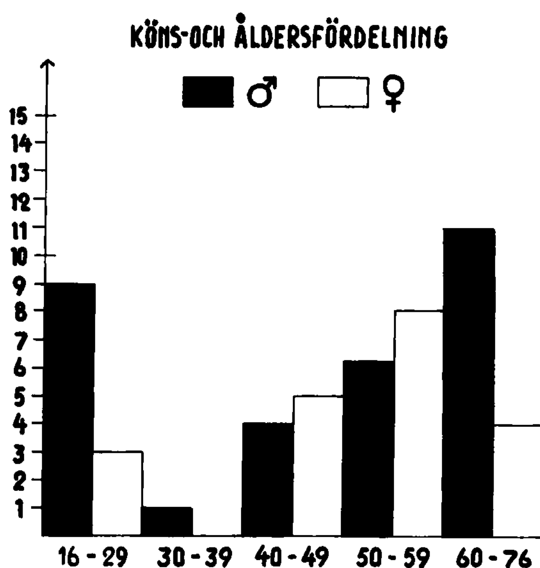

Figure 1. Age and sex distribution.

Table 1. Type of trauma

		%
Pedestrian hit by car	22	43
Automobile collisions	12	23
Fall from a height	10	20
Fall on the same plane	7	14

central dislocation of the femoral head were encountered (which should comprise almost all injuries of this type occurring in the area during the period in question), but unfortunately only 51 cases could be reached for a follow-up examination.

Some of the people who could not be reached had died in conjunction with the injury. Others, comprising a rather large group of patients more than 70 years of age, had died of other causes in the years immediately following the accident.

Age and sex distribution in the follow-up material may be seen in Figure 1. There were 31 men and 20 women. The relatively high average age at the time of trauma was extraordinary. More than half of the patients were more than 50 years and nearly a third were more than 60.

The nature of the trauma may be seen in Table 1. Two-thirds were traffic injuries and the kind incurred by a pedestrian hit by a car appears to be typical. The automobile collisions often occurred at road crossings in which the patient as driver or passenger was hit from the side by another car. In cases in which patients were able to recall details of the accident, they reported direct trauma to the region around the trochanter.

Table 2. Type of fracture and degree of dislocation

Inner Wall 23		Superior dome 28	
High-grade disloc.	Mod. disloc.	High-grade disloc.	Mod. disloc.
13	10	23	5

Radiological examinations in conjunction with the accident were usually limited to frontal pictures of the entire pelvis and of the injured side. Therefore, no especially careful analysis of the fracture anatomy was possible. However, frontal projection provides a rather good view of the condition of the weight-bearing part of the joint surface, the superior dome, and its relation to the femoral head. For this reason, fractures were only divided into two groups: those without involvement of the superior dome (inner wall fractures) and those in which, in addition to central dislocation of the caput, a more or less split fracture of the superior dome could be observed (superior dome fractures). Distribution of the two types may be seen in Table 2. By high-grade dislocation we mean a central dislocation of the caput by more than 1.5 cm. Figure 2 shows an inner wall fracture with high-grade dislocation and Figure 3 shows a superior dome type fracture also with high-grade displacement of the caput (left side).

No primary traumatic caput injury was observed in any case.

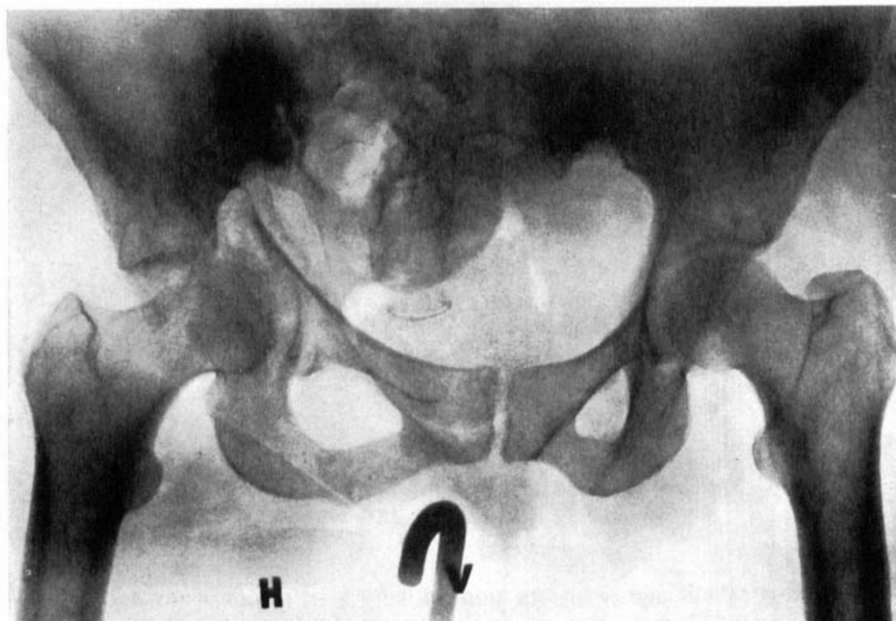

Figure 2. Inner wall fracture with high-grade dislocation of femoral head.

Treatment

Attempts were made in 32 cases to reduce the caput with traction. Longitudinal traction only was used in 22 cases and a combination of lateral and longitudinal traction in 10 cases. 28 of the 32 patients had high-grade dislocation and 4 had moderate dislocation of the caput. There were 17 superior dome and 11 inner wall fractures among the 28 high-grade fractures.

Reduction was considered good if residual medial dislocation of the femoral head in relation to the superior dome was less than 1 cm. As may be seen in Table 3, there was good reduction with 8 of the 17 superior dome fractures and 9 of the 11 inner wall fractures.

Nineteen patients were only treated with a period of bed rest and early mobilization. Eleven of these patients had moderate and 8 had high-grade dislocation.

No load was generally permitted before 3 months at the earliest.

Early complications. Early complications were uncommon in the material given follow-up examinations. One patient had an acute urethral injury treated with a

Table 3. Results of reduction
(28 high-grade dislocated fractures)

Superior dome fractures (17)		Inner wall fractures (11)	
Good red.	Poor red.	Good red.	Poor red.
8	9	9	2

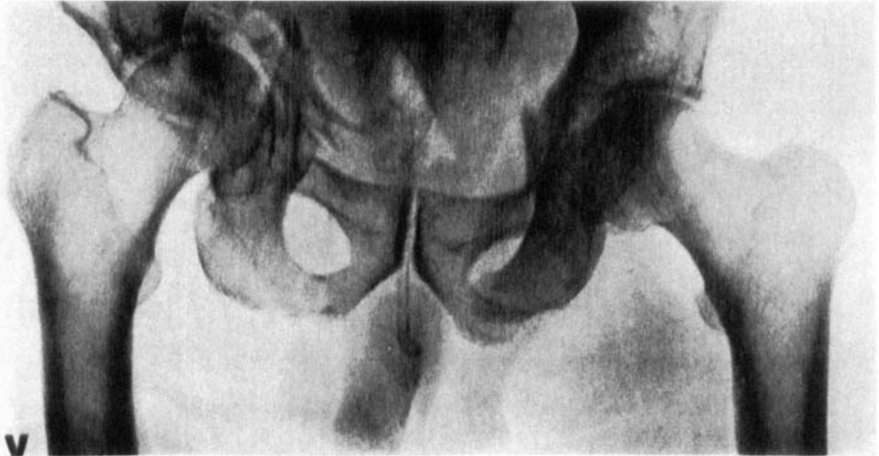

Figure 3. Sinistral superior dome fracture with high-grade dislocation of femoral head.

palliative cystostome and secondary suturing with good results. Four patients had transient urinary bladder atony (probably because of retroperitoneal haemorrhage) which required treatment with an indwelling catheter. As a complication to traction therapy (wire traction through the distal end of the femur), one patient developed a synovitis in the knee, which healed without after-effects. No case was complicated by infection with trochanter traction. Deep venous thrombosis was diagnosed in four cases and one patient developed pulmonary infarction. There was no nerve damage.

Follow-up Examination

The patients were given clinical follow-up examinations by the authors 3–12 years after their accidents. The mean period of observation was 6 years.

In this examination the patients' functional status was evaluated according to

Table 4. Function (entire material)

		%
No or mild functional limit	37	72
Moderate functional limit	10	20
Severe functional limit	4	8

Table 5. Pain (entire material)

		%
No or insignificant pain	25	49
Mild load pain and/or ache following exertion	17	33
Severe load pain and/or constant ache	9	18

Table 6. Range of motion (entire material)

			%
Flex	>90	40	78
	50 – 90	8	16
	<50	3	6
Abduct	>25	23	45
	10 – 25	16	31
	<10	12	24
Rotation	>50	14	27
	20 – 50	17	33
	<20	20	40

the Shepherd procedure, the range of hip motion was noted, and the pain anamnesis was recorded. On the same occasion X-rays were taken in frontal and Lauenstein projection.

RESULTS

The results to be discussed here may be seen in Tables 4–12. They were evaluated with respect to function, pain, and range of motion in the entire material (Tables 4, 5, and 6) and with respect to function, pain, and occurrence of arthrosis is relation to the type of fracture and degree of dislocation (Tables 7, 8, and 9) and, regarding high-grade dislocated fractures, in relation to reduction achieved (Tables 10, 11, and 12).

The degree of arthrosis is always difficult to determine, and a certain amount of subjectivity in evaluation is unavoidable. This is particularly true of joints directly deformed by a trauma. Factors such as the joint gap's height and the occurrence of osteophytes have no

Table 7. Functional results in relation to type of fracture and degree of dislocation

	Superior dome fracture (28)		Inner wall fracture (23)	
	High-grade disl.	Mod. disl.	High-grade disl.	Mod. disl.
No or mild limit in funct.	13	5	10	9
Moderate limit. in funct.	7	0	3	0
Severe limit. in funct.	3	0	0	1
Total	23	5	13	10

Table 8. Pain results in relation to type of fracture and degree of dislocation

	Superior dome fracture (28)		Inner wall fracture (23)	
	High-grade disl.	Mod. disl.	High-grade disl.	Mod. disl.
No or insignif. pain	9	4	7	5
Mild load pain and/or ache after exert.	7	1	5	4
Severe load pain and/or constant ache	7	0	1	1
Total	23	5	13	10

Table 9. Arthrosis results in relation to type of fracture and degree of dislocation

	Superior dome fracture (28)		Inner wall fracture (23)	
	High-grade disl.	Mod. disl.	High-grade disl.	Mod. disl.
No or insignif. arthrosis	13	4	8	9
Mod. to high-grade arthrosis	10	1	5	1
Total	23	5	13	10

Table 10. High-grade dislocated fractures (36). Functional results in relation to reduction achieved

	Superior dome fracture (23)		Inner wall fracture (13)	
	Good red.	No or poor red.	Good red.	No or poor red.
No or mild limit. in funct.	6	7	7	3
Moderate limit. in funct.	2	5	2	1
Severe limit. in funct.	0	3	0	0
Total	8	15	9	4

Table 11. High-grade dislocated fractures (36). Pain results in relation to reduction achieved

	Superior dome fracture (23)		Inner wall fracture (13)	
	Good red.	No or poor red.	Good red.	No or poor red.
No or insignif. pain	6	4	4	3
Mild load pain and/or ache after exert.	1	5	4	1
Severe load pain and/or constant ache	1	6	1	0
Total	8	15	9	4

Table 12. High-grade dislocated fractures (36). Arthrosis results in relation to reduction achieved

	Superior dome fracture (23)		Inner wall fracture (13)	
	Good red.	No or poor red.	Good red.	No or poor red.
No or insignif. arthrosis	6	7	8	0
Mod. to high-grade	2	8	1	4
Total	8	15	9	4

significant relevance. Thus, clear signs of cyst formation and sclerotic parts in bony structures near the joint, in addition to the occurrence of osteophytes, were required for the evaluation "moderate to severe (high-grade) arthrosis".

DISCUSSION

The authors were astonished by the material's relatively good prognosis, primarily in respect to function, but even with respect to pain and range of motion in the injured hip (Tables 4, 5, and 6).

Seventy-two per cent of the patients had no or only mild functional limitations. Pre-pension age patients in this group were able to return without invalidity to the same work as before the accident.

Twenty per cent had moderate functional limitation. They either returned to their old jobs with some invalidity or took new work. Only 8 per cent had severe invalidity and were unable to work. Results were less satisfactory with respect to pain, but half of the patients had no or only insignificant pain. One-third had mild pain on loading and/or ache following exertion, while less than 20 per cent had severe pain on loading or constant ache.

However, these results are in rather good agreement with those reported by other authors. Rowe & Lowell (1961) had 80 per cent excellent or good results in their material comprising acetabular fractures which, however, also comprised non-dislocated fractures, posterior dashboard fractures, and some operated superior dome fractures. Nicoll (1961) had 20 good clinical results (65 per cent) of 31 surviving, conservatively managed fractures with central or postero-central dislocation. Eichenholtz & Stark reported that good results could be achieved with closed methods of treatment in 75 per cent of the cases with central acetabular fracture.

If the results with respect to function and pain are related to type of fracture and degree of dislocation (Tables 7 and 8), good results are found in cases with moderate dislocation, irrespective of fracture type. Of a total of 15 such cases, only one patient displayed severe functional limitation; the remaining 14 either had no or only mild functional limitation. However, with high-grade dislocated fractures, the prognosis regarding function and pain appears to some extent to depend upon the type of fracture.

The occurrence of arthrosis (Table 9) was low with moderately dislocated fractures (2 out of 15). The incidence of arthrosis was much higher among high-grade dislocated fractures (15 out of 36) but without any difference between both types of fracture.

If well-reduced and poorly reduced or unreduced cases (Tables 10 and 11) among high-grade dislocated fractures are compared, it is found that the results of reduction appear to have prognostic significance in superior dome fractures. Poorly reduced fracture patients are far less well off, particularly with respect to pain, than well-reduced fracture cases. Thus, one finds that 6 out of 15 poorly reduced fractures had severe pain as opposed to 1 out of 8 well-reduced cases. On the other hand, no such difference regarding the prognosis could be found with inner wall fractures. The frequency of arthrosis (Table 12) is much greater among poorly reduced than among well-reduced fractures, regardless of fracture type.

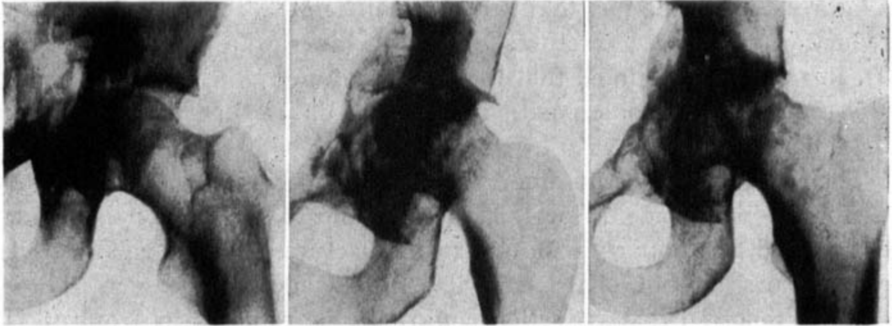

Figure 4. Left: superior dome type fracture with high-grade dislocation of the caput prior to treatment, which consisted of longitudinal traction for 8 weeks and did not lead to satisfactory reduction. Middle: The same hip three years after the accident with high-grade arthrosis changes. Right: The same hip nine years after the accident. Further progress of the arthrosis.

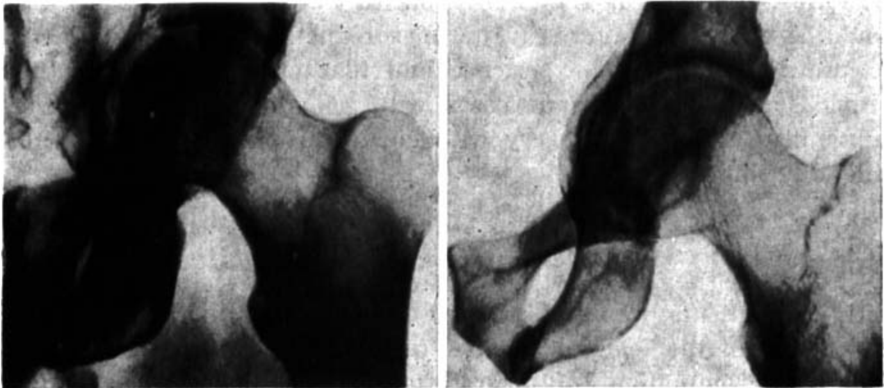

Figure 5. Left: inner wall type fracture with high-grade dislocation prior to treatment, which consisted of closed reduction + combined traction for 5 weeks and which led to a permanent good caput position in relation to the joint dome. Right: The same hip four years later. No signs of arthrosis.

Figure 4 illustrates the development of arthrosis in one case with high-grade dislocation in which satisfactory reduction could not be attained. Figure 5 shows one case in which restoration of a normal relation between caput and an intact superior dome could be achieved with closed reduction. Four years later there were no signs of arthrosis.

It appears likely that the poorer prognosis with high-grade dislocated superior dome fractures (Tables 7 and 8) can be ascribed to

a large extent to the fact that it is more difficult to achieve satisfactory reduction with these fractures than with inner wall fractures (Table 3). Rowe & Lowell noted that the caput in inner wall fractures generally remains in a stable position under the intact superior dome after reduction.

There appears to be no doubt that it is worthwhile trying for reduction in all high-grade dislocated fractures and that reduction can often be retained, particularly with inner wall fractures. Thus in this respect, the authors do not share the view of Hagadon & Pearson. These authors reported that reduction could only be retained in 1 out of 11 cases of inner wall fracture.

If on the basis of this limited material an attempt is made to distinguish any group of patients for whom operative reconstruction might be thought to have improved the prognosis, it will be found that this group consists of patients with poorly reduced superior dome fractures. However, it should be pointed out that cup arthroplasty could be used as an alternative to open reduction and osteosynthesis. According to our own experience and that of others, this method provides good results. Four cases with poor results in this series subsequently received surgery with cup arthroplasty and were considerably improved.

SUMMARY

Fifty-one patients, who had incurred acetabular fractures with central dislocation of the femoral head, were given clinical and radiological follow-up examination 3–12 years after their accidents. All cases had been treated conservatively with either closed reduction or traction (longitudinal or a combination of lateral and longitudinal) or with early mobilization without loading. The prognosis as a whole was regarded as relatively good with functionally good results in 72 per cent of the cases. Among high-grade dislocated fractures, results were generally better in respect to function, pain and occurrence of arthrosis if satisfactory reduction had been achieved than if reduction had been unsuccessful or untried. Especially in cases in which a high-grade central dislocation of the femoral head was combined with fracture(s) in the superior weight-bearing part of the joint surface (the superior weight-bearing dome) and good reduction had not been achieved, results were less satisfactory. The incidence of severe pain and more significant arthrosis was relatively high in this group. Open methods

of treatment may be expected to improve the long-term prognosis in such cases if they are given a careful pre-operative radiological examination and collected in large traumatological units in which sufficient experience of surgical treatment can be assembled.

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