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ACETABULAR FRACTURES

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Pelvic fractures represent about 0.4 per cent of all fractures (Solheim 1961) and acetabular fractures make up about 11 per cent of these (Solheim et al. 1969). Consequently, acetabular fractures are rather uncommon. They are, however, important injuries because they may give rise to disabling symptoms. Furthermore, they are increasing in frequency due to the increasing number of traffic accidents.

We have reviewed the patients treated for acetabular fractures in our general surgical department, which treats about 4,000 inpatients a year, of whom about 25 per cent are accident cases.

MATERIAL AND METHODS

In all, 95 patients (55 males and 40 females) were treated for acetabular fractures in the period 1957-71, inclusive. Their case histories and X-rays were reviewed and a clinical and roentgenological follow-up study performed. Half the number of patients were under 50 years of age (Figure 1). In about two-thirds of the patients, traffic accidents were the cause of the injury (Table 1). Consequently, multiple

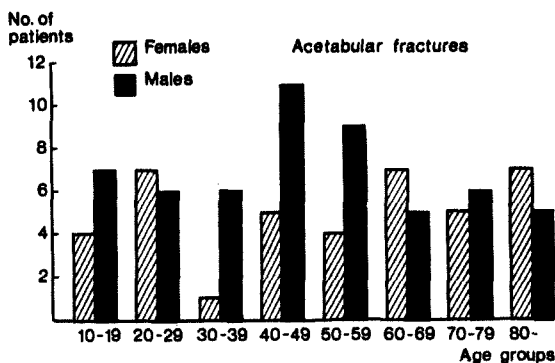


Figure 1. Distribution by age and sex.

Table 1. Circumstances of injury.

	No.
Road traffic accidents	63
Accidents at work	6
Sports injuries	2
Fall on the same level indoors	14
Fall on the same level outdoors	10
Total	95

Table 2. 110 associated injuries in 61 patients.

Type	No.
Head injury	46
Thoracic injury	12
Abdominal injury	4
Fracture of lower limb	29
Fracture of upper limb	19
Total	110

Table 3. Treatment.

Treatment	No. of patients
Bed rest only	53
Traction only	16
Tibial tuberosity	10
Trochanter	1
Both	3
Pelvic sling	2
Osteosynthesis	26
Posterior rim	14
Others	12
Total	95

injuries were common (Table 2). One patient had symptoms and signs indicating lesion of the sciatic nerve which, however, subsided. Two patients had urethral injury and two patients had urinary bladder rupture.

Classification of acetabular fractures is a most disputed topic. In our retrospective study, we followed the simple classification of the AO group (Müller et al. 1970), modified from the original classification of Letournel (1961) and Judet et al. (1964)

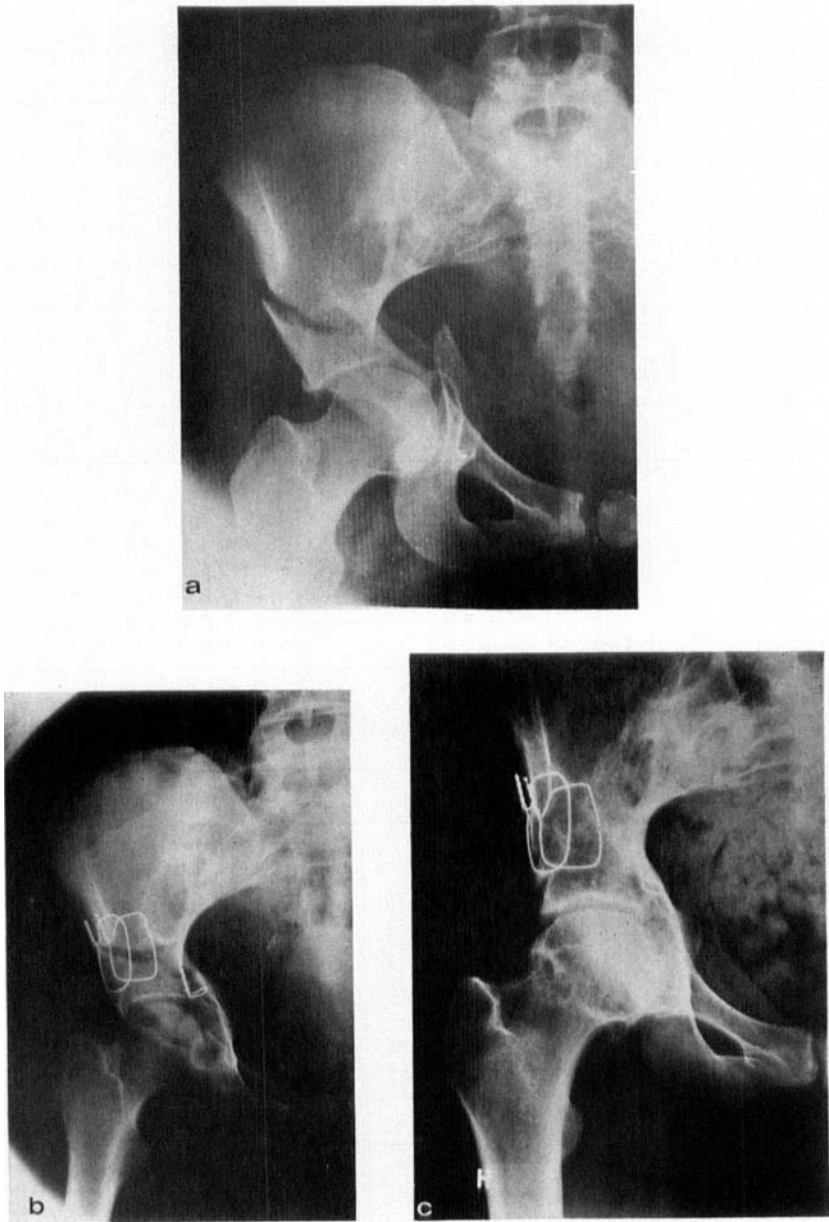


Figure 2. (a) 21-year-old female injured in a traffic accident. Severely comminuted acetabular fracture.

(b) Open reduction 4 days after injury.

(c) Postoperative course uneventful. Normal follow-up 9 years later, with only minimal arthrosis.



Figure 3. (a) 50-year-old male, fell 2 m. Vertical fracture of anterior column with dislocation of the femoral head.



Figure 3. (b) The dislocation of the femoral head was easily reduced with skeletal traction through the tibial tuberosity and femoral trochanter. Note that the acetabular fragments remain dislocated.



Figure 3. (c) Open reduction 6 days after injury.

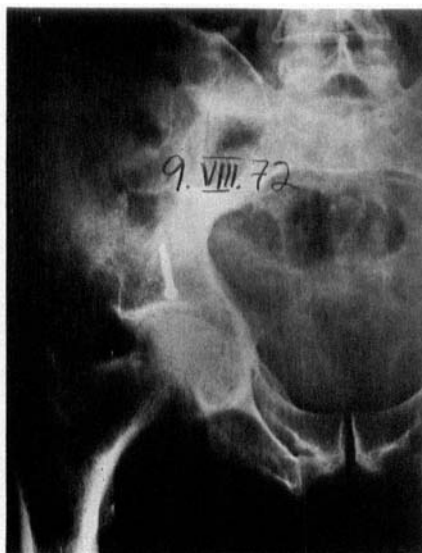


Figure 3. (d) Follow-up 8 years later: slightly reduced rotation, otherwise normal. Some arthrosis.

(Tables 5–9). In 64 of the 95 patients, a dislocation of the acetabular fracture was present.

The treatment is summarized in Table 3. Most of the patients treated with bed rest only were allowed out of bed without weightbearing after a few days if the acetabular fracture was the only significant injury. Two-thirds of the patients with dislocated fractures were treated with traction and/or operation. The obsolete pelvic sling is not used any more. When traction treatment was not followed by osteosynthesis, it was prolonged for about six weeks. The patients operated upon were usually allowed out of bed on crutches about one week postoperatively and full weightbearing started after three months. The osteosynthesis was carried out through a posterior or an anterior approach. We have so far not used plates as recommended by the AO group (Müller et al. 1970) but resorted to wires (Figure 2) and screws (Figure 3). The operation was never carried out as an emergency procedure but after a few days when the condition of the patient had stabilized.

Deaths. There were 10 hospital deaths (Table 4).

Follow-up

Of the 85 patients discharged from the hospital alive, 20 patients were dead from intercurrent diseases or were subsequently lost for follow-up. The remaining 65 patients were examined clinically and roentgenologically after a mean observation period of 4.4 years (range, 0.5 to 10 years). Only in two cases was the observation period less than one year.

Table 4. Hospital deaths.

Cause	No.
Pulmonary embolism	3
Bronchopneumonia	2
Peritonitis (Rupture of urethra, bladder, rectum and diaphragm; gangrenous bowel)	2
Aspiration asphyxia	1
Head injury	1
Total	10

Table 5. Posterior rim fractures.

	Results					
	Good	Fair	Poor	Un- known	Dead	Total
<i>With posterior femoral luxation</i>						
Operated	6	—	4	2	—	12
Not operated	1	—	—	—	1	2
<i>Without femoral luxation</i>						
Operated	2	—	—	—	—	2
Not operated	—	—	1	1	—	2
Totals	9	—	5	3	1	18

Evaluation: "Good" — no arthrosis, no symptoms or signs.

"Fair" — slight arthrosis, slight symptoms or signs not incapacitating for work or every day life.

"Poor" — severe arthrosis, shortening of leg, incapacitating symptoms or signs.

The results are given separately for the different groups. All patients without dislocation of the acetabular fracture had a good end result.

Posterior rim fractures (18 patients; Table 5) were often combined with posterior luxation of the femoral head. In some cases, spontaneous reduction probably takes place and the X-rays, taken at admission to the hospital, consequently appear normal as far as the luxation is concerned. A posterior rim fracture may then be overlooked as was the case in one of our patients, with a severe arthrosis as the disabling result. Most of the patients with posterior rim fracture in the present series were operated upon. In five of these, a severe arthrosis nevertheless supervened, necessitating cup arthroplasty. In all of these, the reduction of the acetabular fracture had been satisfactory. Four patients were not operated upon; in three of

Table 6. Posterior column fracture.

	Results					Total
	Good	Fair	Poor	Unknown	Dead	
<i>Without dislocation</i>	8	—	—	—	1	9
<i>With dislocation</i>						
Operated	2	—	—	—	—	2
Not operated	5	3	—	—	2	10
Totals	15	3	—	—	3	21

Table 7. Anterior column fracture.

	Results					Total
	Good	Fair	Poor	Unknown	Dead	
<i>Without dislocation</i>	10	—	—	2	1	13
<i>With dislocation</i>						
Operated	1	1	—	—	—	2
Not operated	7	1	2	4	3	17
Totals	18	2	2	6	4	32

Table 8. Transverse fracture.

	Results					Total
	Good	Fair	Poor	Unknown	Dead	
<i>Without dislocation</i>	3	—	—	—	—	3
<i>With dislocation</i>						
Operated	—	—	—	1	—	1
Not operated	1	1	—	2	1	5
Totals	4	1	—	3	1	9

them the fracture was a minor one; the fourth had an overlooked posterior rim fracture.

Fracture of the posterior column (21 patients; Table 6). Two patients with severe dislocation were operated upon with a good end result. The 10 patients not operated on had moderate dislocation and had satisfactory results.

Fracture of the anterior column (32 patients; Table 7). Two patients with marked

Table 9. Other fracture.

	Results					Total
	Good	Fair	Poor	Unknown	Dead	
<i>With dislocation</i>						
Operated	1	—	2	2	2	7
Not operated	1	1	2	2	2	8
Totals	2	1	4	4	4	15

dislocation of the acetabular fracture had a satisfactory end result after operation. Those patients not operated on usually had minor dislocations; two with marked dislocations, however, had poor results (severe arthrosis clinically and roentgenologically).

Transverse fractures (9 patients; Table 8). The number of the follow-up patients is too small for evaluation.

Others (15 patients; Table 9). This group consisted of patients with a combined fracture of the anterior and posterior column—except for one patient with a fracture through the upper, lateral part of the acetabulum. They are usually highly displaced fractures and seven of them were operated on. The patients with poor result not operated on had highly displaced fractures; the others had minor dislocated fractures.

DISCUSSION

The present series of acetabular fractures discloses a broad spectrum of injuries and their classification, especially in retrospect, is difficult. With this reservation, a classification was found possible and the results evaluated.

Acetabular fractures without dislocation will have a good end result with bed rest only, as was also found in the present series.

On the other hand, this treatment for dislocated fractures will leave a high percentage of the patients with poor results, although some authors claim good results in smaller series (Austin 1971). The poor late results are due to the rapid development of arthrosis, as shown in several reports (Urist 1948, Westerborn 1954, Stewart & Milford 1954, Pearson & Hargadon 1962, Göthlin & Hindmarsh 1970). The arthrosis is most often due to incongruity of the acetabular fragments, especially when the weightbearing parts of the acetabulum are affected, i.e., the upper and posterior parts, and the more so, the more dislocated the fracture. Traction will reduce a displaced femoral head, e.g., in central

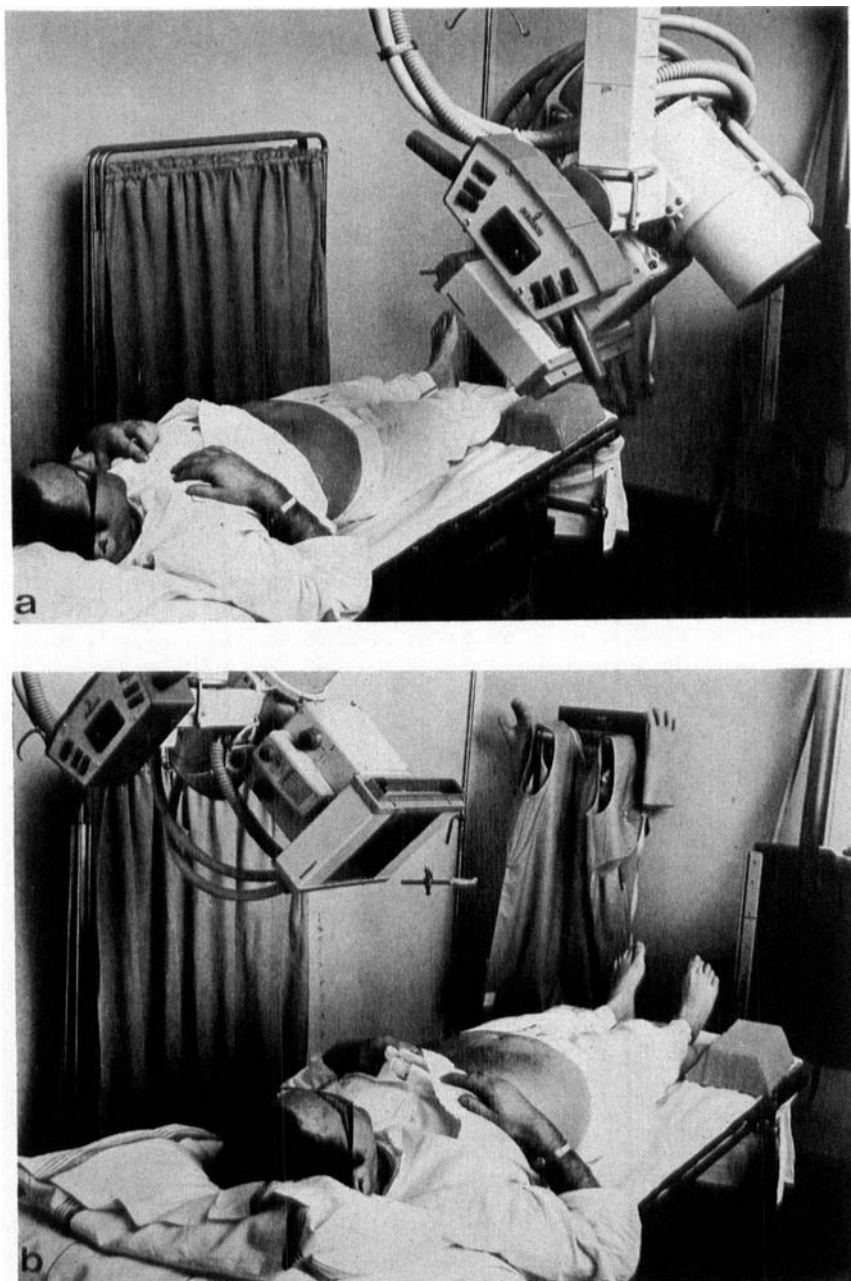


Figure 4. *Instead of positioning the patient obliquely, the X-ray tube is positioned obliquely on both sides of the injured hip. In this manner, unnecessary handling of the injured patient is avoided (a and b).*

luxation, but has often no effect on the position of the acetabular fragments. Therefore, operative reduction and internal fixation have been increasingly recommended in later years (Waller 1955, Knight & Smith 1958, Lethonen 1968, Letournel 1961, Judet et al. 1964, Mazas 1969, Schweiberer 1970, Müller et al. 1970, Paleari & Gualtieri 1971, Johansson & Olerud 1971).

In the present series 41 per cent (26/64) of the dislocated fractures were operated on. We feel this to be too low a figure. The majority of the patients in the present series were younger individuals with many years of active life ahead and we feel that operative treatment in displaced fractures affords the best possibilities of achieving this. Otherwise, the end result may be poor, necessitating reparative procedures (D'Aubigné & Mazas 1969).

However, operative treatment of these fractures is a most difficult task and should be undertaken only under the best conditions and by surgeons well trained in hip surgery. Furthermore, an adequate roentgenological examination must be insisted upon by the surgeon who would do well to supervise personally the taking of the roentgenograms. This is mandatory both for the classification of the fracture and for the planning of the operation, as amply stressed by French surgeons (Letournel 1961, Judet et al. 1964). The ordinary anterior-posterior X-rays must be supplemented by X-rays taken with the patient in 45° right and left lateral position or obliquely with the patient supine (Figure 4). Additional information may be obtained with tomography and stereo-X-ray.

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