

Acetabular Fractures at CHU Gabriel Toure

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Abstract

Introduction: Acetabulum fractures involve the functional prognosis of the coxofemoral joint. The purpose of our study was to determine the epidemiological, clinical, and outcome aspects of treatment.

Materials and Methods: This was a retro-prospective study of patients with acetabulum fracture treated and followed from January 2015 to June 2018.

Results: We collected 49 patients with an acetabulum fracture. Acetabulum fractures made up 8.3% of all pelvic injuries during the study period. The male sex prevailed (87.8%) with a sex ratio of 7.16. The average age was 36.14 years (range: 17 years and 77 years). The circumstances of the trauma were accidents on the public highway (69.4%), accidents at work (14.3%), accidents in the home (10.2%), accidents in sports (4.1%), assaults (2%). The mechanism was indirect in 87.8%. Pain with total functional impotence was observed in 83.7% and with a vicious attitude of the traumatized limb in 89, 8%. The standard radiography with the incidences of the pelvis face as well as the $\frac{3}{4}$ wing and $\frac{3}{4}$ obturator was performed in all patients. The transverse fracture of the acetabulum was the most common anatomico-radiological type (61.2%). Shock (34.6%) and hip dislocation (24.4%) were the most common early complications. Treatment was orthopedic in 95.9%. After an average follow-up of 23.24 months, the anatomical results were satisfactory in 32.7% and the functional results good in 51%. Lameness (91.8%), mechanical pain (30.6%) and osteoarthritis (16.3%) were the main complications in the medium term.

Conclusion: Fractures of the acetabulum are the preserve of the adult, especially of the male. The complications are dominated by mechanical pain, lameness and early hip osteoarthritis. The anatomical results that condition the functional results are less good with the orthopedic treatment.

Keywords: Acetabulum; Fractures; Epidemiology; Clinic; Treatment

Introduction

Acetabulum fractures occur mainly in young adult patients following high-energy trauma [1,2]. The displacement of fracture fragments of the acetabulum creates an incongruence between the cartilage of the femoral head and the acetabulum. These fractures may be associated with other lesions, which may affect the functional prognosis of the hip, or even the life prognosis of the subject [2]. They are particularly generative of necrosis of the femoral head in the short term and of hip osteoarthritis in the medium and long term [3]. These fractures pose delicate treatment problems. The place of surgery in their treatment is important, but its delicate implementation and some of its indications still discussed. Orthopedic treatment can sometimes also give good results [4].

Purpose of the Study

The purpose of our study was to determine the epidemiological, clinical, and outcome aspects of treatment.

Materials and Methods

This was a retro prospective study concerning patients with an acetabulum fracture, at the Orthopedics -Traumatology department of the CHU Gabriel TOURE from January 2015 to June 2018.

Included were patients with an acetabulum fracture whose management was performed in the Orthopedics-Traumatology department of CHU Gabriel and followed for at least 12 months.

Those patients whose initial management was performed elsewhere and those lost to follow-up were not included. The traumatized hip CT scan was not performed in all patients. Pathological lesions were classified according to Judet and Letournel (Table 1). The anatomical results were assessed according to the criteria of Matta., *et al* (Table 2).

<p>Elementary fractures:</p> <ul style="list-style-type: none"> • Fracture of the posterior wall of the acetabulum • Fracture of the posterior cup of the acetabulum • Fracture of the anterior wall of the acetabulum • Fracture of the anterior column of the acetabulum • Transverse fracture of the acetabulum <p>Complex fractures:</p> <ul style="list-style-type: none"> • T-shaped fracture • Fracture of the posterior column associated with a posterior wall fracture • Transverse fracture associated with a fracture of the posterior wall • Fracture of the anterior column associated with a hemi-transverse fracture of the posterior column • Fracture of two columns
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Table 1: Classification of Judet and Letournel.

Quality of reduction	Displacement
Anatomical	< 1 mm
Satisfactory	1 - 3 mm
Unsatisfactory	> 3 mm

Table 2: Matta reduction criteria.

The results were assessed according to the functional rating of Postel Merle d'Aubigné (Table 3).

Data were collected from hospital registers, consultations and clinical records.

The analysis was done on an HP 630 computer with Microsoft office Word, Excel, and SPSS Statistics 21.0 software (French version).

	Indolence	Mobility	Market
0	Very sharp and continuous pain	Ankylose en attitude	
1	Very sharp pains and preventing sleep	Clinical ankylosis with slight or no vicious attitude	Impossible walk
2	Sharp pains when walking and preventing any limited activity	Flexion : 40° Abduction : 0°	Only with two rods
3	Sharp but tolerable pain with limited activities	Flexion : 40 - 60°	Limited with cane (less than an hour) Very difficult without a cane
4	Pain only after walking disappearing after rest	Flexion : 80 - 90°	With a cane even extended Limited without cane
5	Very mild, intermittent pain that does not prevent normal activity	Flexion : 80 - 90° Abduction: 25°	Without cane but slight claudication
6	Complete indolence	Flexion: 90° Abduction: 40°	Normal

Table 3: Postel Merle d'Aubigné score evaluation.

Results

Acetabulum fractures constituted 8.38% of pelvic injuries (54 cases/648) during the study period. We collected 49 patients with acetabulum fracture. The male predominated (87.8%) with a sex ratio of 7.16. The average age was 36.14 years with extremes of 17 years and 77 years and a standard deviation of 14.78. Workers were the most affected layer (28.6%), followed by school children (14.3%). AVP was the main etiology with 69.4%, followed by work accidents (14.3%), accidents in the home (10.2%). The indirect mechanism was noted in 87.8%. Pain with total functional impotence was observed in 83.7% and with a vicious attitude of the traumatized member in 89.7%.

The standard X-ray with the pelvis-to-wing and ¾-shutter incidences was performed in all patients (100%), while the pelvic CT was performed in 5 cases (10.2%). The anatomopathological types were transverse fracture of the acetabulum (61.2%) (Figure 1), posterior wall (20.4%) (Figure 2), posterior column (8.2%), bi-column (8, 2%) and the anterior column (2%). The associated lesions were mainly bone and osteoarticular (61.2%). Among these, we observed 12 cases of coxo-femoral dislocation (24.4%) including 10 posterior dislocations (Figure 3) and 2 cases of central dislocation, in 13 cases of other bone lesions of the pelvis (26.5%), the fracture of the distal end of the femur in 2 cases, the femoral head (1 case), the trochanter (1 case), femoral diaphysis (1 case). In 17 cases, we recorded a state of shock (34.6%). We performed orthopedic treatment in 95.9% and surgical treatment in 4.1%. The average hospital stay was 37.8 days with extremes of 25 days and 57 days. All patients were subjected to thromboprophylaxis (Enoxaparin 40mg per day subcutaneously) for at least 21 days. We noted the following complications: lameness (91.8%), mechanical pain (30.6%) and osteoarthritis (16.3%), urinary tract infection (12.2%), pressure ulcers (6.1%), thrombophlebitis (4%), 1 case of osteonecrosis of the femoral head, 3 cases of death. Our average traction time (trans-bone traction and plaster cast with anti-rotator blade) was 42.6 days with extremes of 25 days to 52 days. The average support time was 81, 43 days with extremes of 40 days and 120 days. After an average follow-up of 23.24 months, we achieved 32.7% good anatomical results, and as for the functional results 51% good, 30.6% average results and 18.4% bad. There was a correlation between the anatomopathological type and the functional results, Fischer's exact test = 14.234 and p = 0.022; and as for the type of treatment and the functional results, there was no relation (Fischer's exact test: 8.225, p = 0.05).

Discussion

Our study has some shortcomings, among others: small sample making it difficult to apply statistical tests, most often unavailability of computed tomography in our teaching hospital, difficulty in properly monitoring patients and insufficient technical platform. Thus, the



Figure 1: X-ray of the right frontal hip showing a transverse fracture of the right acetabulum associated with a fracture of the right ilio-pubic branch.



Figure 2: CT with 3D reconstruction showing a comminuted fracture of the posterior wall of the left acetabulum associated with iliac dislocation.



Figure 3: X-ray of the pelvis showing a left iliac dislocation associated with a fracture of the posterior wall.

male predominated with 87.8%. Our result is similar to that of: Meena U., *et al.* [5] with 83.9%, Anis Chagou., *et al.* [6] with 92.5% and Rabah Atia., *et al.* [7]: 81.8%. These results show that men are most often at high energy trauma. The average age of our patients was 36, 14 years old. This average age is close to that of Meena U., *et al.* [5] and Anis Chagou., *et al.* [6] who found 38, 75 and 35 years respectively; however, Kreder HJ., *et al.* [8] found an average age of 42 years. Acetabular fractures, consecutive to high velocity trauma occur in various circumstances, and in our series accidents on the public highway (AVP) represented 69.4%. Our results are close to those of Anis Chagou., *et al.* (85%) [6], Fessy MH., *et al.* (87%) [9]; on the other hand different from those of Raba Atia (23%) [7] and Ridder Van., *et al.* (44%) [10]. Standard radiographs of the front and $\frac{3}{4}$ wing and $\frac{3}{4}$ obturator pelvis were performed in all patients (100%). On the other hand, the pelvis CT scan could only be performed in 5 patients (10.2%) for the exact lesion assessment, while in the series by Rabah Atia., *et al.* [7], this examination was performed in 39%. The radiographic assessment allowed us to have the following anatomoradiological lesions: 45 simple fractures of the acetabulum (91.8%) including 30 transverse fractures (representing 61.2% of our entire series) and 4 complex fractures (8.2%). Fessy MH., *et al.* [9], George P., *et al.* [11] and Hicham Mahdane., *et al.* [12] found 8%, 18% and 27.2% respectively. As for Raba Atia., *et al.* [7], they found 61.6% of complex fractures. The frequency of this transverse fracture in our series could be explained by the hip abduction mechanism at the time of the trauma. Associated lesions were frequent (61.2%). They were mainly bony and interesting mainly the pelvis (26.5%) and the hip joint (20.4% hip-hip dislocation).

Therapeutically, two types of treatment can be offered: orthopedic treatment or surgical treatment [2,13]. We performed orthopedic treatment in 97.9% and surgical treatment (4.1%). The rate of completion of surgical treatment is important in the literature: Anis Chagou., *et al.* (37.5%) [6], Rabah Atia., *et al.* (37%) [7] and de Ridder., *et al.* (68%) [10]. The predominance of this orthopedic treatment is explained by the insufficiency of the technical platform, the reluctance of the patients to the surgery thus the financial precariousness. We recorded some complications such as lameness (91.8%), mechanical hip pain (30.6%), osteoarthritis (16.3%), bedsores (6.1%), thrombophlebitis (4%) and 3 case of death (6, 1%). Fessy MH., *et al.* [9] found 13.3% of thromboembolic complications. Our rate of thromboembolic complications lower than that of Fessy MH., *et al.* [9] can be explained by the size of the sample. After an average decline of 23, 24 months, we obtained 51% of good functional results. This result falls short of most series: Meena U., *et al.* (77%) [5], Anis Chagou., *et*

al. (90%) [6], Fessy MH., *et al.* (80%) [9], de Ridder., *et al.* (70%) [10], Hicham Mahdane., *et al.* (78%) [12]. This difference is explained by the frequency of orthopedic treatment which cannot obtain an anatomical reduction guaranteeing good functional results, the frequency of associated bone and osteoarticular lesions and the support early.

Conclusion

Fractures of the acetabulum are more and more frequent due to accidents on public roads, the main victims of which are two wheels. They are the prerogative of the young adult, especially male. They are serious requiring collaboration with anesthetists-intensive care. The complications are dominated by mechanical pain, lameness and early hip osteoarthritis. The anatomical results that condition the functional results are less good with the orthopedic treatment.

The rarity of fractures can be explained by the resistance of this area compared to other parts of the basin. The predominance of men can be explained by the misconduct of men in traffic. AVP (auto-moto) were the main circumstances. The frequency of indirect mechanisms could be explained by fall or shock on the knee. The transverse variety could be explained by the abduction of the hip at the time of the trauma. The insufficiency of the anatomical and functional results is explained by the orthopedic method.

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