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Original Article

Conservative Management Vs Operative Management for Acetabular Fracture: A Comparative Analysis

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ABSTRACT

Surgery for acetabular fractures is challenging due to challenging surgical access, challenging fracture anatomy, challenging anatomic reduction, challenging surgical complications, challenging functional outcomes, and challenging chondral damage. Acetabular fractures have a significant mortality and morbidity rate. Internal fixation is a fast developing method of treating these fractures with results that are comparable to those of conservative treatment. Displaced fractures are now typically treated with surgery. Perfect reduction is the aim of open reduction and internal fixation of an acetabular fracture.

Our study compares the outcomes of non-operative and operative care for displaced acetabular fractures in the Indian population.

Methods: We chose 50 patients for this retrospective investigation, of whom 25 received surgery and 25 did not, and who were all diagnosed with a displaced acetabular fracture. Since all patients underwent surgery more than a year after the fracture, we compared their functional results at the end of the year. We used the Merle D'Aubigne and Postel scoring system to evaluate the functional result at one year. These results were then compared between the two groups using a paired t-test.

Results: In the operated group, we had 56% (14 patients) great results, 24% (6 patients) very good results, 4% (1 patient) decent results, 8% (2 patients) mediocre results, and 8% (2 patients) poor results. The non-operated group had outcomes of 16% (4 patients) that were excellent, 20% (5 patients) that were very good, 4% (1 patient) that were good, 16% (4 patients) that were moderate, and 44% (11 patients) that were poor. We split the outcomes of patients who underwent surgery and those who did not into two groups. Patients in the first group were those who had good or better results, and patients in the second group were those who had subpar results. With an odd ratio of 9.036 and a 95% coefficient interval between 3.966 and 20.588, the Fisher's exact test was employed to compare the two groups, and the results showed a statistically significant difference between the outcomes of the operated and non-operated groups.

Conclusion: Compared to conservative care, displaced acetabular fractures treated with surgery fixation perform better in terms of functional outcome and post-treatment side effects.

Key Words: *Acetabular fractures, Internal fixation, Non-operative management, Functional outcomes.*

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INTRODUCTION

In industrialised nations, undisplaced acetabular fractures are still treated with conservative care. The therapy of displaced fractures has been a contentious topic over the years with varying results in their treatment and prognosis, even though undisplaced acetabular fractures have a decent prognosis with conservative treatment[1, 2].

Longer follow-up of surgically treated acetabular fractures, as reported by Matta[3]and others, has made it evident that fractures with even minor residual inconsistencies of the critical portion of the acetabulum more frequently result in long-term arthritis than do comparable fractures with perfect reductions. The indications for open reduction and internal fixation of acetabular fractures have broadened as a result of this research. There is no research comparing the functional outcomes of conservative and surgical therapy for displaced fractures in the Indian population. The study's goal is to assess, one year after open reduction-internal fixation and conservative treatment for any form of displaced acetabular fracture in the Indian population.

MATERIALS AND METHODS

Our research was carried out retrospectively at the orthopaedic department of a tertiary hospital in India. Patients with displaced acetabular fractures who received treatment at our centre and had a minimum of a year of follow-up are

included. Inclusion Patients with displaced acetabular fractures in the age range of 15 to 65 years were the study's eligibility criteria. Patients with an undisplaced acetabular fracture, those who died within a year of receiving therapy for their fracture, those who had the same fracture operated on twice, and those who underwent replacement surgery after receiving conservative treatment within a year were all excluded from the study.All 50 of the patients we chose had displaced acetabular fractures, with 25 of them undergoing surgery and 25 remaining unoperated.

Using the Merle D'Aubigne and Postel scoring method, we assessed the functional outcome at the end of a year. The Fishers Exact Test was then used to compare the two groups. The patient's postoperative functional status, radiological union, range of motion, and infection rates were the primary outcome metrics.

RESULTS

The majority of patients in the both the group were between the ages of 21 and 60 (70%) and 41 and 60 (30%), with 39 being the mean age in our study.

In the group that underwent surgery, there were 10% associated fracture types and 60% simple fracture types (15 individuals). In the non-operated group, we had 56% (14 patients) of simple fracture types and 44% (11 patients) of associated fracture types. The majority of simple fractures in the operated group were anterior column and posterior wall fractures, accounting for 28% and 12% respectively.

Simple fractures include in the non-operated group, posterior wall and transverse fractures made up the majority, accounting for 24% and 16%, respectively. Maximum 'T' type fractures in related fractures were around 16%, followed by both column fractures in the non-operated group at 12%. In the operated group, 'T' type fractures were the most common concomitant fracture, occurring in both column fractures at a maximum of roughly 16%.X-rays were acquired in all three views, and the Joel Matta criterion was used to evaluate the reduction. 18 of the patients we operated on had anatomical reduction, and 5 of them had excellent reduction. In two cases, the reduction was not adequate. We successfully reduced the anatomical size of two non-operated patients, and 11 other patients' reductions were satisfactory. Twelve patients' reductions were not adequate.Functional analysis was performed. We used Fisher's exact test to compare the two groups, and the result was a 'p' value of o.ooo1, indicating a statistically significant difference between the results of the operated and non-operated groups, with an odd ratio of 9.036 and a 95% coefficient range between 3.966 and -20.588.

DISCUSSION

According to a study by Sen RK4 in Chandigarh, India, acetabular fractures involving the weight-bearing dome that are reduced by closed reduction can be maintained by heavy lateral and longitudinal traction with satisfactory clinicoradiologic results comparable to surgical therapy.

As with other intraarticular fractures, the treatment of acetabulum fractures is focused on precise anatomical reduction, stable fixation, and prompt mobilisation. The type of lesion to the acetabulum's weight-bearing region determines the indication, the course of treatment, and the prognosis.

A thorough preoperative evaluation, based in particular on a CT scan with three-dimensional reconstruction, is required to determine the type of fracture. According on the diagnosis, the appropriate surgical technique, reduction technique, and fixation type is chosen. The effectiveness of the articular surface reconstruction and the frequency of complications, either from the injury or from the operation itself, directly affect the results.To get satisfactory long-term results, an exact congruence between the femoral head and acetabulum must be acquired through open reduction and internal fixation. Transtectal fractures, or displaced acetabular fractures of the weight-bearing portion of the dome, require surgical intervention. The surgery should ideally be done within a week of the injury. Displaced acetabular fractures should be treated surgically unless certain parameters for nonoperative therapy are met, in contrast to most conditions where surgery is based on specific operative indications.These include a stable joint, an undamaged weight-bearing surface (as determined by roof arc and subchondral arc measurements on computed tomographic scans), and a congruent hip joint on the anteroposterior and oblique (Judet) radiographs. The patient's functional requirements, expectations, and physical state, as well as the doctor's experience and institutional support for treating this kind of damage, must all be taken into account before a final choice about the course of treatment is made. Secondary congruence in displaced both-column fractures may lead to better outcomes than other displaced fractures. Non-operative treatment may be used successfully in older patients. Transtectal fractures, or displaced acetabular fractures of the weight-bearing portion of the dome, require surgical intervention.

The acetabulum's physiological function depends heavily on the stability and integrity of the lunata articular surface in the dome area. The fracture associated with this component will alter the region of contact and tension between the acetabulum and femur head. Even with appropriate exposures, it might be challenging to achieve a satisfactory anatomical reduction, especially for some difficult comminuted or crushed fractures. Consequently, there is a higher chance of developing forward traumatic arthritis.

The goal of surgically fixing an acetabular fracture is to get the hip joint back to working at its best. One of the most challenging fractures to treat is an acetabular fracture, which presents a difficulty to the treating surgeon. These patients

survived longer thanks to improved resuscitation techniques. Due to the availability of imaging techniques, these fracture patterns may be recognised more easily. Since it is an intra-articular fracture and the joint's congruence largely determines functional outcomes, proper reduction is essential.

The mean age of 163 fractures in the Keith A. Mayo[4]study between 1984 and 1991 was 31 years. 75 fractures were studied in another study by V.A. de Ridder MD and S. de Lange MD6 in 1988–1991; the average group age was 45 years. The individuals who participated in our study ranged in age from 15 to 65.

In our study, the non-operated group included 12 out of 25 patients (48%) with additional injuries. In the operated group, 17 out of 25 patients (68%) suffered additional wounds. Theses had multiple injuries in 5 of 12 non-operated patients and 9 of 17 operated patients. 98 out of 102 patients in Keith Mayo's 96% series suffered further injuries.

In our study, 4 patients (16%) suffered an acetabular fracture as a result of a fall, and 21 patients (84%) were involved in auto accidents. 20 patients (80%) were involved in car accidents, while 5 (20%) in the operated group suffered acetabular fractures as a result of falls. This agrees with findings from other investigations. In the study by Joel Matta MD (1980-1990), there were 472 fractures, of which both column fractures (34%) and T shape fractures (19%) were more common. Both column (41.1%) and PW+ transverse (20%) fractures were found in the 163 fractures in the Keith Mayo collection.

In our study, the combination method was adopted in 5 patients (20%), the Kocher-Langenbeck strategy in 12 patients (48%), and the ilio inguinal approach in 4 patients (16%). In 3 patients (12%), the extended iliofemoral technique was adopted. In one patient (4%), the iliofemoral technique alone was used. Ilioinguinal approach and KL were both employed in Keith Mayo's study, respectively in 52.6% and 15.95%. In this series, the ilio-inguinal method was utilized more frequently because to the higher number of both column fractures (41.63%), while the KL technique was used less frequently due to the lower number of PW (8.5%) fractures. Paul D. Ruesch7 used KL in another study in 27.5% of cases and ilio inguinal in 37.25% of cases.In the first week, 13 patients (or 52%) underwent surgery. Six patients (24%) received care in the first two weeks. This time frame is seen as optimum because the majority of cases were performed during it. In the Keith Mayo series, a surgery's delay lasted, on average, 5-7 days. The average wait time for surgery in the Paul D. Ruesch series was 3 to 10 days.

Using Joel Matta criteria, the reduction of the fracture was evaluated. The anatomical reduction we achieved in the operated group was 72% (18 patients), satisfactory in 20% (5 patients), and unsatisfactory in 8% (2 patients). In the non-operated group, we obtained anatomical decrease in 8% (2 patients), 44% (11 patients), and 48% (12 patients) according to the same criteria.Anatomical reduction was achieved in 74%, satisfactory in 16%, and unsatisfactory in 10% of the 472 fractures in the Joel Matta series. Anatomical reduction was achieved in 64% of the 55 fractures in the J. Dean Cole, MD8 series, and was adequate in 25% of the cases. Anatomical reduction was achieved in 73%, satisfactorily in 16%, and unsatisfactorily in 9% of the 75 fractures in the V.A. de Ridder, MD series. A acceptable anatomical reduction was achieved in 27% of the 102 fractures in Paul D. Ruesch's series. The anatomical or acceptable reduction is required to provide great or very good functional results, as shown by our study. Infection: In the operated series, one patient (4%) experienced a severe infection that was treated with parenteral antibiotics. Two (8%) of the patients had superficial infections that were treated with IV antibiotics and delayed the healing of the lesion. 4 (16%) patients in the non-operated group had pintrack infections, which were treated with pin removal and antibiotics.Two individuals (8%) with heterotopic ossification experienced ectopic ossification. One of them employed the Kocher-Langenbeck technique, while one patient used a combination approach. For six weeks, these patients received indomethacin 75mg in three evenly spaced doses. They did not all need surgery. Heterotopic ossification (HTO) occurred in 207 patients in Eric E. Johnson9's dataset at an 11% rate. 19% of HTO were treated using the KL technique in the Keith Mayo trial, while 35% were treated using the extensile strategy. Two (8%) of the patients in the surgical group experienced post-operative hemorrhage. These patients underwent I&D, had their hemorrhages suctioned closed for a week, and were given antibiotics for their parents. The cultures were bad. One (four percent) of the patients in each group exhibited peroneal sciatic neuropraxia. They received physiotherapy in addition to a drop foot splint treatment. He made a complete recovery. The incidence of sciatic nerve palsy in the Keith Mayo series was 1.8%.10% of the characters in the Paul D. Ruesch series had sciatica. Abductor weakness was present in 6 (24%) of the patients, but it was treated with PT.All of these patients in the operated group had greater trochanteric osteotomy using the Kocher-Langenbeck method. Eight patients in the non-operated group had weak abductor muscles, which also got better with physiotherapy. After a year of damage, 2 (8%) patients developed osteoarthritis.

OA incidence in the Keith Mayo series was 12%. 17% of the 127 fractures in the Helfet and Schmeling10 study revealed radiographic indications of OA alterations, although none of them experienced any symptoms or required a total hip replacement. 24% of the 207 fractures in the Eric E. Johnson series experienced OA alterations, and 28% of those were treated with THR. The high incidence of OA in this dataset is due to the inclusion of fractures that are treated beyond 21–120 days.

We did not experience complications such avascular necrosis of the femoral head, loss of reduction due to technical surgical errors, joint penetration by screws, iatrogenic sciatic nerve palsy, non-union, or DVT.Based on the Merle d'Aubigne and Postel11 scoring method, functional assessment was conducted.

Each patient's pain level, ability to walk, and range of motion were evaluated, and a score was assigned to each. That said, in the operated group, we got 56% (14 patients) great results, 24% (6 patients) very good results, 4% (1 patients) good results, 8% (two patients) fair results, and 8% (two patients) terrible results. That said, in the non-operated group, we had reasonable results in 16% (4 patients), excellent results in 20% (5 patients), very good results in 4% (1 patients), and terrible results in 44% (11 patients).

The delayed operation was largely to blame for the unsatisfactory results in two patients. Both of them came to us through another hospital. In this case, the reduction was not sufficient, and he also experienced complications like heterotopic ossification. Excellent results were attained in 37%, good results in 47%, fair results in 14%, and bad results in 2% of the 373 fractures in the Joel Matta, MD series. Excellent results were attained in 51%, good results in 30%, and poor results in 19% of the 102 fractures in Paul D. Ruesch's series. In a series of 75 fractures by V.A. de Ridder, MD, outstanding results were obtained in 41.6% of the cases, good results in 33%, and fair results in 25%.

Limitation:

Our study's only drawback is that we only included a small number of patients. This may be due to the lower incidence of acetabular fractures compared to other limb fractures. To examine a specific fracture pattern and its relationship to surgical and nonsurgical treatment, we advise a larger study with more tertiary centers and longer follow-up.

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