

Original Research Article

Functional outcome following conservative management of acetabular fractures

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ABSTRACT

Background: Acetabular fractures are complex injuries caused due to high velocity injury and constitutes about 18 % of Pelvic fractures. To obtain articular congruency and anatomical reduction is the gold standard in treating these fractures. In this study we have studied about the functional outcome in acetabular fractures managed conservatively with the long term follow.

Methods: A retrospective study with prospective analysis done between 2011-2020 involved 39 patients with acetabular fractures who were treated conservatively at St John's Medical college Hospital. Patients were followed up at 6 months, 1 year, 2 years and at the end of 5 years for functional evaluation and assessment with the clinical outcome scores with Merle d'Aubigne and Postel score & Harris Hip Score.

Results: Study included 39 patients with the average age of 41.3 years with 31 male and 8 female patients. Functional outcome score showed good to excellent results in 80%, fair to satisfactory results in 18%, 0.5 to 2% had poor result in the patient analyzed with both Merle d'Aubigne and Postel score and Harris Hip Score. 80 % of the patients were able to sit cross legged, 90% had returned to regular work and 10% of the patients changed their occupation to desk jobs.

Conclusions: Conservative management of acetabular fractures gives a good long-term result following congruent reduction of the fracture, good early rehabilitation and gradual weight bearing. Return to activity of daily living was good even in congruently reduced acetabular dome fractures with good to excellent functional outcome scores.

Keywords: Acetabular fractures, Conservative, Functional outcome, Long term

INTRODUCTION

Acetabular fractures are result of high velocity injury involving 18% of all pelvic fractures.^{1,2} Anatomical and congruent reduction of the acetabular fracture is the gold standard in the management of the acetabular fractures. In the published literature both conservative and operative management have been studied having advantages and disadvantages of both the modalities of treatment.²⁻⁴

Quality of reduction and type of fracture determines the functional outcome in the acetabular fractures. Displaced fractures are best treated surgically by open reduction and internal fixation. Conservative method of treatment by closed reduction and maintaining the concentric reduction with the skeletal traction is still the main stay of treatment in developing countries.³

Acetabular fractures cause degenerative changes in the acetabulum and femoral head causing dysfunction of the

hip due to alteration in the biomechanics leading to secondary arthrosis.⁵

Our aim in this study was to evaluate the functional and clinical outcome following conservative management of the acetabular fractures with long term follow up study.

METHODS

A retrospective study with prospective analysis done between 2011 and 2020 involved 39 patients with acetabular fractures who were treated conservatively at St John’s Medical College, Bangalore, India. Based on Judet et al classification the X-rays and CT scans were classified.⁶ The patients with associated pelvic ring fractures were excluded from the study. The inclusion criteria were patients having more than 3mm intra-articular displacement on the x rays and with a minimum follow-up of 5 years.

Patients were managed conservatively after closed reduction under sedation if associated with dislocation and followed by distal femur or proximal tibial longitudinal skeletal traction. Associated central dislocation was treated with standard lateral traction. The duration of traction was 6-8 weeks with 10-20% of the body weight. X-ray of pelvis with both hip joint AP view with traction was done every week. Gradually range of movement with the traction was started from 4th week onwards along with stepwise reduction of the traction weight. During the management patients were treated with in-bed exercise therapy and used water mattress to prevent bedsores, DVT prophylaxis started, chest physiotherapy, incentive spirometry and periodic psychological assessment and counselling was done to motivate the patients to maintain positive outlook.

Once the traction was off patient were subjected to post-operative rehabilitation involving tilt-table proprioceptive exercise, muscle strengthening exercise and non-weight bearing walking for 4-6 weeks. This was followed by progressive weight bearing from toe-touch to full weight bearing by the end of 8-12 weeks. Patients were followed up at 6 months, 1 year, 2 years and at the end of 5 years for functional evaluation and assessment with the clinical outcome scores Merle d’Aubigne and Postel score and Harris Hip Score.^{8,9} The research analysis of the data was done using IBM SPSS Statistics data management tool version 25.0 (64-bit).

RESULTS

Study included 39 patients with the average age of 41.3 years with 31 (79.48) male and 8 (20.51) female patients with the average BMI 24.39 kg/m². The mechanism of injury was commonly RTA in 29 (74.35%) of patients and in 10 (25.64%) was fall from height. Based on the X-rays and CT scan patients had fractures involving 13

(33%) posterior wall 3 (7.5%) posterior column, 3 (7.5%) anterior column, 4 (10 %) transverse, 1 (0.4%) posterior column with posterior wall, 4 (10%) transverse with posterior wall, 3 (7.7 %) T-shaped, 1 (0.4%) anterior column with posterior hemi-transverse, and 9 (23.5%) involved bi-columnar fractures (Figure 1). Average duration of skeletal traction was 6 weeks and the average follow up was 6.5 years with the minimum follow up of 4 years and maximum of 10 years (Table 1).

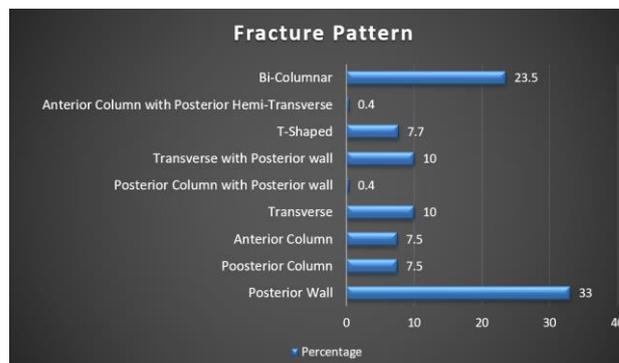


Figure 1: Type of acetabular fracture in this study.

Table 1: Demography.

| | |
|--|---|
| Total | 39 patients |
| Age | Mean 41.3 Years |
| Sex | Male- 31 patients (79.49 %) Female- 8 patients (20.51%) |
| Body Mass Index(kg/m²) | Mean -24.39 kg/m ² |
| Mechanism of injury | Road Traffic accident-29 (74.35%) Fall from height-10 (25.65%) |
| Average duration of Skeletal traction | 6 weeks |
| Average follow-up | 6.5 years |

Complications during the management had 7 (17.94%) patients with grade 1 and 2 bed sores who were treated with application of moisture-barrier lotion and sore gradually reduced over a week’s time. There were 3 (7.69%) patients had restricted range of movement and was treated with physiotherapy. Following which patient attained functional range of movement. There were 3 (7.69%) patients developed pin tract infection in whom 2 (5.12%) recovered with oral antibiotics with daily dressing.

And in one patient the skeletal traction was removed and treated with intravenous antibiotics, adequate wash and buck’s traction was applied. 2 (5.12%) patients had developed avascular necrosis of the head of femur at the end of 2 years. There were no deep vein thrombosis and other systemic complications seen (Table 2).

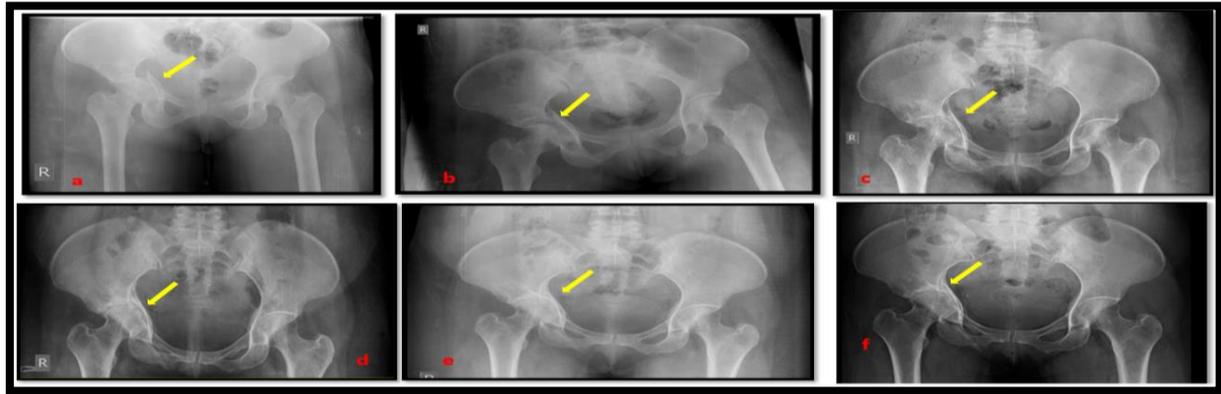


Figure 2: X ray of pelvis with both hip joint showing (A) acetabular fracture on the right side, (B) Concentric reduction following closed reduction and application of skeletal traction, (C) 1 month post traction x ray showing callus formation- time we start clinically gentle range of movement of the hip joint, (D) shows follow up x ray at 1 year showing fracture healing in remodeling stage, (E) follow up x ray at 5 years, (F) follow up at 8 year showing complete healing of the fracture with good articular congruency with no evidence of AVN.

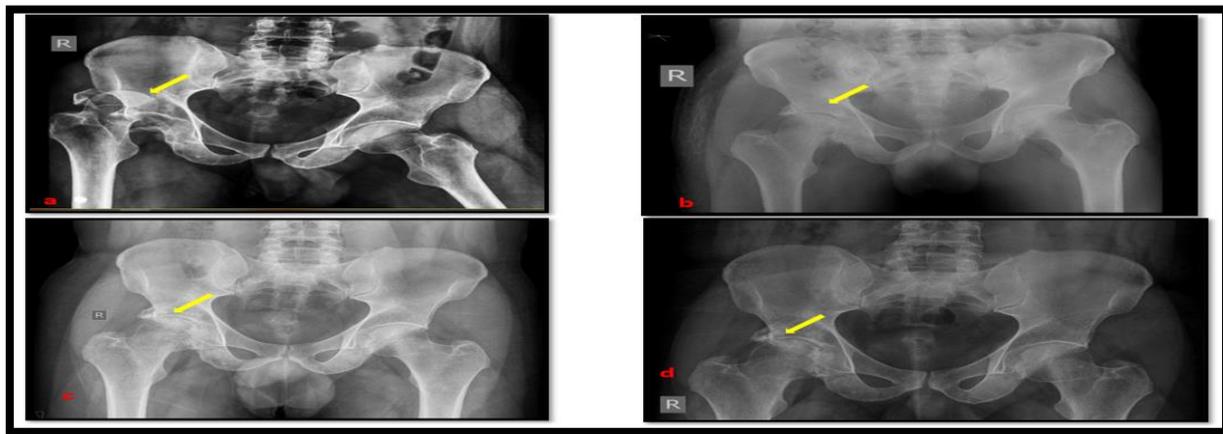


Figure 3: X ray of pelvis with both Hip Joint showing (A) posterior dislocation of right hip joint with posterior wall fracture, (B) shows concentric reduction of the joint and the fracture, (C) shows follow up at 5 years, (D) shows healed acetabular fracture with Pincer type femoro-acetabular impingement with concentric reduction of the joint with no evidence of AVN.



Figure 4: Functional outcome at 10 years follow up a. Crossed leg sitting. B. Flexion. C. Abduction with full weight bearing. D & E shows Squatting with no limitation of Activity of daily living.

Table 2: Complications.

| Complications due to conservative management | Number and percentage of patients |
|--|-----------------------------------|
| Bed sore | Grade 1- 4 (10.25%) |
| | Grade 2- 3 (7.69%) |
| Joint stiffness | 3 (7.69 %) |
| Pin tract infection | 3 (7.69 %) |
| Avascular necrosis of head of femur | 2 (5.12%) |

Table 3: Functional outcome score.

| Outcome | Harris hip Score | Merle d'Aubigne and postel score |
|------------------|------------------|----------------------------------|
| Excellent | 14 | 08 |
| Good | 17 | 22 |
| Fair | 07 | 07 |
| Poor | 01 | 02 |
| Total | 39 | 39 |

Functional outcome score showed good to excellent results in 80%, fair to satisfactory results in 18 %, 0.5 to 2% had poor result in the patient analyzed with both Harris Hip Score, Merle d'Aubigne and Postel score. 31 (80%) patients were able to sit cross legged, 35 (90%) had returned to regular work and 4 (10%) patients changed their occupation to desk jobs (Figure 2, 3) (Figure 4) (Table 3).

DISCUSSION

Acetabular fractures are complex injuries to treat and require great skills in managing the fracture as it involves major weight bearing joint of the body. With advances in the management of the acetabular fracture, the complications involved with the treatment has reduced significantly.⁵ Controversy still exists as to which is the best treatment modality of choice.⁷

Sen et al conducted a long-term study on 32 patients with displaced acetabular fractures with more than 3 mm displacement involving the weight bearing dome without unstable pelvic fracture with 56.3% reducibility were treated conservatively had good to excellent functional results in 83.3% with good to excellent radiological grade in 50% of cases.²

Magala et al analyzed 140 patients and concluded that for un-displaced acetabular fractures and minimally displaced fractures conservative treatment is the method of choice with good to excellent results and satisfactory results were seen in displaced fractures with high risk for surgery who were managed conservative treatment.^{3,10}

Magu et al conducted a retrospective study with 69 patients who had 71 displaced acetabular fractures managed conservatively with the average follow-up of

4.34 years had good or excellent results in 45 patients with good congruent reduction and concluded the role of non-operative management of acetabular fracture with congruent reduction.⁴

Lovrić et al conducted retrospective study of 103 patients and compared functional status of hip joint following surgical and conservative treatment of acetabular fractures and concluded that the results obtained both the methods were equally effective and had similar functional status.⁵

Amaravati et al evaluated 68 cases of acetabular fractures with the average follow up 36 months showed that 30 cases out of 46 cases treated conservatively and 12 out of 22 cases treated surgically had achieved good to excellent results respectively.⁷

A retrospective study of 57 patients treated conservatively by Heeg et al with a n average follow up of 7.9 years demonstrated overall satisfactory functional results in 75% of cases in patients in whom the joint congruency was maintained.¹¹

In our study functional outcome score showed good to excellent results in 76%, fair to satisfactory results in 17%, 7% had poor result in the patient analyzed with both Harris Hip Score, Merle d'Aubigne and Postel score. 80% of the patients were able to sit cross legged, 90% had returned to regular work and 10% of the patients changed their occupation to desk jobs.

CONCLUSION

Acetabular fractures can be treated conservatively with good to excellent results. Joint congruency must be maintained especially in weight-bearing dome and monitored with serial x rays during the treatment with traction and early range of movement of the hip joint, proprioceptive exercise, muscle strengthening with progressive gait training will provide good to excellent Functional and clinical outcome.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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