



ISSN (P): 2521-3466
ISSN (E): 2521-3474
© Clinical Orthopaedics
www.orthoresearchjournal.com
2021; 5(1): 26-29
Received: 15-11-2020
Accepted: 21-12-2020

Dr. P Sunil Kumar
Associate Professor, Department
of Orthopaedics, Konaseema
Institute of Medical Science,
Amalapuram, Andhra Pradesh,
India

Dr. Alla Karthik
Post Graduate Student,
Department of Orthopaedics,
Konaseema Institute of Medical
Science, Amalapuram, Andhra
Pradesh, India

Dr. Vemula Bhanu Prakesh
Post Graduate Student,
Department of Orthopaedics,
Konaseema Institute of Medical
Science, Amalapuram, Andhra
Pradesh, India

Dr. KV Dhanwantary Naidu
Associate Professor, Department
of Orthopaedics, Konaseema
Institute of Medical Science,
Amalapuram, Andhra Pradesh,
India

Corresponding Author:
Dr. KV Dhanwantary Naidu
Associate Professor, Department
of Orthopaedics, Konaseema
Institute of Medical Science,
Amalapuram, Andhra Pradesh,
India

Unstable acetabular fracture, a prospective evaluation of outcome of surgical management in tertiary care hospital

Dr. P Sunil Kumar, Dr. Alla Karthik, Dr. Vemula Bhanu Prakesh and Dr. KV Dhanwantary Naidu

DOI: <https://doi.org/10.33545/orthor.2021.v5.i1a.255>

Abstract

Background: Surgical management of acetabular fracture is a challenge and require technical expertise as there is chance of serious complications. Various studies have been conducted about outcome of management of acetabular fracture in adult with variable outcome. Present study has been designed to study the functional outcome of unstable fracture managed by open reduction and internal fixation in our clinical setup.

Material and Method: This is a prospective study that included 32 patients with closed posteromedial tibial plateau fractures who had undergone open reduction and internal fixation through a posteromedial approach by plate and screws between August 2017 and December 2020. Reconstruction plate or semi tubular plate was used if lag screw was not possible. Drug therapy was given as per standard protocol and suture was removed on 12 post-operative day.

Result: As per Merle D' Aubign  and Postel Modified Score after surgical treatment of unstable fracture of acetabulum outcome was excellent in 10(31.25%). The outcome was good in 14(43.75%), fair in 4(12.5%) and poor in 4(12.5%).

Conclusion: From our study we can conclude that fracture of acetabulum was common in young patient with high energy impact. The outcome was good in 14(43.75%), fair in 4(12.5%) and poor in 4(12.5%). Anatomical reduction was achieved in 14 (43.75%) patients. Reduction was imperfect in 12 (37.50%) patients and poor in 6(18.75%).

Keywords: Acetabular fracture, outcome, anatomical reduction

Introduction

The acetabulum is situated at about the centre of lateral aspect of hip bone. It is an approximately hemispherical cavity facing anteroinferiorly and having irregular margin which is deficient inferiorly at the acetabular notch. All three component of hip bone contribute to the acetabulum [1]. The main function of acetabulum is to transfer the body weight to lower extremities when we are standing [2]. This transfer of weight is through articular lunate surface called dome. The femoral head spins inside the acetabulum on a transverse axis when thigh is flexed or extended. Similarly acetabulum rotates in the same axis during flexion and extension of trunk on stationary femoral axis [3]. Fracture of acetabulum is a complicated injury to treat. Fracture of acetabulum is common in young age people due to high energy trauma. With the increase in life expectancy of human, incidence of fracture is high in older people due to osteoporosis. In early days conservative approach was mail modality of management [4]. Management of acetabular fracture was individualised and failure rate was high as there was no proper classification. Judet R, Judet J, Letournel E *et al.* has classified the fracture and describe the management protocol that is considered gold slandered [5, 6].

Surgical management of acetabular fracture is a challenge and require technical expertise as there is chance of serious complications. Various studies have been conducted about outcome of management of acetabular fracture in adult with variable outcome. Trikha, V., Das, S., Aruljothi, V. *et al.* has reported that Fifty eight [90.62%] patients out of the total 64 patients had good to excellent outcome on functional and radiographic results. Cases which present late may have difficulty through this approach as scarring or granulation tissue may lead to

inadequate visualization. so timing of management is also important for outcome [7]. Ziran, N., Soles, G.L.S. & Matta, J.M has concluded that Anatomic reduction is the most influential factor predictive of clinical outcome and is what surgeons should strive for in the treatment of these fractures [8]. Paksoy AE, Topal M, Aydin A, Zencirli K, Kose A, Yildiz V *et al.* has concluded that anatomic-successful reduction was achieved in 84% of acetabulum fractures in their study, perfect-good functional outcomes in 81%, and perfect-good radiological outcomes in 81%.

Present study has been designed to study the functional outcome of unstable fracture managed by open reduction and internal fixation in our clinical setup.

Material and Method

Place and time of study

This study has been conducted in the department of orthopaedics, Konaseema institute of medical sciences, Amalapuram, Andhrapradesh from November 2017 to November 2020.

Type of study

This is a prospective observational study.

Ethics

Approval from institutional ethics committee was taken before start of study. A written informed consent was obtained from all patients before enrolling them for study.

Selection of patients

The patients admitted in the department of orthopaedics with unstable acetabular fractures were enrolled for this study as per

following exclusion and inclusion criteria.

Inclusion criteria

- Age more than 18 years
- Both sex
- Non-displaced fracture of articular lunate surface (dome)
- Without subluxation of femoral head

Exclusion criteria

- Less than 18 years
- Acute infection
- Pathological fracture and malignancy

Method

This is a prospective study that included 32 patients with closed posteromedial tibial plateau fractures who had undergone open reduction and internal fixation through a posteromedial approach by plate and screws between August 2017 and December 2020. After receiving patient in casualty and trauma department, first patient were stabilised and a thorough examination was done and proper history of patient regarding mode of injury basic demographic data and details were recorded. After stabilization radiological investigation was done of by x ray of pelvis in AP view, obturator oblique view and iliac oblique views and axial CT scan was done in all patients. All fractures have been classified by Letournel and Judet classification⁵. After standard preoperative procedure spinal anaesthesia was given to all patients. Patients were shifted to operation table and depend upon requirement lateral; floppy lateral and prone position was used for surgery. We used Kocher Langenbeck or Iliofemoral surgical approach based on displacement of each column and the degree of superior articular surface involvement.



Fig 1: Fracture of acetabulum in young and adult

After exposing the fracture site fracture configuration was verified by C arm and fragment was reduced with K wire. Lag screw fixation and buttress plating was done. Reconstruction plate or semi tubular plate was used if lag screw was not possible. Drug therapy was given as per standard protocol and suture was removed on 12 post-operative day. Early mobilisation started allowed to sit on first day, walking with

walker/crutches was started at 6 weeks and was maintained up to 12 weeks. Full weight bearing was started from 12 weeks onward.

Patient were followed radiologically in all three view on 2nd week, 12 weeks, 24 weeks and one year. Functional outcome was assessed by the Grading system of Merle D'Aubigné' and Postel modified score. The results were graded as Excellent (18),

Very good (17), good (16) fair (14), Poor (less than 13) [10].

Result

During our study period of three years as per our selection criteria we have enrolled 32 patients with unstable fracture of acetabulum. Mean age of the patients were 39.24 ± 6.54 years, number of patients between age 18 to 30 were 14(43.75%), between 31 to 50 years are 8(25%) and above 51 years were 10(31.25%). There was male predominance and male to female ratio was 20/12. Regarding type of fracture elementary type was present in 19 patients that includes anterior column 2(6.25%), posterior column 5(15.625%), transverse 10(31.25%) and simple in 2 (6.25%). Associate type was present in 13 patients that include both column in 2(6.25%), Hemi transverse with posterior wall in 7(21.85%), Posterior column + Posterior wall 2(6.25%), and T type in 2(6.25%) patients.

Table 1: Profile of patients with unstable fracture of acetabulum

Variables		Number	Percentage	
Age	18 to 30	14	43.75	
	31 to 50	8	25	
	More than 51	10	31.25	
Sex	M	20	62.5	
	F	12	37.5	
Type of fracture	Elementary type (19)	Anterior column	2	6.25
		Posterior column	5	15.625
		Transverse	10	31.25
		Simple	2	6.25
	Associate type (13)	Both columns	2	6.25
		Hemi transverse with posterior wall	7	21.85
		Posterior column + Posterior wall	2	6.25
T type	2	6.25		
Displacement (in mm)	10 to 20	20	62.5	
	More than 20	12	37.5	
Time taken in surgery (in days)	Less than 5	16	50	
	5 to 10	8	25	
	More than 10	8	25	
Duration of surgery (hours)	2 to 3	21	65.62	
	3 to 4	11	34.37	
Posterior dislocations	Present	8	25	
	Absent	24	75	

Regarding displacement of fracture 20 patients have displacement between 10 to 20 mm and remaining patients have displacement more than 20 mm. Time taken for surgery was less than 5 days in 16 patients (50%), 8(25%) patients were operated between 5 to 10 days and remaining 8(25%) patients were operated between after 10 days. It took 2 to 3 hour to operate in 21 (65.62%) patients and in 11(34.37%) patients it took 3 or 4 hours. Posterior dislocation was present in 25% patients.

Table 2: Merle D' aubignè and postel modified score after surgical treatment of unstable fracture of acetabulum

Merle D' aubignè and Postel modified score	Number	Percentage
Excellent	10	31.25
Good	14	43.75
Fair	4	12.5
Poor	4	12.5

As per Merle D' Aubignè and Postel Modified Score after surgical treatment of unstable fracture of acetabulum outcome was excellent in 10(31.25%). The outcome was good in 14(43.75%), fair in 4(12.5%) and poor in 4(12.5%).

Table 3: Characteristics of reduction

Reduction	Number	Percentage
Anatomical	14	43.75
Imperfect	12	37.50
Poor	6	18.75

Anatomical reduction was achieved in 14 (43.75%) patients. Reduction was imperfect in 12 (37.50%) patients and poor in 6(18.75%).

Discussion

In present study 32 patients were enrolled for evaluation of outcome of surgical management of unstable acetabular fracture. We have observed that the mean age of patients were 39.24 ± 6.54 years and maximum number of patients were between age 18 to 30 with male predominance. Manzoor Ahmed Halwai, Qazi Waris Manzoor, Mohd. Iqbal Wani and Bashir Ahmed Mir *et al* has reported that mean age to be 33 years with male predominance which is similar to our finding [11]. Boudissa, F. Francony, G. Kerschbaumer, S. Ruatti, M. Milaire, P. Merloz, J. Tonetti has reported that mean age was 49.4 years with male predominance which is higher than our study [12, 13]. Elementary type of fracture was little common than associate type and in most of our patients displacement was less than 2 cm. Which is supported by the work of Hoge S, Chauvin BJ *et al.* and Ziran, N., Soles, G.L.S. & Matta, J.M *et al.* [4, 8].

Time take to decide for surgery was less than 5 days in 50% patients, up to 10 days in 25% and more than 10 days in 25% patients. In most of the patients duration of surgery was less than 3 hours. Mesbahi SAR, Ghaemmaghmi A, Ghaemmaghmi S, Farhadi P *et al.* has reported that there was an average delay of 7.25 days (ranged from 1 to 22 days) from admission to time of surgery and the surgeries lasted 162.4 ± 78.5 (range, 75 to 450) min on average, this corroborates with our finding [14]. Posterior dislocation was present in 25% patients this is supported by the study of Dilogio IH, Erwin US, Hendriarto A *et al.* [15].

As per Merle D' Aubignè and Postel Modified Score after surgical treatment of unstable fracture of acetabulum outcome was excellent in 10(31.25%). The outcome was good in 14(43.75%), fair in 4(12.5%) and poor in 4(12.5%). Li XG, Tang TS, Sun JY has reported that Functional results were excellent in 41 patients (51.9%), good in 12 (15.2%), fair in 13 (16.5%), and poor in 13 patients (16.5%) [16]. Mesbahi SAR, Ghaemmaghmi A, Ghaemmaghmi S, Farhadi P *et al.* has reported that the clinical outcome was graded as excellent in 16 patients, good in 14, fair in 4 and poor in 3 theses finding support our study [17].

Anatomical reduction was achieved in 14(43.75%) patients. Reduction was imperfect in 12(37.50%) patients and poor in 6 (18.75%). Paksoy AE, Topal M, Aydin A, Zencirli K, Kose A, Yildiz V *et al.* has reported that anatomical reduction was determined in 15 (40.6%) of 37 acetabulum fractures, successful displacement in 16 (43.2%), and poor displacement in 6 (16.2%) [18].

Conclusion

From our study we can conclude that fracture of acetabulum was common in young patient with high energy impact. There was male predominance. Elementary type of fracture was little common than associate type and in most of our patients displacement was less than 2cm. Posterior dislocation was present in 25%. The outcome was good in 14(43.75%), fair in 4(12.5%) and poor in 4(12.5%). Anatomical reduction was achieved in 14 (43.75%) patients. Reduction was imperfect in 12 (37.50%) patients and poor in 6(18.75%).

References

1. Krebs V, Incavo SJ, Shields WH. The anatomy of the acetabulum: what is normal? *Clin Orthop Relat Res* 2009;467(4):868-75. DOI: 10.1007/s11999-008-0317-1. Epub 2008 Jul 22. PMID: 18648904; PMCID: PMC2650057.
2. D'Lima DD, Urquhart AG, Buehler KO, Walker RH, Colwell CW Jr. The effect of the orientation of the acetabular and femoral components on the range of motion of the hip at different head-neck ratios. *J Bone Joint Surg Am* 200;82:315-321.
3. Govsa F, Ozer MA, Ozgur Z. Morphologic features of the acetabulum. *Arch Orthop Trauma Surg* 2005;125:453-461. <https://doi.org/10.1007/s00402-005-0020-6>
4. Hoge S, Chauvin BJ. Acetabular Fractures. [Updated 2020 Jun 23]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing 2020. <https://www.ncbi.nlm.nih.gov/books/NBK544315/>
5. Judet R, Judet J, Letournel E. Fractures of the acetabulum: classification and surgical approaches for open reduction. preliminary report. *J Bone Joint Surg Am* 1964;46:1615-1646.
6. Letournel E. Acetabulum fractures: classification and management. *Clin Orthop Relat Res* 1980;151:81-106.
7. Trikha V, Das S, Aruljothi V *et al.* Prospective Evaluation of Outcome of Acetabular Fractures Managed by Anterior Intrapelvic Approach. *JOIO* 2005;54:228-238. <https://doi.org/10.1007/s43465-020-00154-y>
8. Ziran N, Soles GLS, Matta JM. Outcomes after surgical treatment of acetabular fractures: a review. *Patient Saf Surg* 2019;13:16. <https://doi.org/10.1186/s13037-019-0196-2>
9. Paksoy AE, Topal M, Aydin A, Zencirli K, Kose A, Yildiz V. Outcomes of Surgical Management of Acetabular Fractures Treated with Anterior Approaches. *Eurasian J Med* 2019;51(3):257-261. DOI:10.5152/eurasianjmed.2019.0241
10. Ugino FK, Righetti CM, Alves DP, Guimarães RP, Honda EK, Ono NK. Evaluation of the reliability of the modified Merle d'Aubigné and Postel Method. *Acta Ortop Bras* 2012;20(4):213-217. DOI:10.1590/S1413-78522012000400004
11. Manzoor Ahmed Halwai, Qazi Waris Manzoor, Mohd. Iqbal Wani, Bashir Ahmed Mir. The epidemiology and fracture patterns of acetabular fractures in a tertiary care centre of North India: A hospital based International Journal of Orthopaedics Sciences 2019;5(2):18-21.
12. Boudissa M, Francony F, Kerschbaumer G, Ruatti S, Milaire M, Merloz P, Tonetti J. Epidemiology and treatment of acetabular fractures in a level-1 trauma centre: Retrospective study of 414 patients over 10 years, *Orthopaedics & Traumatology: Surgery & Research* 2017;103(3):335-339. ISSN 1877-0568. <https://doi.org/10.1016/j.otsr.2017.01.004>.
13. Mauffrey C, Hao J, Cuellar DO 3rd *et al.* The epidemiology and injury patterns of acetabular fractures: are the USA and China comparable? *Clin Orthop Relat Res* 2014;472(11):3332-3337. DOI:10.1007/s11999-014-3462-8.
14. Mesbahi SAR, Ghaemmaghami A, Ghaemmaghami S, Farhadi P. Outcome after Surgical Management of Acetabular Fractures: A 7-Year Experience. *Bull Emerg Trauma* 2018;6(1):37-44. DOI:10.29252/beat-060106
15. Dilogio IH, Erwin US, Hendriarto A. Posterior dislocation of left hip joint with closed fracture of left acetabulum Judet-Letournel type posterior wall, femoral head fracture, management and follow up: A case report. *Int J Surg Case Rep* 2020;71:85-90. DOI:10.1016/j.ijscr.2020.04.009
16. Li XG, Tang TS, Sun JY. Results after surgical treatment of transtectal transverse acetabular fractures. *Orthop Surg* 2010;2(1):7-13. DOI: 10.1111/j.1757-7861.2009.00056.x. PMID: 22009901; PMCID: PMC6583288.
17. Mesbahi SAR, Ghaemmaghami A, Ghaemmaghami S, Farhadi P. Outcome after Surgical Management of Acetabular Fractures: A 7-Year Experience. *Bull Emerg Trauma* 2018;6(1):37-44. DOI:10.29252/beat-060106.