University Journal of Surgery and Surgical Specialities

ISSN 2455-2860 2020, Vol. 6(3)

Functional and Radiological outcome of T-Type acetabular fractures treated through Anterior approach

SIVAKUMAR P
Department of Orthopaedic Surgery, MADRAS MEDICAL COLLEGE AND GOVERNMENT GENERAL HOSPITAL

Abstract : AIM Functional and Radiological outcome of T-Type acetabular fractures treated through Anterior approach. INTRODUCTION Acetabular fractures occurring following high velocity injury are increasing in the present scenario. Acetabular fractures with significant displacement need internal fixation for early mobilization and to maintain joint congruity. In transverse acetabular fractures reduction of either anterior or posterior column leads to reduction of other column, but in case of TType acetabular fracture both column should be addressed individually to achieve congruent joint. This can be dealt with anterior approach alone by using combined Ilioinguinal and stoppas approaches. MATERIALS AND METHODS In this study we analysed the functional and radiological outcome of T-Type acetabular fractures treated anterior approach. We analysed the functional and radiological outcome of 5 patients who had T-Type acetabular fractures treated by anterior approach with a follow up of minimum 1 year period. we used lateral window for xation of a low posterior column fracture with posterior column lag screw. The functional outcome is analysed based on Merle DAubigne score which comprises of pain, walking and Range of motion. Out of 5 patients 4 patients had excellent outcome, 1 patient had good outcome. No poor outcomes were encountered in our study. The Radiological outcome is analysed using the mattas grading for fracture reduction which comprises of anatomical reduction ,satisfactory reduction, unsatisfactory reduction. Out of 5 patients 4 patients had anatomical reduction and 1 patient had satisfactory reduction. No complications were encountered in our cases . CONCLUSION Anterior approach alone by using combined Ilioinguinal and stoppas approaches for the treatment of T-Type acetabular fractures permits good to excellent reduction in the majority of cases while giving exceptional access to and visualization of the corona mortis, quadrilateral surface, anterior and posterior column .

Keyword :acetabulum, Ilioinguinal, Stoppa, Merle DAubigne, mattas, anterior column, Posterior column

Introduction:

Acetabular fracture is an intra-articular fracture of the most important weight-bearing joint, the hip joint, and in order to obtain optimal results, accurate anatomic reduction, firm fixation, and early rehabilitation are essential [1,2,3] .However, the treatment of acetabular fractures is quite difficult not only due to the associated major organ injuries but also due to the complicated fracture type and difficulties in the operative approach for reduction. Marked progress has been made after a systematic approach and treatment algorithm were proposed by Judet et al. [4] and Letournel and Judet [5] in the 1960s. Until now, diverse surgical approaches have been used for the reduction of acetabular fractures and they are categorized into anterior, posterior, extensile, and combined approaches. The surgeon should become familiar with the technical tips and the advantages and disadvantages of each approach. Currently, the ilioinguinal approach or the modified Stoppa approach[6] is used as the anterior approach, and the ilioinguinal approach is used more commonly and its outcomes have been reported more extensively among these two approaches. The modified Stoppa approach is an intrapelvic approach initially used for inguinal hernia surgery by Rives et al. and Stoppa et al. in the early 1990's and was introduced the method for approaching the anterior acetabulum and pelvic bone by Cole and Bolhofner[7] and Hirvensalo et al.[8] In transverse acetabular fractures reduction of either anterior or posterior column leads to reduction of other column, but in case of T-Type acetabular fracture both column should be addressed individually to achieve congruent joint.This can be dealt with anterior approach alone by using combined Ilioinguinal and stoppas approaches. we aimed to evaluate the efficacy of the operative technique by analyzing the results and the complications of T-Type acetabular fractures treated with the anterior approach.

Methods and materials

This study is to assess functional and radiographic outcome of T-Type acetabular fractures fixed through anterior approach was done at the Institute of Orthopaedics and Traumatology , Madras medical college and Rajiv Gandhi Government general hospital, Chennai from August 2013 - December 2015 Our study consists of 5 cases of T-Type acetabular fractures. Inclusion criteria consists of Age greater than 14 years , less than 70 yrs, Closed

fractures, T Type fracture, fractures less than 3 weeks old. Open injuries, fracture greater than 3 weeks old, age less than 14 yrs and more than 70 yrs were excluded from this study and also not encountered. In our study after general resuscitation of the patients , a detailed clinical examination and radiological assessment was done . Patients were put on lower femoral pin traction.

The Mean age of the patients was 41 year ranging from 20 to 60 years.

Age	No of Patients	Percentage
21-30 years	1	20%
41-50 years	3	60%
51-60 years	1	20%

Sex Incidence

Sex	Numbers	Percentage
Male	4	80%
Female	1	20%

Males dominate in our study Mode of Injury : All five patients suffered from Road Traffic Accidents .

Surgical Approaches :

In our study we used lateral window and middle window of the Ilioinguinal approach and stoppa's approach.

Functional Outcome:

Functional outcome analysed using the Modified Merle'd Aubinge And Postel Grading System Modified Merle'd Aubinge And Postel Grading System:

CLINICAL GRADING SYSTEM

Pain

None - 6
Slight or intermittent - 5
After walking but resolves - 4
Moderately severe but patient is able to walk - 3
Severe, prevents walking - 2

Walking

Normal - 6
No cane but slight limp - 5
Long distance with cane or crutch - 4
Limited even with support - 3
Very limited - 2
Unable to walk - 1

Range of motion*

95-100% - 6
80-94% - 5
70-79% - 4
60-69% - 3
50-59% - 2
<50% - 1

Clinical score

Excellent-18
Good-17,16,15
Fair 13 or 14
Poor <13

*The range of motion is expressed as the percentage of the value for the normal hip. This is calculated by obtaining a total of the range of movements, in degrees, of flexion-extension, abduction, adduction, external rotation, and internal rotation for the injured hip and dividing it by the total for the normal hip.

Radiological outcome:

Matta's Scoring System
Ø Displacement greater than 3 mm- unsatisfactory reduction
Ø Displacement of 3 mm or less - satisfactory reduction
Ø Displacement 1 mm or less - anatomic reduction

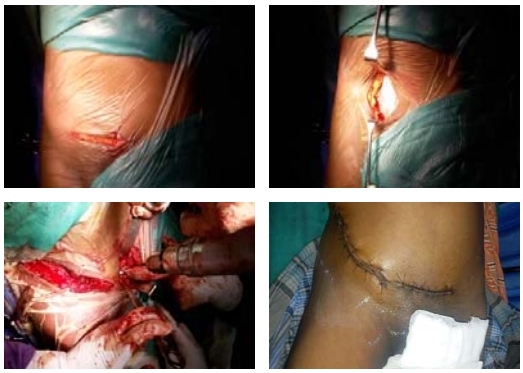
Case

42 yr old male presented with alleged history RTA and sustained injury over the left hip diagnosed to have T-Type fracture acetabulum left, operated on fifth day through Anterior approach.

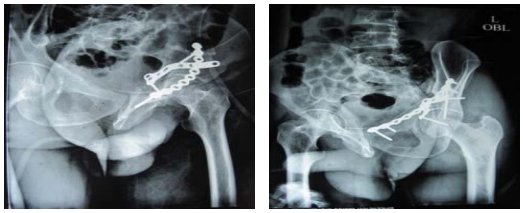
Immediate post op and 1 and 1/ 2 yrs follow up shows excellent results.

PRE OP X-RAYS

Intra Operative pictures



Immediate post op x ray



1 and 1/2 yrs follow up

Clinical pictures



Results:

Out of 5 patients 4 patients had excellent outcome, 1 patient had good outcome based on Merle D'Aubigne score . No poor outcomes were encountered in our study. Out of 5 patients 4 patients had anatomical reduction and 1 patient had satisfactory reduction based on the matta's grading .No complications were encountered in our cases .

Discussion

The options for treatment of complex acetabular fractures are wide and are continuously refined over time. The treatment of complex acetabular fracture are difficult because it involves both the columns and reduction of the both by single or double approach is must. There are articles on conservative management of complex acetabular fractures treated with lateral and longitudinal skeletal traction . They highlight that congruent reduction can be achieved by traction. But immobilization and their complications are to be stressed upon[9]. The highlight of open reduction and internal fixation is Anatomic reduction, rigid fixation and early mobilization which will keep the joint functional as told by Matta [10]. Pennal et al quoted that, the quality of the clinical result depends directly on the quality of the reduction that was achieved when open reduction and internal fixation were performed . Difficult surgical exposure, delay in surgery, and complications pose great challenge for the surgeons but with experience and care those factors can be addressed. Management of displaced acetabular fracture requires adequate exposure with minimal morbidity of the approach itself.

An ideal approach would allow visualisation of both columns and the joint surface with minimal complications. Extensile approaches around the hip joint have reported a high rate of complications. Alonso et al. reported 53% incidence of heterotopic ossification with a Triradiate approach and 86% incidence with the use of an extended iliofemoral approach. We used non extensile approach for operating in these patients. Modified Rives-Stoppa's approach are known for their safety and less complications . Matta [11] in 1994 reported on his 10-year perspective (average follow up of 3 years) in treating acetabular fractures through the ilioinguinal approach. In 119 approaches, he was able to obtain 74% anatomic reductions, 16% satisfactory reductions, and 10% unsatisfactory reductions. Clinical results showed 37% excellent results, 47% good results, 14% fair results, and 2% poor results. Complications were noted in 13% of patients and included one femoral artery laceration, one femoral nerve palsy, and three wound infections. Although a number of small series examining the use of the modied Rives-Stoppa for pelvic and acetabular injuries exist[12,13] , Hirvensalo et al[14] have reported on the largest serial experience using this approach for acetabular fractures. In 164 patients, 84% of reductions were graded as good, 9% were graded as fair, and 7% were graded as poor. They found that 80% of patients achieved a Harris hip score of 75 or greater on clinical examination and functional outcome scoring. The purported advantages to stoppa approach are as follows: 1) direct visualization and access to the posterior column from the greater sciatic notch to the ischial spine allowing for reduction and plating.2) direct visualization of the entire pelvic brim from the pubic body to the anterior aspect of the sacroiliac joint; 3) direct visualization and access to the external iliac to obturator anastomosis; 4) direct visualization and access to the quadrilateral plate allowing for reduction and plating.

The complication rate is very low when compared to Matta and Swiontkowski studies . No case of heterotopic ossification is encountered till date in our study. Heterotopic ossification was reported as high as 20% in extensile approaches used for complex fractures . Avascular necrosis of femoral head was reported in literatutre . In our study we had not encountered that complication. The results of operative treatment of acetabular fractures are influenced by numerous factors, including the type of fracture and/or dislocation, damage to the femoral head, associated injuries, timing of the operation, quality of reduction, local complications, and the surgical approach. We had a study group of 5 patients and analysed the functional outcome. We are able to produce satisfactory result with this approach without complications.

CONCLUSION:

Anterior approach alone by using combined Ilioinguinal and stoppas approaches for the treatment of T-Type acetabular fractures permits good to excellent reduction in the majority of cases while giving exceptional access to and visualization of the corona mortis, quadrilateral surface, anterior and posterior column .

References

1. Letournel E. The treatment of acetabular fractures through the ilioinguinal approach. Clin Orthop Relat Res. 1993; (292):62-76.
2. Matta JM. Fractures of the acetabulum: accuracy of reduc- tion and clinical results in patients managed operatively within three weeks after the injury. J Bone Joint Surg Am. 1996;78(11):1632-45.
3. Min BU, Nam SY, Kang CS. Complications of surgical treat- ment in patients with acetabular fractures. J Korean Hip Soc. 2000;12(3):253-60.
4. Judet R, Judet J, Letournel E. Surgical treatment of recent fractures of the acetabulum: apropos of 46 operated cases. Mem Acad Chir (Paris). 1962;88:369-77.
5. Letournel E, Judet R. Fractures of the acetabulum. Berlin: Springer-Verlag; 1974.
6. Andersen RC, O'Toole RV, Nascone JW, Sciadini MF, Frisch HM, Turen CW. Modified stoppa approach for acetabular fractures with anterior and posterior column displacement: quantification of radiographic reduction and analysis of in- terobserver variability. J Orthop Trauma. 2010;24(5):271-8.
7. Cole JD, Bolhofner BR. Acetabular fracture fixation via a modified Stoppa limited intrapelvic approach: description of operative technique and preliminary treatment results. Clin Orthop Relat Res. 1994;(305):112-23.
8. Hirvensalo E, Lindahl J, Bostman O. A new approach to the internal fixation of unstable pelvic fractures. Clin Orthop Relat Res. 1993;(297):28-32.
9. Horwitz D. S. and Higgins D. F. (2007): Acetabular

Reconstruction: Surgical Approaches . In: Fractures of The pelvis and acetabulum Informa healthcare New York, chapter (10), pp: 169- 174.
10. Matta JM. Fractures of the acetabulum: accuracy of reduction and clinical results in patients managed operatively within three weeks after the injury. J Bone Joint Surg Am. 1996;78:1632–1645.
11. Matta JM. Operative treatment of acetabular fractures through the ilioinguinal approach. A 10- year perspective. Clin Orthop Relat Res. 1994;305:10–19.
12. Ponsen KJ, Joosse P, Schigt A, et al. Internal fracture xation using the Stoppa approach in pelvic ring and acetabular fractures: technical aspects and operative results. J Trauma. 2006; 61:662–667.
13. Jakob M, Droeser R, Zobrist R, et al. A less invasive anterior intrapelvic approach for the treatment of acetabular fractures and pelvic ring injuries. J Trauma. 2006;60:1364–1370.
14. Hirvensalo E, Lindahl J, Kiljunen V. Modied and new approaches for pelvic and acetabular surgery. Injury. 2007; 38:431–441.