Research Paper

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Medical Science

KEYWORDS :

Study of Operative Results of Fractures of Acetabulum in Adult

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INTRODUCTION

Acetabular Fractures are life altering injuries that commonly occurs in young, active productive members of society although the number of elderly patients sustaining acetabulum fracture has increased. The operative treatment of acetabular fracture is technicallychallenging.The surgical approaches and reduction techniques must be thoroughly understood to properly manage this three-dimensional.Failure to achieve anatomical reduction, rigid internal fixation leads to a poorer functional outcome and an increase in posttraumatic.

We have done an observational study of 20 patients with acetabulum fracture which is treated using open reduction and internal fixations and evaluated the results of same during 2011 to 2014.

Etiology

Fractures of the acetabulum occur as a result of the force exerted through the head of the femur to the acetabulum. The femoral head acts like a hammer and is the last link in the chain of forces transmitted from the greater trochanter, knee, or foot to the acetabulum. The position of the femur at the time of impact and the direction of the force determine the type and displacement of the fracture[12].

Classification

Judet and Letournel classification

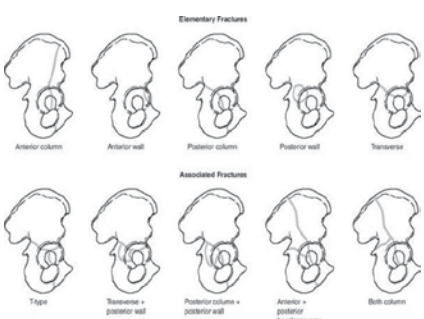
The easiest classification is that of Judet and Letournel, who classified acetabular fractures according to the fracture morphology as elementary fracture patterns[13]

A. Elementary fractures: These have only 1 fracture line and include the following:

1. **Posterior wall fractures**
2. **Posterior column fractures**
3. **Anterior wall fractures**
4. **Anterior column fractures**
5. **Transverse fractures**

B. Associated Fractures

1. **Anterior with posterior hemi transverse fractures**
2. **Fracture posterior column & posterior wall**
3. **Transverse & posterior wall fractures**
4. **T-shaped fracture**
5. **Both column fractures**



MATERIALS AND METHODS

We undertook the study in our instituted between 2011 to 2014. Data for all the patient admitted to our orthopaedic unit where collected basic details including age, gender, nature treatment, Mechanism of injury.

Acetabulum fractures were immobilized with lower femoral ST pin and skeletal traction.Patient was investigated for bloodchemistry, radiologically in form of roentgenograms (AP and obliqueviews of involved part plus routine trauma series), ultrasound and CAT scan. We were operated 26 patients in our institute

We included in our study:

- All type of displace fracture acetabulum in adult
- Only acute trauma case selected

We excluded from our study

- Fractures of the public ramus and pelvic fractures not involving the acetabulum were also excluded.
- Medically co morbid and unfit patients,
- Age <18 years

Common approaches

1. Kocher-Langenbeck approach[22]

Indication

Isolated fracture of the posterior wall and/or column with or without dislocation.

2. Ilioinguinal approach

Indication

- Anterior wall
- Anterior column
- Combined anterior column with posterior hemitransverse extension
- Medial wall fracture with central dislocation

Reduction and fixation

- **Reduction**

o Reducing acetabular fractures is one of the most challenging tasks the orthopaedic surgeon faces. It requires patience and skill. One tends to improve with experience, Analysis of the fracture pattern, displacement of the fragments, and meticulous preoperative planning go a long way in easing the difficulties faced in the surgical treatment of acetabular fracture[4].

- **Provisional fixation:** Provisional fixation usually is established by means of Kirschner wires (K-wires).

- **Definitive fixation:** Definitive fixation is established with the following:

o Screws: The primary fixation usually is by means of an interfragmentary screw. This is usually a 3.5-mm cortical screw used as a lag screw or a 4-mm cancellous screw. Screws measuring 6.5 mm are used.

o Plates: Because of the curvaceous pelvic anatomy, implants that are too rigid must be avoided, as they need to be mould-

ed perfectly to avoid malreduction. The 3.5-mm reconstruction plate, either curved or straight, DCP, is ideal for this purpose.

Complications

Complications are divided into early and late.

1. Early complications

Common complication in acetabulum surgery is Infection, Nerve damage, vascular injury Thromboembolism, Fixation failure but in our study one patient develop infection and nerve palsy. Seropurulnt discharge started from 2 post op day and sent for Culture and sensitivity. Empirical injectable antibiotics start still report. Despite antibiotics; discharge continues and then patient took for serial debridement

2. Late complications

Avascular necrosis, Posttraumatic osteoarthritis, Heterotopic new bone formation , Non-union But In our study one patients develop osteoarthritis at 1syear of age and go for THR, no Non-union and heterotrophic new bone formation

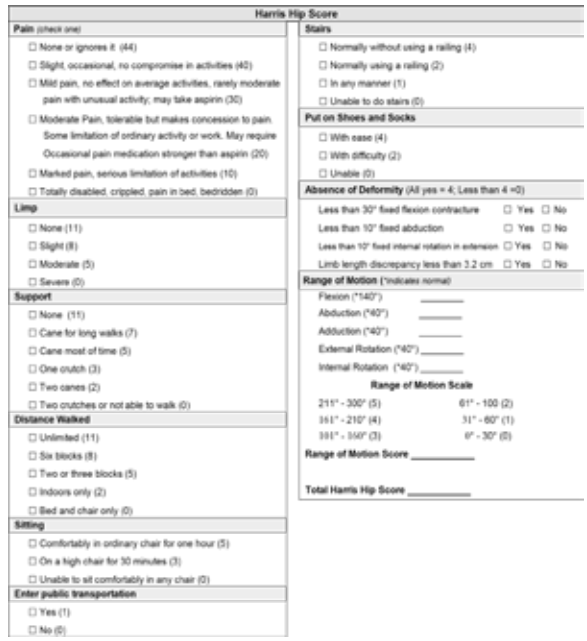
Criteria	Points
Pain	
None	6
Slight or intermittent	5
After walking but resolves	4
Moderately severe but patient is able to walk	3
Severe, prevents walking	2
Walking	
Normal	6
No cane but slight limp	5
Long distance with cane or crutch	4
Limited even with support	3
Very limited	2
Unable to walk	1
95-100%	6
80-95%	5
70-79%	4
60-69%	3
50-59%	2
<50%	1

Clinical grade

Excellent	18
Good	15 to 17
Fair	13 to 14
Poor	<13

MODIFIED MERLE D'AUBIGNE SCALE[23]

HARRIS HIP SCORE[24]



Harris Hip Score

Pain (check one)
- ☐ None or ignores it (44)
- ☐ Slight, occasional, no compromise in activities (40)
- ☐ Mild pain, no effect on average activities, rarely moderate pain with unusual activity; may take aspirin (30)
- ☐ Moderate Pain, tolerable but makes concession to pain. Some limitation of ordinary activity or work. May require Occasional pain medication stronger than aspirin (20)
- ☐ Marked pain, serious limitation of activities (10)
- ☐ Totally disabled, crippled, pain in bed, bedridden (0)

Limp
- ☐ None (11)
- ☐ Slight (8)
- ☐ Moderate (5)
- ☐ Severe (0)

Support
- ☐ None (11)
- ☐ Cane for long walks (7)
- ☐ Cane most of time (5)
- ☐ One crutch (3)
- ☐ Two canes (2)
- ☐ Two crutches or not able to walk (0)

Distance Walked
- ☐ Unlimited (11)
- ☐ Six blocks (8)
- ☐ Two or three blocks (5)
- ☐ Indoors only (2)
- ☐ Bed and chair only (0)

Sitting
- ☐ Comfortably in ordinary chair for one hour (5)
- ☐ On a high chair for 30 minutes (3)
- ☐ Unable to sit comfortably in any chair (0)

Enter public transportation
- ☐ Yes (1)
- ☐ No (0)

Stairs
- ☐ Normally without using a railing (4)
- ☐ Normally using a railing (2)
- ☐ In any manner (1)
- ☐ Unable to do stairs (0)

Put on Shoes and Socks
- ☐ With ease (4)
- ☐ With difficulty (2)
- ☐ Unable (0)

Absence of Deformity (All yes = 4; Less than 4 =0)
- Less than 30° fixed flexion contracture ☐ Yes ☐ No
- Less than 10° fixed abduction ☐ Yes ☐ No
- Less than 10° fixed internal rotation in extension ☐ Yes ☐ No
- Limb length discrepancy less than 3.2 cm ☐ Yes ☐ No

Range of Motion (*indicates normal)
- Flexion (*140°) _____
- Abduction (*40°) _____
- Adduction (*40°) _____
- External Rotation (*40°) _____
- Internal Rotation (*40°) _____

Range of Motion Scale

211° - 300° (5)	61° - 100 (2)
161° - 210° (4)	31° - 60° (1)
101° - 160° (3)	0° - 30° (0)

Range of Motion Score _____

Total Harris Hip Score _____

IX. OBSERVATION AND DISCUSSION

In our study during the period of 2011-2014, total admissions of acetabulum fractures were 39. 0ut of this, we have operated 26 patients and 6 patients were lost to follow up. Rest were treated conservatively as they were undisplaced, leaving 20 patients included in our study. The average follow up duration was 1.8 months ranging from a minimum of one year to a maximum of three years. The study included 18 male patients and 2 female patients which suggests males are more involved. The ages of the patients ranged from 20 to 63 years.

AGE DISTRIBUTION

In our study average age is 38.5. 65% of these patients are of 21 to 40 years age group, which is similar to observation in the study of Matta et al. and is due to youngand active individual who are involved in high energy accidents. 38

MODE OF INJURY

Most common cause of acetabulum fracture in this series of patients is highenergy road traffic accidents (85%), producing acetabular fractures requiring fixation.

FRACTURE INCIDENCE

ELEMENTARY FRACTURE

Posterior wall 5 (25%)
Posterior column 0
Anterior wall 0
Anterior column 1(5%)
Transverse 4(20%)

ASSOCIATED FRACTURE

T-shaped 2(10%)
POSTERIOR WALL-POSTERIOR COLUMN 0
Transverse-Posterior wall 3(15%)
Anterior WALL with Posterior hemi transverse 1(5%)
Both COLUMN 4(20%)

AVERAGE HOSPITAL STAY

Average hospital stay in our study is 20 days. But one patient required longerstay of more than one month due to post-operative infection. Hospital stay is more inour study because most of our patients reside at distant places from our hospital, so weprefer sending our patients after removal of stitch.

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TIME OF MOBILISATION AND PHYSIOTHERAPY:

Most important aspect in acetabulum fracture is to start earlymobilisation.For stable fixation we start early mobilisation as soon as possible mostly on 2 nd post op day in the form of Q- drill, ankle and toe mobilition,bed sideknee bending, in bed physiotherapy.For unstable fixation, we start Q-drill and ankle toe mobilization withskeleton traction for 1 month.

Time for Mobilisation

After 1 month we start non weight bearing walker walking and thendepending upon union partial weight bearing walker walking is started(in ourstudy average time 1-1.5 month). After complete union we start full weightbearing walking(average time 4 -5 month). After that patients resume theirduty.

COMPLICATIONS

Nerve palsy 1
Infection 1
AVN 0
Heterotropic ossification 0
Bed sore 0
Only one neurological injury occurred during a Kocher-Langenbeck approach.

FINAL OUTCOMES

OUTCOME	NO.OF PTS.	PERCENTAGE
Excellent	8	40%
Good	10	50%
Fair	1	5%
Poor	1	5%
Total	**20**	**100%**

In our study we operated all patients using currently established protocol. Itgives 40% excellent result and 50% good result.One patient had poor and one had fair outcome as both of them had associatedinjury of femur and tibia, affecting the outcome scores. However, both of them hadnormal range of motion of the hip.

COMPARISON WITH OTHER STUDIES

A comparison between clinical results of operative management of acetabular fracture of Letournel and judet, Matta study and present study (based on MERLE D'AUBIGNE SCALE)

Type of fracture	Excellent	Good	Fair	Poor	Total
Letournel and judet[17]	307 (62.4%)	90 (18.29%)	30 (6.1%)	65 (13.2%)	492 (100%)
Matta[28]	104 (40%)	95 (36%)	21 (8%)	42 (16%)	262 (100%)
Present study	8 (40%)	10 (50%)	1 5%	1 5%	20 (100%)

In our study, good to excellent results were obtained in the same proportion of patients as both the other studies.

X. CONCLUSION

- The most common cause injury is vehicular accidents and occur in young andactive men.
- The most common type fracture pattern is posterior wall and then transversewith posterior wall.
- The best time for surgery is within a week.
- Kocher Langenbeck approach gives good result for posterior wall involvement.
- Ilioinguinal approach is excellent for anterior column and anterior wall –posterior hemi transverse fracture.
- The quality of reduction is strongly associated with clinical result.
- The use of prebent reconstruction plates helps in anatomical reduction offracture.
- In acetabular surgery for fracture if we follow established protocols we getgood outcome in patients.
- Result of surgery of acetabulum fracture is directly proportional to surgeon'sexperience and skill.

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