



**A COMPARATIVE STUDY OF FUNCTIONAL OUTCOME OF SINGLE VERSUS DUAL APPROACH IN PERIACETABULAR FRACTURES". (A PROSPECTIVE NON RANDOMIZED OPEN LABEL STUDY OF 30 CASES)**

**Dr. Niharkumar Mayani**

M,B;B,S PG In Orthopaedics Government Medical College,Bhavnagar. Gujarat. India 364001

**ABSTRACT**

**OBJECTIVES:** This study aims at the overall functional outcome and to decide whether single or dual approach should be used in cases of Acetabular fractures. Our primary objective was to determine the choice of surgical approach in the management of periacetabular fractures by comparing the operative time, blood loss, intraoperative and postoperative complications and secondary objective was to study the fracture patterns of acetabular fractures and methods to operate them.

**MATERIALS AND METHODOLOGY:** This prospective study was carried out at the Department of orthopedics, Sir T hospital, Bhavnagar. In this study, around 30 patients (21 males, 09 females; mean age 40 years range 18 to 65 years) with Acetabular fractures (Letournel classification type I and J) were included. 15 Patients having I type of fractures treated with Ilioinguinal approach while rest 15 patients having J type of fractures treated with Kocher Langenbeck approach. The patients were evaluated using HARRIS HIP SCORE score and MERLE D'AUBIGNE score after the treatment.

**OBSERVATION:** Good to excellent results are present in almost all fracture type and in both the scores i.e. HARRIS HIP SCORE score and MERLE D'AUBIGNE score .10 patients got excellent score in MERLE D'AUBIGNE score while 13 patients got excellent score in HARRIS HIP SCORE. There is no any significant difference in results between these two scores. 90% patients returned to their activity at 4-5 months.

**CONCLUSION:** If acetabulum fractures are operated by experienced surgeon, it gives better outcome. In anterior plus posterior column communitated fractures(J type) augmented dual approach (Ilioinguinal+Kocher Langenbeck) plating is preferred over single approach.

In anterior column fractures with posterior hemitransverse fractures(I type) only anterior Ilioinguinal approach acetabular plating gives good stability and functional outcome. If the surgery is well planned, intra operative reduction is anatomical and the associated morbidity is less patient can achieve near normal range of movement.

**SUMMARY** In order to obtain stability of complex acetabular fractures, reduction and fixation of both the columns is necessary if posterior column communitation is more(J type). Hence augmented dual approach(IL+KL) plating is preferred over single. While in anterior column fractures with posterior hemi transverse(I type) only anterior ilioinguinal approach acetabular plating gives good stability and functional outcome. In this research we evaluated the results of acetabular plating in single(IL) versus dual(IL+KL) approaches.

**KEYWORDS :**

**INTRODUCTION**

Acetabular fractures happen due to road traffic accidents, trauma and fall down from height. Acetabular fractures are one of the most difficult fractures to manage in orthopaedic surgery. Acetabular fractures are life altering injuries that commonly occur in young, active and productive members of society although the number of elderly patients sustaining acetabulum fracture has increased. The operative treatment of acetabular fracture is technically challenging. The incidence of acetabular fracture is about 1 in 50000 population per year in UK<sup>(1)</sup> and 3 in 100000 in USA. It constitutes approximately 2% to 3% of all fractures<sup>(2,3)</sup>. There is also increase in incidence of acetabulum fracture in our country also due to rising number of high speed vehicular accidents.

**AIMS AND OBJECTIVE**

**Aim:** To study the overall functional outcome and to decide whether single or dual approach should be used in cases of Acetabular fractures.

**Objectives:**

- **Primary objective:** To determine the choice of surgical approach in the management of periacetabular fractures by comparing the operative time, blood loss, intraoperative and postoperative complications.
- **Secondary objective:** To study the fracture patterns of acetabular fractures and methods to operate them.

**MATERIALS AND METHODOLOGY**

**Study design:** Prospective, non randomized open label.

**Study duration:** 2 Years (Sept 2016 – August 2018)

**Inclusion Criteria**

- Age 18 years – 65 years
- All types of fracture pattern with anterior and posterior column involvement
- Only acute trauma cases were selected.
- Those patients operated within first three weeks of injury were selected.

- Those patient giving consent for surgery

**Exclusion Criteria**

- Age <18 & >65 years
- Isolated anterior wall and anterior column fracture
- Isolated posterior column fracture.
- Central fracture dislocation.

We took 15 cases of anterior column acetabular fractures with minimal posterior column involvement but with posterior single chunk(I type according to letournel classification) operated with ILLIOINGUINAL(IL) approach and 15 cases of anterior column acetabular fractures with posterior column major communitation(J type) operated with dual approach i.e. anteriorly ILLIOINGUINAL(IL) and posteriorly KOCHER LANGENBACK(KL) approach.

**Letournel Classification**

**Table**

Letournel Classification	Approch Used	No. of patients	Percentage
J type	IL+KL	15	50%
I type	IL	15	50%

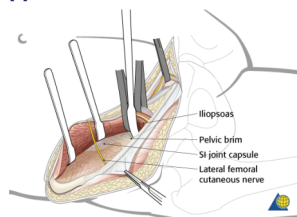
**OPERATIVE TECHNIQUE:**

The choice of approach usually is dictated by the fracture anatomy.

2 approaches' descriptions are given below:

- 1) Ilioinguinal and 2) Kocher-Langenbeck

**Ilioinguinal approach:**



**First window**

The three windows of the ilioinguinal approach can now be fully exploited.

The first window encompasses the entire internal iliac fossa from the SI joint posteriorly to the iliopectineal eminence anteriorly.

This window is optimized with hip flexion to relax the iliopsoas. Medial retraction usually requires placement of retractors on the quadrilateral surface.

**Second window**

The second window provides access to the pelvic brim and quadrilateral surface from the SI joint to the lateral third of the superior pubic ramus. Medial retraction of the femoral vessels should be gentle and must be carefully monitored.

**Third window**

The third window can be developed in a number of different ways. Regardless of method the bladder must be protected. This can be achieved by packing the space of Retzius with a sponge after the bladder has been identified by palpation of the urinary catheter bulb.

The same visualization can be achieved by leaving the rectus attached and splitting the rectus heads in the midline. With the rectus still attached, retraction is carried out posterior to the rectus with a Hohmann retractor placed along the superior ramus.

**Kocher-Langenbeck approach:**

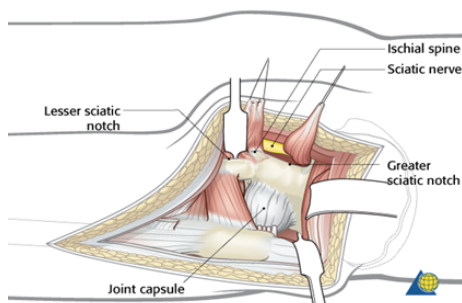
Start the skin incision a few centimeters distal and lateral to the posterior superior iliac spine. Continue the incision anteriorly over the greater trochanter. Curve it distally along the tip of the greater trochanter towards the lateral aspect of the femoral shaft.

End the incision at the mid third of the thigh (just distal to the insertion of the gluteus maximus tendon).

Expose the greater sciatic notch, the ischial spine, and the lesser sciatic notch.

Insert a retractor in the lesser sciatic notch and one anterosuperiorly in the direction of the anterior inferior spine. Now the posterior column is visible in its whole extent.

Protect the sciatic nerve, which lies behind the retractor, with abdominal sponges. Use the short external rotator muscles as a cushion.



**Reduction and fixation:**

- Provisional fixation: Provisional fixation usually is established by means of Kirschner wires (K-wires).
- Definitive fixation: Definitive fixation is established with the following:

**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.

Plates: Because of the curvaceous pelvic anatomy, implants that are too rigid must be avoided, as they need to be moulded perfectly to avoid malreduction. The 3.5-mm reconstruction plate, either curved or straight, DCP, is ideal for this purpose. Post-operative physiotherapy was started 2nd post op day and evaluated at regular interval.

**Intra operative complication Table**

Intra operative complication	No. of patients
Vascular injury	1[With IL]
Nerve injury	2[With IL+KL]
Fracture	None

**Post operative Complications: Table-**

Complications	Patients	%
<b>Infection (Local)</b>		
• Wound infection	01	3%
<b>Hip stiffness</b>	6	20%
• Mild	3	10%
• Moderate	1	3.3%
• Severe	20	66.67%
• No stiffness		
<b>Loss of flexion</b>	25	83.3%
• No Loss	3	10.0%
• > 90°	2	6.6%
• 90° or < 90°		
<b>Muscle Power</b>	2	6.67%
• VI	28	93.33%
• V		
<b>Nerve palsy</b>	2	6.67%
<b>AVN</b>	0	00%
<b>Heterotrophic ossification</b>	0	00%
<b>Hip arthritis</b>	2	6.67%

**EVALUATING SCORES:**

- 1) Modified Merle D'aubigne Score and
- 2) Harris Hip Score

**1.modified Merle D'aubigne Score<sup>33</sup>**

Criteria	Points
<b>Pain</b>	
None	6
Slight or intermittent	5
After walking but resolves	4
Moderately severe but patient is able to walk	3
Severe, prevents walking	2
<b>Walking</b>	
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
<b>RANGE OF MOTION</b>	
95-100%	6
80-95%	5
70-79%	4
60-69%	3
50-59%	2
<50%	1
<b>CLINICAL GRADE</b>	
Excellent	18
Good	15 to 17
Fair	13 to 14
Poor	<13

2) HARRIS HIP SCORE<sup>24</sup>:

**Harris Hip assessment tool**

**I. Pain (44 possible)**

- A) None or ignores it 44
- B) Slight, occasional, no compromise in activities 40
- C) Mild pain, no effect on common activities, rarely moderate pain with unusual activity, may take simple pain medication 30
- D) Moderate pain, tolerable, accepts limitations caused by pain. Some limitation of common activities or work. Occasionally takes pain medication stronger than aspirin 20
- E) Pronounced, serious limitation of activities 10
- F) Totally disabled, crippled, pain in bed, bedridden 0

**II. Function (47 possible)**

**A. Gait (33 possible)**

- 1. Limp
  - a) None 11
  - b) Slight 8
  - c) Moderate 5
  - d) Severe 0
- 2. Support
  - a) None 11
  - b) Cane for long walks 7
  - c) Cane most of the time 5
  - d) One crutch 3
  - e) Two canes 2
  - f) Two crutches 0
  - g) Not able to walk 0  
(specify reason: \_\_\_\_\_)
- 3. Distance walked
  - a. Unlimited 11
  - b. 6 blocks 8
  - c. 2-3 blocks 5
  - d. Indoors only 2
  - e. Bed and chair 0

**B. Activities (14 possible)**

- 1. Stairs
  - a) Normally without using a railing 4
  - b) Normally using a railing 2
  - c) In any manner 1
  - d) Unable to do stairs 0

- 2. Shoes and socks
  - a) With ease 4
  - b) With difficulty 2
  - c) Unable 0
- 3. Sitting
  - a) Comfortably in ordinary chair one hour 5
  - b) On a high chair for one half hour 3
  - c) Unable to sit comfortably in any chair 0
- 4. Enter public transportation 1

**III Absence of deformity points (4) are given if the patient demonstrates:**

- A) Less than 30° fixed flexion contracture
- B) Less than 10° fixed adduction
- C) Less than 10° fixed internal rotation in extension
- D) Limb length discrepancy less than 3.2 centimeters

**IV. Range of motion (index values are determined by multiplying the degrees of motion possible in each arc by the appropriate index)**

- A. Flexion
  - 0—45 degrees X 1.0
  - 45—90° X 0.6
  - 90—110° X 0.3
- B. Abduction
  - 0—15° X 0.8
  - 15—20° X 0.3
  - over 20° X 0
- C. External rotation in extension
  - 0—15 X 0.4
  - over 15° X 0
- D. Internal rotation in extension
  - any X 0
- E. Adduction
  - 0—15° X 0.2

To determine the overall rating for range of motion, multiply the sum of the index values X 0.05. Record Trendelenburg test as positive, level or neutral.

**Operative Outcome Of Our Study****Table : By Merle D'aubigne Scale:**

No. of patients	Score	Result
10	18	Excellent
14	15-17	Good
4	13-14	Fair
2	<13	Poor

**Table :by Harris Hip Score:**

No. of patients	Score	Result
13	90 to 100	Excellent
15	80 to 90	Good
01	70 to 80	Reasonable
01	<70	Poor

**Distribution Of Clinical Results According To Fracture Type:**

Fracture type	Excellent	Good	Fair	Poor
I type(MERLE D'AUBIGNE SCALE)	5	7	2	1
I type (HARRIS HIP SCALE)	7	8	0	1
J type (MERLE D'AUBIGNE SCALE)	5	7	2	1
J type (HARRIS HIP SCALE)	6	7	1	0

Good to excellent results are present in almost all fracture type. If acetabulum fractures are operated by experienced surgeon, it gives better outcome. 90% patients returned to their activity at 4 -5 months.

**CONCLUSION**

- The most common cause of acetabular injury was vehicular accidents and occur in young and active men.
- The most common type fracture pattern was posterior wall and then transverse with posterior wall.
- The best time for surgery was within a week.
- In anterior plus posterior column comminuted fractures(J type) augmented dual approach (Ilioinguinal+Kocher Langenbeck) plating was preferred over single approach.
- In anterior column fractures with posterior hemitransverse fractures(I type) only anterior Ilioinguinal approach acetabular plating gave good stability and functional outcome.
- The quality of reduction was strongly associated with clinical result.
- The use of prebent reconstruction plates helps in anatomical reduction of fracture.
- In acetabular surgery for fracture if we follow established protocols we get good outcome in patients.
- Result of surgery of acetabulum fracture was directly proportional to surgeon's experience and skill.

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