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**Dr. Hemant Mathur**  
 Head of Department,  
 Department of Orthopaedics,  
 Medical College and SSG  
 Hospital, Baroda, Gujarat, India

**Dr. Jay Patel**  
 Junior Resident, Department of  
 Orthopaedics, Medical College  
 and SSG Hospital, Baroda,  
 Gujarat, India

**Dr. Gaurang M Patel**  
 Associate Professor, Department  
 of Orthopaedics, Medical College  
 and SSG hospital, Baroda,  
 Gujarat, India

**Dr. Shivam Shah**  
 Junior Resident, Department of  
 Orthopaedics, Medical College  
 and SSG Hospital, Baroda,  
 Gujarat, India

**Dr. Harsh Shah**  
 Junior Resident, Department of  
 Orthopaedics, Medical College  
 and SSG Hospital, Baroda,  
 Gujarat, India

**Corresponding Author:**  
**Dr. Hemant Mathur**  
 Head of Department,  
 Department of Orthopaedics,  
 Medical College and SSG  
 Hospital, Baroda, Gujarat, India

## A hospital based prospective study of short term outcome of anterior column acetabulum plating using modified stoppa approach

**Hemant Mathur, Jay Patel, Gaurang M Patel, Shivam Shah and Harsh Shah**

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### Abstract

**Introduction:** The treatment of pelvic ring fractures continues to evolve in an attempt to improve outcomes for these patients. The treatment continues to be based on the fundamental understanding of pelvic anatomy. The incidence of pelvic ring fractures was reported to be 0.82 per 100000 people. An understanding of the anatomy of the pelvis is the key to the management and treatment of pelvic injuries. Any break in this ring can lead to stability issues, which may require operative intervention. Surgical intervention may be needed for fracture treatment and /or hemodynamic concerns. The pelvis is divided into anterior and posterior parts, and injuries to respective areas will dictate treatment. In the current study 10 patients with acetabular fractures were selected after proper pre-operative evaluation and underwent acetabulum plating using stoppa approach between May 2018 to Oct 2019. All patients were evaluated at 1 month, 3 month, 6 month post-operatively. The outcome was measured by Harris Hip Score.

**Methods:** This study was conducted in Department of Orthopaedics, S. S. G. Hospital and Medical College, Vadodara and included 10 cases of a study of results of Short Term Outcome of Anterior Column Acetabulum Plating Using Stoppa Approach from May 2017 to October 2019. The outcome was measured by Harris Hip Score.

**Results:** Maximum number of our patients were in 21-60 age group. The youngest patient was 21 years of age and the eldest was 80 years of age. The mean age was 47.1 years.

Table 1: Results

Results	No of patient	Percentage
Excellent (90-100)	4	40%
Good (80-89)	4	40%
Fair (70-79)	1	10%
Poor (<70)	1	10%
Total	10	100%

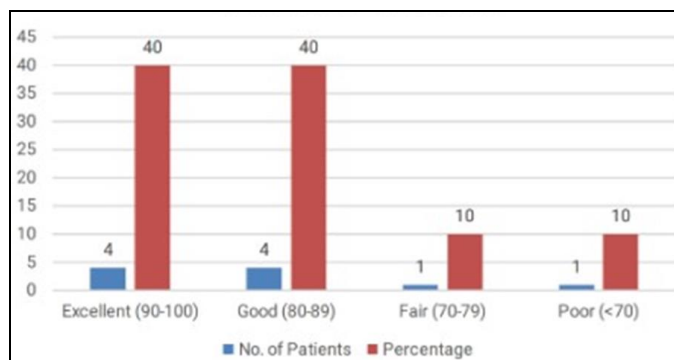


Fig 1: Results and Patients

**Conclusion and Interpretation:** Patients were assessed using Modified Harris Hip score for the overall

performance after Open Reduction and Internal Fixation for acetabular fractures. The average post-operative score for the patients was 85.7.

**Keywords:** anterior column acetabulum, stoppa approach, Harris Hip Score

### Introduction

Acetabular fractures are one of the most difficult fractures to manage in orthopaedic surgery. Anatomical reduction of these fractures is necessary to get the optimal result [1]. Acetabular fractures are growing in developing countries with increasing incidence of high-energy trauma like road traffic accidents or fall from a significant height [2]. According to the epidemiological data, the incidence of acetabular fractures is approximately 3/100 000/ year.

Acetabular fracture is an intra-articular fracture of the most important weight-bearing joint and in order to obtain optimal results, accurate anatomical reduction, firm fixation and early rehabilitation are essential [4]. 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 pattern and difficulties in the operative approach

Since the initial work of Letournel, operative treatment of acetabular fractures has become the gold standard for displaced and unstable fracture patterns. Surgical decision making entails fracture classification and the surgical approach.

The choice of surgical approach depends on the fracture pattern, direction of displacement, skin condition at the surgical incision site and duration since the time of injury. Rigid internal fixation is obtained by using several combinations of plates and screws after careful preoperative planning [7]. Fracture of pattern's involving medial displacement especially the acetabular quadrilateral plate are technically challenging because of the location of fracture in the true pelvis, the scanty bone stock and the fracture's proximity to the articular surface of hip joint.

### Objectives



Following were the objective for our study.

1. To evaluate the results of Short term Follow-up of patients of anterior column acetabulum plating using stoppa approach operated at our institute and to compare the results with other standard series.
2. To analyze the complications there of.
3. To learn from our own experience of Open Reduction and Internal Fixation of anterior column Acetabular Fractures in view of the available world literature for the better long term results in the future.

### Methodology

In the current study 10 patients with acetabular fractures were selected after proper pre-operative evaluation and underwent acetabulum plating using stoppa approach between May 2018 to Oct 2019. All patients were evaluated at 1 month, 3 month, 6 month post-operatively. The outcome was measured by Harris Hip Score.

### Study design

The study design was a hospital based one year prospective study.

### Duration and period of study

Present one year study was conducted between May 2018 to Oct 2019.

### Place

This study was done in the Department of Orthopaedics.

### Source of Data

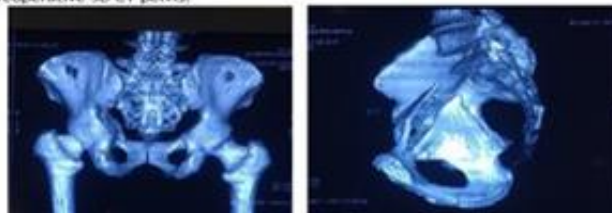
Patients with acetabular fractures were selected after proper pre-operative evaluation and underwent acetabulum plating in the Department of Orthopaedics were included in the study.

### Sample Size

10 patients with acetabular fractures were selected after proper pre-operative evaluation and underwent acetabulum plating using stoppa approach between May 2018 to Oct 2019. All patients were evaluated at 1 month, 3 month, 6 month post-operatively.



Preoperative 3D CT pelvis:





**Fig 2:** Preoperative and postoperative evaluation of acetabulum fracture patient

**Results**

This study was conducted in Department of Orthopaedics, S. S.G. Hospital and Medical College, Vadodara and included 10 cases of A study of results of Short Term Outcome Of Anterior Column Acetabulum Plating Using Stoppa Approach from May 2017 to October 2019.

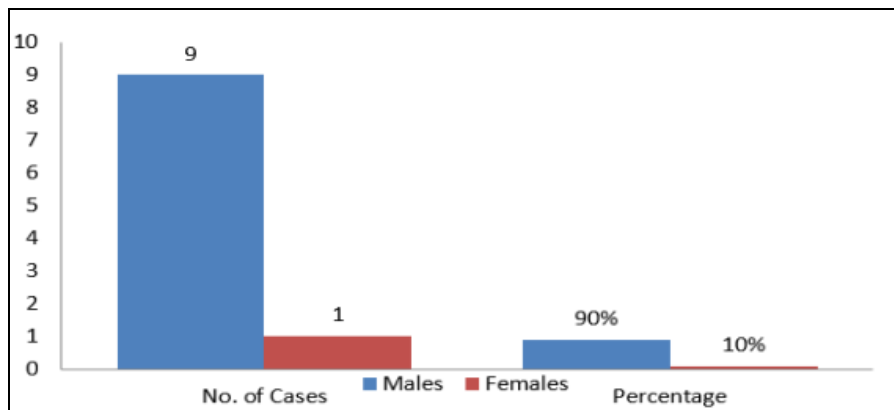
The data obtained was analysed and the final results and observations were tabulated as below.

9 cases (90%) were males and 1case (10%) was of female.

The male to female ratio was 9:1.

**Table 1:** Sex distribution

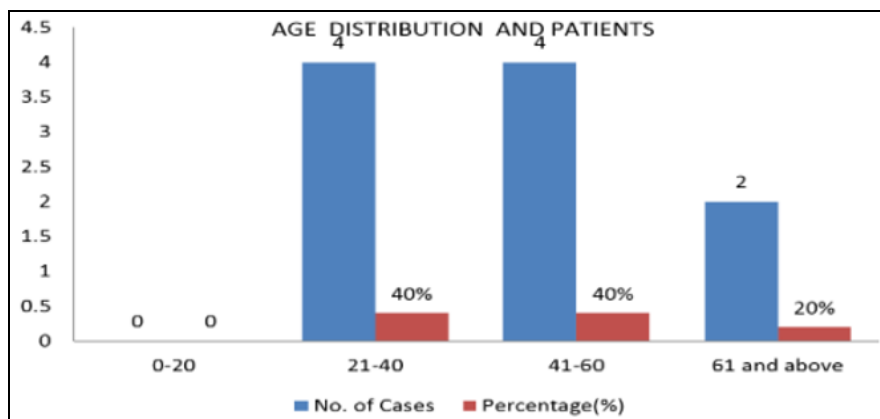
Sex	No. of Cases	Percentage
Males	9	90%
Females	1	10%
Total	10	100%



**Graph 1:** Sex distribution and patients

**Table 2:** Age distribution

Sr. No.	Age Groups (in years)	No. of Cases	Percentage (%)
1.	0-20	0	0
2.	21-40	4	40%
3.	41-60	4	40%
4.	61 and above	2	20%
	Total	10	100%

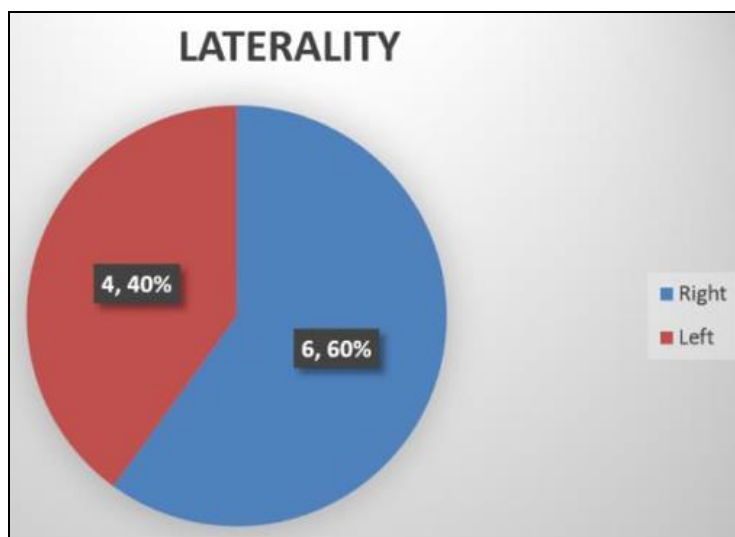


**Graph 2:** Age distribution and patients

Maximum number of our patients were in 21-60 age group. The youngest patient was 21 years of age and the eldest was 80 years of age. The mean age was 47.1 years.

**Table 3:** Laterality

Side	No. of Cases	Percentage	Side
Right	6	60	Right
Left	4	40	Left
Total patients	10	100	Total patients

**Graph 3:** Laterality

6 patients sustained acetabular fractures on right side and 4 patients on left side. There was no case of bilateral fracture in a single patient.

### Discussion

Between May 2017 to October 2019, 10 patients with complex acetabular fractures with age between 21 to 80 years were treated with open reduction and internal fixation in the Department of Orthopaedics, Medical College and S. S. G. Hospital, Baroda.

Complex acetabular fractures usually occur due to high velocity trauma. The incidence of complex acetabular fractures requiring both column plating was relatively low which was clearly observed in the small sample size during the course of the study.

The mean age was found to be 47.1 years. Majority of patients belonged to the age group of 21 to 60 years. It shows that complex acetabular fractures are more common in this age group due to their active participation in physical activities. However, two patients (20%) were above the age of 60 years showing that with increasing age osteoporosis may have its role in causation of these fractures.

40% of the patients were unskilled labourers by occupation. This shows that these fractures are more common among labourers due to their frequent involvement in strenuous physical activities and are more prone to the catastrophes like fall from height due to lack of safety measures in Indian scenario. Majority of labourers are uneducated and are less exposed to the safety measures. Education can make them more aware about the safety measures while carrying out physically strenuous activities. Giannoudis *et al* found in 2005 that the incidence of acetabular fractures due to fall from height was 10% as compared to 20% in the present study 30. The difference in the incidence of the acetabular fractures caused due to fall from height in labour class population clearly shows the impact of education about safety measures in western countries as compared to Indian working conditions. Also, education

can have impact post-operatively on the importance of taking the type of diet and nutrition, rehabilitation program and regularity of follow up in OPD clinics.

According to Judet and Letournel classification system, 9 (90%) patients sustained both column fractures, 1 (10%) patient had anterior column +posterior hemi transverse fracture. As sample size was very small nothing can be stated clearly about the incidence rate.

### Conclusion

We have concluded that Anterior Column Acetabular fractures treated using Stoppa Approach is an effective method of treatment despite the complexities and difficulties in approach and reduction. The conservative management advocated before 1920 in the form of lateral skeletal traction, pelvic binders and derotation boots had very high rates of complications like avascular necrosis of femoral head, post traumatic osteoarthritis and significant mortality. 33 The complications encountered due to prolonged immobilization like bed sores, joint stiffness and deep vein thrombosis also caused significant morbidity in the follow up period. The combination of an irregular articular surface with a multidirectional femoro-acetabular impingement justifies poor outcome of the conservative management 34. Even if we take into account the concept of 'secondary congruence', the outcome of such fractures after conservative management is poor as compared to surgical management. Taking into account, the poorer results and complications faced due to conservative management, the open reduction and internal fixation of both column acetabular fractures is highly recommended. Hence, the present study favouring anterior column acetabular fractures treated with stoppa approach is justified.

We highly recommended the use of modified stoppa approach for fracture anterior column acetabulum instead of ilio-



inguinal approach. We also recommend the use of this approach in large sample size population, long term follow up, prospective study.

### Summary

- This study comprised of 10 cases of study of results of Short Term Outcome of Anterior Column Acetabulum Plating Using Stoppa Approach which were operated between May 2017 to October 2019 in Department of Orthopaedics, S.S.G. Hospital and Medical College.
- Majority of patients were in the age group of 21-60 years. Mean age of the patients in our study was 47.1 years.
- 9 cases (90%) were of males and 1 case (10%) was of female. The male to female ratio was 9:1.
- 4 (40%) patients of acetabular fractures were labourers by occupation.
- 8 patients (80%) sustained acetabular fractures due to

### Road Traffic Accidents

- 8 patients (80%) sustained acetabular fracture on the right side and 2 patients (20%) on the left side.
- Out of 10 patients, 3 patients (30%) had associated orthopedic injuries like shaft tibia fracture (1 patient), shaft femur fracture (1 patient) and lower end radius fracture (1 patient).
- All the patients were operated using Combined Approach (Kocher-Lengenbeck and Ilioinguinal and modified stoppa approach).
- The Mean Surgery-Lag Time was 6.1 days.
- We achieved Post-Operative Satisfactory Reduction (Matta's Criteria) in 8 patients (80%) of acetabular fracture.
- We encountered Post-Operative infection (superficial) in 1 patient only which was managed by surgical debridement and intravenous antibiotics.
- Sciatic nerve palsy was seen in 1 patient only leading to foot drop which recovered gradually with time.
- We encountered Post traumatic Osteoarthritis in 1 patient (10%) and avascular necrosis of femoral head in 1 patient (10%) of acetabular fracture. The patient having avascular necrosis of femoral head was managed by total hip replacement arthroplasty.
- The follow up period ranged from 6 months to 24 months, average follow up period was 15 months.
- The average Post-Operative Modified Harris Hip Score for the patient was 85.7.
- 40% of the patients had Excellent Functional Outcome and 40% of the patients had Good Functional Outcome.
- 10% of the patients had Fair Functional Outcome and
- 10% of the patients had Poor Functional Outcome.
- 40% of patients who had Excellent and Good Functional Outcome were in 21-40 years of age group.
- 44.4% of male patients had Excellent Functional Outcome.
- 30% of the patients who had Excellent Functional Outcome had no associated injury.
- 40% of the patients who had Excellent/Good Functional Outcome had surgery-lag time <7 days.

All of the patients who had Satisfactory Post-Operative Reduction had Excellent or Good Functional Outcome.

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