

Original Research Article

RETROSPECTIVE STUDY ON OUTCOME OF ANTEROPOSTERIOR COMPRESSION TYPE OF PELVIC INJURIES TREATED WITH ANTERIOR PLATING AND POSTERIOR PERCUTANEOUS ILIO-SACRAL SCREW FIXATION

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ABSTRACT

Background: To analyse the functional outcome of Antero Posterior compression type of pelvic injuries treated with anterior plating and posterior percutaneous ilio-sacral screw fixation.

Materials and Methods: This descriptive study was done in the Orthopaedic department. Patients with APC Type II and APC Type III pelvic injuries admitted to Trichy SRM Medical College Hospital and Research Centre, Trichy have been taken for this study after obtaining their informed, valid written consent. This is a retrospective study done in January 2024.

Results: In our study retrospectively we followed 20 cases with an average follow-up of 12 to 20 months ranging from 6 months to 21 months. The functional outcomes of these patients were analyzed with the Majeed outcome scoring system¹. This scoring system includes pain, standing, sitting, walking, sexual intercourse, and radiological analysis. Of these 20 cases, 9 patients had excellent, and 8 patients had good results. All these excellent, good-score patients went back to their original job. Fair and poor results are mostly due to old age and associated injuries.

Conclusion: Thus in the management of Anteroposterior type of Pelvic injuries, closed reduction and percutaneous ilio-sacral screw for sacroiliac joint and Plating for pubic diastasis provided adequate early stabilization of the pelvis, which is valuable in terms of reducing morbidity and improving long term functional outcome.

Keywords: Pelvic fractures, Plating, ileo-sacral screws.

INTRODUCTION

Pelvic ring fractures most commonly occur in high-velocity injuries following road traffic accidents. Many times there are associated injuries like visceral injuries (bladder, urethra, and intestine) and neurovascular (iliac vessels and sacral nerve roots).^[1,2] Above associated injuries make the management complex. The mortality and morbidity in these patients are higher. Mortality occurs early if the hemodynamic status is not maintained stable.³

In the olden days, most such pelvic injuries were treated conservatively and resulted in the articular incongruity of the sacroiliac joint. Finally leading to pain and discomfort due to arthritis.^[4]

Earlier Literature showed poor results in conservatively managed patients. Lack of adequate knowledge regarding the biomechanics of bone and ligament complex and the injury pattern and the techniques regarding the internal fixation of pubic diastasis & sacroiliac joint disruption lead to poor functional outcomes in those patients who survived such injuries.^[5,6]

In our study, briefing regarding the anatomy, biomechanics of the pelvis, and classification of different types of pelvic ring fractures were done, followed by clinical examination and radiological survey and modalities of surgical management. Finally analyzing the functional outcome of the patients who sustained pelvic injuries treated with

Plating for Pubic diastasis and Screw fixation for sacroiliac screw fixation.

MATERIAL AND METHODS

This is a retrospective study done at Trichy SRM Medical College Hospital and Research Centre, Trichy from 2019 – 2021

Inclusion Criteria

Anteroposterior compression type 2 and Type 3 pelvic injuries

Exclusion Criteria

Non consenting patients

The patient is not willing to follow up

Pathological fractures

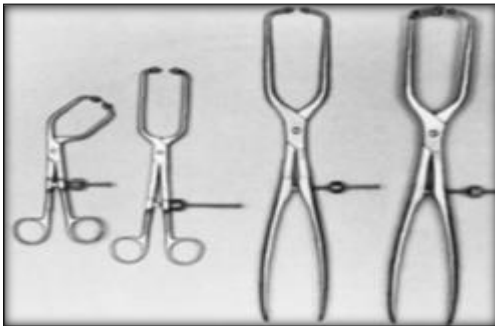
Compound fractures

Preoperative Evaluation

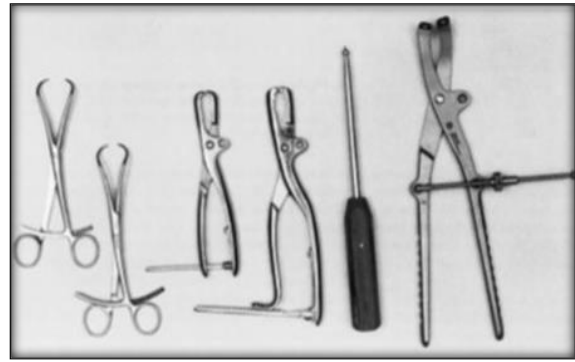
- ATLS protocol² followed for the management of the patients. All patients were stabilized hemodynamically
- Clinical examination in detail and identification of other injuries
- Complete hemogram and Renal function tests
- Radiographic study of the pelvis (Anteroposterior view, Inlet and Outlet views)
- CT Pelvis with 3D Reconstruction of pelvis

Implants and Instruments

For anterior plating for Pubic diastasis, Pelvic reduction camps, Farabeuf clamp, Pointed reduction clamp, Pelvic Recon plates, ADCP plates, 3.5mm Cortical screw system.



Large and small offset clamp, the single-pronged and double-pronged clamp to fit over the iliac crest



Pointed reduction clamps, Farabeuf clamps in two sizes, and pelvic reduction clamps



Pelvic Recon Plate



Recon Plate

Statistical Analysis

Data analysis was conducted using SPSS Statistics version 22 (IBM Corporation, Armonk, New York). The data were analyzed using descriptive statistics. Categorical variables were expressed as numbers and percentages. Continuous variables were expressed as mean ± standard deviation if normally distributed and median with range if skewed. A p-value of <0.05 is considered statistically significant.

Table 1: Majeed score scale¹

I. Pain -30 Points		0-5
Intense and continuous at rest		
Intense only with activity		10
Tolerable, but limits the activity		15
Only with moderate activity, but abolished by rest		20
Mild, intermittent, normal activity		25
Slight, Occasional or no pain		30
II. Work -20 Points		
Regular work could not be performed		0-4
Light work		8
Change in job		12
Same job, but reduced performance		16
Same job, but same performance		20

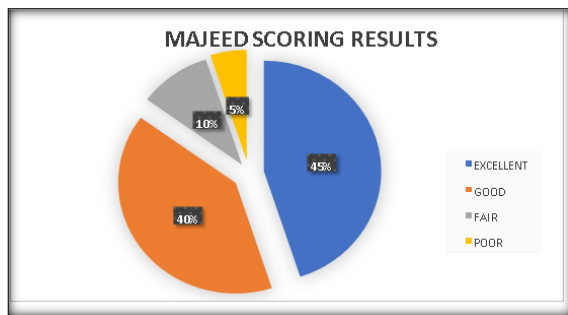
III. Sitting -10 Points	
Painful	0-4
Painful if prolonged / awkward	6
Uncomfortable	8
Free	10
IV. Sexual Intercourse -4 Points	
Painful	0-1
Painful if prolonged / awkward	2
Uncomfortable	3
Free	4
V. Standing (36 Points) A Walking aids -12 Points	
Bedridden or almost	0-2
Wheel chair	4
Two Crutches	6
Two Sticks	8
One Stick	10
No Sticks	12
VI. B Gait Unaided (12 Points)	
Cannot walk or almost	0-2
Shuffling small steps	4
Gross limp	6
Moderate limp	8
Slight limp	10
Normal	12
VII. C Walking distance (12 Points)	
Bedridden or few metres	0-2
Very limited time and distance	4
Limited with sticks difficult without prolonged standing possible	6
One hour with a stick limited without pain	8

One hour without sticks slight pain or limp	10
Normal for age and generation condition	12

RESULTS

As per table 2 Totally 20 patients in our study who got admitted to our institute are analyzed for functional outcomes and various factors influencing their outcomes. Most of the patients belong to >50 years of age group (percentage of 35%). Commonly males are affected more in our study group with 15:5 male-female sex ratio. The majority of patients suffered road traffic accidents followed by falls from height. High-velocity road traffic accidents are the reason for 95% of our patients with 5% of patients belonging to fall from height group. APC type II was 15 and APC type III was 5. [Table 2]

As per table 3, 10 patients have associated injuries among them bladder injury was the most common followed by Splenic injury. For all 20 patients, the surgical procedure was ORIF with Plating for Pubic Diastasis and Percutaneous screw fixation for Sacroiliac joint. The average time taken for definitive fixation is two week. [Table 2]



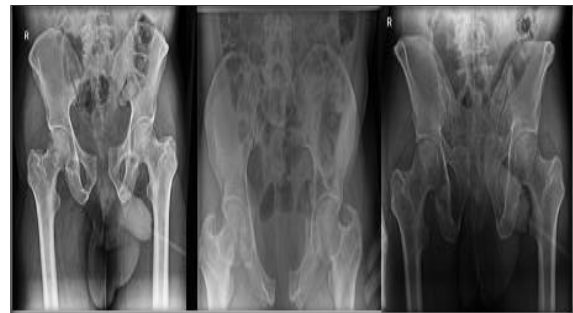
As per figure 1 the Majeed scoring suggests around 45% showed excellent scoring followed by 40% showed good scoring. Around 5% showed poor scoring. The functional outcomes of these patients were analyzed with the Majeed outcome scoring system. This scoring system includes pain, standing, sitting, walking, sexual intercourse, and radiological analysis. Of these 20 cases, 9 patients had excellent, and 8 patients had good results. All these excellent, good-score patients went back to their original job. Fair and poor results are mostly due to old age and associated injuries. There is no incidence of impotence in our patients. However, clear data could not be obtained due to social and aesthetic reasons as people hesitate to reveal their sexual history.

One patient had implant failure (Plating for pubic diastasis) in the form Plate breakage, due to premature weight bearing. Then broken implant exit done and Redo plating both superiorly and anteriorly done with percutaneous screw fixation for Right sacro iliac joint.

Case Illustration

Case:1 43 yrs male admitted in our hospital with a history of road traffic accidents.

On admission patient was diagnosed as having APC Type II injury, Pubic diastasis with left-side sacroiliac fracture disruption. The patient managed with open reduction and internal fixation with plating for Pubic Diastasis and percutaneous Screw fixation for left SI joint disruption. the patient had an excellent functional result after months follow up.

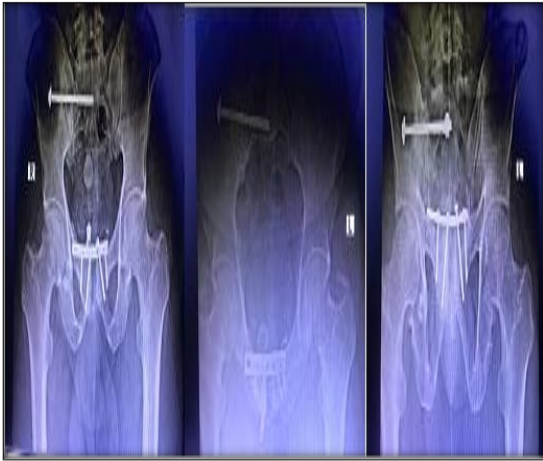


Immediate post op



Final Follow up





Case 2: 43 yrs male admitted in our hospital with history of road traffic accident.

On admission patient was diagnosed as to have APC Type II injury, Pubic diastasis with left side sacroiliac fracture disruption. Patient managed with open reduction and internal fixation with plating for Pubic Diastasis and per cutaneous Screw fixation for left SI joint disruption. Patient had an excellent functional result after 23 months follow up

Pre OP



Immediate post op



FINAL FOLLOW UP



Case 3

54 yrs male admitted in our hospital with history of road traffic accident. On admission patient was diagnosed to have APC Type II injury, Pubic diastasis with Right side sacroiliac joint disruption. Patient initially managed with open reduction and internal fixation with plating for Pubic Diastasis alone, pt undertook pre mature weight bearing against advice and returned with implant failure. Finally Patient managed with implant removal and dual plating for Pubic Diastasis and per cutaneous Screw fixation for Right SI joint disruption. Patient had an excellent functional result after 13 months follow up.

Pre op

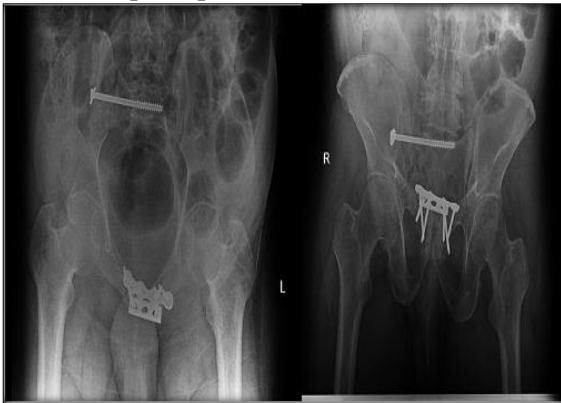


Pre mature weight bearing against advice. Patient returned with failed Implant



Broken Implant Exit and Dual plating superiorly and anteriorly done.

Immediate post op



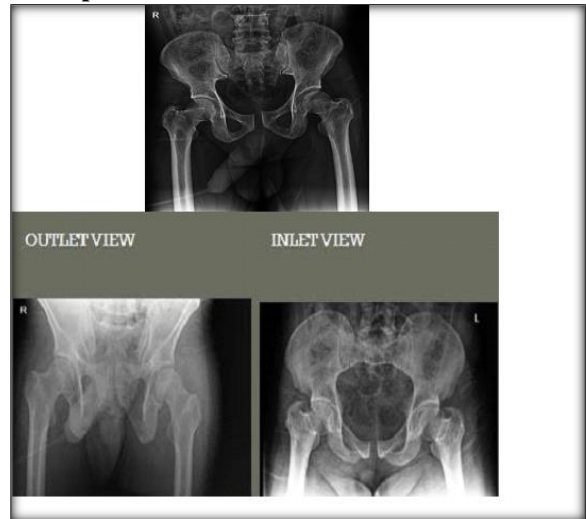
Final Follow up



Case 4

45 years Male admitted in our hospital with alleged History of RTA. Patient diagnosed to have Pubic diastasis with Right sacroiliac joint disruption. ORIF with Plating for Pubic diastasis and Percutaneous screw fixation for RtSacro iliac joint done.

Pre Op



Immediate post op





Inlet view



Outlet view

FINAL FOLLOW UP



Patient Had Rt Hip Pain. Then Screw exit alone done, one year following fixation Post Screw exit



Case 5

37 Year Male admitted to our hospital with alleged History of RTA. Pt was diagnosed to have Pubic diastasis with Right Sacro iliac joint disruption. Patient also had Bladder injury which was treated conservatively by Urologist. Plating could not be done for pubic diastasis because of bladder injury and hence treated conservatively. Percutaneous screw fixation for Right sacro iliac joint done.

Pre OP



Immediate Post op



Final Follow up

Table 2: Age incidence and Genderdistribution with Mode of Injury

Age in years	No. of patients	Percentage
11-20	1	5%
21-30	4	20%
31-40	4	20%
41-50	4	20%
> 50	7	35%
Total	20	100%

Table 3: Associated injuries

Associated injury	No. of patients
Bimalleolar fracture	1
Bladder injury	4
Distal radius	1
Femur Fracture	1
Head injury	1
Perineal laceration	1
Splenic injury	3

DISCUSSION

According to Conventional orthopaedic knowledge the patients who survive sacroiliac disruption in the pre fixation era, eventually had some late musculoskeletal problem.^[4] According to the natural history of the injury to pelvic ring, there are high chances of mortality in unstable types in acute stage and chronic morbidity in the long term.⁵Inspite of aggressive resuscitation including external fixator application, the mortality of 10-20% remained unchanged, which led to the clinical trials on internal fixation.

Large number of studies,^[6,7] have proven that early ORIF (open reduction and stable internal fixation) improved the chances of survival markedly and much more importantly is that it reduces the incidence of late musculoskeletal morbidity.

The mean age of the patient in our study was 45 years with range from 15 to 75, where as Cole et al,^[7] reported an average of 32 years. Sunny Brook Medical series reported 30.9 years. Sunil et al reported 78 cases with an average age of 29.9 years (range 10-65)⁸

There was extreme male preponderance in our series with male: female patients ratio as 15:5. Cole et al,^[7] reported male preponderance with male: female ratio as 36:28 out of 64 patients. Sunny Brook Medical

Centre8 study reported that 55% of patient were males.

The most common mode of injury was found to be RTA (Road Traffic Accident) 19 out of 20 with 95% of the total. Sunny Brook Medical Centre's8 reported 81%of cases were due to RTA (Road Traffic Accident).

Bladder injuries were the major associated injury in our series. According to Cole et al,^[7] skeletal injuries are the most frequently associated injury. But Sunny Brook Medical Center study reported 38% incidence of head injury as their major injury association. Tornetta et al,^[9] reported 24 patients with associated skeletal injuries out of 39 patients who suffered rotationally unstable sacroiliac disruption.

In our study, 09 patients had excellent results following pelvic ring injuries. Tornetta et al,^[9] reported out of 48 patients with unstable posterior pelvic disruptions treated with ORIF (open reduction and internal fixation), 67% of patients had good functional results. Cole et al,^[7] reported out of 51 patients treated with posterior internal fixation for type C injuries reported that 15 patients had functional deficits with mean pelvic score of 29 points (range 8-40).

In our study out of 20 patients 4 patient had bladder injury and none had urethral injury. Sunil et al,^[10] reported, out of 78 cases, 17 patients had urogenital injuries, most common being the urethral injury (8 cases). Miranda et al,^[11] reported urological injury in 15 of 55 patients with Tile's type B and C injuries. No patient in our study had L5 palsy on admission. However, Cole et al,^[7] reported 19 cases with neurological injury in his series.

Torenetta et al,^[9] reported 35% of significant neurological injury in his study of 48 unstable posterior pelvic ring disruptions.

CONCLUSION

Thus in the management of Antero posterior type of Pelvic injuries. Closed reduction and percutaneous ilio-sacral screws for sacroiliac joint and Plating for pubic diastasis provide adequate early stabilization of the pelvis is valuable in terms of reducing morbidity and improving long term functional outcome.

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