

An Assessment of Plate Fixation in Traumatic Injuries of Pubic Symphysis

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ABSTRACT

Objective: the functional and radiological outcomes after plate fixation of pubic symphysis diastasis

Methods: This was a retrospective study conducted from January 2012 to January 2016. A predesigned score was used to assess the functional outcome of patients and for radiological outcome, x-ray of pelvis taken at 12 months post operatively was analyzed and compared with the immediate post-operative x-ray.

Results: 22 patients were enrolled in study with mean age 42.2 years (range 18-68). **Population standard deviation was 9.57.** Of these 20(91%) were males and 2(9%) were females. 04 (18.2%) patients had excellent, 13(59%) patients had good, 4 (18.2%) had fair and 1 (4.5%) had poor functional outcome. 11 (50%) patients had good radiological outcomes.

Conclusion: Plate fixation of traumatic pubic symphysis diastasis with single or dual plating had given better results and early functional recovery.

Keywords: Pubic Symphysis Diastasis/surgery, Bone Plates/therapeutic use, APC II injuries

INTRODUCTION

Traumatic injuries to the pelvis are a leading cause of morbidity and mortality all over the world notably caused by Road Traffic Accidents [1]. The pelvis is made up of three bones joined anteriorly at the pubic symphysis and posteriorly by the sacroiliac joints. High energy trauma that causes disruption and separation of the pelvis leads to instability, deformity and associated injuries to the surrounding visceral structures[2]. These injuries if inadequately treated, can result in chronic residual pain, Limb –length discrepancy, limping, sitting problems and sexual dysfunction [3].

According to Young and Burgess classification [4], three types anteroposterior compression pelvic fractures can be encountered. APC I are stable and APC II and APC III are unstable fractures as they result in high energy trauma and are fixed via Open reduction and internal fixation (ORIF) using plate across the pubic

symphysis. APC-II fractures are classified as pubic diastasis >2.5cm with anterior sacroiliac joint disruption (rotationally unstable, vertically stable). At our institution, we retrospectively evaluated the outcome of such fractures treated with plate fixation of symphysis pubis.

METHODS

This retrospective study included patients who sustained APC-II injury and underwent symphysis pubis plating either with posterior sacro-iliac screw fixation or without during January 2012 till January 2016. The exclusion criteria were open fractures, associated acetabular fractures, concomitant spinal injuries, delayed presentation or fixation (>2 weeks), less than one year post surgery and those managed initially with external pelvic fixator.

After approval from the institutional review board, data from hospital record was searched and patients were called in outpatient clinic along with their records for evaluation. Patients were assessed for outcome using score devised by Majeed SA [5]. Pelvic radiographs of the 1st post-operative day was compared to 1-year post-op X-rays for evidence of screw loosening, implant failure, and diastasis widening.

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RESULTS

Search from the hospital database revealed that 29 patients underwent symphysis pubis fixation during January 2012 to January 2016. Out of these 7 were not appropriate for study as per selection criteria and hence were excluded. Therefore, a total of 22 patients were called in clinic for evaluation of functional and radiological outcome. The basic characteristics of patient are mentioned in Table-I.

Table 1: Patient characteristics

Characteristics	N = 22
Age in years (mean & range)	42.2 (18-69)
Male : Female	20:2

Mode of injury	
Road traffic accident	18 (81.8%)
Fall from height	3 (13.6%)
Others	1 (4.5%)
Surgical treatment	
Symphyseal plating only	16 (72.7%)
Symphyseal plating + sacro-iliac screws	8 (36.3%)
Diastasis maintained (post op)	
0-5 mm	3 (13.6%)
6-10 mm	8 (36.3%)
11-15 mm	8 (36.3%)
16-20 mm	2 (9%)
>20 mm	1 (4.5%)



Figure 1: Pelvis preoperative Radiograph
Post operative Radiograph

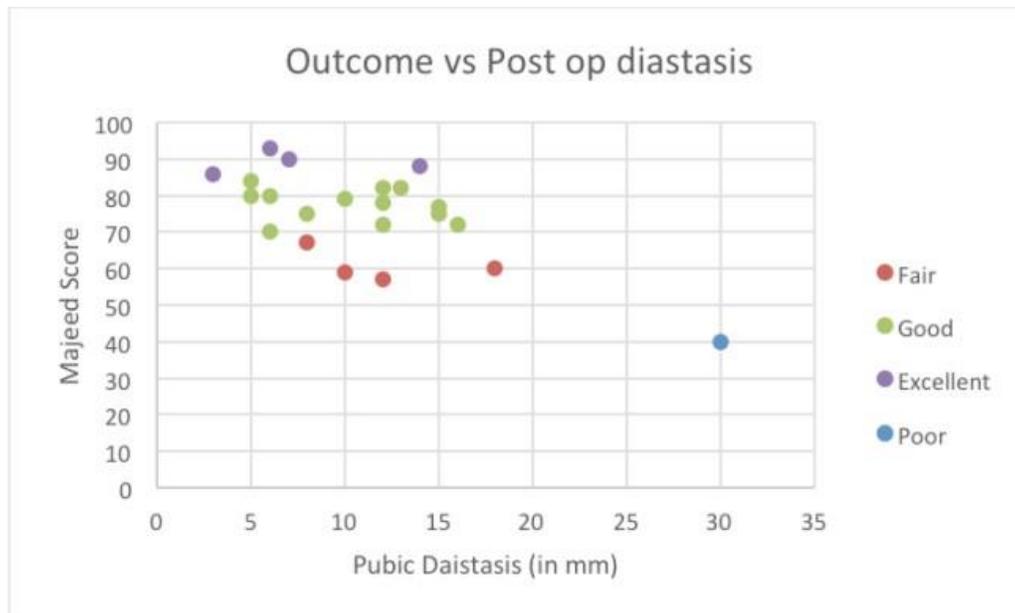


Figure 3: Chart depicting correlation of outcome with diastasis

According to score proposed by Majeed scoring system [5], 04(18%) patients achieved excellent while 13 patients had good outcome (59%). 04 (18.2%) patients showed a fair outcome while 1 (4.5%) had poor functional outcome (see figure – II). The gentleman who suffered a poor outcome was an obese male who also suffered cerebral contusion and prolonged post-operative ICU stay and later delayed mobilization due to respiratory and neurosurgical issues. Patient also had implant failure (symphyseal plate breakage) that was documented at 6 months follow up and was offered revision surgery but declined due to financial constraints.

On radiological assessment, comparison of 1 year x-rays with immediate post-op x-rays showed loosening of implant in 4 patients (18.2%), diastasis widening in 6 patients (27.2%), while only one patient (4.5%) showed implant failure/breakage. Rest of the patients 11 (50%) showed no signs of loosening, widening or failure (see figure-I).

DISCUSSION

The pelvic ring bearing acetabular sockets on its lateral aspects is pivotal in transferring axial load of the body [6]. Any injury or disruptions in the ring can cause significant impairments in mobility and function. Most of the pelvic injuries occur in high velocity motor vehicle accidents and there is a significant proportion of associated fractures and other visceral injuries along with pelvic fractures but in our region of the world motorbike usage is very common due to poverty issues and it is with this transportation vehicle that two specific mechanisms of force transfer have been elaborated by the trauma victims. First being into a high to moderate speed head on collision with a motor vehicle and second being motorbike been hit from the rear and biker being ejected while he/she was decelerating. Although being stated by the patients themselves, the second mode of trauma seem valid but not have been tested in a simulated environment yet. Other modes of injury we encountered were fall from height and one of our patient having fall of heavy industrial machinery directly over him.

Although we selected patients only with APC II injuries, not all of them underwent both posterior and anterior ring stabilization. The reason to this was much part. At some instances, the posterior element injury was not demonstrable on imaging and at some instance it was surgeon preference. Did this really

affect our outcome we cannot be sure, however we have tried our best to demonstrate the outcomes pertaining only to symphyseal fixations and hence the selection of Majeed scoring system [5].

Dual plating of symphysis pubis diastasis has also been shown in literature to be superior to single plating [7]. Superior and anterior plating combined give more fixation points to hold the structure together while healing takes place. Although we also firmly believe and often perform dual plating at our institution, but we didn't encounter any of these cases in our study.

Another important point to note in our patients was that majority had not achieved complete diastasis reduction, in fact more than 40% of these patients had 10 mm or more gap but functional outcome didn't show decline with relation to the gap (see figure – III). Although acetabulum fractures do show correlation of functional outcome with regard to fracture reduction as shown by Iqbal F 2016 [8], we cannot comment on this for pelvic diastasis since our sample is very small.

Failure of symphyseal fixation can be treated with revision fixation or arthrodesis [9]. In our patients one patient had failure but he refused surgery due to unaffordability. We do not have any experience of arthrodesis of symphysis.

CONCLUSION

Symphysis pubis diastasis and pelvic ring injuries merit operative fixation for better functional results. With small surgical expertise, fair technical support but a sound anatomical knowledge; a surgeon can benefit these patients in providing a better and healthy outcome.

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