ORIGINAL ARTICLE

Pain Relief in Patients of Thoracolumbar Spine Fracture Treated with Pedicle Screws and Rods

IMRAN KHAN WAZIR, QAZI FARHAT ULLAH, MUHAMMAD INAM, M ARIF, M SAEED, ABDUL SATAR

ABSTRACT

Objective: The objective of this study is to determine the effectiveness of posterior spinal fusion using pedicle screws and rods in terms of pain relief in patients with unstable thoracolumbar spine fracture**.**

Methods and Materials: This descriptive study was done in Department of orthopedics, Hayatabad medical complex Peshawar on 66 consecutive patients from June 2011 to May 2012. Patients of above 18 years of either sex with unstable thoracolumbar spine fracture with moderate to severe pain were included while. Patients with malignancy, infections of spine, Diabetes mellitus and Smokers were excluded from the study.

Results: In this study 69.7% patients were male and 30.3% were female. Three months after surgery 61% patients had no pain (Visual Analogue Scale 0), 30% patients had mild pain (VAS 1-3) not requiring anti-inflammatory drugs,4(6%)patients had moderate pain(VAS 4-7) requiring the occasional use of analgesics, 2(3%)patients had severe pain(VAS 8-10), with occasional loss of work days and significant changes in daily activities.

Conclusions: Posterior spinal fixation with rods and screws results not only in excellent pain control in majority of patients but is also a useful choice for stability of spine and making the nursing care easier in paraplegic patients .

Key words: Thoracolumbar fracture, Pedicle screws and rods, Visual Analogue Scale.

INTRODUCTION

Fractures of the thoracolumbar spine rank among the severest injuries of the human skeleton. Especially in younger patients they often result from high-energy accidents[1] .

These fractures commonly occur in the thoracolumbar spine due to the relative immobility of the thoracic spine compared to the lumbar spine[2]. In developed countries such injuries mainly occur in association with motor vehicle accidents and falls, while in the developing world they are primarily the result of a fall from a height[3]. Frequency of vertebral fractures increases with age due to osteoporosis and decreasing bone density[4] .Spinal fractures have an annual incidence of 64 per 100,000 and neurological deficit is seen in 50%, resulting in an estimated 12,000 new spinal cord injuries in the United States every year. In Pakistan significant number of people suffers from spinal injuries every year[1,5].

Correspondence: Dr Muhammad Inam, Department of Orthopedic and Spine Surgery PGMI Hayatabad Medical Complex Peshawar, Email: dr_mohammadinam@yahoo.co.uk

The AO classification is commonly used, as it provides a comprehensive classification describing the nature of injury, the degree of instability, and prognostic aspects that are important for choosing the most appropriate treatment[6].

There are different types of management of spinal injuries including operative and non-operative. Non-operative management has been shown to be effective if there is minimal spinal canal compromise, intact dorsal elements, and no neurological deficit[7]. Surgery is indicated to stabilize Spine, correct spinal deformity, improve neurological function, minimize pain, early mobilization and rehabilitation of the patient and a decrease in complications arising from prolonged bed rest[2]. There are several surgical options in these injuries, for example ventral or dorsal approach, posterior intertransverse fusion or posterior interbody fusion technique, short or multi-segmental fixation[7].

In the past, thoracolumbar fracture was treated with conservative methods of cast or brace immobilization with long-term bed resting[8]. With the introduction of pedicle screw instrumentation in 1940s, surgical management became widespread. Pedicle screw devices allow immediate stable

fusion as the screws traverse all the three columns of the spine. The pedicle screws are passed one level above and one level below the injured vertebra via posterior approach[9] .In a previous study 79% patients experienced either no pain or mild pain after posterior spinal fusion with pedicular screws and rods[10]. This study was done to determine the effectiveness of posterior spinal fusion using pedicle screws and rods in terms of pain relief in patients with unstable thoracolumbar spine fracture.

MATERIAL AND METHOD

This descriptive study was done in Department of orthopedics, Hayatabad medical complex Peshawar on 66 consecutive patients June 2011 to May 2012. Patients of above 18 years of either sex with unstable thoracolumbar spine fracture with moderate to severe pain were included while. Patients with malignancy, infections of spine, Diabetes mellitus and Smokers were excluded from the study.

Patients with unstable thoracolumbar spine fracture diagnosed by plain x-rays in anteroposterior and lateral views and computer tomography scan, reporting to orthopedic department through casualty/OPD were admitted according to inclusion criteria. The purpose of the study was explained to the patients, their reservations and concerns were addressed. Informed written consent was taken from the patients. A detailed history and examination was carried out especially evaluating the mode of trauma. In addition, the patient was undergone a battery of blood and urine tests, and possibly an electrocardiogram that allow the operation to be performed safely. Patients were operated by single experienced orthopedic surgeon fellow of CPSP, through posterior approach and internal fixation was done using pedicular screws and rods system. On stabilization of their condition post operatively, they were referred to physiotherapy and rehabilitation centre with instructions. Patient name, age, sex, addresses, preoperative and follow-up data were recorded with the help of a Performa. The pain was assessed at three months after the surgery. The pain status was assessed using Visual Analogue Scale, and was graded as (0 score= No pain); (1-3 score = Mild pain); (4-7score= Moderate pain) and (8-10 score= Severe pain). Then the Data was analyzed using SPSS version 10.

RESULTS

A total of 66 patients were observed in which 46(69.7%) were male and 20(30.3%) were female. Male to female ratio was 2.3:1. (Figure 1)

Average age was 36.42± 10.35SD with rang 21-58 years. Male group contain 19(41.3%) patients in 20-30 years, 23(50%) patients 31-50 years and 4(8.6%) patients lies between the age of 51 and 60. While Female group contains 5(25%) patients in 20-30 years, 13(65%) in 31-50years and 2(10%) patients have age more than 50 years. (Table 1)

The levels of vertebrae involved were as follows; in 29 patients the fracture was located in L1 vertebra, in 19 patients in L2 vertebra ,in 7 patients at T12 ,in 5 patients T11 vertebra was involved in fracture, in 2 patients T9 ,in 2 patients T10 , in 2 patients L3. (Table 2)

Pre operative pain among 66 was analyzed as 2(3%) patients had mild pain, 30(45%) patients had moderate pain while 34(52%) patients had severe pain. (Table 3)

The patients were assessed for severity of pain at 3 months of the surgery. The pain status was assessed using Visual Analogue Scale(VAS), with 0 no pain**,** 1-3 Mild pain, 4-7 Moderate pain and 8-10 Severe pain. Three months after surgery 40 (61%) patients had no pain (Visual Analogue Scale 0), 20(30%) patients had mild pain(VAS 1-3) not requiring anti-inflammatory drugs,4(6%)patients had moderate pain(VAS 4-7) requiring the occasional use of analgesics, 2(3%)patients had severe pain(VAS 8-10), with occasional loss of work days and significant changes in daily activities. The mean VAS score at the last follow-up was 1.5 (mild pain). (Table 4)

Effectiveness of posterior spinal fusion among 66 patients was analyzed as this procedure was effective in 53(80%) patients while it was not effective in 13(20%) patients. (Table5)

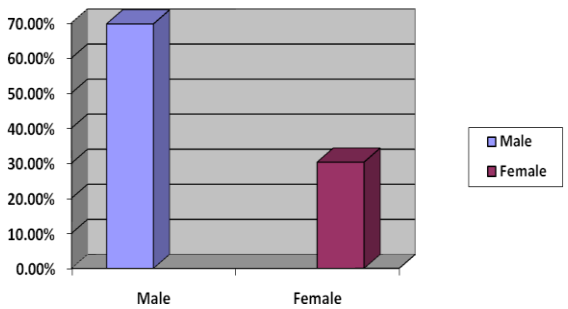

Figure 1: Chart showing gender wise distribution of patients

Table 1: Age wise Distribution of the Patients (n=66)

Age (in years)	Male	Female	Total
21-30	19	5	24
31-50	23	13	36
51-58	4	2	6
Total	46	20	66

Table 2: Level of Injury (n=66)

Level of Fracture	Frequency	Percentages
T9	2	(3.03%)
T10	2	(3.03%)
T11	5	(7.5%)
T12	7	(10.6%)
L1	29	(43.93%)
L2	19	(28.78%)
L3	2	(3.03%)
Total	66	(100%)

Table 3: Pre Operative Pain Grade (n=66)

		Frequency	Percentages
Pre Operative Pain	No Pain	0	0%
	Mild	2	3%
	Moderate	30	45%
	Severe	34	52%
Total		66	100%

Table 4: Post Operative Pain at 12th Week (n=66)

		Frequency	Percentages
Post Operative Pain at 12th week	No Pain	40	61%
	Mild	20	30%
	Moderate	4	6%
	Severe	2	3%
Total		66	100%

DISSCUSSION

The primary objectives of the treatment of unstable thoracolumbar fractures are decompression of neural elements, early stability, pain relief and good nursing care. Due to disadvantages of conservative treatment like deterioration in neurological status of the patients, progressive kyphotic deformity, persistent backache, decubitus ulcer and deep venous thrombosis early internal fixation is necessary. Either anterior, posterior or both approaches can be used[11, 12].

Although many studies focused on radiological outcome of posterior spinal fusion using pedicle screws but few of them included clinical outcome measure such as pain[13].

The current study shows that young males are mostly affected because they mainly constitute the working population, are involved in laborious works and are more prone to injuries. Same trend can be seen in studies conducted in other parts of the world[14,15].

Various studies showed different results regarding pain improvement after spinal fixation. Rehman et al[11] studied 80 patients with fracture of thoracolumbar spine and found that at 6 months follow up 75% patients were completely pain free (P1)using Denis pain scale which is equal to 2 on visual analog score while in current study at three months follow up after surgery 40 (61%) patients had no pain **(**Visual Analogue Scale 0). In another study done by Verlaan et al[12], 84% of the patients had no or minimal pain at final follow-up while in current study the mean VAS was 1.5 which indicates mild pain.

Arif et al[16] in their study found that 57.9% of their patients had no pain, 2.6% had moderate to severe pain one year after surgery which is almost comparable to current study.

A multicenter study done by Stadhouder et al[17] found that the mean VAS score at the last follow-up was 2.5(mild pain) which is again comparable to current study.

Helton[18] studied a sequential group of 20 patients with thoracolumbar burst fractures that were operated. He observed that eight patients (44%) had no pain, four (22%) had minimal pain not requiring anti-inflammatory drugs, three (17%) had moderate pain requiring the occasional use of analgesics and three (17%) had moderate to severe pain, with occasional loss of work days and significant changes in daily activities. In current study 61% patients had no pain and 30% patients had minimal pain not requiring anti-inflammatory drugs.

Tonbul et al[19] studied forty-three patients treated conservatively for thoracolumbar compression fractures in which the mean pain score was 1.44 while the mean follow up was 7.5 years. Two patients required substitution of the body cast for orthosis due to excessive sweating, and three patients received local treatment for skin problems secondary to the use of orthosis. This and some studies[18,19] may show good results in term of pain with conservative treatment but other

problems associated with this type of treatment like progressive kyphotic deformity, decubitus ulcer and deep venous thrombosis cannot be ignored .

CONCLUSIONS

Posterior spinal fixation with rods and screws results not only in excellent pain control in majority of patients but is also a useful choice for stability of both anterior and posterior columns, achieving better neurological recovery and making the nursing care easier in paraplegic patients .

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