openaccess Journal
SCIENCE LETTERS
2015 | Volume 3 | Issue 2 | Pages 62-63

Data analysis

Comparison of the outcomes of operative versus non-operative treatments for thoraco-lumbar fractures with neurological deficit

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Abstract
The aim of this study was to explore the outcome of operative and non-operative treatment for thoraco-lumbar fractures with neurological deficit. This is a retrospective analysis cross-sectional study performed on 27 patients. Among them, 14 (52%) received spinal fixation and of which 1 patient died during operation and 13 (48%) patients received conservative treatment. The mean age of the patients was 30 years (SD ± 11.85). The mean length of hospital stay was 117.6 days (SD ± 48.66 days) in surgical group, while that of non-surgical group was 93.38 days (SD ± 33.28 days), in which difference was not statistically significant (t = 1.482 and P = 0.153). The Delay consent giving was the probable major cause of long time hospital stay for the surgical group. We found a significant association between treatment modalities and neurological outcome of the patients (P=0.05). Spinal fixation showed better neurological recovery (t = 2.42 and P = 0.032). There was no patient worsened neurologically till the time of discharge in both groups. Surgical and conservative, both treatments, significantly reduced the pain score in the fracture area (P=0.0001). There was no significant difference on the functional outcome after therapy between two groups (P=0.183). Treatment cost was higher for those who went under surgical management. Early surgical management is preferable for quick and better neurological outcomes.
Key words: Spinal cord injury, thoracolumbar fracture, outcome, spinal fixation, neurological deficit, spine surgery.

Received February 3, 2015 **Revised** March 29, 2015 **Published online first** April 30, 2015
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To cite this manuscript: Helal SU, Nuri RP, Baseer MA, Rahman A. Comparison of the outcomes of operative versus non-operative treatments for thoraco-lumbar fractures with neurological deficit. Sci Lett 2015; 3(2):62-63.

The thoraco-lumbar vertebral column (T11 to L2) is a common site of spinal injury. Fall from height, fall while carrying heavy load on the head, road traffic accident and bull attack are common causes of thoraco-lumbar fracture in Bangladesh. If the fragments of the fracture damage the spinal cord itself or it's nerve root, partial or complete loss of sensory and/or motor function in the legs with or without urinary and fecal incontinence may result. Although many injuries do not cause paralysis primarily, they may leave an unstable spinal segment, which may cause different sorts of neurological deficits later on, like, paraplegia and urinary incontinence. Conservative management includes bed rest, proper medication and appropriate brace for immobilization of the fractured spine to reduce pain. Surgical treatment involves decompression and stabilization of the fractured spine by instrumentation. The debate over the management of thoraco-lumbar fractures is continuing with controversy remaining as to whether treatment should be non-operative (non-surgical) or operative (surgical) especially when the neurological deficit is associated with the spinal cord injury (SCI) [1].

Advocates for surgical treatment claimed improvement in spinal alignment, decreased deformity, early mobilization and rehabilitation of the patients and a decrease in complications arising from prolonged bed rest and back pain [2]. Bedbrook et al. and Mehemet et al. have reported equivalent results, claiming satisfactory alignment of the spinal column and the maintenance of its stability by non-operative means [3, 4]. Wood et al. in a prospective randomized trial found no significant difference between operative and non-operative groups with respect to kyphosis and return to work. The average pain scores were similar for both groups, but those who treated non-operatively reported less disability. Moreover, they showed in their study that complications were more frequent in the operative group [5]. A Cochrane review reached the same conclusion [6]. However, another multicenter prospective randomized trial of Siebenga et al. found that functional outcome scores and return to original jobs was significantly better in the operative group [7].

On the other hand, ASIA motor index improvements were noted in the non-operative group, though likely related to increased incompleteness of injuries within this group. Early versus late spinal surgery was associated with shorter length of hospital stay and reduced pulmonary complications; however, no differences in neurologic or functional improvements were noted between early or late surgical groups [8]. An another study conducted by Resch et al. has shown that despite more loss of correction (34%) after conservative treatment than after surgical treatment (19%), 15% of the patients of the surgical group were not satisfied or moderately satisfied with the result while all patients in the conservatively treated group were satisfied or very satisfied [9].

A retrospective analytical cross-sectional study was performed on patients who have received treatment for thoraco-lumbar spinal cord injury with neurological deficit from January-June, 2009 in the Centre for the

Rehabilitation of the Paralysed (CRP), Dhaka, Bangladesh. We collected data from those patients who received surgical intervention and from those who were proposed for surgery but they refused and underwent conservative management. Then we compared the treatment outcome between two groups on the basis of pain level, functional improvement, ASIA impaired scale (AIS) and length of hospital stay. The pain level of the patients was collected through face-to-face interview using a visual analogue scale (VAS) [10]. Functional improvement was measured by functional independence measurement (FIM) Scale [11]. An occupational therapist was responsible for fill-up the FIM Scale before and after treatment. The researchers collected AIS and other related information from the patients' medical record. All patients completed their treatment within this period and discharged with proper advice upto June, 2009. For data analysis, Statistical Package for the Social Sciences (SPSS) version 16 (Chicago, USA) was used.

The total number of participants was 27. Among them 14 (52%) received spinal fixation and of which 1 patient died during operation and 13 (48%) participants received conservative treatment. The mean age of the participants was 30 years (SD ± 11.85), where mode was 35 years (6 patients). The mean length of stay (LOS) in hospital was 117.6 days (SD ± 48.66 days) in the surgical group. On the other hand, the mean LOS in hospital was 93.38 days (SD ± 33.28 days) in the non-surgical group. 'Delay consent giving' for surgery was the probable major cause of long time hospital stay for the surgical group, but the difference of LOS between these two groups was not statistically significant (t = 1.482 and P = 0.153). We found a significant association between treatment modalities and neurological outcome of the patients (P=0.05). Spinal fixation showed better neurological recovery (t=2.42 and p=0.032). No patient worsened neurologically till the time of discharge in the both groups. Both treatments significantly reduced the pain score in the fracture area (P=0.0001). There was no significant difference in the functional outcome after therapy between operative and non-operative treatment groups for thoraco-lumbar fractures with neurological deficit. Treatment cost was higher for those who went under surgical management.

Both types of treatments significantly reduced the pain in the fractured area, but neurological recovery was better in the operative group as compared to the non-operative group. Difference in function related outcom-es and length of hospital stay is not statistically significant. There is a need to improve the facilities for spinal surgery so that the patients can maximally be benefited. Decision of surgery should be taken as early as possible. Those who refuse to undergo surgery, conservative approach is highly effective for them to reduce pain and treatment cost, if they have a stable fracture without severe deformity. This study included small sample size which precluded firm conclusions. More research with high quality trials is needed.

Acknowledgement

The authors wish to express their sincere gratitude and appreciation to the Founder, CEO and the Head of Medical division of CRP for their generous support and encouragement.

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