

## Comparison of Management of Multiple Rib Fractures at a Tertiary care Hospital: A Clinical Study

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### ABSTRACT

**Background:** Fractured ribs are frequent findings after chest trauma. Multiple rib fractures occur in 10 % of poly-traumatized patients due to blunt, high-energy trauma and can lead to unstable thoracic cage injuries or flail chest with respiratory insufficiency. The present study aims at comparing the conservative management and surgical management of rib fracture.

**Materials & Methods:** This study was conducted in the Department of Orthopaedics, World College of Medical Sciences and Research, Gurawar, Jhajjar, Haryana (India) on 550 patients. Patients were divided into 2 groups. Group I (surgical) and group II (conservative) included 275 patients each. Outcome of treatment was compared in both groups.

**Results:** Number of fractures was 12 and 15 in group I and group II respectively. Abbreviated injury scale was 4.5 and 4.8 in group I and group II respectively. Flail chest in group I (30) and group II (35). Lung contusion was in group I (70) and group II (68). Hemothorax was in group I (66) and group II (62). Pneumothorax was in group I (22) and group II (25). Chest wall deformity was in group I (60) and group II (65). Mechanical ventilation was in group I (18) and group II (20). The difference among both groups was non-significant ( $P>0.05$ ). Chest tightness was seen in 10 in group I and 40 in group II patients.

Thoracic pain was seen in 3 in group I and 7 in group II. Dyspnoea was seen in 6 and 17 in group I and group II respectively. Chest wall deformity was seen in 8 in group I and 45 in group II. The difference was significant ( $P<0.05$ ).

**Conclusion:** The surgical management has proved to be effective in speedy recovery and improving the quality of patients' life.

**Key words:** Dyspnoea, Hemothorax, Pneumothorax.

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### INTRODUCTION

Rib fracture management is challenge for orthopedicians as it has relatively thin cortex and its tendency to fracture obliquely. Both conservative and surgical modalities have been tried in the management of rib fractures. Both techniques have few advantages and shortcomings too. A number of new fixation devices and better techniques have been developed for surgical treatment of rib fractures.<sup>1</sup>

Fractured ribs are frequent findings after chest trauma. Multiple rib fractures occur in 10 % of poly-traumatized patients due to blunt, high-energy trauma and can lead to unstable thoracic cage injuries or flail chest with respiratory insufficiency. One of the advantage of surgical treatment is that it decrease the need for ventilator support and intensive care.<sup>2</sup> Conservative management with analgesics and ventilator support is the treatment for flail

chest. However, long hospitalization with immobilization is few drawback which leads to complications, such as pulmonary infections and long term disability with chronic pain. Indications for rib fracture repair include flail chest, painful, movable rib fractures refractory to conventional pain management, rib fracture nonunion, and during thoracotomy for other traumatic indication.<sup>3</sup> Closed reduction of displaced rib fractures was eventually abandoned as ineffective, but resection of rib fragments driven into the pleural space and lung was advocated during the first half of the Twentieth Century, was performed by American surgeons during World War II, and recently has been achieved thoroscopically.<sup>4</sup>

The present study aims at comparing the management of rib fracture.

## MATERIALS & METHODS

This study was conducted in the Department of Orthopaedics, World College of Medical Sciences and Research, Gurawar, Jhajjar, Haryana (India).

It comprised of 550 patients (male- 250, female-300) with rib fracture. Patient general information such as name, age, sex etc was recorded in case history performa.

Patients were divided into 2 groups. Group I was managed with surgery and group II conservatively. Each group had 275 patients. Factors such as days of hospitalization, ICU stay time, pain score, tracheostomy, mortality, pnemothorax, hemathorax, lung contusion, chest wall deformity, flail chest, pneumonia etc. was recorded in both groups and compared. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

## RESULTS

Graph I shows that number of fractures was 12 and 15 in group I and group II respectively. Abbreviated injury scale was 4.5 and 4.8 in group I and group II respectively. Flail chest in group I (30) and group II (35). Lung contusion was in group I (70) and group II (68). Hemothorax was in group I (66) and group II (62). Pneumothorax was in group I (22) and group II (25). Chest wall deformity was in group I (60) and group II (65). Mechanical ventilation was in group I (18) and group II (20). The difference among both groups was non- significant ( $P>0.05$ ). Table I shows that chest tightness was seen in 10 in group I and 40 in group II patients. Thoracic pain was seen in 3 in group I and 7 in group II. Dyspnoea was seen in 6 and 17 in group I and group II respectively. Chest wall deformity was seen in 8 in group I and 45 in group II. The difference was significant ( $P< 0.05$ ).

Graph I: Clinical data of patients

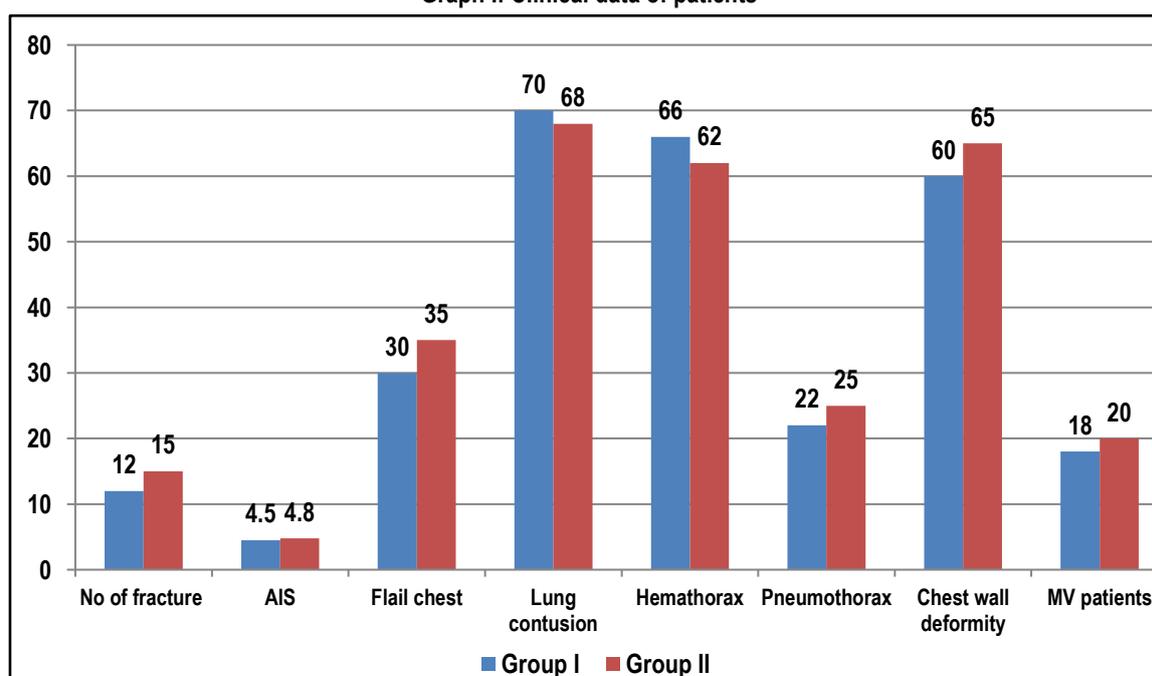


Table I: Comparison of chronic index in both groups

Parameters	Group I	Group II	P value
Chest tightness	10	40	0.01
Thoracic pain	3	7	0.1
Dyspnoea	6	17	0.02
Chest wall deformity	8	45	0.01

## DISCUSSION

Rib fractures in patients with early most feel severe chest pain, dare not to breathe, cough, body posture change also is limited. Even some serious multiple fractured ribs with because of flail chest and merge pulmonary contusion will appear acute respiratory function failure, which threaten life.<sup>5</sup> The present study was conducted to compare management of rib fractures in study group.

We found that number of fractures was 12 and 15 in group I and group II respectively. Abbreviated injury scale was 4.5 and 4.8 in group I and group II respectively. Flail chest in group I (30) and group II (35). Lung contusion was in group I (70) and group II (68).

Hemothorax was in group I (66) and group II (62). Pneumothorax was in group I (22) and group II (25). Chest wall deformity was in group I (60) and group II (65). Mechanical ventilation was in group I (18) and group II (20).

Wei et al<sup>6</sup> in their study found that in the acute phase, compared with conservative treatment, patients with mechanical ventilation in time (mechanical ventilation time MV) ( $3.7 \pm 1.4$  vs.  $9.5 \pm 4.3$ ), ICU stay time ( $8.2 \pm 4.3$  vs.  $14.6 \pm 3.2$ ), total hospitalization days ( $15.3 \pm 6.4$  vs.  $26.5 \pm 6.9$ ), the incidence of pneumonia (6.7% vs. 19.1%), mortality (1.3% vs. 5.3%) and pain score on patients (3.3 vs. 5.8) of surgical treatment group were significant lower

( $P < 0.05$ ). The number of tracheostomy in surgical patients with conservative treatment (4 vs. 7) was no statistically significant difference ( $P > 0.05$ ). In chronic phase, the surgical patients compared with patients with conservative treatment in the chest wall pain ( $2.9 \pm 1.2$  vs.  $5.6 \pm 1.7$ ), chest wall tension (13.3% vs. 57.3%), dyspnea (5.3% vs. 22.4%) and chest wall deformity rate (4% vs. 93.5%) were lower significantly ( $P < 0.05$ ).

However Brasel et al<sup>7</sup> in their study found that those who underwent surgical management spent more time in hospital. Devgan et al<sup>8</sup> in his study found that mechanical ventilation and prevalence of pneumonia was less in surgical group when compared with conservative group. There is significantly increase in prevalence of accidents in the past few years. The number of fractures cases involving long bones and facial bones has increased at tremendous rates. Multiple fractured rib is a common clinical manifestations of chest trauma accounts for 10-15% trauma, including fractured ribs accounted for 85% of chest trauma. We found that chest tightness was seen in 10 in group I and 40 in group II patients. Thoracic pain was seen in 3 in group I and 7 in group II. Dyspnoea was seen in 6 and 17 in group I and group II respectively. Chest wall deformity was seen in 8 in group I and 45 in group II. Chest wall tension is a kind of tightening feeling caused by multiple fractured ribs dislocation healing. Surgical patients with rib fractures in various degree of chest wall tension were significantly lower than that of patients with conservative treatment, because of multiple fractured ribs dislocation shortening healing in patients with thoracic narrow or collapse caused by chest wall deformity in conservative group.<sup>9</sup> Chest wall tension caused by chest wall deformity limits the range of the patient's breathing, the onset of dyspnea in patients with feeling, reduce the patient's lung function, influence the patient's quality of life.<sup>2</sup>

## CONCLUSION

The surgical management has proved to be effective in speedy recovery and improving the quality of patients' life.

## REFERENCES

1. Leinicke JA, Elmore L, Freeman BD and Colditz GA, Operative M. Operative Management of rib fractures in the setting of Flail Chest: a systematic review and meta-analysis. *Ann Surg.* 2013; 258: 914-21.
2. Hwang EG, Lee Y. Effectiveness of intercostal nerve block for management of pain in rib fracture patients. *J Exerc Rehabil* 2014; 10: 241-44.

3. Topcu I, Ekici Z and Sakarya M. Comparison of clinical effectiveness of thoracic epidural and intravenous patient-controlled analgesia for the treatment of rib fractures pain in intensive care unit. *Ulus Travma Acil Cerrahi Derg.* 2007; 13: 205-10.

4. Solak O, Oz G, Kokulu S, Solak O, Doğan G, Esmel H, Ocalan K and Baki ED. The effectiveness of transdermal opioid in the management multiple rib fractures: randomized clinical trial. *Balkan Med J.* 2013; 30: 277-81.

5. Moreno De La Santa Barajas P, Polo Otero MD, Delgado Sánchez-Gracián C, Lozano Gómez M, Toscano Novella A, Calatayud Moscoso Del Prado J, Leal Ruiloba S and Choren Durán ML. Surgical fixation of rib fractures with clips and titanium bars (STRATOSTM System). Preliminary Experience *Cir Esp.* 2010; 88: 180-86.

6. Wei, Girsowicz E, Falcoz PE, Santelmo N and Marsard G. Does surgical stabilization improve outcomes in patients with isolated multiple distracted and painful non-flail rib fractures? *Interact Cardiovas Thorac Surg.* 2012; 14: 312-15.

7. Brazel A, Aktunc E, Kutluk AC, Buyukates M, Demircan N and Demir AS. Analysis of 282 patients with thoracic trauma. *Turk J Thorac Cardiovasc Surg.* 2007; 15: 127-32.

8. Devgan, De Mastral C, Mckee MD, Schemitsch EH and Nathens A. Flail chest injuries: a review of outcomes and treatment practices from the National Trauma Data Bank. *J Trauma Acute Care Surg.* 2014; 76: 462-68.

9. Coskun A, Ozbay S, Bayram M and Atli B. Management of thoracic trauma in emergency service: Analysis of 1139 cases. *Pak J Med Sci.* 2013; 29: 58-63.

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