

Chest Trauma Requiring Admission: Differences in Earthquake Victims and other Modes of Injury

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ABSTRACT

Background

The April 25, 2015 Nepal earthquake (7.8 Richter scale) followed by May 12, 2015 major aftershock (7.3 Richter scale) killed more than 9,000 people and injured more than 23,000 people. Dhulikhel Hospital situated at Kavre district of Nepal encountered major bulk of Earthquake victims residing at Sindhuplanchowk, Kavre and Dolakha districts during subsequent earthquake events.

Objective

To distinguish any significant differences in hospital admitted Earthquake and non-Earthquake chest trauma cases.

Method

Retrospective study was done comparing earthquake with non-earthquake chest trauma cases admitted in Dhulikhel Hospital. Study included parameters like mode of injury, time taken to reach health center, symptoms at presentation, involvement of chest area, presence and site of rib fracture, presence of hemothorax or pneumothorax, spectrum of treatment required, hospital admission days.

Result

There were total 23 earthquake victims of which 14 (61%) were female and rest of 9(39%) were male whereas out of total 95 non earthquake cases 23(24%) were female and 72 (76%) were male ($p < 0.01$). Mean age in earthquake victims was 53.73 (SD 18.33, range 19-84) while non earthquake cases was 46.83(SD 16.53, range 11-90), ($p > 0.05$). Major mode of injuries in earthquake victims was hit by objects (82.60%) followed by fall (17.4 %). Incidence of rib fractures was 69.56% in earthquake victims and 85.26 % in non earthquake cases with average of 2-3 ribs in both cases ($p > 0.05$). There was higher rates of pneumothorax in earthquake victims (52.17%) compared to non earthquake cases (30.52%), ($p < 0.05$). There wasn't evidently major differences in incidence of pulmonary contusion, hemothorax and surgical emphysema. The mean duration of hospital admission days in earthquake victims was 7.78 days while non earthquake cases was 5.04 days ($p > 0.05$). The total number of patients requiring chest tube insertion in earthquake victims was 16(69.56%) while that was 29(30.52 %) in non earthquake patients ($p < 0.01$).

Conclusion

There was preponderance of female gender in earthquake related cases compared to non earthquake cases. Incidence of rib fracture was higher in earthquake victims. In earthquake victims, higher proportion of patient required chest tube drainage compared to non earthquake cases.

KEY WORDS

Chest trauma, Earthquake, Pneumothorax, Rib fracture

INTRODUCTION

The April 25, 2015 Nepal earthquake killed more than 9,000 people and injured more than 23,000. It occurred at 11:56 HRS on 25 April, with a magnitude of 7.8 Richter Scale with epicenter on east of the district of Lamjung.¹ Following April 25, 2015 major aftershock hit Nepal on 12 May 2015 at 12:50 HRS with a magnitude of 7.3 Mw, epicenter being at border of Dolakha and Sindhupalchowk.²

Dhulikhel Hospital situated at Kavre district of Nepal encountered major bulk of Earthquake victims residing at Sindhupalchowk, Kavre and Dolakha districts during subsequent Earthquake events. Victims sustained injuries ranging from fatal head, thoracic, pelvic injuries to minor soft tissue injuries. Majority of victims with chest trauma were managed in outpatient basis while rest required admissions. Besides this, in other regular period, we receive considerable number of chest trauma patients, some of which requires admission. Considering the different setting on which thoracic injuries has occurred, this study is done to distinguish any significant differences in hospital admitted Earthquake (EQ) and non Earthquake (non EQ) chest trauma cases, if present.

METHODS

Retrospective study was done to see differences in chest trauma in EQ and non EQ cases. Data for earthquake cases included patient admitted from date of April 25, 2015 to May 30, 2015, who had sustained thoracic injuries following earthquake. Similarly for other modes of injury, data of the chest trauma patients admitted on September 2012-July 2015 were included. Data included various parameters like mode of injury, time taken to reach health center, symptoms at presentation, involvement of chest area, presence and site of rib fracture, spectrum of treatment required, hospital admission days. All the data were recorded in Microsoft Office access and analysed in SPSS 13.0.

RESULTS

There were total of 23 EQ cases of which 14(61%) were female and 9(39%) were male. There were 95 non EQ cases of which 23(24%) were female and 72(76%) were male. Female patients were statistically more common than male patients in earthquake cases as compared to non EQ cases ($p < 0.01$). Mean age in EQ cases was 53.73 (SD 18.33, range 19-84) while in non EQ cases it was 46.83 (SD 16.53, range 11-90), $p > 0.05$. The means days of arrival to hospital in EQ cases was 1 day while non EQ cases was 2.4 days ($p < 0.05$). Comparing mode of injuries in EQ cases, major bulk was from hit by objects (82.60%) followed by fall from height (17.4%) while in non EQ cases modes were fall from height (62.1%), hit by objects (16.84%), Road Traffic Accidents (15.78%) and Physical assault (5.2%). Analyzing symptoms

there were no significant difference in frequency of chest pain (EQ 100%, non EQ 94.73%), shortness of breath (EQ 66.66%, non EQ 72.63%), hemoptysis (EQ 0%, non EQ 5%) except for cough which was less common in EQ cases than with non EQ cases (EQ 30.56%, non EQ 68.42%, $p < 0.05$). The side of impact in both cases were mostly left side (EQ 65.22%, non EQ 58.95%) and right side (EQ 34.78%, non EQ 41.05%) ($p < 0.05$).

Study depicted no noteworthy differences in incidence of rib fractures analyzing both cases with figures of 69.56% in EQ cases and 85.26% in non EQ cases with average of 2-3 ribs in both cases ($p > 0.05$). Noticeably there were relatively higher frequencies of pneumothorax in EQ cases with numbers of 12(52.17%) in comparison to non EQ (30.52%) with $p < 0.05$. Corresponding to above numbers the total number of chest tube insertion in EQ cases was 16 (69.56%) with only 29(30.52%) cases in non EQ patients ($p < 0.01$). However the mean number of chest tube in-situ days between the two categories (EQ 5.68 days vs non EQ 4.77 days) was not of much variation ($p > 0.05$). There wasn't evidently major differences in incidence of pulmonary contusion, hemothorax and surgical emphysema. The mean duration of hospital admission days in EQ cases was 7.78 days while non EQ cases was 5.04 days ($p < 0.05$). In EQ patients there was one flail chest and one tension pneumothorax while in non EQ c In Management aspect prescribing analgesics, steroids and antibiotics to the patient in both cases had cases there were two flail chest and 3 tension pneumothorax. Total 5 patients in EQ cases had epidural analgesia while 7 in non EQ cases had epidural analgesia. There were no mortality in both the groups.

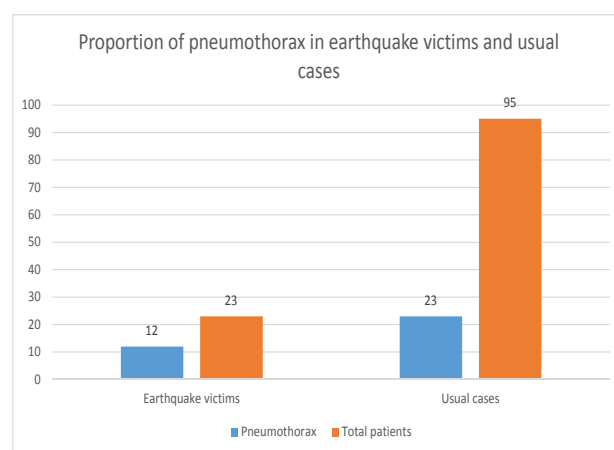


Figure 1. Incidence of pneumothorax in EQ vs non EQ cases ($p < 0.05$)

DISCUSSION

Thoracic traumas are common both in traumas associated with earthquakes and in other major blunt traumas.^{3,4} This study also showed different types of thoracic injuries sustained in earthquake comparing to non earthquake causes although patients with minor chest trauma due to

earthquake, treated in outpatient basis were not included in the study.

Male patients were more commonly involved in non-earthquake-related thoracic traumas.⁵ Similar results are drawn in this study as well.

However in earthquake, female patients was more often encountered. Contrary to his, one study has found 47.91% female and 52.09% male patients in earthquake.⁵ Another study showed a total of 263 patients (46.3% (n=122) male and 53.6% (n=141) female.⁶ In context of Nepal, most females in rural areas are housewives by occupation and so hit by house materials during earthquake can be a cause. The mean age of EQ patients (53.73 yrs) was higher than that of non EQ patients (46.83) but not evidently significant ($p > 0.05$).

This study showed mean days of arrival was 1 day in EQ victims whereas 2.4 days in non EQ victims. In Sichuan earthquake study however, contrary to above findings, in EQ victims, the mean time from injury to the multidetector CT examination was 7 days, ranging from 1 hour to 25 days while in non EQ cases the mean time from injury to the multidetector CT examination was 10 hours, ranging from 0.5 hour to 26 days.⁵ This could be due to fact that the site of EQ impact was nearby to Dhulikhel Hospital.

While assessing symptoms cough was found to be considerably less in EQ victims (30.56%, non EQ 68.42%, $p < 0.05$). Overlooking of this symptoms in period of rush by medical personnels and exacerbation of chronic chest problem (which has cough as a symptom) following trauma in non EQ case could possibly be the reason for this difference.

Rib fracture is the main finding in earthquake-related thoracic trauma and non EQ thoracic trauma as stated in various studies.^{3,4,7,8} In EQ cohort rib fractures were more frequently involved in bilateral pattern and had higher incidence than in non EQ cases.⁵ In our study however the mean number of rib fractures in both cases were 2-3. Chest trauma impact was more on left side in both victims, likely

due to reason that most people are right side dominant and would prefer to save that side from impact.

This study has depicted Pneumothorax to be more common in EQ cases than in non EQ cases ($p < 0.05$). The number of rib fractures is significantly related to the presence of pleural injuries.⁹

There were no significant differences in incidence of pulmonary contusion, hemothorax and surgical emphysema.

The total number of chest tube insertion in EQ cases was 16(69.56%) with only 29(30.52%) in 95 non EQ patients ($p < 0.01$). Relative high incidence of pneumothorax in EQ cases could led to it. Average duration of chest tube insitu was more in EQ cases (7.78 days in EQ while non EQ cases was 5.04 days, $p < 0.05$).

Blunt thoracic trauma has a significant impact on morbidity and mortality when left untreated.¹⁰ Chest Trauma Patients admitted in hospital from both EQ and non EQ cases were managed medically with analgesics, steroids and antibiotics as required. The three treatment modalities in blunt chest trauma that have significant evidence for their benefits are surgical rib fixation, epidural analgesia and transdisciplinary clinical pathway.¹¹ The mean duration of hospital admission days in EQ cases was 7.78 days while non EQ cases was 5.04 days ($p < 0.05$). Other insults beside thoracic injuries in EQ victims might have prolonged the duration of admission. Most of the EQ victims did not have proper shelters to live on during early post EQ period.

CONCLUSION

Disaster either natural or artificial can occur anywhere at any time with minor to major impact on human health. In blunt chest trauma like in EQ, the incidence of Pneumothorax can be high and in accordance chest tube insertion could be simple life saving procedure. Adequate equipments and skills regarding chest tube insertion at rural areas of Nepal could lessen the mortality and morbidity among referred chest trauma cases in EQ.

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