

Pattern of Injuries in Fatal Cases of Mass Disaster, Caused By Building Collapse in Himachal Pradesh, India a Postmortem Study

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ABSTRACT

Introduction: Building collapse is a common tragedy which occurs in hilly regions due to various reasons. It causes loss of precious lives. Studying the pattern of injuries in these cases will help first responders and medical staff in better assessment and management of such patients in future.

Material and methods: This study comprised of the victims of building collapse brought to casualty and mortuary of Maharishi Markandeshwar Medical College and Hospital Solan, Himachal Pradesh. The cases were brought directly from the site of accident or who died after admission following building collapse. External injuries, internal injuries and cause of death were studied after pathology.

Results: Multiple injuries were present in all the cases. Abrasions, contusions, lacerations, fractures were seen in almost all cases. Commonest site of injury was chest, followed by head, limbs and abdomen respectively. Majority of fatal injuries were on thorax and head.

Conclusion: Deaths due to injuries from a collapse of building are a major source of multiple deaths. Rescue management training should be given to medical personals. As on site medical attention can save many lives. First aid training should be given to rescue personals. Head injuries and chest injuries are a major cause of death. Evacuation of critical patients to tertiary care centre having a well equipped trauma centre should be done at the earliest to increase the chances of survival and decrease the morbidity and mortality.

Key Words: Building collapse, head injuries, chest injuries, crush injuries, autopsy.

INTRODUCTION

Modern building and building materials are a boon to our civilization. Concrete buildings are very effective in saving us from adverse weather conditions and also provide safe living conditions. But every now and then tragedies occur due to collapse of building. Such events occur due to various reasons like earthquakes, tsunami, due to adverse weather conditions such as excessive rains, floods, tornados, hurricanes, when faulty material or methods

are used in construction. [1,2] Such tragedies always lead to multiple losses of lives. Fatality in these events can be due to various injuries to vital organs like brain, lungs, heart, crush injuries and due to traumatic asphyxia. Traumatic asphyxia is described as asphyxia resulting from respiratory arrest due to mechanical fixation of chest, suggestive of that normal movement of chest wall is prevented. [3] Falling debris can cause both traumatic asphyxia and entrapment of victims in

closed spaces. Sometimes serious damage may occur in thoracic cavity without any external injury which is diagnosed only when chest is opened either during operation or autopsy. [4,5] knowledge of types of injuries that can occur in such cases and preparedness to deal with such injuries can save many lives. Most of the victims have multiple external injuries and internal injuries. [6] Prior knowledge of first aid and pattern of injuries by rescue personals improves the chances of survival. [7] Building collapse is a common tragedy which occurs in hilly regions if the base of building is not strong enough. In our present research study we have studied the pattern of injuries suffered by patients in a building collapse in district Solan of Himachal Pradesh, India. Objective is that knowing the pattern of injuries will help first responders and medical staff in better assessment and management of such patients in future.

MATERIALS AND METHODS

The study comprised of the victims of building collapse brought to casualty and mortuary of Maharishi Markandeshwar Medical College and Hospital Solan, Himachal Pradesh. The cases were brought directly from the site of accident or who died after admission following building collapse. This study included 14 cases of fatal deaths. The relevant information was collected from the relatives or persons accompanying the deceased. Post mortem was done in all the cases. Autopsy finding including external injuries, internal injuries and cause of death in each case were recorded. The data thus collected was analyzed to study the demographic profile of victims and to study the patterns of injuries sustained by victims.

RESULTS

Present study comprised of 14 numbers of cases due to collapse of a multistoried building. It demonstrated preponderance of males 13 (92.85%) victims over females 1(7.14%) victims. The

overall male to female ratio was 13:1. The maximum incidence was seen in the age group of 41-45 years which comprised of 10 (71.4%) victims. Commonest site of injury was chest, followed by head, limbs and abdomen respectively. Multiple injuries were present in all the cases. Abrasions, contusions, lacerations, fractures were seen in almost all cases. Fractures were the most common injury. Fracture of multiple ribs was seen in all cases who sustained fatal injuries to chest. The most common injuries which caused death were thoracic injuries, followed by cranial injuries, crush injuries to abdomen and limbs respectively.

Table 1: Distribution of cases according to sex

Males	Females	Total
13	1	14

Table 2: Distribution of cases according to Age group

Age Group (years)	No. of Cases	Percentage of cases (%)
36-40 years	1	7.14%
41-45 years	10	71.42%
46-50 years	1	7.14%
51 or above years	2	14.28%
	14	100%

Table 3: Sites of injuries

	Site of injury	No. of injuries	Percentage
1	Head/Face	13	21.6%
2	Neck/Spine	7	11.6%
3	Chest	14	23.3%
4	Abdomen	3	5.0%
5	Pelvis	2	3.3%
6	Lower limbs	11	18.3%
7	Upper limbs	10	16.6%
	Total	60	100%

Table 4: Pattern of injuries

	Pattern of injury	No. of injuries	Percentage
1	Abrasion	21	10.3%
2	Contusion	39	19.3%
3	Laceration	32	15.8%
4	Fracture	102	50.4%
5	Crush	8	39.6%
	Total	202	100%

Table 5: Distribution of fatal injuries

	Site of injury	No. of injuries	Percentage
1	Head injury	12	37.5%
2	Chest injury	13	40.6%
3	Abdomen injury	3	9.3%
4	Pelvis injury	2	6.2%
5	Lower limb injury	2	6.2%
	Total	32	100%

DISCUSSION

All the victims had multiple injuries, which is in concordance with other studies Pan ST et al and Armenian H.K end et al. [6,

^{10]} In majority of cases in patients who had suffered serious injuries, were declared dead at site or brought dead on arrival in casualty department by the attending doctors. Time is of critical importance in such cases, thus having prior knowledge of first-aid and some training in rescue programs by the disaster managing rescue personals and general public which will increase participation in rescue efforts in major earthquakes, improve survival. ^[8] The most important resources after these disasters are nurses with wound care skills and general practice doctors with basic surgical skills. ^[9] Combined effects of blunt injuries to head and chest were the most common cause of death. Cerebral damage was seen in all fatal cases of head injuries. Multiple open skull fractures with laceration of meninges and brain were observed in few cases. Fracture of multiple ribs and laceration of lungs was seen in majority of cases who sustained thoracic trauma. In open abdominal trauma evisceration of abdominal contents was seen. Majority of these injuries could have been caused due to fall of heavy debris on the victims from the falling walls and roof. Head injuries could have lead to initial unconsciousness due to which victim was unable to move out. Amputation and crush injuries were seen in few cases which would have led to death from hemorrhage and shock even if no other injury to vital organs was present.

CONCLUSION

Considering the increasing urbanization and increase in the number of high-rise buildings worldwide, the rescue efforts for future casualties in vulnerable, large urban areas could become more challenging. ^[6, 11,12] Deaths due to injuries from a collapse of building are a major source of multiple deaths. Time is of supreme importance in saving lives, thus rescue training programs should be conducted regularly. First aid training should be given to rescue personals. Rescue management training should be given to medical personals. As on site medical

attention can save many lives. Head injuries and chest injuries are a major cause of death. Evacuation of critical patients to tertiary care centre having a well equipped trauma centre should be done at the earliest to increase the chances of survival and decrease the morbidity and mortality.

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