

Pattern of Fatal Railway Injuries in Sealdah (South) Section, Kolkata - An Autopsy Based Study

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Abstract

Objective: The objective of this study is to analyze the victim profile and pattern of injuries in railway related fatalities in Sealdah (south) section, Kolkata.

Material & Methods: A retrospective analytical study performed on dead bodies autopsied in mortuaries of NRS Medical College & hospitals, Kolkata during the period of one year from 1st September, 2015 to 31st August 2016. Out of the total autopsies, details of autopsies on railway related fatalities were collected in a preformed performa under the heading of age, gender, type of injuries, region of the body involved and cause of death.

Results: A total of 2764 medico legal autopsies were conducted during the study period, out of which 138 (4.99%) were reported to be on dead bodies of railway fatalities. Male dominance, with 104 males and 34 females was observed. Highest numbers of victims were in the age group of 41-50yrs contained a total of 44 cases (31.9%) of total numbers of cases studied. This was followed by closely by the group of 31-40yrs which contained 31 (22.5%) cases. Laceration and fractures were the two most common types of injuries encountered in 114 (82.60%) and 128(92.75%) victims of railway related deaths respectively and head injury 28(20.28 %) cases with or without shock was the leading cause of death. More than one body region with multiple injuries were affected in 82.60% of cases.

Conclusion: Although a low frequency of railway related deaths but males of young age group are affected. Multiple injuries of multiple regions of the body indicating accidental nature of injuries were found in railway related deaths. Poly trauma and head injury contributed in majority of railway fatalities.

Keywords: Railway fatalities, Polytrauma, Laceration, Fractures, Head injury, Safety.

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I. Introduction

Ever since the railway engine was invented, a railway disaster has been associated with numerous fatalities. Thousands of people have been killed over the years in railway incidents, as this constitutes a common mode of public transport system all over the world, especially in India, having a large railway network with unprotected railway crossings.

Even though the Railway lines were laid some distance away from the dwelling places, the principle reason for the Railway accidents is fast urbanization, leading to enormous extension of residential as well as industrial infrastructure in the vicinity of Railway tracks. In a few cases a determined suicide victim will deliberately lie across the railway track or even place his/her head so that self – destruction is inevitable [2], other reasons for death may be a train and automobile accident, a collision between trains or passengers hanging out of compartment doors who are hit by posts, trees or electrical poles in a running train [1, 2]. The Railway accidents present with a vast variety of injuries which are often very difficult to assess as to their patterns at the postmortem examination. Certain features such as wheel marks on the body, dirt and grease contamination and the manner of severance of tissues deserve special observation to rule out criminal violence [2, 4]. In this present study, an effort has been made to analyze various patterns of injuries due to the railway fatalities occurring in Sealdah (south) region of eastern railway, Kolkata.

This region having the heavy burden of transportation of the passengers and goods as well; therefore the incidences of railway fatalities and mishaps are also higher at this junction. Most of the reported cases of railway deaths were either directly hit by the train or recovered in the vicinity of the railway tracks. Fatal railway injury is characterized by extensive disruption of more than one body region. Hence, to properly understand the epidemiology of railway deaths and the pattern of injuries produced, a retrospective analytical study has been undertaken.

II. Aims And Objectives

- i. Victims profile of fatal railway injury cases.
- ii. The pattern of fatal railway injuries in the victims.
- iii. To analyze the data and use it for betterment of patient care in the Emergency Department.
- iv. Help us to devise strategies and policies to reduce mortality and morbidity from fatal railway injuries.

III. Materials & Method

The present study was undertaken during September 2015 to August 2016 in Kolkata, Sealdah (south) section of eastern railways. A total number of 138 fatal cases of railway injuries have been carried out in the Department of Forensic Medicine and Toxicology, NRS Medical College, Kolkata. The data was collected from the visiting the scene of incidence, hospital case records, police records, post-mortem reports and by interviewing the victims and their attendants. The data was tabulated in a pre-tested Performa and the results were analysed using appropriate statistical methods.

IV. Observation

During the study period (September 2015- August 2016) of one year, there were 138 cases of fatal railway injuries comprising 4.99% out of 2764 autopsies done at NRS Medical College, Kolkata. It is observed that out of 138 cases 104 victims (75.36%) under this study were male and 34(24.63 %) were female.

Table -1Age Wise Distribution (n=138)

A g e G r o u p	F r e q u e n c y	%
< 1 0 y r s	2	1 . 4
1 1 - 2 0 Y r s	3	2 . 1
2 1 - 3 0 Y r s	8	2 0 . 3
3 1 - 4 0 Y r s	31	2 2 . 5
4 1 - 5 0 Y r s	44	3 1 . 9
5 1 - 6 0 Y r s	12	8 . 7
6 1 - 7 0 Y r s	11	7 . 9
7 1 - 8 0 y r s	7	5 . 2
> 8 1 y r s	0	0
T o t a l	1 3 8	1 0 0 . 0

It is observed from the above table that the highest numbers of victims were in the age group of 41-50yrs and contained a total of 44 cases, comprising 31.9% of total numbers of cases studied. This was followed by closely by the group of 31-40yrs which contained 31 (22.5%) and The other group 21-30yrs with 28 cases (20.3%), 51-60yrs with 12 cases (8.7%), 61-70yrs with 11 cases(7.9%).

Table -2Distribution of duration of survival of the victim (n=138)

Frequency	%
S p o t D e a t h	99
< 1 2 h r	11
> 1 2 h r - < 2 4 h r	7
> 2 4 h r - < 4 8 h r	7
> 2 d a y s - < 7 D a y s	1
> 7 d a y s	0
T o t a l	1 3 8

From the above table it is clearly evident that majority of victims died on the spot 99 (83.33%) because of sustaining severe type of injuries, insufficient ambulance services and within 24 hr duration 31 (22.46%) victims succumbed to death.

Table -3Region wise distribution

P o l i c e S t a t i o n	No Of Cases	%
J a d a v p u r G r p s	6	1 1 . 6
S e a l d a h G r p s	39	9 . 5

Ballygaunge Grps	1	9	13.7
Sonarpur Grps	3	3	23.9
Baruipur Grps	2	9	21.1
Diamond Harbour Grps	2	8	20.3
T o t a l	1	38	100

It is seen from the above table that most of the victim in the study coming from the Sonarpur GRPS with 33 cases (23.9%) followed by Baruipur GRPS with 29 cases (21.1%), Diamond harbor GRPS with 28(20.3%) .

Table -4:Distribution of victim status at the time of incidence (n=138)

STATUS OF VICTIM	NO OF CASES	%
Rail track crossing By pedestrians	25	18.1
On Vehicles	39	28.3
Walking on railway track line hit by side	7	12.3
Rail track crossing while talking in mobile	22	15.9
Standing on running train door	9	6.5
Fall from running train	8	5.8
Unknown	18	13.1
T O T A L	138	100

As for as the position of the victim at the time of incident to the direction of train is concerned, it has been observed that that most number of victim status during the incidence was on vehicles 39 (28.3%), followed by level crossing of pedestrians 25 (18.1%) and crossing of railway track while talking on mobile 22(15.9%). Position of the victim could not be assessed in 18(13.1%) cases.

Table -5Types Of Injuries Found In Railway Fatalities Victims

Type Of Injuries	Sub - Type	No Of Cases	Percentage
Abrasion	Grazed Abrasion	114	82.61%
	Impact Abrasion	24	17.39%
Laceration	Spilt Laceration Avulsion Tear	114	82.60%
Contusion		98	71.01%
Crush Injury		73	52.89%
Fracture		128	92.75%
Traumatic Amputation		33	23.91%
Rupture Of Internal Organs	Lungs	86	62.31%
	Heart	18	13.04%
	Liver	57	41.30%
	Spleen	43	31.15%
	Kidney	21	15.21%
	Stomach	15	10.86%
	Intestine	22	15.94%
	Bladder	13	9.42%
Scalp Haematoma		34	24.63%
Intracranial Haemorrhage& Brain Contusion		28	20.28%
Decapitation		64	46.34%

Abrasions, being the most common pattern of injuries were found in all the 138 (100%) cases, of which Grazed abrasions were present in 114 (82.61%),while Impact abrasions were seen in 24 (17.39%) cases. Laceration and fractures were the two most common types of injuries encountered in 114 (82.60%) and 128(92.75%) victims of railway related deaths respectively. This was followed by contusion (71.01%) , rupture of internal organs(62.31%) , crushed injuries(52.89%),amputation(23.91%) observed in railway fatalities . Total number of injuries exceeds the actual number of cases because more than one type of injury in various regions of the body of a single case was observed.

Table -6Distribution of bones fracture (n=138)

BONES FRACTURE	NO OF CASES	PERCENTAGE
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# s k u l l	2	8	2	0	.	2	8
# r i b s	9	6	6	9	.	5	6
#sternum & clavicle	2	3	1	6	.	6	6
# f e m u r	3	8	2	7	.	5	3
#tibia & fibula	2	7	1	9	.	5	6
# humerus, radius, ulna	1	7	1	2	.	3	1
# v e r t e b r a e	1	3	9	.	4	2	
# p e l v i s	0	9	6	.	5	2	

With regard to bony injuries, individual fractures as well as multiple bone fractures were observed. In 30 (21.7%) cases skull is fractured. Most commonly seen fracture is ribs fracture in 96 cases (69.56) followed by lower limbs fracture femur 38 cases (27.53%) and tibia fibula 27 case (12.31%). Skull, Ribs and Limbs fractures were seen in 28(20.28%) cases.

Table -7 Cause of death in railway fatalities (n=138)

Causes Of Death	No Of Cases	Percentage
H e a d I n j u r y	2	8
Vital Organ Injury	8	3
Hemorrhage & Shock	2	6
S e p t i c e m i a	1	0
T o t a l	1	3
	8	1
		0
		0

Maximum numbers of fatalities were due to injuries to vital organs i.e.84 (60.14 %) followed by head injury in 28(20.28 %) cases, Shock and hemorrhage accounts for 26(18.84 %) cases.

V. Discussion

The increasing use of train has been prevailing globally due to its cheapness and expanding population. Despite the use of trains as a common mode of transportation, fatalities of railway accidents are relatively low but increasing continuously with time. The present study has reported a low incidence of railway related deaths contributing 4.99% of out of 2764 unnatural deaths, autopsied in NRS medical college. Fatalities by the railway were predominantly seen in the male 104 cases (75.36%) as compared to female 34(24.63 %) cases). Male to female ratio was 3:1. The male predominance over female was due to the fact that most of the outstation activities are usually carried out by the males. Males outnumbering females in railway fatalities have also been observed by other. [5-9] The maximum numbers of victims were found to be in the age group of 41-50yrs and contained a total of 44 cases(31.9%) followed age group of 31-40yrs which contained 31 (22.5%) similar findings were observed by the others. [3-5, 7-10]

The passengers on the train, specially males of these age group takes the risk to get boarding in the running train, hanging on to the doors, windows when the trains are overcrowded. Males are trying cross the rail lines while the train was nearby , takes risk to walk along the railway track, etc are the reasons to get succumb to the train fatalities. Most of the victim position during the incidence was on vehicles 39 (28.3%), followed by crossing the track line by pedestrians 25 (18.1%) and crossing of railway track while talking on mobile 22(15.9%). Position of the victim could not be assessed in 18(13.1%) cases.

Majority of victims died on the spot 99 (83.33%) because of sustaining severe type of injuries, insufficient ambulance services and within 24 hr duration 31 (22.46%) victims succumbed to death. Most of the injuries sustained were abrasions and contusion followed by rupture of internal organs and crushed injuries, fracture of limbs, similar findings were observed by some observant [4, 9]. The primary impact injuries are related to the head and arms, chest, trunk as it is usually get struck from the side, which are usually multiple and extensive and the secondary injuries are due to been thrown down and run over resulting in the crushing and deep injuries. Concerning the thoraco-abdominal organ involvement, laceration and the contusion to the lung was seen in most of the cases compared to the heart. Reason is that lung is the superficial organ than the heart and occupies maximum area of the thoracic cavity. Most of the parts of the heart are retro-sternal therefore lungs are more vulnerable to injury as compare to heart. Abdominal injuries are sustained following the primary and secondary impact resulting in grave injuries to the abdominal viscera mostly liver and spleen.

Maximum numbers of fatalities were due to injuries to vital organs 84 (60.14 %) followed by head injury in 28(20.28 %) cases, Shock and hemorrhage accounts for 26(18.84 %) cases and in only one case septicemia was the cause of death.

VI. Conclusion

Most of the railway fatalities were accidental in nature and in the bread earning age group particularly among the males. The increasing number of population, overcrowding in the trains, reckless and careless behavior of the passengers, pedestrians and the train drivers towards safety norms are the constant causes of railway fatalities. Public as well as the railway authorities must take some measures to bring down these

fatalities. People must follow some easy set of laws like do not travel on footboard, do not enter or get down from running trains, do not try to cross the level crossing gate when it is closed, be alert and reduce your speed while approaching railway unmanned level crossing, never guess the speed of the train and adhere to the set norms of railway safety to curb this menace. The railway authority must take some steps to prevent the accidents by acknowledging the safety engineering, training and awareness among staff, attentive surveillance, high quality maintenance and strict law enforcement.

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