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Study of the injuries and its pattern in railway accidents

Forensic Medicine

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ABSTRACT

Railway accidents are a leading cause of accidental deaths in India. Hence a study to find the injury patterns in such deaths can lead to predicting and mitigating such deaths. In our study it is found that separation of the body following accident is not an uncommon occurrence. Most of the victims sustain injuries over head and face area followed by both upper and lower limbs. It is found that crush injuries topped the list of injuries followed by abrasion and then laceration. Self-vigilance on the part of the passengers and adherence to the rules & regulations safe practices will help prevent railway accidents.

KEYWORDS:

accidents, head and face, crush, vigilance

Introduction

The Indian Railways is one of the largest and busiest rail communication networks in the world touching remotest corners of the country covering almost all the states. India has a dubious distinction of highest number of accidents both in roads and rail tracks. Railway accidents may be referred to as collisions, derailments or other event involving the operation of on-track equipment1.They cause devastating damages and personal injuries including death due to the speed and tremendous weight of the railway machineries. With fast pace of commercialization and globalization in all spheres of life, the railways have gone a long way but safety has always been a concern. The increased number of railway casualties has augmented the burden of a Forensic Medicine expert. Close observation the injury patterns is of utmost necessity to opine the cause and mode of death. This in turn helps the railway administration to verify the cases liable for compensation and also formulating ways for safety measures

Aims and objectives

1. To examine the injuries in details in terms of pattern, nature, distribution and thereafter make a comparative study

2. To comprehend the pattern of certain injuries or other autopsy findings characteristic of railway tract incidents

3. To put forward some of the safety measures to prevent railway tract incidents and preserve human life

Materials and Methods

A cross sectional study has been carried out on the victims of the autopsies that are carried out in the mortuary of the department of Forensic medicine, Gauhati Medical College. The study period extended from 1st July, 2014 to the 30th June, 2015. During this period a total number of 2964 autopsies were carried out in the department.

The criteria for selection of cases in this study are as follows:

1. All autopsies where death occurred unnaturally by railway tract injuries are taken as case for the study.
2. Autopsies where death occurred due to natural causes in or near the railway station were excluded from the study.
3. The cases included both known and unknown victims of railway tract injury deaths as well as decomposed bodies.

Results

A total of 2964 numbers of medico-legal autopsies were performed in the Department of Forensic Medicine, Gauhati Medical College, Guwahati during the study period from 1st July, 2014 to 30th June 2015. Out of these 85 numbers of cases were deaths due to railway tract incidents.

CONDITION OF THE BODY AND DEGREE OF SEPARATION

Condition of The Body	Number	Percentage
Intact Body	51	60
2 parts	21	24.70
3 parts	8	9.41
4 parts	2	2.35
5 parts	2	2.35
Mutilated	1	1.17
Total	85	100

Table1 The condition of the body and the degree of separation.

Separation of body parts were seen in 34 cases out of which 1 case was mutilated and received as case property while the rest 51 cases were intact bodies.

BODY REGION INVOLVED IN SEPARATION

A total of 34 cases showed separation of the body parts. Highest number of cases showed separation in lower limbs and lowest number observed in the thorax. The regions of body involved are listed in the following table:

Body Part	Number	Percentage
Neck	6	17.64
Head	2	5.89
Thorax	1	2.94
Abdomen and pelvis	9	29.41
Upper limb	10	29.41
Lower limb	25	73.52

Table 2: Body region involved in separation: (The figures in the above table exceeds 34 cases due to multiple site involvement in some cases)

In the present study lower limb is found to be mostly involved in separation with 25 cases followed by upper limbs with 10 cases.

DISTRIBUTION OF INJURY

Distribution of injuries in different body regions of the 85 railway tract injury cases are summarized in the following table:

Body Region Involved	Number	Percentage
Head	70	82.35
Face	67	78.82
Neck	26	30.58
Thorax	47	55.29
Abdomen & Pelvis	40	47.05
Upper Limbs	65	76.47
Lower Limbs	65	76.47

Table 3: The distribution of injury in the victims of railway tract incidents. (The figures in the above table exceeds total number of cases due to different body parts of same victim sustaining different injuries)

It is found in the study that most of the victims sustain injuries over head and face area followed by both upper and lower limbs.

PATTERNS OF INJURY

The study of pattern of external injuries sustained by the victims is as follows,

Injuries Sustained	Number	Percentage
Abrasion	80	94.11
Contusion	49	57.64
Laceration	77	90.58
Abrasion + Laceration	9	10.59
Fracture	34	40
Fracture + Abrasion	17	20
Fracture + Laceration	24	28.23
Fracture+Abrasion+Laceration	2	2.35
Crush injury	83	97.64
Transective separation/Amputation	53	62.35

Table 4: The pattern of injury in the victims of railway tract incidents. (The figures in the above table exceeds total number of cases due to presence of more than one injury pattern in the same victim)

It is found that crush injuries topped the list followed by abrasion and then laceration.

MANNER OF DEATH

The manner of death of the various victims of railway tract incidents are given in the table below,

Manner	Number
Accidental	72
Suicidal	7
Not Known	6
Total	85

Table 5: Showing the manner of death

Most of the cases in the present study were accidental in nature.

CRUSH INJURIES IN DIFFERENT BODY PARTS

In this present study 85 cases were studied with railway tract incidents. The crush injuries including transective separations sustained over the different parts of the body are as follows,

Crush Injuries	Number			Percentage
Head	32			37.64
Face	15			17.64
Neck	6			7.05
Thorax	7			8.23
Abdomen	12			14.11
Upper limb	Right	13	Total 22	25.88
	Left	9		
Lower Limb	Right	20	Total 42	49.41
	Left	22		

Table 6: The crush injury over different body parts (The figures in the above table exceeds total number of cases due to presence of more than one injury pattern in the same victim and examining both sides of upper and lower limbs)

The present study examined head and face differently and found lower limbs to suffer the most from crush injuries.

Discussion

The findings of the present study in most of the aspects are similar to that of Chandru K et al2 but different from Sabale PR3, Basu R et al.4 who both got laceration as highest injury. The variation may be due to difference in type and frequency of train, speed of movement and safety measures prevalent in those places.

The crush injuries here included both with and without transective separation, also both sides of upper and lower limbs. In the present study it is found that most of the victims sustained crush injury over the lower limbs. The findings of the present study are quite similar to that of Kumar A5. who found crush injuries to be common in head and face with 107 cases followed by lower limbs with 80 cases and also with Wasnik NR 6 who found crush injuries mostly over lower limbs followed by the upper limb then over the face and head.

CONCLUSION

A set norm of railway safety, high quality of maintenance and vigilant supervision by the railway authorities along with required awareness among the people can make rail-travel much safer. Implementation of newer technology like anti-collision device, modern signaling devices like panel inter-locking, route relay inter-locking, centralised traffic control, automatic signalling and multi-aspect colour light signalling, are the need of the hour. Regular repair and maintenance of the tracks, the train machineries and existing communication devices will automatically reduce some avoidable railway accidents.

There is lack of first aid to the injured at the stations; and also lack of definitive shifting facilities. Hence there is a considerable time lag between accident and admission to the hospital. The deaths that occurred due to extensive blood loss and hypovolemic shock could possibly have been prevented. Therefore, ambulances with para-medics should be present in every stations. Public awareness regarding railway safety should be spread by involving various social groups, media etc. Self-vigilance on the part of the passengers and adherence to the rules & regulations safe practices will help prevent railway accidents. This effectively includes avoiding crossing of rail-tracks, no hanging outside trains, no sitting on train roof-tops and no jostling while boarding or alighting from the trains, especially moving trains.

Railway related deaths are taking place day by day leading to increased autopsies and this study makes an effort to emphasize the need to understand the injuries in a better way and in turn help to decipher the weaknesses of the railway mechanism which led to such tragic mishaps.

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