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Study of Pattern And Distribution of Injuries in Fatal Road Traffic Incident Cases Under Jurisdiction of NRSMCH Morgue, Kolkata

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Abstract:
***Context**: to study pattern and distribution of injuries in road traffic incidents by Autopsy examination*
***Material and methods**: Prospective, cross sectional autopsy based study by sincere analysis of autopsy findings, inquest reports, hospital records*
***Result:** Of the total 3614 autopsy examinations during the study period, 588 deaths were related to road traffic incident of which 167 cases were studied depending upon inclusion and exclusion criteria. Out of 167 cases 124 cases where hospitalized of which 52 cases were hospitalized within 30 minutes of incidence. 65 cases died within 1 hour of admission whereas only 5 cases died after 7 days. 82.03% received scalp injury and skull fracture was present in 28.1% cases. Subdural haemorrhage in combination was present in 65.69% of cases. Most common organ injured in the study cases was brain in 61.07% cases, followed by lungs in 18.60% cases. Vertebral column was injured in 09.58% cases. Abrasions and lacerations are the commonest mechanical injuries involving upper and lower extremities.*
***Conclusions:** Road traffic incidents though very much high in number in present days but are preventable too with a little effort from us and also from the law enforcing agencies to combat the issue by close coordination and collaboration among many sectors and disciplines.*
***Keywords:** road traffic incident, autopsy, skull fractures, subdural, abrasion, laceration.*

Introduction

Road traffic incident- a pathology of development and modernization, where the gross pathology is speed. Speed is life, we all love speed. We are running behind our dreams constantly. We have enough time to sleep, to eat, to be very much active in social media, but we cannot spend much time on road. We need fastest way of transport to reach our destination. Wasting time on road is simply wastage of our valuable time which could be utilized in other various medium of productivity or even in recreation purposes. And who are we? We are the people of 21st century. And to chase our success and happiness, automobiles come as an indispensible medium of transport to reach our goals. Along with it comes road traffic incident (we should prefer to call it road traffic incident rather than calling it road traffic accident) – a tragic mode of suffering and death that appears as a curse in this modern jet era causing damage to the body, mind, reputation and property and making such incidents a major medico legal and socioeconomical problem for the society. Road traffic incidents not only cause morbidity and those cases which terminate in death also produce severe economic loss to the society and socioeconomical as well as emotional vacuum in family.

All over the world an estimated approx 3 million people die every year from injuries sustained in road traffic incident (WHO report, 1995). Currently, motor vehicle incident cases rank top among all the leading causes of fatal accidents (W.H.O report, 1995). During the year 1998, approximately 80,000 lives were lost and 330,000 people were injured. India has only 1% of the motor vehicles in the world, but carries the burden of 6% of the global motor vehicle accidents. In every 19 minute a injury related death occurs in India (Sethi AK et al,2001). Considering our city of joy Kolkata being one of the densely populated metropolitan city not only in India but also in the world, along with congested and narrow roads where pedestrian pathways are occupied by different categorical professionals especially the hawkers along with simultaneous movement of fast moving vehicles causes unintentional injuries.

Road traffic incidents in two wheelers involving riders and pillion riders cause a variety of injuries. Head injuries in vehicular accidents cause mortality in 60% of cases. According to J.Chandra (1979) 71.99% of deaths due to vehicular accidents were due to fatal traumatic head injury. Though we know that the brain is well protected by the bony skull, but it is not immune to injury. The head is a complex structure comprising of

different components like the scalp, skull, meninges, brain tissue, blood vessels, nerves etc. Each and every structures show variable response to traumatic injury and also show different symptoms and signs which again vary in each and individual case.

The other two most vital organs without which life is incompatible are the lungs and the heart. Both the lungs and the heart are though encased in a well protected thoracic bony cage which protects these organs from external injury to a certain extent. Injury to the chest wall in high intensity road traffic incident causes serious life threatening injuries. Thoracic injury directly causes 20-25% deaths due to trauma and act as a contributory factor in another 25% of trauma deaths. Immediate death from thoracic injury is primarily due to major injury to the heart or the great vessels.

Injury to abdomen may cause laceration of liver and spleen causing severe intra abdominal hemorrhage and death either following neurogenic shock or hypovolemic shock. Almost all road traffic accident causes injury to the skeletal system causing fractures with or without Fracture femurs are a major injury and at times lead to life threatening seriousness owing to the amount of blood loss involved causing death by hypovolemic shock or sometimes by fat embolism. Here in this study Post mortem examination is being carried out at NRSMCH Morgue, under the Department of Forensic & Toxicology, NRS Medical College, Kolkata. During the year 2016, 3614 post mortem examinations were carried out, out of which 588 deaths were due to road traffic incidents. In this study we have made a conscious effort to study the pattern and distribution of fatal injuries sustained by the victims of road traffic incident to identify the most common organ involved following injury along with to establish the cause of death. We have put our efforts to o study time interval between road traffic incidence and time of admission in Hospital and duration of survival among hospitalized patients following road traffic incident**.** The sole objective of this study is to create awareness among public and law enforcing agencies dealing with such cases to prevent the so called curse of modern jet era- 'the road traffic incident'.

I. Aims and objectives:

1. To study distribution and pattern of injuries in fatal road traffic incident cases by Autopsy.
2. To find out most common cause of death in road traffic incident cases.
3. To study time interval between road traffic incidence and time of admission in Hospital.
4. To study duration of survival among hospitalized patients following road traffic incident**.**

II. Materials And Methods

Study Area: The present study has been carried out in NRSMCH Morgue under the Department of Forensic Medicine and Toxicology, Nil Ratan Sircar Medical College, Kolkata.
Study period: The study period extended from 1st January 2016 to 31st December 2016
Study duration: 12 months.
Study population: During this period total number of 3614 autopsies were carried out in the department, out of these 588 were associated with road traffic incidents. Among which 167 cases were studied depending upon inclusion and exclusion criteria.
Study design: Prospective, Cross sectional Autopsy based study.
Inclusion criteria: The cases with history of road traffic incidents brought at the NRSMCH Morgue were included in the study.
Exclusion criteria:

1. Decomposed bodies were excluded from the current study.
2. Visit to the scene of incident were excluded from the current study, however available information regarding scene of incident was collected from the concerned investigating officers and relatives.
3. All autopsies where the nature of incident could not be ascertained (like whether the injuries sustained following road traffic incident or following fall from height) were not included in the study.

Consent: not required here as we collected all the data during medicolegal autopsy which does not require any consent.
Conflict of interest: there is no conflict of interest. The study has been conducted without revealing identification of deceased and there are no economical transactions or any monetary contribution from any person or agencies while conducting the study.

Material used:

1. Examination of the inquest report.
2. Personal interview of investigating officer and the accompanying police constable.

3. Interview of accompanying relatives/ friends/ eyewitnesses of the incident and survivor of the same incident, if any.
4. In case of hospitalized victims, hospital records of the treatment.
5. Findings collected from the autopsy examinations performed on the dead body of the victim to ensure the deceased really sustained injuries following road traffic incident and not by other means.
6. Findings collected from the autopsy examinations performed on the dead body of the victim. During the post mortem examination apart from recording every data about the injury special stress was also given to detect any pre-existing physical or functional deformity that may have some bearing on the issue, especially in the extremes of ages for obvious reasons.

All data that were collected from different sources were then recorded in a specially designed proforma for each case and statistically analyzed using appropriate statistical tools. The information were collected and studied mainly under the following headings.

a) Brief history
b) Causal factors
c) Autopsy examination
d) Cause of death
e) Time since death

History and Causal factors: a comprehensive picture about the background of the victims were though elicited by information such as serial number (replaced in place of name), age, sex, address, religion, marital status, presence of any pre-existing natural disease (whether known to the family members), but included in this study as we are emphasising only on pattern and distribution of fatal injuries following road traffic incidents.

Autopsy examination: The detailed post mortem examination carried out in each case comprises of an external and an internal examination, and finally the cause of death and the approximate time since death was ascertained.

a) **External examination:** Clothes, if any, on the body were examined in detail for any injury (recent tear), stains (blood stains, grease stain or any other chemical stains), tyre thread mark. Information regarding condition of the body, specific site and dimension of injuries corresponding to the six regions of the body, i.e., head and face, neck, chest, abdomen and pelvis and extremities including external orifices were recorded.

b) **Internal examination** was carried out systematically opening the three principle body cavities viz., the chest, abdomen and the cranium, one by one and the findings were recorded separately. Dissections were carried out over extremities wherever required. The location and the extent of the injury were specially observed to note any pattern if any.

Cause of death and time since death: After evaluation of all the facts and taking into account all the injuries sustained on the body, the cause and time of death were ascertained.

IV. Results And Analysis:

A total of 3614 autopsies were performed at NRSMCH Morgue, under the Department of Forensic Medicine and Toxicology, NRS Medical College, Kolkata during the period from 1st January 2016 to 31st December 2016. Of this total no. of road traffic incident cases were 588.

Table – I

Total No of autopsies	No. Of traffic related cases	Percentage
3614	588	16.27

Out of 588 cases of road traffic incidents, using inclusion and exclusion criteria 167 cases of road traffic accidents were included in the study.

Victim was discovered on the spot:

Distribution of study cases according to their status as discovered on the spot (n-167)

Table – II Distribution of study cases according to their status as discovered on the spot

	No. Of Cases	Percentage
Conscious	41	24.6
Unconscious	83	49.7
Dead	43	25.7
TOTAL	167	100

It is seen from the above table that most of the victims were found unconscious at the place of incidence in 83 cases (49.7%), followed by found dead in 43 cases (25.7%) and found conscious in 41 cases (24.6%).

Victim Hospitalised or Not:
Distribution of cases according to the hospitalization of the victims (n-167)

Table –III Distribution of cases according to the hospitalization of the victims

	No. Of Cases	Percentage
Hospitalized (conscious+ unconscious)	124	74.25
Not Hospitalized (SPOT DEAD)	43	25.74
Total	167	100

It is seen from the above table that a majority of the victims were hospitalized after the incident in 124 cases (74.25%) and remaining victims were not hospitalized in 43 cases (25.74%) as they died on spot and directly sent to Morgue via Emergency Department of NRSMCH.

Time Interval Between Incidence And Time Of Admission In Hospital: (Among Hospitalized Patients N=124)

Table –IV Distribution of study cases according to time interval between incident and time of admission

	No. Of Cases	Percentage
<30 Minutes	52	41.9
30 Minutes – 1 Hrs	6	4.8
1 Hrs – 2 Hrs	26	20.9
2 Hrs – 6 Hrs	24	19.3
>6 Hrs	16	12.9
TOTAL	124	100

It is seen from the above table that 52 cases (41.9%) were hospitalized in less than 30 minutes, 24 cases (19.3%) were hospitalized between 2-6 hours, 16 cases(12.9%) were hospitalized in greater than 6 hrs after incident, 26 cases(20.9%) were hospitalized between 1-2 hrs after incident and 6 cases(4.8%) were hospitalized in between 30 minutes-1 hour after the incident.

Place of Death Of The Victim:

Table – V Distribution of study cases according to their place of death

	No. Of Cases	Percentage
Spot	43	25.7
Hospital	124	74.25
TOTAL	167	100

It is seen from the above table that most of the victims as seen in 124 cases(74.25%) died in the hospital during treatment, followed by 43 cases(25.7%) died on the spot.

Duration Of Survival: (among hospitalized patients, n=124)

Table –VI Distribution of study cases according to their duration of survival (n=124)

	No. Of Cases	Percentage
< 1 Hrs	65	52.41
1 Hrs – 3 Hrs	12	9.67
3 Hrs – 6 Hrs	16	12.90
6 Hrs – 12 Hrs	4	3.22
12 Hrs – 1 Day	7	5.64
1 Day – 3 Days	9	7.25
3 Days – 7 Days	6	4.83
>7 days	5	4.03
TOTAL	124	100

It is seen from the above table that most of the victims survived for less than 1 hour after incident as seen in 65 cases(52.41%), followed by16 (12.9%) cases who survived between 3-6 hours of hospital admission and only 5 (4.03%) persons died after 7 days of hospital admission.

Scalp Injury

Table- VII Distribution of study cases according to the kind of scalp injury present (n=167):

Scalp injury	No. Of Cases	Percentage
Scalp Hematoma only	105	62.87
Scalp Laceration with underneath scalp hematoma	32	19.16

No Injury	30	17.96
TOTAL (Death in hospital+ brought dead)	167	100.00

It is seen form the above table that majority of the victims seen in 137 cases (82.03%) received scalp injury during the incident. In 105 cases (62.87%), scalp hematoma was seen, in 32 cases (19.16%), scalp laceration was present and in 30 cases(17.96%) no scalp injury was detected.

Scalp laceration:

Table – VIII Distribution of study cases according to the depth of scalp laceration (n=32)

Scalp laceration	No of cases	Percentage
Scalp deep	22	68.75
Bone deep	10	31.25
TOTAL	32	100.00

It is seen from the above table that in 22 cases (68.75%) the scalp laceration was scalp deep and only in 10 cases (31.25) it was bone deep.

Skull Fracture

Table – IX Distribution of study cases according to presence of skull fracture

	No. Of Cases	Percentage
Present	47	28.1
Absent	120	71.9
TOTAL	167	100

It is seen from the above table that skull fracture was absent in most of the study cases as seen in 120 cases (71.9%) and present in 47 cases(28.1%).

Types Of Skull Fracture Present

Table – X Distribution of study cases according to type of skull fracture (n=47)

Skull Fracture Present	Frequency	Percentage
Frontal	3	6.38
Parieto-Temporal	3	6.38
Parieto-Occipital	10	21.29
Temporal	11	23.40
Base of Skull	9	19.15
Multiple Sites	11	23.40
TOTAL	47	100.00

It is seen from the above table that Temporal fracture involving squamous part of temporal bone was the most common in 11 cases(23.40%) along with fracture at multiple sites in 11 cases(23.40%), followed by Parieto-occipital fracture in 10 cases (21.29%), followed by Base of the skull fracture in 9 cases(19.15%) and 3 cases(6.38%) each of Frontal and Parieto-temporal fractures.

Base Of Skull Fracture

Table – XI Distribution of study cases according to type of Base of skull fracture (n=9)

Base of skull fracture	Frequency	Percentage
Anterior cranial fossa	3	33.33
Middle cranial fossa	5	55.55
Posterior cranial fossa	1	11.11
TOTAL	9	100.00

It is seen from the above table that fracture involving middle crania fossa was highest as seen in 5 cases (55.55), followed by anterior cranial fossa as seen in 3 cases (33.33%), where as posterior cranial fossa fracture was lowest as seen in only one case (11.11%)

Intracranial Hemorrhage

Table –XII Distribution of study cases according to presence of Intracranial Haemorrhage (n=102)

	Frequency	Percentage
EDH (extradural hemorrhage) only	0	0
SDH (subdural hemorrhage) only	24	23.54
SAH(subarachnoid hemorrhage) only	22	21.57
ICH (intracerebral hemorrhage)only	3	2.94
IVH (intraventricular hemorrhage) only	0	0

EDH + SDH	3	2.94
EDH + SAH	11	10.78
SDH + SAH	16	15.69
SDH + ICH	10	9.80
SDH + IVH	3	2.94
SAH + IVH	7	6.86
SAH + ICH	3	2.94
TOTAL	102	100

It is seen from the above table that most of the cases were Subdural haemorrhage as seen in 24 cases (23.54%), followed by Subarachnoid haemorrhage in 22 cases (21.57%), followed by combination of SDH and SAH in 16 cases (15.69%), followed by combination of EDH and SAH in 11 cases (10.78%), followed by in descending order – SDH + ICH in 10 cases(9.8%), SAH + IVH in 7 cases(6.86%). And 3 cases each were seen of ICH only, EDH + SDH, SAH + ICH and SDH + IVH. No cases were seen of EDH only and IVH only.
Subdural haemorrhage in combination was present in 67 cases of the total 102 cases of head injuries, i.e., 65.69%.Subarachnoid haemorrhage in combination was present in 59 cases of the total 102 cases of head injuries, i.e., 57.84%

Injury To The Chest & Thoracic Cavity
Distribution of cases according to presence of chest injury (n=167)

Table –XIII Distribution of cases according to presence of chest injury

Injury	Frequency	Total No. of cases	Percentage (out of 100%)
Contusion on thoracic wall (internal)	31	167	18.60
Laceration on chest wall (external)	07	167	4.1
Fracture Clavicle	13	167	07.78
Only Lt. Ribs Fracture	13	167	07.78
Only Rt. Ribs Fracture	11	167	06.58
Both Ribs Fracture	18	167	10.77
Fracture Sternum	2	167	01.19
Lung contusion and laceration	31	167	18.60
Heart and pericardium	0	167	0.00

It is seen from the above table that contusion (extravasation of blood over thoracic walls) was present in 31(18.60%) cases, laceration on chest wall was present in 07(4.1%) cases, fracture clavicle was present in 13(07.78%) cases, only Lt. rib fracture was present in 13(07.78%) cases, Rt. Rib fracture was present in 11(06.58%) cases, both side rib fracture was present in 18(10.77%) cases, lung injury in form of contusion and laceration was present in 31(18.6%) cases, sternal fracture was found in 2 cases (01.19%). Injury on heart and pericardium was not seen in any cases.

Abdominal Injury
Distribution of study cases according to the presence of Abdominal Injury (n=167)

Table –XIV Distribution of study cases according to the presence of Abdominal Injury

Injured organ	No Of Cases	Total no. of cases	Percentage (out of 100%)
Spleen	4	167	02.39
G.I. Tract	3	167	01.79
Liver	24	167	14.37
Kidney	12	167	07.18
Urinary Bladder	10	167	5.99

It is seen from the above table that spleen injury was present in 04(02.39%) cases, G.I. Tract injury was present in 03 (01.79%) cases, Liver injury was present in 24 (14.37%) cases, Kidney injury was present in 12 (26.35%) cases and Urinary bladder was injured in 10(5.99%) cases. The most common abdominal organ injured was the liver and the least common abdominal organ injured was the Gastro-intestinal tract.

Fracture And Dislocation In Pelvis
Distribution of cases according to presence of fracture-dislocation in Pelvis (n=69)

Table –XV Distribution of cases according to presence of fracture-dislocation in Pelvis

	Frequency	Total no cases	Percentage
Fracture Dislocation of Symphysis-Pubis Joint	10	167	05.99
Fracture Dislocation of Sacro-	13	167	07.78

iliac joint			
Dislocation of Hip Joint	3	167	1.79
TOTAL	27	167	16.16

It is seen from the above table that fracture dislocation of the sacro-iliac joint was seen in 13 (07.78%) cases, followed by fracture dislocation of symphysis pubis joint as seen in 10 (05.99%) cases, and least common injury was dislocation of Hip joint in 3(1.79%) cases.

Injuries According To Organ Involved

Distribution of injuries according to organ involved (n=167)

Table –XVI Distribution of injuries according to organ involved

Organ Injured	Frequency	Total Cases	Percentage (Out Of 100%)
Cranial Cavity & Brain	102	167	61.07
Spleen	04	167	02.39
Liver	24	167	14.37
Heart	00	167	00.00
Lung	31	167	18.60
Kidney	12	167	07.18
Pelvis	27	167	16.16
G.I. Tract	03	167	01.79

It is seen from the above table that most common organ injured in the study cases was brain as seen in 102(61.07%) cases, followed by lungs in 31 cases (18.60%), pelvis in 27 cases (16.16%), liver in 24 cases (14.37), kidney in 12 cases (07.18%), spleen in 04 cases (02.39%) and G.I tract in 03 cases (01.79%).

Fracture And Dislocation Of Vertebral Column

Distribution of study cases according to fracture and dislocation of vertebral column (n=16)

Table –XVII Distribution of study cases according to fracture and dislocation of vertebral column

Vertebral Injury	Frequency	Total cases	Percentage
Cervical Spine Fracture	3	167	01.79
Fracture dislocation of cervical spine	6	167	03.59
Fracture Thoracic spine	3	167	01.79
Fracture Lumbar spine	4	167	02.39
Total	16	167	09.58

It is seen from the above table that vertebral column was injured in 16 cases (09.58%), in which cervical spine was fractured in 3 cases (01.79%), fracture-dislocation of cervical spines were seen in 6 cases (03.59%), where as thoracic and lumber vertebrae were fractured in 3 (01.79%) and 4 (02.39) cases respectively.

Injury To The Extremities

Upper Limbs

Table –XVIII Distribution of injuries in study cases in upper limbs (n=167)

Type of Injury	Frequency	Total no. of cases	Percentage (out of 100%)
Abrasion	115	167	68.86
Laceration	56	167	33.53
Fracture	25	167	14.97
Dislocation	08	167	4.79

It is seen from the above table that abrasion was the most common injury occurring in the upper limb as seen in 115(68.86%) cases, followed by in descending order laceration in 56(33.53%) cases, fracture (fracture of humerus, radius, ulna) in 25 cases (14.97%) and dislocation (of elbow joint and wrist joint) in 08(04.79%) cases. Contusion is not considered separately as it was invariably seen with laceration and fracture-dislocation in every case.

Fracture Of Bones Of Upper Limb (N=25)

Table- XIX Distribution of study population in relation to fracture of long bones of upper limb (n=25)

Long bone involved	Frequency	Total no of cases	Percentage
Humerus only	15	167	08.98
Radius only	05	167	02.99
Ulna only	05	167	02.99
Total	25	167	14.97

It was seen from the above table that humerus was fractured in most of the cases (in 15 cases), followed by radius and ulna which were fractured in 05 cases each (02.99%)

Lower Limbs

Table –XX Distribution of injuries in study cases in the lower limbs (n=167)

Type of Injury	No. of Cases	Total no. of cases	Percentage (out of 100%)
Abrasion	111	167	66.47
Laceration	60	167	35.93
Fracture	18	167	10.77
Dislocation	10	167	05.98

It is seen from the above table that most common injury in the lower limb was abrasion as seen in 111(66.47%) cases, followed by laceration 60(35.93%) cases and fracture (femur, tibia, fibula) in 18 cases (10.77%) and dislocation 10 (05.98%) cases. . Contusion is not considered separately as it was invariably seen with laceration and fracture-dislocation in every case.

Fracture Of Bones Of Lower Limb (N=18)

Table- XXI Distribution of study population in relation to fracture of long bones of Lower limb (n=18)

Long bone involved	Frequency	Total no of cases	Percentage
Femur only	15	167	08.98
Tibia only	02	167	01.19
Fibula only	01	167	0.59
Total	18	167	10.77

It was seen from the above table that femur was fractured in most of the cases (in 15 cases), followed by tibia in 02 cases (01.19%) and fibula in 01 case only (0.59%).

V. Discussion

Table I shows Out of 3614 cases of autopsy done in NRSMCH Morgue, 588 cases were related to road traffic injuries which comprise 16.27% of all cases done in the year of 2016 that is from 1st January 2016 to 31st December 2016 among which 167 cases were selected for this study depending upon inclusion and exclusion criteria. In their study carried out in the Department of Forensic Medicine, RIMS, Imphal**, Momonchand et al (1988)**, found that, out of the total 310 autopsies carried out during 1985-87, 135 cases (43.5%) were death due to vehicular accidents. The figures in our present study show that, involvement of such incidents is almost less than one third in this part of the country.

Table II shows that most of the victims were found unconscious at the place of incidence in 83 cases (49.7%), followed by found dead in 43 cases (25.7%) and found conscious in 41 cases (24.6%).

It is seen from

Table III that a majority of the victims were hospitalized after the incident in 124 cases (74.25%) and remaining victims were not hospitalized in 43 cases (25.74%) as they died on spot and directly sent to Morgue via Emergency Department of NRSMCH.

It is seen from

Table IV that 52 cases (41.9%) were hospitalized in less than 30 minutes, 24 cases (19.3%) were hospitalized between 2-6 hours, 16 cases(12.9%) were hospitalized in greater than 6 hrs after incident, 26 cases(20.9%) were hospitalized between 1-2 hrs after incident and 6 cases(4.8%) were hospitalized in between 30 minutes-1 hour after the incident.

Table V shows that most of the victims as seen in 124 cases(74.25%) died in the hospital during treatment, followed by 43 cases(25.7%) died on the spot. **Sinha S.N. et al (1989)** carried out an retrospective study on the road traffic accident victims at Port Moresby, Papua New Guinea and found that about two out of three victims died either at the site of the accidents or soon after arrival at the hospital casualty department. **Ghose P.K. (1992)** recorded 56 (24.35%) of his total 230 cases as either spot dead or as brought dead.

Table VI shows that most of the victims survived for less than 1 hour after incident as seen in 65 cases(52.41%), followed by16 (12.9%) cases who survived between 3-6 hours of hospital admission and only 5 (4.03%) persons died after 7 days of hospital admission. **Sevitt S (1973)** reviewed the interval between injury and death in the 254 fatalities after road traffic accidents in Birmingham during 1969 and 1970. In round figures, about a third of the victims in the series died within half an hour, half by two hours, two-third by 24 hours and three-quarters by 2-4 days. **Chandra J. et al** found that 72.5% of the victims died within first 24 hours. **Finate L. et al (1992)** reported that 63% of the victims died within first 24 hours of the injury.

It is seen form

Table VII that majority of the victims as seen in 137 cases (82.03%) received scalp injury during the incident. In 105 cases (62.87%), scalp hematoma was seen, in 32 cases (19.16%), scalp laceration was present and in 30 cases(17.96%) no scalp injury was detected. **Modi (1997) A Kieth Mant (1984), Tyagi A.K. et al (1986)** reported that scalp injuries to be present in 76% cases. **Banerjee K.K. et al (1988)** reported that scalp injuries to be present in 77.7% of the cases in their study groups. **Chandra J. et al (1979):** found that contusions of the scalp were the commonest injuries of the scalp followed by lacerationIt is seen from

Table VIII that in 22 cases (68.75%) the scalp laceration was scalp deep and only in 10 cases (31.25) it was bone deep.

Table IX shows that skull fracture was absent in most of the study cases as seen in 120 cases (71.9%) and present in 47 cases (28.1%).

Table X shows that Temporal fracture involving squamous part of temporal bone was the most common in 11 cases(23.40%) along with fracture at multiple sites in 11 cases(23.40%), followed by Parieto-occipital fracture in 10 cases (21.29%), followed by Base of the skull fracture in 9 cases(19.15%) and 3 cases(6.38%) each of Frontal and Parieto-temporal fractures. **Finate L. (1979)** found that most common cranial bone fractured was temporal bone, comprising 44.96% followed by parietal bone with 32.01% of cases **Dalbir Singh (1996)** reported that temporal bone alone or in combination with other bones was most commonly fractured (76.34%), followed by fracture of parietal bone(76.34%), frontal bone (23.89%) and occipital bone (9.14%).

It is seen from

Table XI that fracture involving middle crania fossa was highest as seen in 5 cases (55.55), followed by anterior cranial fossa as seen in 3 cases (33.33%), where as posterior cranial fossa fracture was lowest as seen in only one case (11.11%).

Table XII clearly shows that most of the cases were Subdural haemorrhage as seen in 24 cases (23.54%), followed by Subarachnoid haemorrhage in 22 cases (21.57%), followed by combination of SDH and SAH in 16 cases (15.69%), followed by combination of EDH and SAH in 11 cases (10.78%), followed by in descending order – SDH + ICH in 10 cases(9.8%), SAH + IVH in 7 cases(6.86%). And 3 cases each were seen of ICH only, EDH + SDH, SAH + ICH and SDH + IVH. No cases were seen of EDH only and IVH only.
Subdural haemorrhage in combination was present in 67 cases of the total 102 cases of head injuries, i.e., 65.69% where as Subarachnoid haemorrhage in combination was present in 59 cases of the total 102 cases of head injuries, i.e., 57.84%. **Freytag (1962)** found EDH in 15% of the cases and SDH in 63% of the cases and SAH in 12% of the cases. He also found that in 63% cases of SDH, there was no injury to the brain. **Christopher C. Baker et al (1986):** Observed that in death due to head injuries in vehicular accidents, EDH was present in only 1.73% of cases, SDH was present in 52% of the cases.

It is seen from **Table XIII** that contusion (extravasation of blood over thoracic walls) was present in 31(18.60%) cases, laceration on chest wall was present in 07(4.1%) cases, fracture clavicle was present in 13(07.78%) cases, only Lt. rib fracture was present in 13(07.78%) cases, Rt. Rib fracture was present in 11(06.58%) cases, both side rib fracture was present in 18(10.77%) cases, lung injury in form of contusion and laceration was present in 31(18.6%) cases, sternal fracture was found in 2 cases (01.19%). Injury on heart and pericardium was not seen in any cases. 'Pattern of chest injuries in road traffic incident victims: A six-year retrospective study' **by Vijay Kumar , Ravindra S** etall showed 34.4% of victims had injuries to both the chest and head/neck and 16.7% had only chest injuries. The most common cause of death was asphyxia (38.3%), followed by shock and haemorrhage (27.8%). The bony involvement of the chest region was the fracture of ribs in 29.5%, clavicle fracture in 25.6% and sternum found fractured in 14.1% of victims. Of these victims sustaining intrathoracic injuries, the lungs were injured in 40.1%, the major blood vessels in 25.5% and the heart was injured in 20.3% of cases. Haemothorax was found in 38.3% and pneumothorax was seen in 20.7% of cases.

It is seen from **Table XIV** that spleen injury was present in 04(02.39%) cases, G.I. Tract injury was present in 03 (01.79%) cases, Liver injury was present in 24 (14.37%) cases, Kidney injury was present in 12 (26.35%) cases and Urinary bladder was injured in 10(5.99%) cases.The most common abdominal organ injured was the liver and the least common abdominal organ injured was the Gastro-intestinal tract. 'Evaluation of Chest and Abdominal Injuries in Trauma Patients Hospitalized in the Surgery Ward of Poursina Teaching Hospital, Guilan, Iran' by **Hossein Hemmati,[1] Ehsan Kazemnezhad-Leili** etall showed There were 24 cases (27.9%) with abdominal trauma which had penetrating lesions and 62 cases (72.1%) with blunt lesions. The most common lesions in patients with penetrating abdominal injuries were spleen (24.2%) and liver (12.1%) lesions.

It is seen from **Table XV** that fracture dislocation of the sacro-iliac joint was seen in 13 (07.78%) cases, followed by fracture dislocation of symphysis pubis joint as seen in 10 (05.99%) cases, and least common injury was dislocation of Hip joint in 3(1.79%) cases. 'Abdominal and pelvic injuries caused by road traffic accidents: characteristics and outcomes in a French cohort of 2,009 casualties' by **Cheynel N[1], Gentil J, Freitz**

M, showed Abdomino-Pelvic injuries were present in one third of the most severely injured victims of road traffic accidents and were a significant factor of gravity and mortality

Table XVI shows that most common organ injured in the study cases was brain as seen in 102(61.07%) cases, followed by lungs in 31 cases (18.60%), pelvis in 27 cases (16.16%), liver in 24 cases (14.37), kidney in 12 cases (07.18%), spleen in 04 cases (02.39%) and G.I tract in 03 cases (01.79%).

It is seen from **Table XVII** that vertebral column was injured in 16 cases (09.58%), in which cervical spine was fractured in 3 cases (01.79%), fracture-dislocation of cervical spines were seen in 6 cases (03.59%), where as thoracic and lumber vertebrae were fractured in 3 (01.79%) and 4 (02.39) cases respectively. 'Fatal cervical spinal injuries in road traffic accidents' by **Tolonen J, Santavirta S, Kiviluoto O, Lindqvist C** showed Front seat and rear seat passengers seem to have an equal risk of sustaining a fatal cervical spinal injury. However, front seat passengers have a significantly greater chance (P less than 0.001) of having fatal cervical spinal injuries than the drivers. Of the victims 21.1 per cent had worn safety belts but there was no statistical difference between those who did and those who did not wear safety belts. Increasing age seems to increase the risk of fatal cervical spinal injuries.

It is seen from **Table XVIII** that abrasion was the most common injury occurring in the upper limb as seen in 115(68.86%) cases, followed by in descending order laceration in 56(33.53%) cases, fracture (fracture of humerus, radius, ulna) in 25 cases (14.97%) and dislocation (of elbow joint and wrist joint) in 08(04.79%) cases. Contusion is not considered separately as it was invariably seen with laceration and fracture-dislocation in every case.It was seen from **Table XIX** that humerus was fractured in most of the cases (in 15 cases), followed by radius and ulna which were fractured in 05 cases each (02.99%).

Table XX shows that most common injury in the lower limb was abrasion as seen in 111(66.47%) cases, followed by laceration 60(35.93%) cases and fracture (femur, tibia, fibula) in 18 cases (10.77%) and dislocation 10 (05.98%) cases. . Contusion is not considered separately as it was invariably seen with laceration and fracture-dislocation in every case.

Table XXI shows that femur was fractured in most of the cases (in 15 cases), followed by tibia in 02 cases (01.19%) and fibula in 01 case only (0.59%). 'A study on injuries sustained in road traffic accidents at a tertiary care level' by **Thalappillil Mathew Celine, Jimmy Antony** showed fractures (42.7%) were more than superficial injuries (18.56%) and dislocations (2.6%).

VI. Conclusion & recommendations:

This study aims to contribute to some knowledge on road safety by studying patterns and distributions of injuries over body following road traffic incident with an expectation to facilitate increased interdisciplinary cooperation and sincere commitment from ourselves to prevent road traffic incidents.

One thing to be kept in mind that road traffic incident though very much high in number in present days but are preventable too with a little effort from us and also from the law enforcing agencies to combat the issue by close coordination and collaboration among many sectors and disciplines.

The major problems revealed in our study are as follows:

1. Inadequate ambulatory services to transport the victim from spot to hospital
2. Inadequate rather deficiency in number of trauma care centres.
3. Though safety measures are incorporated in vehicles, these appear to be ineffective in most of the cases due to lack of monitoring on the part of traffic related law enforcing agencies.

From the observations made in our study we like to recommend the followings:

- Making provision of adequate foot-paths for pedestrians and strict prevention of encroaching of foot-paths by hawkers.
- Setting and enforcing appropriate speed limits on specific roads
- Setting and enforcing laws regarding occupants of the vehicles to wear safety belts, similarly wearing helmets for the rider and pillion rider of two-wheelers.
- Strict monitoring on drivers to check blood alcohol concentration and strict implication of existing laws on 'drunken driving'
- While issuing driving licence proper care should be taken to hand over the licence who are really worthy of it.
- Driver education courses should be made more approachable and taught sincerely along with constant motivation by using different social media platforms
- Urgent improvement in trauma care centres by their number and as well as infrastructures and adequate and equipped ambulatory services.

Lastly we strongly believe it is the problem created by us leading to our own sufferings as well as suffering of others. Blaming only law enforcing agencies will not solve the problem until we are motivated for our personal security on roads. A little cooperation and sincere motivation from our side can easily solve the so called curse of this modern jet era or the so called pathology of modernization and development.

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