

Original Research Article**Changing Trend in the Clinical Case Profile of Trauma in North Andhra**

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**Abstract****Introduction:** Trauma has become a point of major concern these days with increase in its incidence esp. highway trauma due to the increase in vehicular traffic and other personal factors of the drivers.**Aims:** To study the changing pattern of trauma case profile that occur along the national highway passing through the state of Andhra Pradesh.**Material & Methods:** In the present study for the period 2016 – 2018, about 2,895 I.P. cases of trauma consisting RTA (Road Traffic Accidents), falls and assaults cases is analysed in detail to know the implications of trauma burden over the population & economy. It is a retrospective observational study. The cases are reported at a nodal "level one" trauma care center situated at King George Hospital, Visakhapatnam along the National Highway – 5 passing through North Andhra Region as shown in the map. Trauma care centers of various categories like level 1, 2, 3 are established throughout India along the course of quadrangle national highway at 100 km. one each. The need for the ventilator & emergency surgery are studied. The results are compared with other similar studies in India.**Results:** Traumatic brain injury (TBI) is the commonest (60%) of Road traffic accidents (RTA) and also the commonest cause of death. Trauma due to falls constitute 34% of TBI significantly. RTA is the commonest cause of overall trauma cases reported. Poor lighting, narrow roads, heavy traffic and lack of proper incremental traffic release system at junctions are the causes for RTA. Head injury is still the commonest of RTA and also the commonest cause of death among trauma cases which indicates the non use of helmet by the commonest young passenger two wheeler drivers on highways.**Conclusions:** Two-thirds of deaths in the mildly injured patients were preventable, and this subgroup is identified for future intervention. Improvement in Indian trauma care can begin by shifting the focus away from the individual providers and their errors to a system wide perspective.**Keywords:** Trauma, RTA, TBI, deaths, epidemiology, changing trend.**Introduction****Definition:** Trauma means wound in Greek.

Trauma implies that a physical force exerted on a

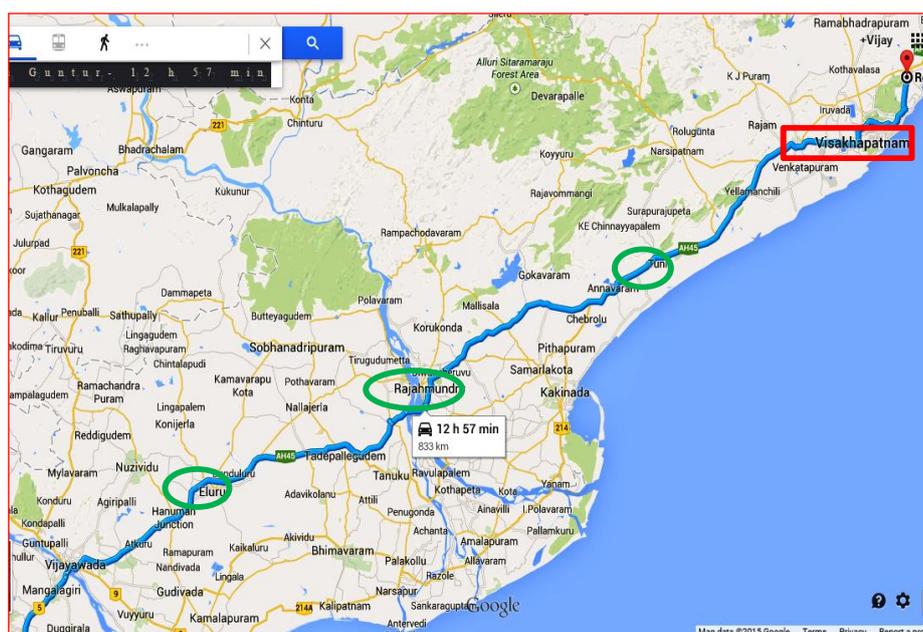
person has led to a physical injury. Major trauma denotes injuries to more than one body region and organ system, ISS (Injury severity score) greater

than 15. It accounts for 15% of all injured patients. RTA, falls and intentional violence are identified as major vectors of traumatic injury. Young patients are involved in RTA characterised by high energy transfer, older patients may sustain injuries from falls of low energy transfer report with fragility fractures.

**Epidemiology:** By 2020, road traffic death in India will increase by 147%, economic loss of India due to RTA is 3% of India's GDP. During 1970-2011, there is 7.3 times increase in road traffic accident injuries. As per ICMR study of causes of death by verbal autopsy revealed that injury ranked among the first five major cause in adults and is the leading cause of mortality for young adults less than 45 yrs. According to national crime records bureau, Delhi, maximum no. of accidents occur between the age group 15-44 years. Injuries account for more premature deaths than cancer, heart disease or HIV. About 1.9 million are hospitalised due to injury. 35% of all emergency cases are due to injuries. Persons less than 45 years account for 60% of all injury fatalities and hospitalisation and 78% of all causality dept visits.

**Scope & Limitations to the study:** Trauma due to stabbing, drowning, Burns, fire arms, blasts,

hanging and sports are not included in the present study. Except injuries due to crimes, accidents of almost all sorts are included in the present study. Difficulties in comparison with other studies arise due to the lack of common or same parameters in all the studies. Latest study by Tejinder Singh published in Nov 2018 revealed most victims are passenger drivers, 50% occurred in 25-44 age and 52% occurred in the evening to night, 42% are motor cyclists, 77% had driving licence, 10% used mobile phone while driving, 22% never used dipper, only 22% used helmet, 15% never used seatbelt, 6% are intoxicated under influence while driving. out of which 85% used alcohol and 15% used drug substance. 96% victims were involved in speed drive. Traumatic brain injury (TBI) is major health problem in India and is the commonest reported in RTA. An epidemiological study in Bangalore indicates that the incidence, mortality and case fatality rates were 150/1,00,000, 20/1,00,000 and 10%, respectively. The most common cause of TBI normally reported in our country are road traffic accidents (RTA) accounting for 60% followed by falls and assaults contributing to 25% and 10% of traumatic brain injuries respectively.



NH-5 passing through AP state with trauma care centers.

**Triage:** Means “sort out” in French. It is system to attend trauma patients formulated by committee of trauma of the American College of Surgeons. <sup>Table-1</sup> **Atls & Phtls** are the two components in triage. ATLS is Advanced Trauma Life Support which is essential for the first hour care of the injured patient. PHTLS is Pre-Hospital Trauma Life Support is to prevent deaths during transport to the hospital.

#### Types of Triage System:

**Multiple casualties:** Staff and facilities are sufficient but priority is given to life threatening injuries. **Mass Casualties:** Staff and facilities are not sufficient to manage. Here those who are likely to have highest chance of survival are given priority. There are four steps to consider under

triage algorithm. **Step 1** is to assess physiological impact by measuring vital signs like BP, Respiratory rate and level of consciousness by Glasgow coma scale and revised trauma score based on air way. **Step 2** to assess anatomical impact like penetrating injuries and fractures and **Step 3** to assess mechanism like crash or blast injuries and finally **Step 4** to assess history of the patient. These steps are important to consider to shift the patient to the trauma center which is important in multiple and mass casualties like fire, blast, automobile and train accidents. **RTS (Table 1):** It is revised trauma score. Glasgow coma scale, systolic blood pressure and respiratory rate are used as parameters. It comes between 0 – 8. Value < 4 needs critical care.

**Table: 1** ATLS (Advanced trauma life support) – Algorithm of initial assessment & Management

REVISED TRAUMA SCORE			
GALSGOW COMA SCALE	SYSTOLIC BLOOD PRESSURE	RESPIRATORY RATE	VALUE
13-15	>39	10-19	4
9-12	76-89	>29	3
6-8	50-75	6-9	2
4-5	1-49	1-5	1
3	0	0	0

Score < 3 is of poor prognostic value.

**Seat belt injuries:** In an individual with seat-belt during impact, violent deceleration of human body occurs. Seat-belt impinges heavily on its point of contact with trunk and viscera continue to move forward. It leads into severe contusion of abdominal contents; detachment of bowl from its mesentery due to free forward rapid mobility of the bowel over a relatively fixed mesentery Solid organ injury occurs only occasionally. Two point anchorages causes solid organ injuries like of liver/spleen. Lap-belt causes contusion and bowel injury commonly. It is often difficult to identify the injuries due to presence of more obvious other injuries. CT Chest and Abdomen, diagnostic peritoneal lavage (DPL) are very useful. Petechiae around iliac crest of costal margin are signs wherein one can suspect seat-belt injuries. Distraction fracture of lumbar spine (chance fracture) with hyper-aesthesia of T12 and L1 level is often associated. 10% of such fractures are

associated with intra-abdominal injuries. Treatment is immediate laparotomy and proceed – bowel suturing/resection/suturing of the organ injuries/splenorrhaphy/splenectomy.

#### Material & Methods <sup>Table-2</sup>

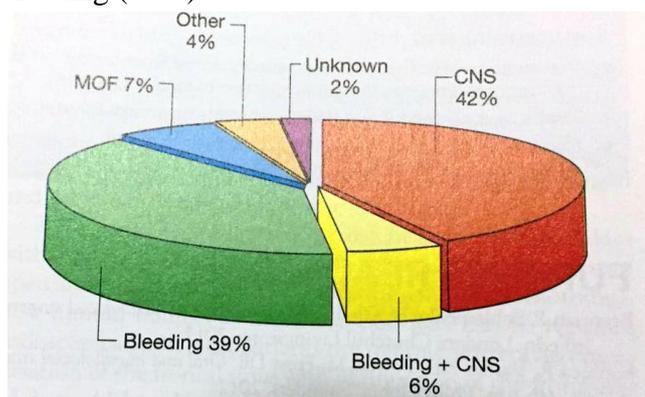
In the present study for the period 2016 – 2018, about 2,895 I.P. cases of trauma consisting RTA (Road Traffic Accidents) and falls and assaults cases is analysed in detail to know the implications of trauma burden over the population & economy.

**Study design and setting-** It is a retrospective observational study. Data and statistics are tabulated upto the availability period of January, 2016 to December, 2018. Permission to conduct research is obtained. The corresponding author worked as incharge trauma care centers at different places in Andhra Pradesh state including at the largest King George Hospital<sup>11</sup> (KGH). The

cases are reported at a nodal “level one” trauma care center situated at 2000 bedded KGH estd. in 1926 Visakhapatnam along the National Highway – 5 passing through North Andhra Region as shown in the map. The trauma care center is a 30 bedded dedicated center with 6 bed ICU and attached CT scan center. Trauma care centers of various categories like level 1, 2, 3 are established throughout India along the course of quadrangle national highway at 100 km. one each. Medico legal considerations, the need for the ventilator & emergency surgery are studied. The results are compared with other similar studies in India in the light of western experience and WHO<sup>8</sup> data.

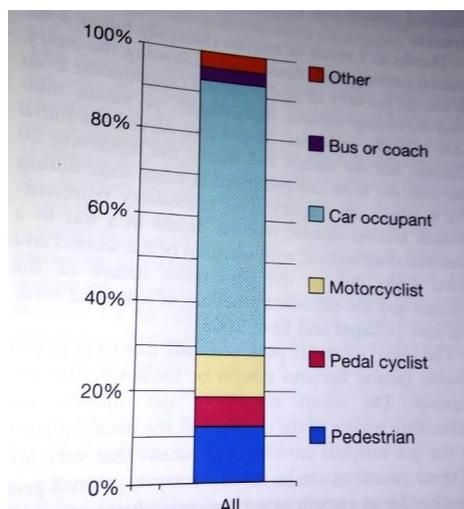
**Diagram: 1**

Most common cause of death<sup>10</sup> in trauma is CNS injuries (42%) followed by hypovolemia due to bleeding (39%).



**Causes of death in trauma**

**Diagram : 2**



Proportion of casualties by road user type (UK 2007 Dept. of transport data) 66% of accidents are car occupants followed by pedestrians & motor cyclist in UK.

**Results & Discussion**

As per the data collected, spread over excel sheet and tabulated the following conclusions are drawn: Most common age group affected in RTA<sup>13-15</sup> is 20 – 60 years. In the west injuries due to falls are more common esp. In old age above 75 yrs. Even in India injuries due to falls at home and on roads due to alcohol<sup>9</sup> consumption is the second most common (34%). The usage of 108 ambulance of the State Govt. is in increasing use these days on rural roads. First aid provided at the scene of accident is variable but until 2013 it was done by 108 personal. Most of the cases(>90%) are done medico legal procedures. Status of the patient at the time brought to the casualty was mostly unconscious and few are brought dead. At the casualty of the tertiary care center also triage, ISS, RTS principles are applied. About 10% are admitted and 70-90% are treated conservatively.

Table-3 As per the data of the CT brain findings, contusions are 314 out of 552 scans amounting to 56.88% i.e., about half of all the CT brain scans. Frontal and fronto-temporal take the lot among contusions. Next comes SDH and SAH in equal proportion. Front impact injuries are more common than side impact injuries.

<sup>6,8</sup>WHO recommended preventable death panel meetings to improve the system related issues. The consensus of contributing factors for trauma deaths, produced by the national and international panels, are presented. The problem areas ascertained were resuscitation, lack of trauma care protocols, and air-way, surgery and long-stay complications. The consensus on early causes of death were haemorrhage, inadequate fluid resuscitation, and inadequate airways. The late contributors to death were systematic factors, ventilator management, disseminated intravascular coagulation (DIC) and sepsis.

**Large prospective, multicentric, observational cohort study** of 2523 in-hospital trauma deaths in India presented by the Dept. of Surgery, BARC hospital Mumbai by Nobhojit Roy and Deepa Kizhakke Veetil in 2017 as per BMC health services research revealed unchanged mortality trend in India despite advances in imaging and

medical technology. India's 30-day trauma mortality rate is twice that of high income countries is due to high clinical load, low resources and high out of pocket expenditure. Low cost interventions can improve trauma care outcome.

**Table - 2**

<b>TRAUMA - CASE PROFILE STATISTICS - 2016 TO 2018</b>				
<b>Variables</b>	<b>2016 Yr</b>	<b>2017 Yr</b>	<b>2018 Yr</b>	<b>Total</b>
<b>O.P.</b>	10191	9885	8422	28498
<b>I.P.</b>	971	1142	782	2895
<b>IP %</b>	9.53	11.55	9.29	10.12
<b>MALE</b>	833	888	651	2372
<b>FEMALE</b>	138	254	131	523
<b>M/F RATIO</b>	6.04	3.50	4.97	4.83
<b>LAMA</b>	114	85	52	251
<b>SHIFT</b>	436	770	508	1714
<b>RTA</b>	493	543	321	1357
<b>FALLS</b>	387	535	426	1348
<b>ASSAULT</b>	29	28	20	77
<b>MLC</b>	954	1139	773	2866
<b>NON-MLC</b>	17	3	9	29
<b>CONSERVATIVE</b>	841	994	662	2497
<b>SURGICAL</b>	130	148	120	398
<b>HEAD INJURY</b>	822	914	650	2386
<b>SPINE INJURY</b>	24	80	58	162
<b>POLY TRAUMA</b>	169	192	123	484
<b>DEATHS</b>	294	264	215	773

**LAMA - LEFT AGAINST MEDICAL ADVISE.**

**RTA - ROAD TRAFFIC ACCIDENT.**

**MLC - MEDICO LEGAL CASE**

In the present study RTA constitute about 58% of the total IP trauma cases. Head injury constitutes

87.61% of the total RTA. Death rate is 3.33% of the total OP trauma cases reported.

**Table : 3**

<b>CT BRAIN – <sup>21-23</sup> TBI - FINDINGS - AREA OF BRAIN AFFECTED - ANALYSIS OF 552 CASES for the yr 2018</b>						
<b>AREA</b>		<b>CONTUSION</b>	<b>EDH</b>	<b>SDH</b>	<b>SAH</b>	<b>TOTAL</b>
Frontal	Right	39	10	7		<b>56</b>
	Left	39	7	6	1	<b>53</b>
	Un-Sp	34	1	4		<b>39</b>
Parietal	Right	5	10	3	1	<b>19</b>
	Left	13	3	3	1	<b>17</b>
	High Parietal		8	1		<b>11</b>
	Un-Sp	7		2		<b>7</b>
Temporal	Right	29	7	4	1	<b>41</b>
	Left	46	4	3	4	<b>57</b>
	Un-Sp	5	11			<b>16</b>
Occipital	Right		2			<b>2</b>
	Left	2	1			<b>3</b>
	Un-Sp	1	1			<b>2</b>
Fronto-Parietal	Right	3	1	3		<b>7</b>
	Left	3	2	3		<b>8</b>
	Un-Sp	2				<b>2</b>

Fronto-Temporal	Right	4	2	5	3	<b>14</b>
	Left	7	2	5	2	<b>16</b>
	Un-Sp					
Parieto-Occipital	Right		1			<b>1</b>
	Left					
	Un-Sp	2				<b>2</b>
Temporo-Occipital	Right					
	Left	1				<b>1</b>
	Un-Sp					
Temporo-Parietal	Right		3	7		<b>10</b>
	Left		9	9	2	<b>20</b>
	Un-Sp		1			<b>1</b>
Fronto-Temporo-Parietal	Right	28		27	3	<b>58</b>
	Left	40		36	3	<b>79</b>
	Un-Sp	4		4	2	<b>10</b>
<b>Total :</b>		<b>314</b>	<b>86</b>	<b>132</b>	<b>23</b>	<b>552</b>

Brain stem – 23 contusions, 1 SDH, Cerebral – 1, Cord – 2 contusions, Ventricular – 1, Others – 97, Total – 125..... Grand total – 552 + 125 = 677. Frontal area is affected most often (148), followed by temporal (114). Hence, frontal impact injuries are significant in TBI.

As per the data of the CT brain findings, contusions are 314 out of 552 scans amounting to 56.88% i.e., about half of all the CT brain scans. Frontal and fronto-temporal take the lot among contusions. Next comes SDH and SAH in equal proportion. Front impact injuries are more common than side impact injuries.

### Conclusions

In this study, more than half of the hospital trauma deaths could have been prevented. Airway management, fluid resuscitation and haemorrhage control are the early contributors to death identified in the Indian urban setting. Lack of surgical protocols and surgical decision making were identified as systems-related opportunities for improvement. Two-thirds of<sup>11</sup> deaths in the mildly injured patients were preventable, and this subgroup is identified for future intervention. Improvement in Indian trauma care can begin by shifting the focus away from the individual providers and their errors to a system wide perspective.

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Conflict of Interest: No.

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