Document heading: Research Article

Retrospective Study of Road Traffic Accident (RTA) Injury Case Profile in North Andhra

Mohan Patro P[1,2], Kodandarao Kuna[2], Tejareddy[2], K. Satyavara Prasad[3]

[1]Faculty, Professor Dept. of General Surgery, GIMSR (Gitam Institute of Medical Sciences & Research), India
[2]Faculty, Dept. of General Surgery, GIMSR (Gitam Institute of Medical Sciences & Research), India
[3] Director, Vishakha Institute of Medical Sciences(VIMS), Prof. & HOD, Dept. of Neurosurgery, King George Hospital-Andhra Medical College, Visakhapatnam, India

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Abstract

Introduction: In the light of increasing rise of vehicular traffic and the accident rate causing great loss to the economy, effective measures have to be taken to control it and to treat the injured victims. **Aim** – to study the case profile of road traffic accident (RTA) injured patients reported at the trauma care center, King George Hospital (KGH), Visakhapatnam, situated in North Andhra along the National Highway – 5 (NH-5). **Material & Methods**: It is a study of data related to trauma cases reported at the trauma care center, KGH for the period 2011 – 2018. It is a retrospective study of about 6532 inpatients out of which 3451 are RTA injury cases. And compared with similar studies of other parts of India. **Results & Discussion:** About 10% are IP admissions and death rate ranges from 3 – 4%. 13 – 30% of IP admissions underwent emergency surgery at trauma OT. About 90% are MLC the cases and death rate has been decreasing from 2011 to 2018 even with increasing number of accidents. Alcohol intoxicated cases constitute about 17 – 46%, are high in this study which is about 15% in other studies. Age group involved is 21 – 50 years young driving two wheelers, mostly occurred from 7PM to 1AM in the ratio of 1:3 morning to evening which conforms with other studies. Most of the total trauma cases are due to road traffic accidents followed by cases due to falls. Head injury is the commonest RTA injury followed by poly trauma which includes soft tissue and bone & joint injury. **Conclusions:**Most fatal accidents are preventable and a comprehensive multi programme approach can mitigate most of them. Cashless treatment policy in emergency trauma victims is obligatory. Controlled incremental release of traffic at junctions can prevent accidents. [18]Helmet and seat belt usage must be made compulsory on state and national highways. L and U road bends must be elimated along highways.De-addiction centers have to be opened at all highway hospitals.

Key words: RTA,Case,Accident.

Introduction

Trauma is a major public health problem. 50% die immediately at the time of accident, 25% die in golden hours of trauma (first 4 – 6 hours of trauma), and another 25% die during treatment due to sepsis and other complications. Injuries may be penetrating, blunt, blast, chemical and electrical.

**Correspondence*
Dr. Kodandarao Kuna
MS(GS)
Faculty, Dept. of General Surgery,
GIMSR – Address :Flat No. 401, Orchid's Apartment, Ocean View Layout, Pandurangapuram,
Visakhapatnam – 530003, India.
E- Mail: kkraomsgs@gmail.com

Of the several causes of trauma, RTA (Road Traffic Accidents) take maximum chunk of share of about 70 – 80%. The economic burden to the family of victims and to the society and nation is significant even affecting the Nation's GDP to the extent of 2 – 3%. The growing incidence of RTA Trauma has attained an epidemic proportion at present due to some important factors like increase in traffic, population and number of vehicles, bad and narrow roads, poor lighting along road side, poor traffic control at junctions and alcoholism.

Triage : Means "sort out" in French. It is system to attend trauma patients formulated by committee of trauma of the American College of Surgeons. **Definition** : It is the process of clinical sorting out a

group of trauma victims at the reception room according to severity of injuries and the urgency of threat to their lives or limbs also means avoiding the ineffective use of time and scarce resource and concentrating on those victims having better chance of survival. The criteria of triage are BP<90mm of Hg, pulse >120/min, resperitatory rate >35 or < 12/min, penetrating injuries, uncouscious patients, traumatic amputation of extremities, flail chest and two long bone injuries. 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 : 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. Injury to atleast two organ systems with a potential life threatening condition of the patient. Injuries of RTA, Train Accidents, Warfare blast injuries, fall from heights come under polytrauma. It is either multiple fractures in limbs and spine or multiple system injuries involving head, thorax, abdomen and pelvis of victims of accidents. 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 oragn injuries like of liver/spleen. Lap-belt causes contusion and bowel injury commonly. It if 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-aesthesis 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. **Risk factors :** Speed drive, violating traffic rules, poor lighting, narrow and bad roads, heavy traffic, more usage of three and four wheelers, non use of helmet or seat belt, poor traffic control at junctions all the 24 hours, usage of vehicles of more than 15 years old are the main factors risking RTA. [6,9,15]**INDIAN SCENARIO :** The increase in economic growth in India coupled with rise in population, motorization and industrialization has contributed to a significant increase in TBI with each advancing year. An epidemiological study in [6,7,11,16]Bangalore indicates that the incidence, mortality and case fatality rates were 150/1,00,000, 20/1,00,000 and 10%, respectively.

ICMR Study

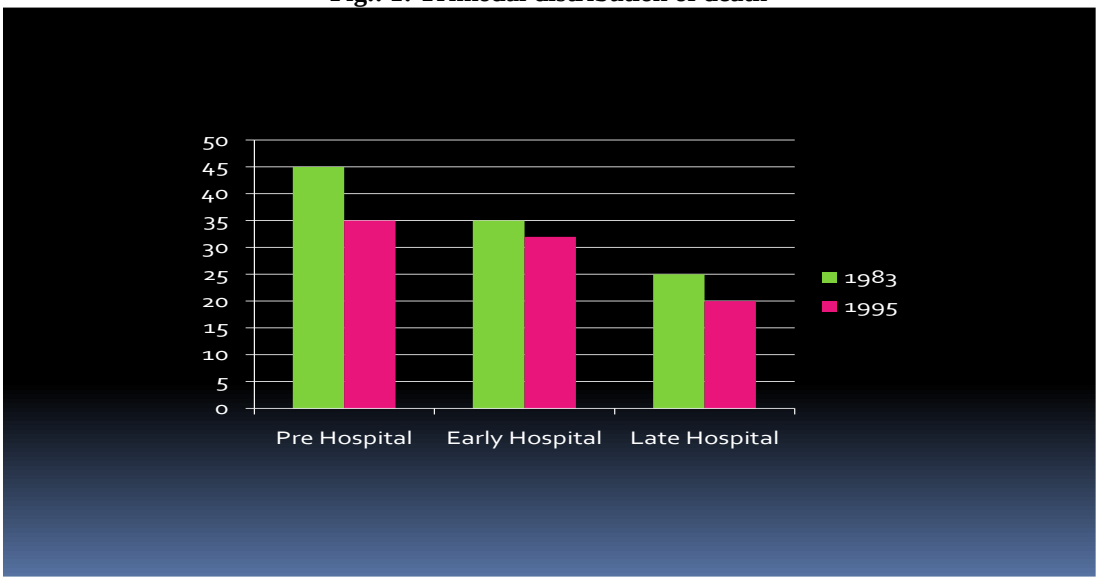
On causes of death by verbal autopsy revealed that injury ranked among the first five major cause of death in adults, it is the leading cause of mortality for young adults less than 45 years and a major burden of disease across all age groups placing heavy burden on nation economy and family.

Epidemiology

Between 15- 44 years of age, RTA is the leading cause of death. Between 15-24 years, 8 out of every 10 deaths in young are due to injuries. Injuries account for more premature deaths than cancer, heart disease, or HIV. 50%% of deaths occur at the scene within minutes or en route to the hospital due to bleeding, 20-30% die of neurological dysfunction within several hours to 2 days post-injury, 10 – 20% die of infection or multiple organ failure within days or weeks. Every year 1.9 million are hospitalized due to injury 27 million are treated in the emergency department. Injuries account for an estimated 8% of all hospital discharges, 37% of emergency department visits, and 35% of all emergency medical services transport. Nonfatal injures lead to reduced quality of life and high costs accrued to the health care system, employers and society in general. Persons more than 65 years account for 25% of all injury deaths and 30 % of injury related hospitalization. 70% of injury deaths and more than 50% of non fatal injuries occur among males. Rate of injury deaths ratio for male and female is 2:1. Rate of

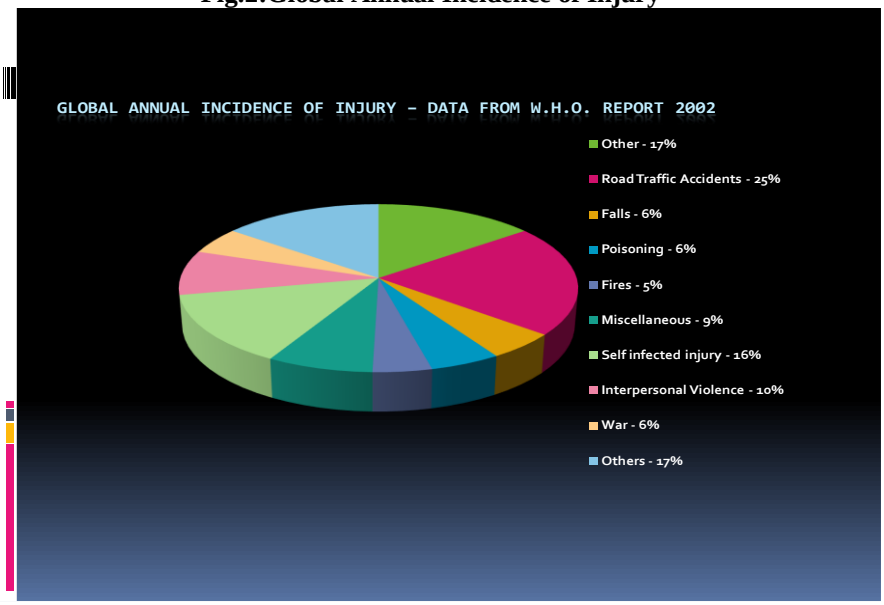
nonfatal injury for male and female is 1.3:1. But over 65 years of age the ratio for male and female is 1:1.3. The above statistics are frightening and calls for immediate attention to rein the deleterious effects of injuries on the mankind. RTA is the tenth leading cause of death world wide, will become the third leading cause of disability **adjusted life years** lost world wide by 2020. 90% of global RTA occur in developing countries RTA is the most common cause of death of people between 5 – 25 years of age. According to [7]**World health report 2002** of the global burden of injuries 30% of morbility and another 30% mortality occur in [10]South East Asia region. By 2020 the road traffic death in [6,9]India will increased by 147% according yr 2000 estimate the economic loss of India due to RTA is 3% of India's GDP. Kuppu Swamy's Socio Economic Index is applicable here[24 – 34].

Fig.: 1: Trimodal distribution of death



Trimodal distribution of death at all the stages of managing the injured patients there is decrease in death rate over years from 1983 to 1995. In the early hospital modal the cause of death is due to bleeding.

Fig.2:Global Annual Incidence of Injury



As per [30]WHO report above the most common cause of trauma is RTA.

Fig. 3:Incidence of Death – 42% CNS Injuries, 39% bleeding

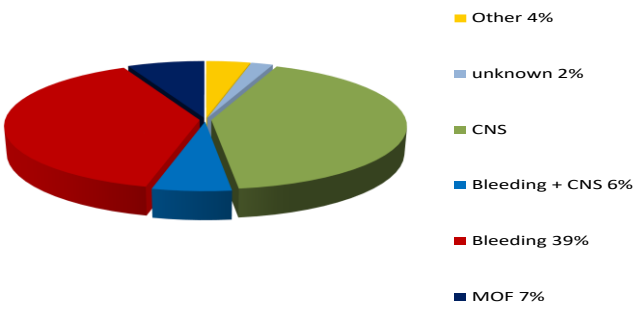
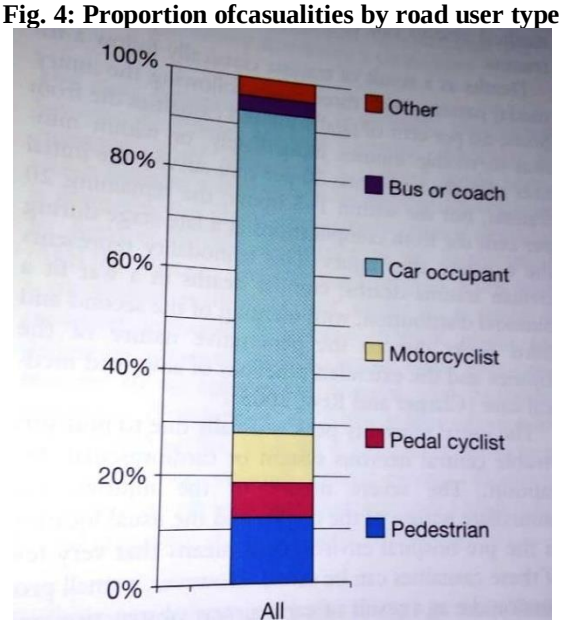


Fig. 4: Proportion ofcasualities by road user type



Proportion of casualties by road user type (UK 2007 Dept. of transport data) 26 – 92% of accidents are car occupants in UK.

Material & Methods

Methodology-Study design

Retrospective observational. **Setting** – tertiary hospital level one 30 bedded trauma care center (Including ICU) situated at King George Hospital, Visakhapatnam, caters to North Andhra consisting of the districts of Visakhapatnam, Vizianagaram and Srikakulam for a population of about 80 lakh. The national highway NH-5 starting from Chennai ending at Kolkata passes through North Andhra districts. The KGH is a premier level one super speciality tertiary care hospital estd. in 1926 consisting of about 2000 beds, one of the busiest hospitals in India. TRAUMA CARE FACILITY AT KING GEORGE HOSPITAL (KGH), VISAKHAPATNAM, AP : The dedicated traumacare center is a 30 bedded ward with 6 bed ICU, 6 ventilators & multi channel monitors, transport ventilator, central oxygen & suction, neuro anaesthesia, Craniotome and drills, C-arm, Bipolar cautery, Pressure gradient suction apparatus, Microsurgical instruments, Haemostatic agents and dural patches and trained staff for traumacare, ICU and OT apart from

neurosurgeons, orthopaedcians and general surgeons. CT scan is attached to the center. Data acquired with permission and clearance for the study. The study material : 6532 cases of trauma on admission out of which 3451 are RTA patients - is the component of the present study. Demographic variables like the rate, ratio, incidence and the parameters like age, sex, type of vehicle, factors influencing driving like alcohol, MLC, ventilator use, ICU role are considered for the present study at the present gitam institutional level of research center. The data collected was analysed in excel sheet of MS-Office with SPSS software application.

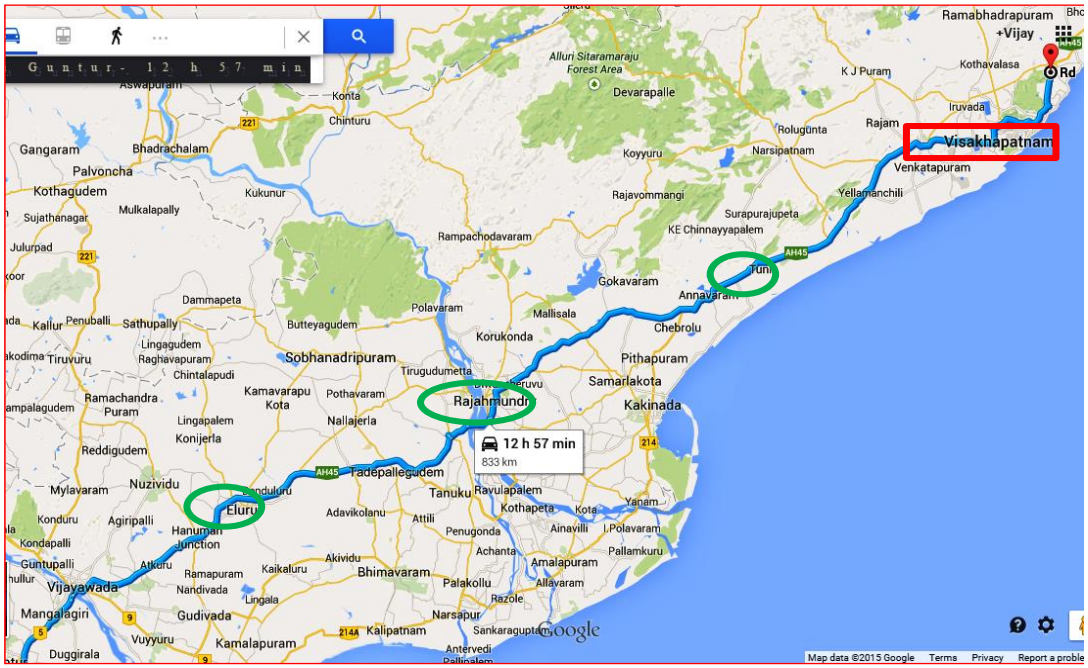


Fig. 5:National highway 5 passing through AP state – Trauma Care Centers in Green Circle

Table-1: TRAUMA - RTA CASE PROFILE STATISTICS - 2011 TO 2018

TRAUMA - RTA CASE PROFILE STATISTICS - 2011 TO 2018									
YEAR	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**TOTAL**
O.P.	8246	8554	8710	8424	9425	10191	9885	8422	71857
I.P.	662	736	640	797	802	971	1142	782	6532
I.P %	8.03	8.60	7.35	9.46	8.51	9.53	11.55	9.29	72.3166
MALE	544	588	503	650	637	833	888	651	5294
FEMALE	118	148	137	147	165	138	254	131	1238
M/F RATIO	4.61	3.97	3.67	4.42	3.86	6.04	3.50	4.97	4.38

DISCHARGE	4	0	2	31	17	127	23	7	211
LAMA	97	108	74	99	88	114	85	52	717
SHIFT	250	265	243	330	410	436	770	508	3212
RTA	404	388	359	453	490	493	543	321	3451
FALLS	179	184	142	198	204	387	535	426	2255
ASSAULT	12	25	16	21	14	29	28	20	165
MLC	550	598	517	686	766	954	1139	773	5983
NON-MLC	112	138	123	114	36	17	3	9	552
CONSERVATIVE	530	515	434	638	673	841	994	662	5287
SURGICAL	132	221	206	159	129	130	148	120	1245
HEAD INJURY	**622**	**682**	**590**	**721**	**722**	**822**	**914**	**650**	**5723**
SPINE INJURY	30	43	39	36	24	24	80	58	334
POLY TRAUMA	154	153	81	112	98	169	192	123	1082
DEATHS	311	363	321	337	287	294	264	215	2392

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-2: CT SCAN BRAIN FINDINGS DATA ANALYSIS OF HEAD INJURY OF RTA PATIENTS 2011 – 2018[20]

YEAR	CONTUSION	SUB ARACHNOID HAEGE	SUB DURAL HAEGE	EXTRA DURAL HAEGE	DIFFUSE AXONAL INJURY	QUADRIPLEGIA	OBSTRUCTIVE HYDROCEPHALUS	MASS EFFECT	MILDLINE SHIFT
2011	105	187	104	86	52	24	6	12	3

2012	262	223	155	72	16	29	30	34	52
2013	268	128	159	88	35	20	29	31	87
2014	316	183	165	92	56	10	30	19	94
2015	331	203	203	103	110	5	10	37	80
2016	378	210	182	111	92	6	4	47	113
2017	385	255	187	129	42	31	1	101	214
2018	299	144	163	86	44	21	2	57	94
TOTAL	**2344**	**1533**	**1318**	**767**	**447**	**146**	**112**	**338**	**737**

SCALP HEMATOMA - 125 , INTRA CEREBRAL HAEMORRHAGE - 4, NO INJURY ON CT - 123. TOTAL -7742.

As per the CT brain data in the table above, the commonest finding is contusion followed by sub arachnoid haemorrhage(SAH) and Sub Dural Haemorrhage (SDH). About 10% have mid line shift and about 5.8% are cases of diffuse axonal injury which are of poor prognostic concern. SAH, SDH and EDH constitute about 50% of cases of head injury.

Table-3: Comparative Indian Studies on RTA Injuries

COMPARATIVE INDIAN STUDIES ON RTA INJURIES				
PLACE	**PERIOD**	**AUTHOR & SAMPLE SIZE**	**TYPE OF STUDY & SETTING**	**FINDINGS**
[5,27]Bhopal	Jan 2009 - Oct 2011	Khare neeraj - 1268	retrospective observational - tertiary care hospital	age 16 - 31 yrs (51%), 6 pm - 12 pm(62%), 3.15% mortality, 64% head injuries
[4,12,13]Pune	Oct 2009 - Feb 2011	S M Pathak - 182	cross sectional - tertiary care hospital	age 20 - 30 yrs, 6pm - 10 pm & monsoon, 27.35% junior drivers, 48.6% soft tissue injuries
[3]Udaipur	Jul 2010 - Dec 2010	Solanki S L - 400	retrospective observational - tertiary care hospital	age 15 - 45 yrs, 5pm - 9 pm (50%), 77% fatigue/lack of sleep, 8.50% mortality.
[2,14,17,19,22,23] New Delhi	Jan 2011 - Dec 2011	Puneet misra - 900	cross sectional - tertiary care hospital	age 16 - 30 yrs, midnight - 6 am, 63% used helmet, 32% used seat belt

[1]Amritsar	Jan 2012 - Dec 2012	Tejinder singh - 1425	descriptive - tertiary care hospital	age 25 - 44 yrs, 4 am - 12 pm, 6% alcohol, 10% used mobile phone while driving, 20% never used helmet, 15% not used seat belt. 25.30% mortality.
Present study Visakhapatnam	**Jan 2011 - Dec 2018**	**Kodandarao K - 6532**	**retrospective observational - tertiary care hospital**	**age 21 - 50 yrs, 7 pm - 1 am, 17 - 46% alcohol consumed, 3-4% mortality.**

Common factors to all studies - younger age group involved, mostly males, two wheelers.

Kenya study - 31% pedestrians affected in RTA.

Donald A. observations - cell phone use has four times higher rate of accidents - New Eng J. of Medicine

Gregerson & Bjurulf Postulates - Inexperience is more important factor than youth in causing accidents.
National Crime Records Bureau, New Delhi - Maximum number of RTA cases reported between age group 15 - 44 yrs.

Fig. 6 Trauma and alcohol intake relation

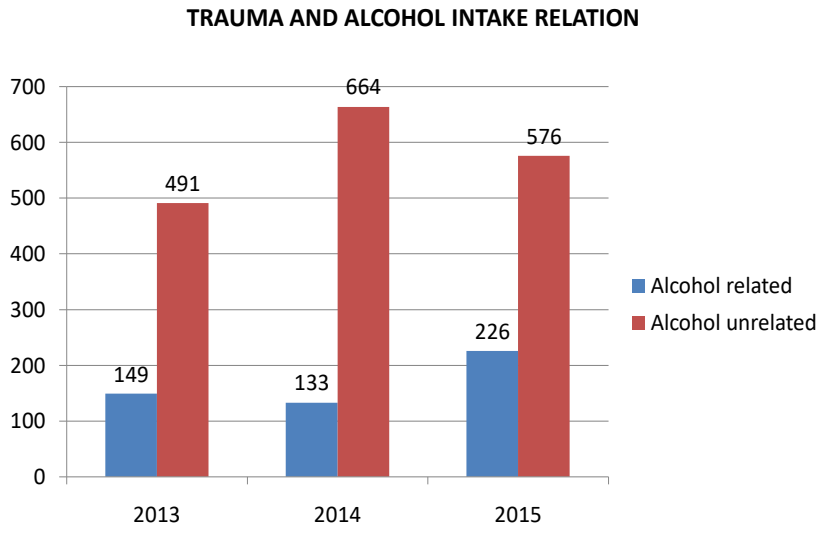


Fig. 7: Protective devices and RTA

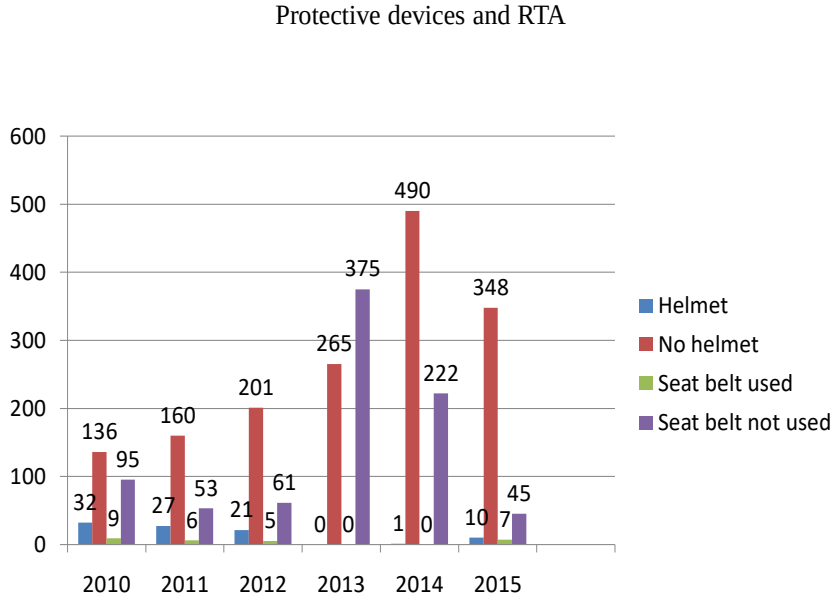


Fig. 8:Incidence of Trauma with respect to mode of Accident

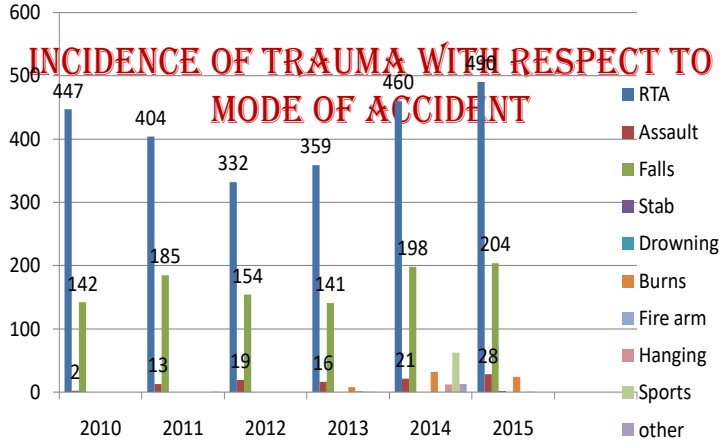


Fig. 9:Pathology wise

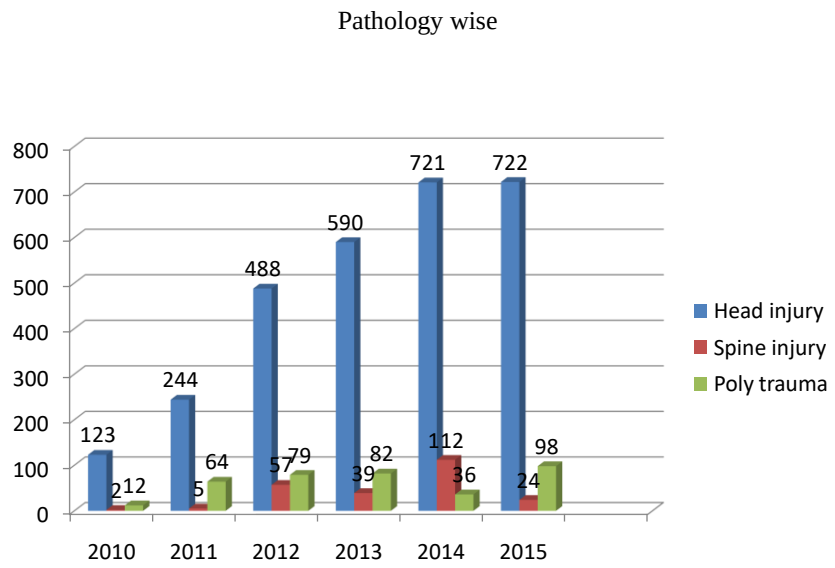


Fig.10: Ventilator requirement

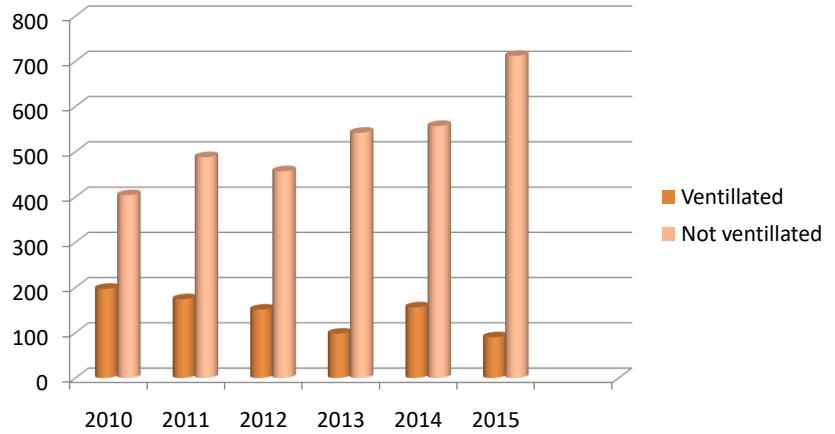


Fig.11: Heavy vehicle accident

Heavy vehicle accident – external fixator to lower limb long bones, compound fracture – GITAM HOSPITAL.

Fig.12: Severe degloving injury lower limb with muscle and tissue loss – RTA

Severe degloving injury lower limb with muscle and tissue loss – RTA.

Results & Discussion

Of the total cases of trauma reported at casualty EMD, OPD of King George Hospital, Visakhapatnam, about 10% are IP admissions and death rate ranges from 3 – 4%. From 13 – 30% of IP admissions underwent emergency surgery at trauma OT. Majority cases are males with male to female ratio of 4 : 1. About 90% are MLC cases and the death rate has been decreasing from 2011 to 2018 even with increasing number of accidents. Alcohol intoxicated cases constitute about 17 – 46%, are high in this study which is about 15% in other studies.

As per the present study of 6235 cases of inpatient admission of RTA cases most commonly happen in the age group of 21 – 50 years. Majority occurred in the evening (7 PM – 1 AM) in the ratio of 1:3 which conforms with other studies. Most of the total trauma cases are due to road traffic accidents followed by cases due to **falls.** Head injury is the commonest RTA injury followed by poly trauma which includes soft tissue and bone & joint injury. Whereas as per the data analysis of a level 2 peripheral highway hospital at Rajmundry the commonest RTA injury is polytrauma and not head injury. This is due to the non availability of Dept. of Neuro Surgery in secondary care hospitals, despite the availability of CT scan even in such centers.

Conclusions and Future Perspective

RTA are more common in younger age group two wheelers are more vulnerable, good number of drivers are junior drivers even without licence and insurance. Fatigue, listening to music, talking in mobile phone, smoking & tobacco products and thereby lack of concentration are the problems with drivers. Most fatal accidents are preventable and a comprehensive multi programme approach can mitigate most of them.

1. Traffic training and comprehensive safety education must be made essential part of school curriculum/education.
2. Traffic rules awareness programmes must be carried out regularly..
3. Emergency health services should be strengthened along the course of all state and national highways functioning round the clock with good network of transport of trauma victims.
4. Cashless treatment policy in emergency trauma victims is obligatory.
5. Controlled incremental release of traffic at junctions can prevent accidents.
6. Helmet and seat belt usage must be made compulsory on state and national highways.
7. L and U road bends must be elimated along highways.
8. [8]De-addiction centers have to be opened at all highway hospitals.
9. All arterial roads have to be widened without encroachment.
10. Air bags fitted on the sides of four wheelers also apart from the front ones is another improved safety measure.
11. Road safety committee at each district consisting of senior orthopaedician, DIG police, District Judge, has to be formed under the chairmanship of district minister.
12. Road safety service police van has to monitor the cases of RTA one each for every 20 km along the course of highways.
13. The existing trauma care centers have to be strengthened with network of transport facility connecting the accident spot and the hospital all the 24 hrs. Public must be made comfortable to help victims.

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