ORIGINAL ARTICLE

Patterns of Intracranial Bleed on CT scan in Road Traffic Accident Patients reporting to a Tertiary Care Hospital of Southern Punjab

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ABSTRACT

Background: Road traffic accidents (RTAs) are on a rapid increase in the developing countries like Pakistan. One of the most common but potentially lethal resulting traumas is head injury. There is need to further look in to the prevalence and description of such injuries on neuroimaging so that an effective national health plan can be formulated.

Aim: To assess the frequency of different computed tomographic patterns of intracranial haemorrhage following RTAs.

Methods: A cross sectional observational study was carried from July 2016 to Jun 2017 at Southern Punjab tertiary hospital. All consecutive patients with head trauma referred specifically for cranial CT scan were included in the study. The radiological findings were assessed and documented for analysis.

Results: A total number of 4029 head trauma patients underwent CT scanning secondary to RTAs. The male to female ratio was 4.2:1 and the mean age was 27±16. The commonest mode of injury was motor bike accidents. The commonest CT appearance of intracranial haemorrhage was haemorrhagic contusions (13.4 %). other CT appearances were subdural haematoma (8.2%), epidural haematoma (8%) and traumatic subarachnoid haemorrhage (6.8%).

Conclusion: The study has demonstrated that hemorrhagic contusion evaluated by CT scan was the most frequent type of intracranial hemorrhage in patients of RTA. With the alarming increase in the number of RTAs, CT scan should be promptly requested in patients of head trauma for identification of lesions that are amenable to surgical treatment.

Keywords: Road traffic accidents, head trauma, intracranial haemorrhage, CT pattern.

INTRODUCTION

In secondary and tertiary care hospitals emergency and trauma department remain overcrowded with road traffic accidents (RTAs) cases. The major cause of head injury is motor vehicle accidents, accounting for approximately 70% of the head traumas. Globally and especially in South East Asia the incidence of traumatic brain injury (TBI) in particular is rising besides other factors[1]. Head trauma accounts for one-fourth to one-third of all accidental deaths and for two-third of trauma deaths in hospitals[2].

Road traffic accidents are also on the increase in developing countries like Pakistan. With the rapidly increasing metaled road network and introduction of high speed vehicles and unorganized crowding with motor cycles and quinche rickshaws, the cases of RTA presenting to the emergencies and trauma centers are on the rapid increase. The timely role of neuroimaging for trauma patients is very important to determine the presence and extent of the brain injury as quick and prompt workup predominantly in the first 48 hours and the possible surgical intervention can modify the sequence of upcoming neurological events. Although medical facilities are increasing on a constant pace but still there is need to study the types, pattern and spectrum of such traum Cell: a related injuries and their outcome as this may be necessary for the planning and predicting the future management of facilities in emergency departments of the hospitals. Neuroimaging is also important in the follow up and prognosis and determining the rehabilitation of such cases. Different Radiological modalities like are very important in not only early detection of head injury but also in confirmation of the diagnosis. These modalities include skull and facial bones X-rays, Computed tomography (CT), Magnetic resonance imaging (MRI), positron emission tomography (PET), single-photon emission computed tomography (SPECT), and angiography. CT of the head remains more sensitive and readily available imaging modality in the initial workup performed to evaluate the extent of acute traumatic brain injury[3].

MRI has been shown to be more sensitive than CT in the detection of small foci of intracranial hemorrhage or axonal injury[4,5,6].

The most commonly encountered types of traumatic ICH include subarachnoid hemorrhage (SAH), epidural hematoma, subdural hematoma, hemorrhagic parenchymal contusions, and cerebral micro hemorrhage due to shear injury. Trauma is the most common cause of ICH, and this study is aimed at determining the frequency of different types of intracranial haemorrhage on CT scan of RTA patients presenting to the emergency department which will help in better and timely neurological management and outcome.

METHODS AND MATERIALS

A cross sectional study of 4029 patients was conducted at district teaching hospital Sahiwal from July 2016 to June 2017. Approval from ethical committee was pursued prior to commencement of study. WHO calculator was used to

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calculate the sample size. Applying consecutive technique, all consecutive cases of head injury in the RTAs presenting to the emergency department and then subjected to CT were included in the study while head injuries due to other causes like falls, assaults, firearms, trauma in sports and other workplace accidents were excluded. There was no gender or age discrimination**.** Informed consent was sought from all conscious adult patients, while consent was obtained from parents or guardians in unconscious patients or minors. The demographics, external appearance of the injury and consciousness level according to Glasgow coma scale were also recorded. All base line investigations were carried out in the emergency department.

Computed tomography (CT) was considered as the investigating modality of choice and all of these patients were then sent to the Radiology department and subjected to perform unenhanced scans on MDCT scan with thin slices of the head region. All the CTs were then observed and those having evidence of intracranial haemorrhage were separated and the patterns of these intracranial haemorrhages were studied.

The data obtained was analyzed using SPSS 21. Mean ±S.D was used to express quantitative variables i-e age while frequency and percentage were calculated for categorical variables e-g gender. Descriptive frequency analysis was done with results presented tables and graphs.

RESULTS

In our study out of 4029 patients, 3254 (80.8 %) were male and rest 775 (19.2 %) were females. Majority of the patients were falling in the range of 21-30 years (table 1) and the mean age was 27± 16. The majority of RTA patients sustained injuries by accidents of motor cycles.

Table 1: Age wise distribution of head trauma patients (n=4029)

Age (years)	n	%age
0-10	99	2.3
11-20	340	8.2
21-30	1946	48.2
31-40	875	21.4
41-50	521	12.6
51-60	207	5.0
61-70	76	1.6
71-80	35	0.7
TOTAL	4029	100 %

Out of these 4029 cases that were referred to CT scan department for CT scan head, 2820 patients did not show any evidence of intracranial haemorrhage (Table 2).

Table 2: Pattern of intracranial haemorrhage on CT scan in head trauma patients.

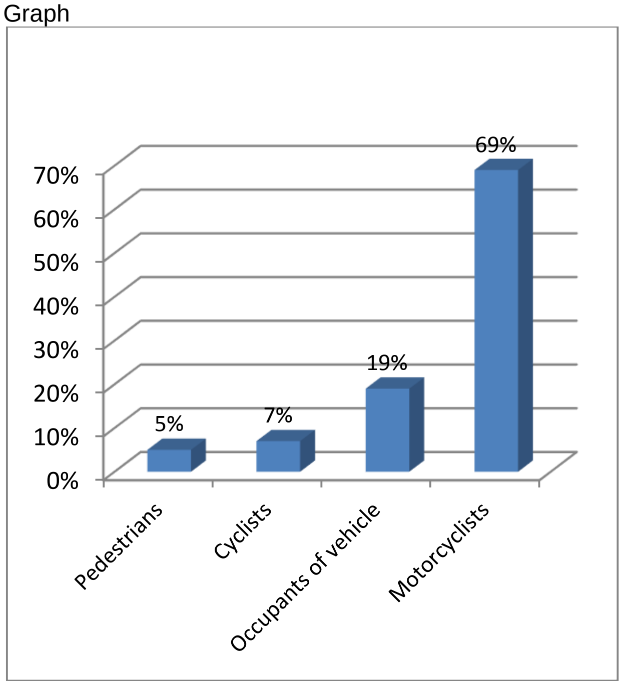
CT pattern on CT scan	n	%age
Haemorrhagic contusions	540	13.4
Subdural haematomas SDH	330	8.2
Epidural haematomas EDH	322	8
Subarachnoid haemorrhage SAH	273	6.8
No intracranial haemorrhage	2820	69.9

In the study, the most common mode of head injury among RTAs was motor cycle accidents 69% followed by head injuries to the occupants of vehicles due to direct collisions or toppling of vehicles due to over speeding19%, while 7% and 5% of the head injuries were due to collision with and hitting the cyclists and pedestrians respectively (Table 3).

Table 3: Mode of injury

Mode of injury	n	%age
Pedestrians	201	5
Cyclists	282	7
Occupants of vehicles	766	19
Motorcyclists	2780	69

Graph



DISCUSSION

Head injury is the commonest neurosurgical emergency and is one of the leading causes for morbidity, mortality and economic loss in all over the world[7]. In the recent past there has been an acute surge in occurrence of RTAs in the low and middle income countries because of urbanization with increasing use of mechanical transport which in turn has increased the incidence of head injuries and has exerted enormous burden on hospitals predominantly the emergency departments[8]. In low income countries like African, Asian, the Caribbean and Latin American countries, RTAs are common among passengers, pedestrians, and cyclists, occupants of buses and users of motorized two-wheelers[9].

It has been estimated globally that in RTAs more than 50% of deaths occur in the younger age group of 15-44 years as study by Peden M et el[10]. In our study also younger age group 21-30 yrs was affected more and the commonest mode of injury was motor bike injuries. This age predominance in our setup was mainly due to the reason of increasing trend of using this mode of transport with in younger age group. The predominant gender involved in our study was male with 4.2:1 male to female ratio. The reason for this relatively higher ratio in southern Punjab as compared to the studies conducted at other larger cities of Pakistan as by Umerani et el and Junaid et el[11] is probably due to the fact that due to local trends in southern Punjab, the females are more restricted to their houses and committed to daily households as compared to the bigger cities where women are more actively involved in outdoor professions and so more mobility is involved[12,13].

In our study CT scan was used as the imaging modality. In the first 24 hours following injury, CT scan is the most widely and logically used imaging modality[14,15]. With the availability of multidetector CT scans in most of the district level hospitals of Punjab, it is now readily available imaging modality and has proven the investigation of choice for different types of head injures. CT is also considered superior in evaluating bones and detecting acute subarachnoid or acute parenchymal hemorrhage[16]. With the help of neuroimaging the treating surgeon gets the ideas of location and volume of the haemorrhage, any impending risk to the brain tissues and the need for any urgent intervention. Neuroimaging can provide important prognostic indicators, which may help decide the surgeon the aggressiveness of management[17,18,19].

In patients of head trauma patients, the most commonly encountered types of traumatic intracranial haemorrhage include subarachnoid hemorrhage (SAH), epidural hematoma (EDH), subdural hematoma (SDH), hemorrhagic parenchymal contusions, and cerebral microhemorrhage due to shear injury[20,21].

In our study haemorrhagic cerebral contusions remained on the top of radiological presentations of RTA related head injuries (13.4%). This was in accordance with other studies conducted at the neurosurgical departments of the tertiary care hospital as by Umerani et el and Junaid et el. Hemorrhagic parenchymal contusions most commonly occur with significant head motion and head impact[22]. The contusions necessitate the need for follow up studies and neuro observation to avoid any early discharge of the patient from the emergency department as they can grow enormously in size over the period of time.

Subdural haematomas accounted for about 8.2 % of the cases in our study. These hemorrhages are most commonly seen along the cerebral convexities, the falx cerebri, and the tentorium cerebelli[23].

Traumatic subarachnoid haemorrhage accounted for about 6.8 % of the cases presenting to our emergency department. This was relatively lesser than the studies conducted at other major trauma centers of bigger cities of Pakistan. This may likely be due to the fact that as SAH doubles the mortality rate[24], most of the patients meeting RTA in the suburbs of our city breathe their last before reaching to the emergency department or undergoing CT scanning. Typical locations for SAH after head trauma is the interpeduncular cistern, Sylvian fissure, or over the cerebral convexity[25].

Extradural hemorrhage accounted for about 8% of our study cases. This relatively higher incidence in our study as compared to other studies conducted in Pakistan was likely due to relative underdevelopment in southern regions of Pakistan with poor quality roads, more use of two wheeler bikes due to lesser affordability and less compliance with the traffic rules and not wearing safety measures like helmets. EDH needs close neuro-observation as the clinical presentation may be delayed as they may be characterized clinically by a lucid interval, in which the patient is largely asymptomatic or not critically ill[26]. A rapidly enlarging arterial EDH can cause a midline shift, culminating in herniation and possible secondary ischemia. Neuroimaging can be life saving in these cases[27].

CONCULSION

The mortality rate due to trauma head is on a rapid increase. Intracranial haemorrhage poses significant surgical event with high mortality rate. The wide variation in the appearances of various patterns of intracranial haemorrhages on neuroimaging warrants skilled neurosurgical intervention at relatively peripheral parts of the country. Dire need for vigilant policy making regarding preventive measures on roads, effective neuroimaging and neurosurgical management will help in modulating advanced medical care in such setups.

Conflict of interest: This study has no conflict of interest to be declared by any of the authors.

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