

EPIDEMIOLOGICAL STUDY AND EVALUATION OF HEAD INJURY FOLLOWING RTASonia X. James¹, Vinod Jakob², Raghu³¹Professor and HOD, Department of Radiodiagnosis, Travancore Medical College, Kollam.²Associate Professor, Department of Radiodiagnosis, Travancore Medical College, Kollam.³Assistant Professor, Department of Radiodiagnosis, Travancore Medical College, Kollam.**ABSTRACT****BACKGROUND**

Head injury is an injury to scalp, skull and/or contents of skull. Injury to scalp maybe in the form of abrasion, contusion or laceration. Common types of skull fractures are simple linear fracture, depressed, base of skull fracture and orbital/blow out fracture. CT scan has been the investigation of choice in head injury cases. Simple linear fracture of skull cases usually require CT scanning. Base of skull fractures are visible in bone window axial CT scans. Cerebral contusions in CT scan appear as small area of haemorrhage in cerebral parenchyma. Intracerebral haematomas appear as hyperdense lesions on CT with associated mass effect and midline shift. Extradural haematomas appear convex in shape on CT and do not expand past suture lines. Subdural haematomas in CT classically appear crescent shaped. Acute bleed are hyperdense whereas chronic bleed can be isodense. A sincere effort has been put in this study to understand the epidemiology and evaluation of head injury following RTA. This study is intended to help the fellow practicing radiological fraternity.

MATERIALS AND METHODS

Forty three cases were taken up for the study and evaluated by the CT scan of head. Ten axial sections from the base of skull were taken and evaluated. The information collected include age, sex, occupation, alcohol consumption, type of vehicle involved, clinical presentation, CT findings.

RESULTS

Male sex had the highest incidence of head injury, which accounted for thirty four cases. The age group of twenty one to forty years accounted for highest number of cases in this study, which accounted to twenty four cases. Based on the occupation of the victim, the labourers suffered maximum number of head injuries in RTA, which accounted for twelve admissions. In this study, twenty one percent of the victims had consumed alcohol, which amounted to nine in number. Based on the type of vehicle involved two wheelers amounted to eighteen cases. Based on clinical presentation of the victim following RTA, thirty three cases presented with headache. The CT findings of the cases studied showed skull fractures in nineteen cases.

CONCLUSION

In this study, it was noted that incidence of head injuries following RTA was more in the age group of twenty one to forty years. It was also noted that male sex outweighed the female sex.

KEYWORDS

CT Scan, Head Injury, RTA, Alcohol, Driving.

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INTRODUCTION: Road safety is one of the biggest challenges in India and the frequency of Road Traffic Accidents (RTA) are among the highest in the world. The cause can be rash driving/disregard for speed limit, disregard for road rules, driving under the influence of alcohol, disregard for personal safety measures like helmets and seat belts, etc. Road traffic accidents not only cause monetary loss, but also mortality and morbidity. The victim may become disabled for life following RTA.

Head injury is one of the commonest causes of morbidity and mortality following RTA. Most serious head injuries and 65% of subsequent deaths are as a result of RTA.¹ Head injury is injury to scalp, skull and/or contents of skull. Injury to scalp maybe in the form of abrasion, contusion or laceration. Scalp lacerations bleed profusely if not controlled because of the blood vessels in the dense fibrous layer superficial to galea aponeurotica, which remains open once cut. Underlying the lacerations and haematomas can be skull fractures. Common types of skull fractures are simple linear fracture, depressed, base of skull fracture and orbital/blow out fracture. Simple linear fractures occur as a result of head striking a broad surface. They may involve the entire thickness of the bone or either of the tables. The fracture usually starts at the point of impact and runs parallel to the direction of force. Depressed fracture occurs as a result of focal impact. Both inner and outer tables of skull can be involved. Depth depends on the velocity of impact.

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The area of impact is driven along the line of the force into the subjacent structures. The depressed fragment may tear the dura or lacerate the brain. Base of skull fractures are of frequent occurrence and are occult radiologically. The base of skull is relatively weak because of presence of various foramina. The anterior fossa fractures, which usually result from direct impact may run through cribriform plate. Blood in these cases may spread along the tissue planes around the eye resulting in black eye or periorbital ecchymosis. Sometimes, there can be CSF rhinorrhoea. Direct impact behind the ear can lead to middle fossa fractures. In such cases, there can be CSF otorrhoea. Mastoid haemorrhage may also be seen in such cases, which is also called as Battle sign. Posterior fossa fractures result due to impact over the back of the head. There can be escape of blood and CSF to the tissues of back of neck. Orbital blow out fractures result from blunt trauma to the eye where force is transmitted via the eye globe to the bony orbit, which leads to disruption of orbital wall. The injury to dura maybe in the form of a tear. Brain injury can be primary brain injury or secondary brain injury. Types of primary brain injury are diffuse axonal injury, cerebral concussion, cerebral contusion and laceration. Types of secondary brain injuries are intracranial haematomas, cerebral swelling, cerebral ischaemia and cerebral herniation. Types of intracranial haematomas are intracerebral, extradural, subdural and subarachnoid.

Subarachnoid haemorrhage is the most common intracranial haemorrhage resulting from blunt trauma to head. The location is between arachnoid matter and pia matter. Traumatic causes are damage to internal carotid, vertebral or basilar artery. Blood may even leak from the vessels of brain surface. The lesion maybe space occupying if the source is arterial. The lesion can be focal, semi-localised, diffuse and bilateral. Subdural haemorrhage can occur due to rupture of bridging veins, tears in dural venous sinuses following head trauma. Location is between dura matter and arachnoid matter. Acute subdural haemorrhage is almost always traumatic in origin. The lesion is often space occupying. It can be unilateral or bilateral. Extradural haematoma mostly occurs due to rupture of middle meningeal artery or its branches following head trauma. It is usually accompanied by linear fracture of skull. The location is between skull and dura matter. It can be space occupying and distribution is usually on one side. Traumatic intracerebral haemorrhages are usually seen in the central white matter of frontal or temporo-occipital regions.²

CT scan has been the investigation of choice in head injury cases. Simple linear fracture of skull cases usually require CT scanning, base of skull fractures are visible in bone window axial CT scans. Cerebral contusions in CT scan appear as small area of haemorrhage in cerebral parenchyma. Intracerebral haematomas appear as hyperdense lesions on CT with associated mass effect and midline shift. Extradural haematomas appear convex in shape on CT and do not expand past suture lines. Subdural haematomas in CT classically appear crescent shaped. Acute

bleed are hyperdense whereas chronic bleed can be isodense.

Diffuse axonal injury can appear as subarachnoid bleeding, brain swelling and petechial haemorrhages in CT scan. The incidences of head injuries are increasing because of industrial revolution and globalisation.³ The injuries could be caused by blunt or penetrating.⁴ Any kind of craniocerebral injury is lethal.⁵ A sincere effort has been put in this study to understand the epidemiology and evaluation of head injury following RTA. This study is intended to help the fellow practicing radiological fraternity.

AIMS AND OBJECTIVES: To study the epidemiology and evaluation of head injury following RTA.

MATERIALS AND METHODS: The study was done in the Department of Radiology, Travancore Medical College, Kollam. The study was done from July 2015 to June 2016. Forty three cases were taken up for the study and evaluated by the CT scan of head. Ten axial sections from the base of skull were taken and evaluated. The information collected include age, sex, occupation, alcohol consumption, type of vehicle involved, clinical presentation, CT findings.

Age Group	Male	Female	Total
0-20 years	6	2	8
21-40 years	18	6	24
41-60 years	8	1	9
>60 years	2	Nil	2

Table 1: Showing Incidence of Age and Sex

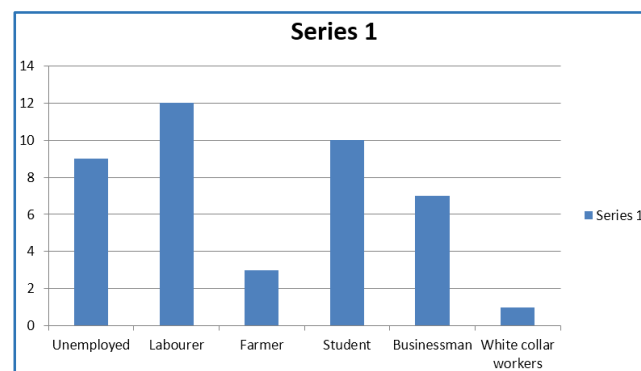


Image 1: Occupation of the Victim

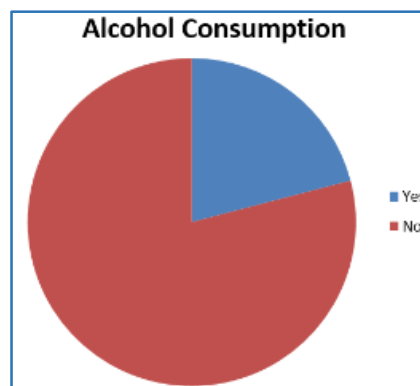


Image 2: Alcohol Consumption

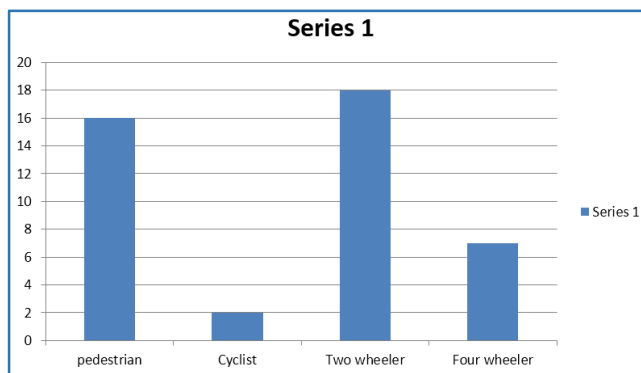


Image 3: Type of Vehicle Involved

Clinical Presentation	
No obvious clinical presentation	2
Headache	33
Vomiting	19
Loss of consciousness	11
Amnesia	7
Seizure	6

Table 2: Clinical Presentation

CT Findings	
Normal brain	3
Skull fracture	19
Extradural haemorrhage	14
Subdural haemorrhage	11
Subarachnoid haemorrhage	12
Intracerebral haemorrhage	08
Cerebral contusions	17
Diffuse axonal injury	12

Table 3: CT Findings in Head Injuries

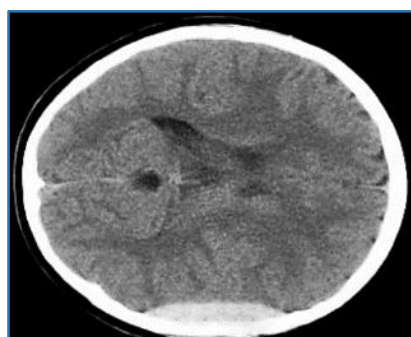


Image 4: Showing CT Scan Picture of Extradural Haemorrhage

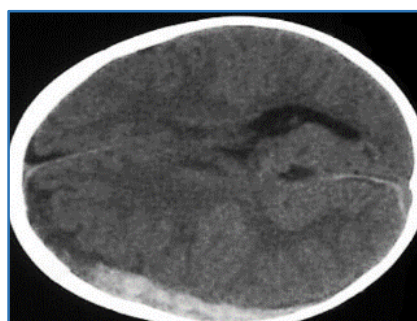


Image 5: Showing CT Scan Picture of Subdural Haemorrhage

DISCUSSION: Male sex had the highest incidence of head injury, which accounted for thirty four cases in comparison to females, which accounted for nine cases. The age group of twenty one to forty years accounted for highest number of cases in this study, which accounted to twenty four cases. Age group forty one to sixty years accounted to nine cases followed by age group of zero to twenty years, which amounted to eight cases. Least number of cases were seen in age group of more than sixty years, which accounted for two cases. Based on the occupation of the victim, the labourers suffered maximum number of head injuries in RTA, which accounted for twelve admissions followed by students, which amounted to ten admissions. The unemployed victims accounted for nine admissions followed by businessmen who accounted to seven admissions followed by farmers, which accounted to three admissions and white collar workers, which accounted to one admission. In this study, twenty one percent of the victims had consumed alcohol, which amounted to nine in number and thirty four cases had not consumed the alcohol, which amounted to thirty four cases.

Based on the type of vehicle involved two wheelers amounted to eighteen cases, followed by pedestrians, which amounted to sixteen cases followed by four wheelers, which amounted to seven cases followed by cyclists, which amounted to two cases. Based on clinical presentation of the victim following RTA, thirty three cases presented with headache, nineteen cases presented with vomiting, eleven cases presented with loss of consciousness, seven cases presented with amnesia, six patients with seizures and two cases had no obvious clinical presentation. The CT findings of the cases studied showed skull fractures in nineteen cases, cerebral contusions in seventeen cases, extradural haemorrhage in fourteen cases, subarachnoid haemorrhage and diffuse axonal injury in twelve cases each, subdural haemorrhage in eleven cases, intracerebral haemorrhage in eight cases. Three cases showed normal brain picture. According to a study conducted by Md. Ziya Ahmad⁶ et al, age twenty one to thirty years had maximum number of cases, male sex amounted maximum number of cases. CT scan finding showed that skull fractures were the injuries, which were noted maximum number of times followed by cerebral contusions.

The trend of involvement of male sex of middle age group involved in a RTA resulting in head injury was also noted in a study conducted by Ghazala Wahid⁷ et al. According to a similar study conducted by Gupt Prashant⁸ et al, maximum number of cases encountered had skull fractures followed by cases with intracerebral haemorrhage whereas in our study maximum number of cases had skull fractures followed by cases with cerebral contusions and extradural haemorrhage.

CONCLUSION: In this study, it was noted that incidence of head injuries following RTA was more in the age group of twenty one to forty years. It was also noted that male sex outweighed the female sex, the reason maybe that males of the age group 20-40 years are the primary bread winners in

our country and they venture out a lot compared to females. CT scan is the ideal tool to evaluate any form of head injury. When in doubt, it is advisable to refer for a CT scan, so that any head injury if present can be caught on early, which helps in early treatment and decreased mortality.

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