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RESEARCH ARTICLE

ASSOCIATION BETWEEN SEVERITY OF TRAUMATIC BRAIN INJURIES AND CERVICAL SPINE INJURIES

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Abstract

Cervical spine injury can cause significant morbidity to the patient if it is associated with neurological impairment and is one of the challenging conditions to manage in the emergency room. Traumatic brain injuries and multisystem trauma can be associated with cervical spine injury. This studycompared the severity of traumatic brain injury to the incidence of cervical spine injury detected on CT scan among TBI patients who presented to a tertiary care hospital. Results among the 180 patients showedthat there was no statistically significant association between the severity of traumatic brain injury and incidence of cervical spine injury. The causation of cervical spine injury can be multifactorial and not just limited to the severity of traumatic brain injury alone.

Introduction:-

Injury to the vertebral column and spinal cord can occur in trauma due a variety of mechanisms like road traffic accidents, falls and assault. Cervical spine is the most commonly injured part of the vertebra due its increased flexibility compared to thoracic and lumbar vertebra and also due to its exposed nature. Usage of seatbelts in four wheeled vehicles may help in reducing impact to other vertebra but not cervical spine as it is not restrained and thereby causing its increased mobility and susceptibility to external forces. Among moderate to severe traumatic brain injuries 6-10% have associated cervical spine inury.[1] Cervical spine injuries associated with polytrauma is reported to be around 10%.[2] In countries where usage of two- wheeler vehicles are very common, traumatic brain injuries form an important subset of patients presenting to the emergency rooms. Studies have shown that there is higher incidence of cervical spine injuries in patients with multisystem trauma.[3] Severity of traumatic brain injuries can be classified as mild TBI with a Glasgow Coma Scale of 13-15, moderate TBI with a Glasgow Coma Scale of 9-12 and severe TBI with Glasgow Coma Scale of 8 or less. Increase in severity of TBI can result in increased incidence of other associated injuries. This study is aimed at determining whether severity of TBI has an association with incidence of cervical spine injuries seen on CT.

Methods:-

This study was done at a single tertiary care hospitalover a period of two years. inclusion criteria included all patients who presented to emergency room above 18 years of age with traumatic brain injury. All patient with previous cervical spine injuries, known cases of metastases and tuberculosis of cervical spine, scoliosis, cervical spondylosis and spondylolisthesis and pregnant patients were excluded from the study. A total of 180 patients with traumatic brain injuries were assessed. All the CT scans were done with GE 128 slice CT Machine. The data was analysed using IBM SPSS version 25. Chi-square test was used to obtain the association between head injury and

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CT findings. The p- value less than 0.05 was considered as statistically significant.

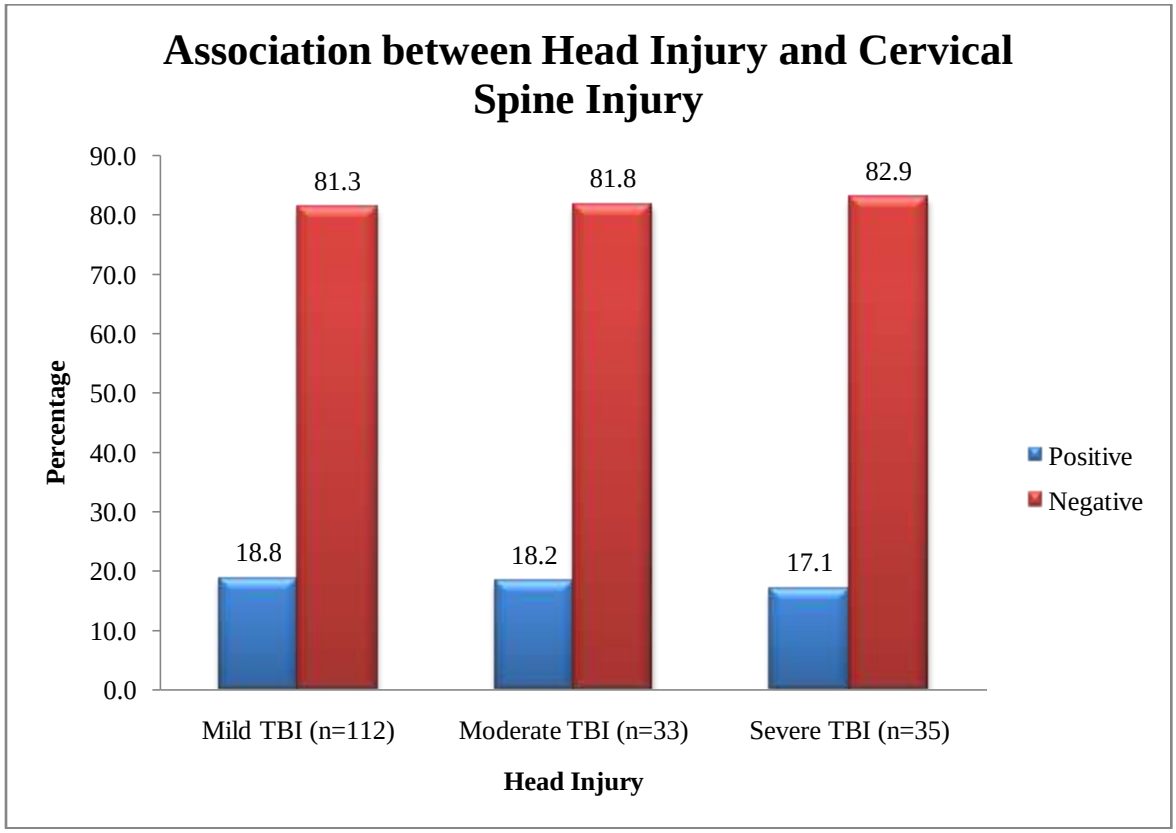

Fig 1:- Association between head injury and cervical spine injury.

Results:-

Out of 180 patients with traumatic brain injuries, majority were males (n=141). Most of the participants were in the age group of 18-45 (n =118) forming 65.6% of the study population. Road traffic accident was the major mechanism of TBI with 154 of 180 (85.6%) cases followed by falls (11.1%) and assaults (3.3%). Among the patients 112 had mild TBI with GCS of 13-15, 33 had moderate TBI (GCS 9-12) and 35 had severe TBI (GCS less than 8). 18.8% (21/112) cases of mild TBI had associated cervical spine injury. 18.2% (6/33) cases of moderate TBI and 17.1% (6/35) cases of severe TBI had cervical spine injury. There was no statistically significant association between severity of traumatic brain injury and cervical spine injury (Table 1).

Table 1:- Association between Head Injury and Cervical spine injury.

Head Injury	NCCT SPINE FINDINGS				χ^2 Value	p Value
	Positive		Negative			
	N	%	N	%		
Mild TBI (n=112)	21	18.8	91	81.3	0.047	0.977
Moderate TBI (n=33)	6	18.2	27	81.8		
Severe TBI (n=35)	6	17.1	29	82.9		

Discussion:-

Cervical spine injury is a serious clinical problem due to the associated morbidity in the form neurological impairment as well its association with other system injuries like traumatic brain injuries or involvement of life threatening thoracic or abdominal injuries or long bone fractures.

Cervical spine injury commonly occurs in younger population as road traffic accidents contribute to majority of the cases cervical spine injury.[4,5]Incidence of cervical spine injury was 10.2% in cases of severe traumatic brain injuries

while it was 1.4% in cases in cases of mild traumatic brain injury in a study done by Demetriades D et al.[1] Cervical spine injuries occur more frequently in cases of multisystem trauma than isolated traumatic brain injuries.[6]

Our study did not show any statistically significant difference in the incidence of cervical spine injury among patients with different severity of TBIs, there was in fact a mild reduction in the percentage of injuries in patients with severe TBI. Factors like mechanism of TBI, type of vehicles in vehicular accidents, helmeted or non- helmeted patients can all influence the severity of TBI. In a study done by Page PS et al,[7] among those with helmets, 20.3% showed radiographic signs of traumatic brain injury, whereas 40.3% of those without helmets exhibited similar injuries. The causation of cervical spine injury can be multifactorial and not just limited to the severity of traumatic brain injury alone.

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