

Research Article**Frequency of Cervical spine injuries in moderate to severe Head Injuries at Allied Hospital Faisalabad**

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ABSTRACT

Objective: Traumatic brain injury, often referred to as TBI, is considered as acute event similar to other injuries. After sustaining the head injury One moment the person is normal and the minutes after life has changed suddenly. Trauma team mostly miss the diagnosis of cervical spine injury (CSI) due to altered level of consciousness as a result of a traumatic brain injury (TBI). The objective of this study was to determine the frequency of cervical spine injury in patients having moderate to severe head injury due to different types of trauma at allied hospital Faisalabad.

Study Design: Cross sectional observational study

Place And Duration Of Study: Neurosurgery Department Allied Hospital Faisalabad from June 2019 to December 2019.

Methodology: A total of 491 patients were included in this study through surgical emergency by non-probability sampling. All the patients selected are gone through X-Ray Cervical spine AP and Lat view, CT Cervical Spine, and MRI Cervical spine to evaluate for cervical spine injury in patients having moderate to severe Head injury.

Results: A total of 491 patients were included in our study, out of which 368 (74.9%) were males and 123 (25.5%) were females. Age of the patients ranged from 5-70 years with mean of 31.93. Out of the 491 patients 30(6.10%) were found to have cervical spine Injury. Among these patients most common cause of injury was MVA 20(4.07%) whereas fall 04(0.83%) and others were 06 (1.2%).

Conclusion: In patients with dual diagnoses in a limited resources, survival rate is 45%; and older patients are at risk. Neurosurgeons who are practicing in limited resources should keep this in mind with the hope of attaining better outcomes. The frequency of cervical spine injury associated with moderate to severe head injury remain almost the same all over the world with minor differences.

Keywords: Traumatic Brain Injury, Head injury, Cervical spine injury

1. INTRODUCTION:

Disruption in brain functioning resulting from unexpected, intolerable, sudden application of trauma force - are relatively common and often require specialized emergency care [1]. TBIs are usually described as either "head injury/contusion," "intracranial bleed" or "concussion"

There is a certain percentage of TBIs that never reach medical care, hence, the overall rates for TBIs are likely underreported.[2]

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The incidence of traumatic brain injury (TBI), in all age groups, is postulated to be in the range of 20–30% (3). TBI affects over 10 million people annually, leading to either hospitalization or mortality (4). This is worst in low and third world countries because of the presence of risk factors associated with TBI like over burden roads, dense population, un licenced driving and severe congestion.

Pakistan is also a low-income country with 190 million population, with a high rate of TBIs [5,6]. A road traffic injury surveillance study (n>100,000) in Pakistan showed that nearly a third of patients had a TBI, and almost 10% percent had moderate to severe TBI. The diagnosis of cervical spine injury (CSI) is very difficult in most of the patients with multiple trauma and having an altered level of consciousness. It can lead to a missed diagnosis of CSI. In 2000, the Eastern Association for the Surgery of Trauma (EAST) recommended anterior and lateral view cervical spine plain radiographs and computed

tomography (CT) images should be done.[7] If X-rays and CT images are normal, then dynamic flexion/extension lateral cervical spine fluoroscopy should be done to rule out any injury for a complete evaluation of the cervical spine.[7.]

Increased risk of CSI in patients with TBIs has been reported.[8] The reported incidence of CSI among patients with TBI ranges from 1.7% to 8%.[9] Several factors which are associated with CSI among patients with TBI include Age, GCS, injury mechanism, thoracolumbosacral spine fracture, limb fracture, facial fracture, and hypotension.

The frequency of missed injuries reported in the cervical spine varies from 4% to 30%.[10.] The most common reason for missed spinal injuries is an inadequate radiographic examination and poor transportation system.[11] Most common injuries which are commonly missed include odontoid, teardrop, facet and hangman's fractures.[12]. When injuries are missed on initial assessment, a delay in diagnosis occurs that increases the morbidity and progressive instability and neurologic deterioration It is clear that a systematic approach to the evaluation of suspected cervical spine injuries is important to avoid these pitfalls.

The cervical spine injuries are mostly noted between C4 to C6 level because the cervical canal is narrowest at this level. The commonest CSI is dislocation of C5 and C6 vertebra 36% ,followed by C6 and C7, 29 % and about 20% of patients presented with complete cervical cord transaction.

The objective of this study was to determine the frequency of cervical spine injury in patients having moderate to severe

Head injury in different types of trauma so the results of this study will help us to properly evaluate the patients having different types of trauma so that morbidity can be reduced.

2. METHODOLOGY

This observational cross- sectional study was conducted in the department of Neurosurgery Allied Hospital Faisalabad, Faisalabad medical University from 1st January 2019 to 30th June 2019. A total of 491 patients included in this study by non-probability sampling .All patients with moderate to severe Head injury above age 5 were included in this study after taking informed consent. Patients having previous cervical spine pathology were excluded from the study.

Patients were recruited from Emergency department Allied hospital Faisalabad and then shifted to Neurosurgery Department Allied Hospital Faisalabad after getting their X-Rays cervical spine ,CT Cervical Spine and MRI cervical Spine .Patients having GCS less than 13 and greater than 8 were included in moderate head injury while having less than 8 and greater than 3 were included in Severe head Injury .Mode of Head Injury were due to MVA, History of fall more than 5 Meter and Assault were also included.

3. RESULTS

A total of 491 patients were included in our study, out of which 368 (74.9%) were males and 123 (25.5%) were females. Age of the patients ranged from 5-70 years with mean of 31.93. Distribution of patients in different age groups is tabulated. Age and gender distribution as.

Table: 01

Age	Males		Females	
	Numbers	%	Numbers	%
<20	137	27.90	45	9.16
21-40	119	24.23	50	10.1
>40	112	22.81	28	22.76

Out of the 491 patients 30(6.10%) were found to have cervical spine Injury. Among these patients most common cause of injury was MVA 20(4.07%) whereas fall 04(0.81%) and others were 06 (1.20%).Head injury after fall from height was mostly below 20 years of age accounting for 48 (54.54%) cases. In age

group 21-40 years ,22 (25%) and above 40 years ,18 (20.45%). Head injury due to MVA below 20 years of age accounting for 110 (29.17%), age group between 21-40 years, 160 (42.44%) ,and above 40 years of age 107 (28.38%).

Table :02

AGE	No. of Patients due to Fall	PERCENTAGE	No. of Patients due to MVA	PERCENTAGE
<20	48	54%	110	29.17%
20-40	22	25%	160	42.44%
>40	18	20.45%	107	28.38%

A total of 159(32.38%) were found to have severe head injury having GCS less than 08 out of which 12(13.83%) had cervical spine injury. In rest of 332(67.61%) patients with moderate head injury having GCS between 9-13 had cervical spine injury in 18 (5.42%) patients.

As for cervical spine injury among different age groups is concerned ,below 20 years the frequency of cervical spine injury were 06 (3.29%) out of 182(37.6%), between 21-40 years cervical spine injury were 14(9.46%) out of 169 (34.3%) and above 40 years the cervical spine injury were 10(7.14%) out of 140(45.57%).

Table :03

Age	No. of Patients	Percentage	Cervical Spine Injury	Percentage
<20	182	37.6%	06	3.29%
20-40	169	34.3%	14	9.46%
>40	140	45.57%	10	7.14%

4. DISCUSSION

Traumatic brain injury (TBI) occurs when a trauma causes the brain to move rapidly within the skull, leading to damage. If the head makes a direct contact with an object it is called impact and second is nonimpact force such as blast waves or rapid acceleration and deceleration forces. In US every 15 seconds a TBI occurs, generating 1.7 million new head injury victims per year. These trauma incidents are responsible for more than 50,000 deaths, leaving 80,000 individuals with permanent disabilities and cost more than US\$77 billion on average per year [13]. The frequency of TBI is currently higher than that of any other diseases. The magnitude of the TBI, Injury severity, type and location, and the individual's age and gender, all make TBI unique brain pathologies, meaning that no two TBIs are the same. Age and injury severity are particularly two important factors determining outcome. Falls (35%) and MVA (17%) are the leading causes of moderate to severe TBI in the US [13], whereas our study showed that fall (17.92%) and MVA (76.78%) are the leading cause of moderate to severe TBI in Allied Hospital Faisalabad. vehicle accidents to be the most common mechanism of injury leading to cervical spine injury in our study which is almost according to Robertson et al [14]. The incidence of sport-related concussions is estimated to be 130,000 per year among children 5-18 years of age [15]. Among active military personnel, blast injury is the most common cause of TBI [16].

Severity of TBI is categorized based on the Glasgow Coma Scale (GCS) as patients having GCS less than 13 and more than 8 are moderate head injury and those having GCS less than 8 and greater than 3 are considered severe head injury.

Kamp et al reported that moderate and severe head injuries were almost equal in occurrence, whereas in our study showed that most of the patients had moderate head injury is 364 (74.14%) and severe head injuries were 127 (26.0%).[17]

It is further noted that head injury associated cervical spine injury is directly proportional to the frequency and severity of the head injury and our study shows that cervical injury with head injury is more in severe head injuries as according to

Paiva et al,[18] . According to Langston et al the incidence of cervical injuries with head injuries are up to 5.3%, which is almost equivalent to our study 6.1%[19]. The incidence of cervical injury in male and female patients in our study are found to be almost same as described by Paiva et al, i.e., male 7% and females 8.9%.

The frequency of cervical spine injury associated with head injury remain almost the same all over the world with minor differences in percentages. Some variations exist that we have observed in our study as compared to other studies which are due to the geographical variations, quality of life, working environment and social factors. This region is notorious for cervical injuries associated with different types of trauma for example fall, and RTAs etc.

Cervical injury association with age is more interesting because the study of the Kreykes et al has found that the incidence of Cervical injury for age group in children (which is up to 19 years is 1-4%, which is near to our study, i.e., 2.7%)[20]. Between age 21-40 years the incidence of cervical spine injury by Dryden et al which is almost equal to our study(4.7%)[21].Similarly, between age 40 years and above, our study shows cervical injury of 10 (7.1%) which is closer to Paiva et al, i.e., 5.3%.We also found in our study that ages between 20-40 years, to be more strongly associated with an increased risk of cervical spine injury which is according to Mahnaz et al.[22]

Motor vehicle accidents to be the most common mechanism of injury leading to cervical spine injury in our study which is almost according to Heidari et al.[23].

5. CONCLUSION

The frequency of cervical spine injury associated with moderate to severe head injury remain the same in all over the world with minor differences in percentages that we have observed in our study. Cervical spine injury is directly proportional to the severity of head injury. It is very important to improve our healthcare system so that we can properly evaluate, transport and manage the trauma patients keeping in

mind the strong association of severe head injury with cervical spinal injury.

6. REFERENCE

- Centers for Disease Control and Prevention (CDC). CDC grand rounds: reducing severe traumatic in the brain injury in the United States. *MMWR Morb Mortal Wkly Rep.* 2013; 62:549-52.
- Levin HS, Shum D, Chan RC. Understanding traumatic brain injury: current research and future directions. New York: Oxford University Press; 2014.
- Nazir M, Khan SA, Raja RA, Bhatti SN, Ahmed E. Cervical spinal injuries in moderate to severe head injuries. *J Ayub Med Coll Abbot-tabad.* 2012; 24:100-2.
- Hyder AA, Wunderlich CA, Puvanachandra P, Gururaj G, Kobusingye OC. The im-*pac*t of traumatic brain injuries:a global perspective. *NeuroRehabilitation.* 2007; 22:341-53.
- Shamim S, Razzak JA, Jooma R, Khan U. Initial results of Pakistan's first road traffic injury surveillance project. *Int J Inj Contr Saf Promot.* 2011; 18:213-7.
- Umerani MS, Abbas A, Sharif S. Traumatic brain injuries: experience from a tertiary care centre in pakistan. *Turk Neurosurg.* 2014; 24:19-24.
- Marion D, Domeier R, Dunham CM, Luchette F, Haid R, Erwood SC. Determination of cervical spine stability in trauma patients (update of the 1997 EAST cervical spine clearance document). Chicago: Eastern Association for the Surgery of Trauma (EAST); 2000.
- Hills MW, Deane SA. Head injury and facial injury: is there an increased risk of cervical spine injury? *J Trauma.* 1993; 34:549-53.
- Tian HL, Guo Y, Hu J, Rong BY, Wang G, Gao WW, et al. Clinical characterization of comatose patients with cervical spine injury and traumatic brain injury. *J Trauma.* 2009; 67:1305-10.
- Gerrelts BD, Petersen EU, Mabry J, Petersen SR. Delayed diagnosis of cervical spine injuries. *J Trauma.* 1991; 31:1622-6.
- Reid DC, Henderson R, Saboe L, Miller JD. Etiology and clinical course of missed spine fractures. *J Trauma.* 1987; 27:980-6.
- Clark CR, Ingram CM, el-Khoury GY, Ehara S. Radiographic evaluation of cervical spine injuries. *Spine.* 1988; 13:742-7.
- Faul M, Xu L, Wald MM, Coronado VG. Traumatic brain injury in the United States: emergency department visits, hospitalizations and deaths. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; 2010.
- Robertson A, Giannoudis PV, Branfoot T, Barlow I, Matthews SJ, Smith RM. Spinal injuries in motorcycle crashes: patterns and outcomes. *J Trauma.* 2002; 53:5-8.
- Cohen J S, Gioia G, Atabaki S, Teach SJ. Sports-related concussions in pediatrics. *Curr Opin Pediatr.* 2009;21: 288-93.
- Elder GA, Cristian A. Blast-related mild traumatic brain injury: mechanisms of injury and impact on clinical care. *Mt Sinai J Med.* 2009; 76:111-8.
- Kamp MA, Sloty P, Sarikaya-Seiwert S, Steiger HJ, Hänggi D. Traumatic brain injuries in illustrated literature: experience from a series of over 700 head injuries in the Asterix comic books. *Acta Neurochir (Wien).* 2011; 153:1351-5.
- Paiva WS, Oliveira AM, Andrade AF, Amorim RL, Lourenço LJ, Teixeira MJ. Spinal cord injury and its association with blunt head trauma. *Int J Gen Med.* 2011; 4:613-5.
- Langston TH, Daniel F K, George JC, Thane B, David L M., and H. Gill C. Cervical spine trauma associated with moderate and severe head injury: incidence, risk factors, and injury characteristics
- Kreykes NS, Ltton RW Jr. Current issues in diagnosis of pediatric cervical spine injury. *Semin Pediatr Surg.* 2010;19 :257-64.
- Dryden DM, Saunders LD, Rowe BH, May LA, Yiannakoulias N, Svenson LW, et al. The epidemiology of traumatic spinal cord injury in Alberta, Canada. *Can J Neurol Sci.* 2003; 30:113-21.
- Mahnaz YA, Shahram PA, Haleh GH, Mohammad GH. The epidemiology of cervical spine Fractures. *Trauma mon.* 2016 Jul; 21(3): e33608
- Heidari P, Zarei MR, Rasouli MR, Vaccaro AR, Rahimi-Movaghar V. Spinal fractures resulting from traumatic injuries. *Chin J Traumatol.* 2010;13(1):3-9. [PubMed] [Google Scholar].

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