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ORIGINAL ARTICLE

Prevalence of Minor Head Injury and its Clinical Management: a Cross-Sectional Study

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ABSTRACT
Aim: To determine the prevalence of minor head injury and determination a suitable strategy for diagnosis and management
Study design: A cross-sectional study
Place and duration: Chandka Medical College/Civil Hospital Larkana, (April 2019-March 2020)
Methodology: A total of 317 participants with traumatic brain injury (TBI) were included in this study. Out of that number 181 (57.09%) had a Glasgow coma scale of less than 15. A Head CT scan was done after 4 hours of their arrival in the Emergency room (ER). Those patients who had penetrating injuries of the head were excluded from the study.
Results: Out of 181 participants who had GCS less than 15, 47 (14.82%) participants had abnormal brain CT scans. A total of 16 (5.04%) needed surgery. Some patients presented with lethal brain lesions. However, even in severe cases, early diagnosis and management were useful.
Conclusion: The present approach of risk stratification regarding minor head injuries in adults based on skull radiography should be replaced with NICE guidelines. This modification will result in relying on CT scans rather than skull radiography eventually increasing the rate of admissions. Intracranial lesions can be detected on early CT scanning and help in the reduction of unnecessary admissions in hospitals.
Keywords: Minor head injury, traumatic brain injury, computed tomography, skull fractures, intracranial lesions, GCS

INTRODUCTION

Traumatic brain injury (TBI) can be described as a sudden injury that can lead to brain damage. It can be caused by a concussion due to jerky moments bump or blow to the head. TBI can be a secondary to closed injury to head. TBI can also be caused by a penetrating injury to the head. The symptoms of TBI are according to the severity of the injury and it can be according to the GCS mild, moderate and severe. [1]. A concussion can be categorized as a mild type of TBI. Severe TBI considered GCS 8 or less and usually carries poor prognosis. The most common cause of TBI in young adult is road traffic accident and fall in elderly individuals. Other causes are sports injuries, child abuse, blast injuries, bullet, hit by sharp objects, and a head injury that trigger fractures of the skull [2].

Symptoms of TBI are according to its severity of trauma. Mild TBI is considered when GCS is 14-15 the patients can experience loss of consciousness for a brief duration, headache, lightheadedness, confusion, dizziness, tinnitus, blurred vision, fatigue, lethargy, altered behavior, altered mood, retrograde amnesia [3]. Symptoms of moderate TBI (GCS 9-13) can include all the symptoms of mild TBI in addition to nausea, vomiting, severe headache increasing with time, convulsions, seizures, unilateral dilated pupil, slurred speech, numbness of limbs, hemiparesis and loss of coordination [4]. The severe brain injury (GCS 3-8) is labelled when patient is usually comatose and unable maintain the airways, almost always require support. Severe brain injury usually carries poor prognosis. The signs and symptoms for raised ICP need to be assessed in patients with head injury which typically includes drop in GCS, Hypertension, bradycardia along with repeated vomiting and severe headaches.

The diagnosis of the TBI is made based on presenting symptoms, neurologic examination, assessment of GCS, CT scan, and MRI. Patients with mild TBI are admitted only for monitoring and observation or can be discharged home with head injury instructions. They are treated symptomatically. Early diagnosis of complications can prevent detrimental consequences. The responsibility of a physician regarding the decision of whether a patient should be sent for a CT scan or not comes with economic implications, particularly in our part of the world. Therefore, there are two sets of guidelines available; NOC (the New Orleans Criteria) and CCHR (The Canadian Computed Tomography Head Rule) [5]. NOC guidelines are used for patients with a GCS score of 15 with minor symptoms such as headache, nausea, vomiting, alcohol intoxication, anterograde amnesia, trauma above the clavicle, and seizure. On the other hand, CCHR is used in patients having GCS 13-15 and severe symptoms such as depressed skull fracture, open skull fracture, basal skull fracture, vomiting more than two times, and long-standing amnesia. CCHR is not applied to patients less than 16 years old and those who are in a hypercoagulable state [6]. Both NOC and CCHR are equally sensitive, however, CCHR is more specific and reduces the rate of CT scans in patients with a minor head injury.

In 2003, the National Institute of Clinical Excellence (NICE) released its guidelines for CT recommendations. They are similar to CCHR with some modifications. According to this criteria, a CT head should be requested at any time if the GCS of the patient is less, more than one episode of vomiting, and GCS is 13 or 14 after two hours of injury [7].

METHODOLOGY

The present study is a prospective cohort study. The study included a total of 317 patients out of which, 181 (57.09%) had GCS less than 15. The study was conducted in Chandka Medical College/Civil Hospital Larkana. The study was conducted in a duration of three years (April 2019-March 2020). All the patients presented with head injuries were included in the study. According to the exclusion criteria, those who had got a penetrating head injury were not included in the study. Written informed consent was signed by all the participants after they had been explained about the study. Those who did not sign the consent form were also excluded from the study and were assured that their treatment would not be stopped. An individual assessment form was filled out for each participant. Permission was taken from the ethical review committee of the institute. The clinical history and findings of the neurological examination were recorded on the performa. The information recorded on the form included time of injury, time of arrival in the emergency department, time of admission, time of discharge, treatment given in the hospital, and findings of other investigations. The form also included the clinical course of the patient, any change in the treatment regimen, and any complications found during a hospital stay.

All those patients who had GCS of 14, and 15 were sent for CT scan after four hours of arrival in the emergency department. The report was prepared and interpreted by the Department of Radiology. The patients who had a normal scan were kept under observation for 2 hours and then discharged. Patients who had been detected with a focal neurological deficits were included in the study. Those patients who had been diagnosed with a lesion were admitted to the hospital for further management. Those patients who had been declared normal were not readmitted to the hospital for the initial head injury. All the data were analyzed by using the SPSS version 22

RESULT

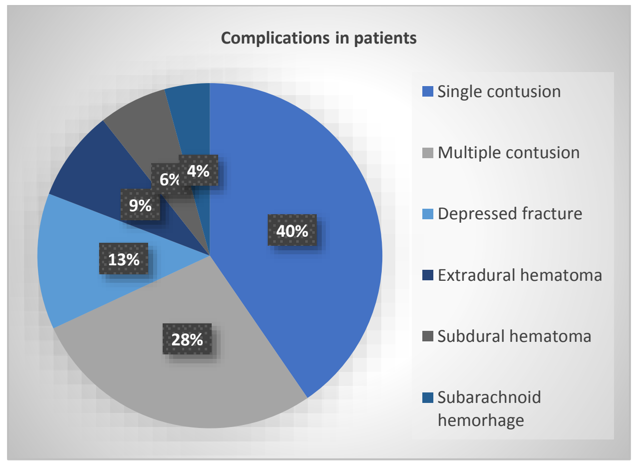
A total of 181 TBI patients out of 317 patients with head injury were detected with GCS less than 15. Out of 317 patients, 136 (42.90%) had a GCS of 15. A total of 120 (66.29%) had a GCS of 14 and 61 (33.70%) had a GCS of 13. Total 27 (14.91%) out of these 181 patients had normal CT scans. The number of patients having normal CT scans and variable GCS is given in table 1. A total of 177 (55.84%) patients were victims of road traffic accidents, 88 (27.76%) got injured as a result of a fall, 35 (11.04%) were victims of assault, and the remaining 17 (5.36%) got injured by a flying object such as a football, cricket ball, etc. The CT scan was associated with the mode of injury and is presented in Table 2. It shows that the rate of abnormal CT scans was highest in patients hit by a flying object and most of them needed surgical intervention. A total of 16 (5.04%) participants needed surgical intervention. The most common symptom presented by the participants was a single contusion found in 19 out of 47 patients with abnormal CT scans. A total of 13 had multiple contusions, 6 had depressed fracture, 4 had extradural hematoma, 3 had a subdural hematoma and 2 had subarachnoid hemorrhage. Graph 1 shows the statistics of complications.

Table 1: Comparison of CT scan findings with the GCS score

Number of patients	GCS	Abnormal CT scan	Normal CT Scan
61	13	22 (36.06%)	39 (63.93%)
120	14	21 (17.5%)	99 (82.5%)
136	15	4 (2.94%)	132 (97.05%)

Table 2: Reason for TBI and abnormal CT scan

Mode of injury	Number of patients n=317	Abnormal CT scan n=47	Need for surgical intervention n=16
Road traffic accident	177 (55.84%)	19 (10.73%)	4 (2.26%)
Fall	88 (27.76%)	4 (4.55%)	1 (1.13%)
Assault	35 (11.04%)	9 (25.71%)	3 (8.57%)
Flying object	17 (5.36%)	15 (88.23%)	8 (47.06%)



Graph 1: Complications in patients

DISCUSSION

Minor head injuries include patients who experience loss of consciousness, post-traumatic amnesia, and a GCS above 13. According to the statistics given by the Global Burden of Disease Study 2016, the rate of TBI in the adult generation was 369 per 1million population per year with more than 80% of patients staying in hospital for 2 to 3 days. Most of these cases were mild [8]. Mild head injuries can be referred to as injuries resulting in GCS 14-15 [9]. In addition to this, clinical, surgical, and radiological findings have a significant part in the identification of risk.

According to the study of Pandor et al, the guidelines given by CCHR are more authentic and cost-effective for adult cases. However, it has limitations for children and needs more research [10]. Mannix et al studied the prevalence of minor head injury presented in a health care setup. They performed a cross-sectional study on 4146777 patients over 5 years. They concluded that 800000 minor head injury patients present each year [11]. The study of Smits et al was majorly concerned with cost-effectivity regarding CT scans and management of head injury strategies. They included 3181 patients and compared both CCHR and CHIP rules to compare the cost-effectivity. They found that CCHR was the most cost-effective. Moreover, they concluded that a CT scan was the most sensitive test when it comes to the selection of a patient for neuro-surgical intervention and management [12]. Kavalci et al also researched on comparison of cost-effectivity of Canadian and New Orleans guidelines. They also concluded that CCHR was more specific and cost-effective [13].

CONCLUSION

Early detection of the extent of head injury and timely management can increase the rate of improved outcomes. CT scan brain is a gold standard investigation for an assessment of mild TBI in the acute stage. The present study supports the replacement of NICE guidelines or CCHR with conventional risk stratification strategy for skull and head injuries. This replacement would lead to a reduction of skull radiography and increase reliance on CT scans and hence improve admission rates in the ward. Moreover, a CT scan is more sensitive regarding the detection of intracranial lesions which can reduce the number of unnecessary admissions. More lives can be saved in this way by the provision of early diagnosis and management.

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