ORIGINAL RESEARCH

Assessment of utility of conventional radiography in head injury

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ABSTRACT

Background: A head injury is a dangerous condition brought on by structural alterations brought about by mechanical pressures to the scalp, skull, and/or internal organs of the skull. The present study was conducted to evaluate utility of conventional radiography in head injury. **Materials & Methods:** 50 autopsies of both genders were collected. The radiological reports of skull radiographs and CT scan were collected. **Results:** Out of 50 cases, X- ray revealed fracture skull in 34 (68%), autopsy in 42 (84%) and CT in 40 (80%) cases. Missed fractures on X- ray skull was 20% and on CT head was 5%. The difference was significant (P< 0.05). **Conclusion:** The detection of skull fracture on conventional radiograph is an indication of serious intracranial injury. CT is indispensible in the management of acute head injury patients. Skull radiograph is of little benefit when a CT scan is obtained.

Keywords: CT head, head injury, fracture skull

INTRODUCTION

A head injury is a dangerous condition brought on by structural alterations brought about by mechanical pressures to the scalp, skull, and/or internal organs of the skull.[1] It frequently occurs in assaults, falls from a height, sports injuries, and other incidents. Since head injuries are a common cause of death and impairment in young people, there is a significant demand on health services.[2] A head injury is the cause of mortality in two third of trauma-related deaths and close to 25% to 30% of accidental deaths. Radiological evaluation of the skull is an essential component of treating individuals with head injuries.[3]

The development of CT and MRI has revolutionized the discipline of radiology. The earliest reports of a skull fracture were from X-rays in 1962 and computed tomography (CT) in 1983.[4] Because the presence of a fractured skull on an X-ray suggests a more serious intracranial injury, skull radiographs are frequently carried out. The initial assessment of individuals with head injuries using skull films (X-rays) has been replaced by CT scanning of the skull and brain.[5] These days, CT is the main modality used to assess patients who have suffered brain trauma. Nowadays, it is acknowledged that CT is the most important imaging method for treating patients with closed head injuries while they are in the acute phase.The gold standard method is CT scanning with axial non-contrast.[6]The present study was conducted to evaluate utility of conventional radiography in head injury.

MATERIALS & METHODS

The present study was conducted on 50 autopsies of both genders. Those cases who underwent both X-ray and CT evaluation prior to death were selected.

Data such as name, age, gender etc. was recorded. The head was examined in detail and dissected in accordance with accepted forensic autopsy protocol. The fractures on the outside table were noted down after the scalp, temporal muscles, and periosteum were dissected. Using an oscillating saw, the skull was opened by creating a circular cut around it, slightly above the ridges of the eyebrows, and staying in close proximity to the reflected scalp flaps. Following the removal of the skull cap, the dura was sawed and reflected using scissors. In order to assist the inspection for the presence of internal fractures across the base of the skull, the dura mater was removed from the skull after the brain was removed.The radiological reports of skull radiographs and CT scan were collected. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Assessment of parameters

Parameters	Cases	Fracture	Percentage
X- ray skull	50	34	68%
Autopsy	50	42	84%
CT head	50	40	80%

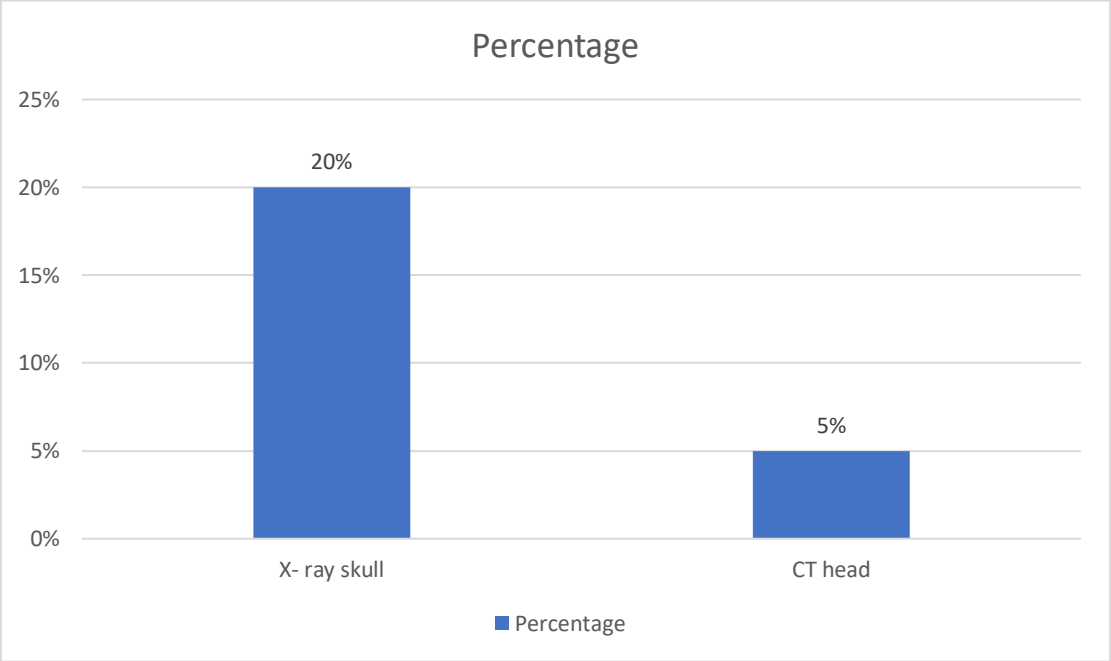
Table I shows that out of 50 cases, X- ray revealed fracture skull in 34 (68%), autopsy in 42 (84%) and CT in 40 (80%) cases.

Table II Assessment of missed fractures

Missed fractures	Percentage	P value
X- ray skull	20%	0.01
CT head	5%	

Table II, graph I shows that missed fractures on X- ray skull was 20% and on CT head was 5%. The difference was significant (P< 0.05).

Graph I Assessment of missed fractures



DISCUSSION

Routine skull radiography examinations cannot identify every single linear fracture of the vault. The width and direction of a fracture determine how it is delineated on radiography. X-rays typically overlook the temporal bone fractures.[7] Additionally, skull films do a poor job of displaying fractures across the base of the skull. Even while simple X-rays can identify skull fractures, they are becoming antiquated.[8] Compared to a skull radiograph, a CT scan with a bone window is more sensitive and accurate at identifying depressed skull fractures.While MRI is more accurate in identifying cerebral disease, CT is still regarded as the most important imaging modality for treating patients with head injuries during the acute phase.[9]Even patients with modest head injuries (GCS>12) who have risk factors such as loss of consciousness, amnesia, age over 60, seizure, history of neurosurgery, alcohol or drug misuse, or both should get CT scanning. If the patient's condition has altered within 24 hours of the incident and the initial CT results were abnormal, a second CT scan should be performed. Given that a delayed cerebral hemorrhage is a possibility.[10]The present study was conducted to evaluate utility of conventional radiography in head injury.

We found that out of 50 cases, X- ray revealed fracture skull in 34 (68%), autopsy in 42 (84%) and CT in 40 (80%) cases. Chawla H et al[11]determined the accuracy of X-ray in detecting skull fractures, comparing the same with autopsy and CT evaluation. The medico-legal cases that died of traumatic head injury and brought for autopsy over a period of two years were included in the study. When compared with autopsy, X-ray missed 19.1% of fractures while 11.9% fractures missed in contrast to CT scan.

We found that missed fractures on X- ray skull was 20% and on CT head was 5%.Yousfani et al[12] observed that CT scan had superior performance in precisely assigning the medico legal grade of head

injury in contrast to plain X-rays. Out of 100 cases studied by them, X-rays in 21 cases of clinically moderate to severe head injury did not show any injury while CT scans in those cases showed 04 fractures without dislocation, 04 fractures with dislocation, 09 fractures with extradural haemorrhage and 04 fractures of skull with ruptured membranes.

Kowalski RG et al[13] in their study the 17 470 patients with TBI analyzed in this study had a median (interquartile range [IQR]) age at injury of 39 (25-56) years and included 12 854 male individuals (74%). Of these patients, 7547 (57%) experienced initial loss of consciousness, which persisted to rehabilitation in 2058 patients (12%). Those with persisting DOC were younger; had more high-velocity injuries; had intracranial mass effect, intraventricular hemorrhage, and subcortical contusion; and had longer acute care than patients without DOC. Eighty-two percent (n = 1674) of comatose patients recovered consciousness during inpatient rehabilitation. In a multivariable analysis, the factors associated with consciousness recovery were absence of intraventricular hemorrhage (adjusted odds ratio [OR], 0.678; 95% CI, 0.532-0.863; P = .002) and intracranial mass effect (adjusted OR, 0.759; 95% CI, 0.595-0.968; P = .03). Functional improvement (change in total functional independence score from admission to discharge) was +43 for patients with DOC and +37 for those without DOC (P = .002), and 803 of 2013 patients with DOC (40%) became partially or fully independent. Younger age, male sex, and absence of intraventricular hemorrhage, intracranial mass effect, and subcortical contusion were associated with better functional outcome. Findings were consistent across the 3 decades of the database.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that the detection of skull fracture on conventional radiograph is an indication of serious intracranial injury.CT is indispensible in the management of acute head injury patients. Skull radiograph is of little benefit when a CT scan is obtained.

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