

Compliance with NICE Guidelines in Head Injury Patients in Regard to CT scan of the Brain: A Retrospective Audit

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INTRODUCTION

Head injury is a broad term that results from damage to the scalp, skull, brain and underlying tissue and blood vessels in the head. It can be as mild as a bump, bruise (contusion), or cut on the head, or can be moderate to severe in nature due to a concussion, deep cut or open wound, fractured skull bone(s), or from internal bleeding and damage to the brain¹. Depending on the extent of head trauma, head injuries are also known as brain injury or traumatic brain injury. According to the health service executive Ireland data 90% of patients who presented with head injuries suffered minor injuries, among these 40-50% are children.¹ Children usually experienced minor injuries due to their high energy level and less sense of danger. Head injury is one of the most common cause of disability and death in adults^[1].

To standardize the management of traumatic head injuries the NICE guidelines, first published in 2003 and last updated in September 2019, advise a computerised tomography (CT) brain in certain situations.² A CT scan of the brain aims to identify patients with significant brain injury and is especially important for patients requiring urgent surgical evacuation that drastically changes clinical outcomes.³ The use of clinical guidelines can improve patient care, reduce over unnecessary imaging and lower hospital admissions by identifying patients at low risk of a clinical significant brain injury [2,3].

NICE Guidelines for Head Injury Patients

A provisional written radiology report should be made available within 1 hour of the CT taking place

ADULTS

CT head scan within 1 hour of the risk factor being identified

- Glasgow Coma Scale (GCS) <13 on initial assessment
- GCS < 15 at 2 hours after injury on assessment in the emergency department
- Suspected open or depressed skull fracture
- Any sign of basal skull fracture

- Post-traumatic seizure
- Focal neurological deficit
- More than one episode of vomiting since the head injury

CT head scan within 8 hours of the head injury

Current anticoagulant treatment

Loss of consciousness or amnesia since the head injury with any of the following risk factors

Age > 65 years

A history of bleeding or clotting disorder

Dangerous mechanism of injury (high speed road traffic accident either a pedestrian or cyclist struck by a motor vehicle, an occupant ejected from a motor vehicle or a fall from height of > 1 meter or 5 stairs

More than 30 minutes of retrograde amnesia of events immediately before the head injury

Children

CT head within 1 hour of the risk factor being identified

- Suspicion of NAI
- Post-traumatic seizure, but no history of epilepsy
- On initial assessment, GCS <14, or for children under 1 year GCS < 15
- At 2 hours after the injury, GCS <15
- Suspected open/depressed skull fracture or tense fontanelle
- Any sign of basal skull fracture
- Focal neurological deficit
- For children < 1 year, presence of bruise, swelling or laceration > 5 cm on head
- If none of the above is present, then presence of 2 or more of the of the following risk factors
- Loss of consciousness lasting more than 5 minutes
- Abnormal drowsiness
- 3 or more discrete episodes of vomiting
- Dangerous mechanism of injury (high speed RTA either as a pedestrian, cyclist or vehicle occupant, fall from height of > 3 meters, high speed injury from an object)

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- Amnesia (ante grade or retrograde) lasting > 5 minutes (assessment not possible in pre-verbal children and unlikely in any child <5 years)
- Development of any of the following factors during 4 hour observation period: GCS <15; Further vomiting; Further episode of abnormal drowsiness.

CT scan within 8 hours of injury

If none of the above risk factors present, but the patient is on current anticoagulation treatment.

Methods: This was a retrospective chart review of the patients being assessed for head injury in the emergency department of the Portiuncula University Hospital, a model 3 general and maternity hospital. Sixty-four patients irrespective of the age with head injuries, presenting to the emergency department during the months of March, April and May 2020, were included in the audit. The data was extracted by reviewing the charts of the patients retrospectively.

The primary outcome was the prevalence of head injury patients, where the emergency doctors applied the NICE guidelines to decide accordingly regarding their care.

The secondary outcomes were the prevalence of patients who got CT brain according to the NICE guidelines, outcome of the CT brain, mechanism of injury, gender distribution and assessment of Glasgow coma sale (GCS).

RESULTS

Data was collected on 64 patients with mean age (+SD) of 34 (+24), 70.31% male & 29.69% females. All patients presented with head injuries. Compliance with NICE guidelines was observed in 61(95.3%) of the patients. Of the patients presenting with head injury 18(28.12%) underwent CT scan of the brain.

Of these patients CT brain was reported normal in 15(83.33%), while 3(16.67%) patients were found to have intracranial bleed. Regarding the mechanism of injury, 56(87.50%) patients reported mechanical falls, 3(4.68%) non-mechanical falls and 5(7.82%) had a fall secondary to alcohol intoxication.

The GCS was assessed in all 64(100%) patients. The GCS was 15/15 In 62(96.87%) patients and 14/15 in 2(3.13%) of the patients. Thirty-seven (57.81%) patients presented within 2 hours of the injury, 20(31.25%) within 8 hours and 7(10.93%) presented after 8 hours.

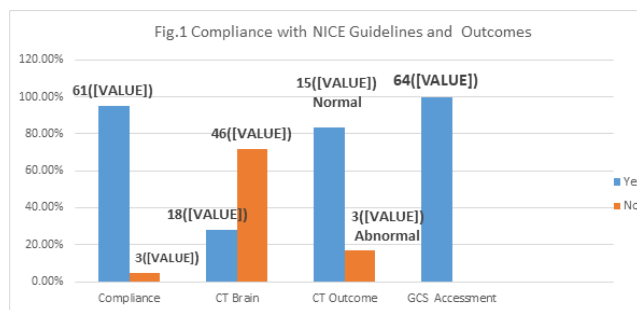
Table 1: Baseline characteristics.

Age	34 +/- 24	
Sex	Male	Female
	45(70.31%)	19(29.69%)

Table 2: Primary and secondary outcomes.

Compliance	CT Brain		CT Brain outcome				Mechanism of Injury			GCS Assessment		Time since injury		
	Yes	No	No	IC	Me	No	Alc	Yes	No	2	8	Aft		
			rm	ble	cha	non-	oh			ho	ho	er		
			al	ed	nic	me	ol			urs	urs	8		
					al	nic						ho		
						al						urs		
95.31%	4.69%	28.12%	71.88%	83.33%	16.67%	87.50%	4.68%	7.82%	10.00%	0%	57.81%	31.25%		
												10.93%		

Figure 1: Compliance and outcomes.



DISCUSSION

This audit demonstrated that the application of the NICE guidelines has significantly reduced the number of CT scans of the brain ordered in the emergency department of the Portiuncula University Hospital. As we look at the outcomes of the CT brain, in 15(83.33%) patients CT was reported normal and with intracranial bleed in 3(16.67%) patients. Incomplete documentation in the clinical notes by the doctors in emergency department was the cause of non-compliance in 3(4.69%) patients.

A study conducted in Roscommon Hospital concluded that application of the NICE guidelines to these patients would have resulted in a 56% increase in the rate of CT brains being performed.² A study by Haydon at St. Vincent Hospital Sydney Australia demonstrated that the head injury guidelines are not being fully utilised at a major UK trauma hospital, resulting in 5% of patients being exposed to ionising radiation without apparent documented clinical justification.³ The Australian New South Wales (NSW) guideline has distinct differences to the UK National Health Service Clinical Guideline (CG) 56, with a more complex algorithm and an absence of specific time frames for head CT completion.³ The results suggest a need for further education and awareness of head injury clinical guidelines.³ A study conducted in Birmingham Children Hospital showed adherence to the NICE head injury guidelines would have resulted in a three-fold increase in the total number of CT examinations of the head.⁴ A study conducted in University Hospital Aintree, Liverpool concluded that, while NICE guidelines provide a valuable tool for the investigation of head injuries, elderly patients on anticoagulation may be at risk

of having significant head injuries missed and a lower threshold for scanning should be adopted.⁵ One of the study done in Emergency Medicine, Hope Hospital Salford, Manchester concluded that, the implementation of the NICE guidelines led to a two to fivefold increase in the CT head scan rate depending on the cases and baseline departmental practice. However, the reduction in skull X-ray (SXR) and admission appears to more than offset these costs without compromising patient outcomes.⁶ An audit done in The University of Leeds concluded that the majority of patients who present with a head injury to Accident and Emergency departments are discharged home^[4-7].

CONCLUSION

Compliance with NICE guidelines has significantly reduced the number of CT scans of the brain ordered in the emergency department of the Portiuncula University Hospital. Compliance may be further improved by proper documentation in the clinical notes.

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