

# Assessing the impact of adherence to National Head Injury Guidelines between 2003 and 2008, based in a District General Hospital in the UK

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**Abstract:** This study was conducted to assess the adherence and impact of National institute for Health and Clinical excellence (NICE) guidelines on Computer tomography (CT) imaging of head injuries in the emergency department of Wexham Park Hospital in December 2003 and 2008. A data collection sheet was used to collect information on the CT imaging of head injury patients presenting to Wexham Park Hospital Emergency department in December 2003 and then again in December 2008. 37 patients were included in the audit in 2003 and 47 in 2008. As a consequence of the results in 2003 a change was implemented this consisted of distributing copies of the head injury guidelines and locating them in the areas receiving major trauma in the Emergency department. There was also education given to new doctors starting work in the Emergency department about the head injury guidelines. The data collected in 2008 assessed the impact of this change. In 2003, 30% and in 2008, 17% of head injury patients received the appropriate CT imaging according to criteria 1 of the guidelines. 26% of patients in 2003 with head injuries fulfilled one or more of Criteria 1 of the guideline but did not receive CT imaging. In 2008 this had reduced to only 4% of patients requiring a head CT according to criteria, but not receiving one. This indicates a dramatic improvement following the interventions in the emergency department. This indicates that very simple interventions have increased the adherence to national head injuries imaging guidelines. This intervention is simple, cheap, is time effective to set up, and is easily reproducible in other hospitals and with other sets of guidelines within the emergency department.

**Keywords:** guidelines, head injury

## INTRODUCTION

Head injury is a common presenting problem for Emergency Departments in the United Kingdom. The National Institute of Clinical Excellence (NICE) published guidelines in 2003, which were re-updated in 2007 on certain criteria that must be met for a head injury patient to warrant a computerised tomographic (CT) imaging of their head, in order to assess the extent of their head injury. These guidelines are key for advising on the appropriateness of CT imaging for an individual head injury patient. Every Emergency Department in the UK should be managing head injury patients according to the head injury guidelines on CT imaging. The aim of this study was to audit the adherence to these guidelines in Wexham Park Hospital, a busy medium sized district general hospital in East Berkshire. Initial data was collected in December 2003 and then repeated in

December 2008 for comparison. A change was instigated after data collection in 2003, and hence analysed the efficacy of this intervention.

## METHODS

A data collection sheet was designed to collect information on patients presenting to Wexham Park Hospital Emergency Department during December 2003 and then again in December 2008 (See appendix 1). Thirty seven patients were included in the audit in 2003 and 47 in 2008. The final data was analysed using Microsoft Excel software. Appendix 2 shows the inclusions, criteria, standards and exclusions for CT imaging for head injuries according to national guidelines.

## CHANGE IMPLEMENTATION AFTER DATA COLLECTION IN 2003

A copy of the National Head injury guidelines were put up around the Emergency department in Wexham Park Hospital in all areas receiving major trauma to raise staff awareness of the need for appropriate CT imaging

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in managing head injury patients and therefore to increase adherence to these national guidelines.

At 4 monthly intervals when new junior doctors (senior house officers, staff grades and clinical fellows) rotated through the Emergency department, the National Head injury guidelines were taught to them during lectures at their induction program.

### FINDINGS

Data was collected on 39 patients in 2003 and 47 in 2008 presenting to the Emergency department with head injuries. The table below shows the percentages of head injury patients who did/did not fulfil the National NICE guideline criteria for requiring CT imaging. Comparison can be made between 2003 and 2008.

Table 1: Percentage of head injury patients and NICE guidelines

	Indicated & CT Imaging	Indicated & NO Imaging	Not Indicated & CT imaging	Not Indicated & NO CT imaging
Criteria 1 2003	30%	26%	0%	44%
2008	17%	4%	0%	79%
Criteria 2 2003	23%	10%	0%	67%
2008	0%	2%	0%	98%

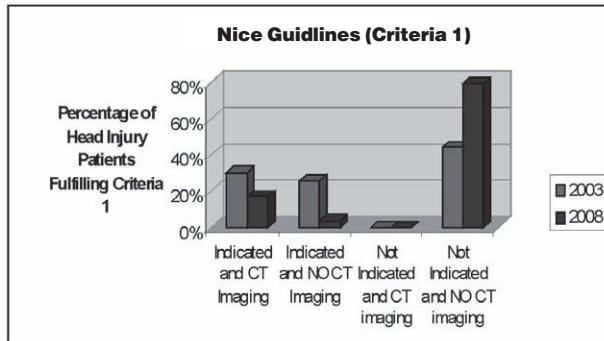


Fig 1: NICE criteria and CT indications (criteria 1)

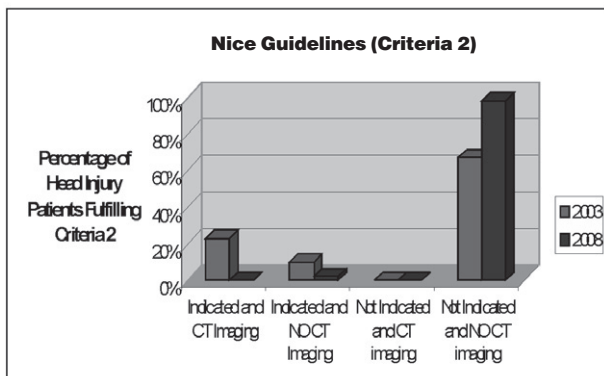


Fig 2: NICE criteria and CT indications (criteria 2)

26% (10/39) of patients with head injuries in 2003 had met one or more of the criteria but did not receive CT imaging. With only 4% (2/47) of patients in 2008 fulfilling the criteria but not receiving a head CT, this indicates dramatic improvement.

In 2003 30% (12/39) and 17% (8/47) in 2008 received the appropriate CT imaging.

44% (17/39) of patients in 2003 and 79% (37/47) in 2008 did not meet the criteria for CT imaging and hence were not given one.

No patients in 2003 or 2008 received CT imaging that was inappropriate.

10% (4/39) of patients in 2003 with head injuries had fulfilled criteria 2 so therefore required a head CT but did not receive one. However in 2008 only 2% (1/47) of patients did not receive CT scan who were indicated for CT imaging.

23% (9/39) in 2003 and 0% in 2008 received the appropriate CT imaging.

67% (26/39) of patients in 2003 and 98% (46/47) did not meet the criteria for CT imaging and hence were not given one.

No patients in 2003 or 2008 received CT imaging that was inappropriate.

### DISCUSSION

In 2003 26% of patients with head injuries fulfilled one or more of Criteria 1 but did not receive CT imaging. In 2008 this had reduced to only 4% of patients requiring a head CT according to criteria 1, but not receiving one. These results were also mirrored with Criteria 2 where 10% of patients in 2003 did not receive a scan when it was indicated, compared to 2% in 2008. These results indicate a significant improvement from 2003 to 2008 in the imaging of head injuries where a CT scan is indicated according to NICE. These results suggest there was improvement in the quality of care received by head injury patients within the Emergency department in 2008 compared to 2003, due to the implemented change.

Of note, there was no documentation recorded in the notes to suggest reasons for why a CT head was not performed in the above patients. There may have been a justified reason i.e. uncooperative or intoxicated, but due to lack of documentation they were classed as a failure to meet the national guidelines standards.

Head injury is a cause of significant morbidity and mortality within the UK, particularly as it is a condition affecting all age ranges, but commonly younger patients as a result of trauma. It is extremely important head injury patients presenting to Emergency Departments receive correct and timely imaging of their brain, when deemed appropriate, as the results gleaned from imaging can dramatically influence their immediate management aiming to reduce/prevent any secondary brain injury. This has the potential to reduce any subsequent mortality and morbidity from the initial injury. The national NICE Head injury guidelines provide a good frame work for assisting decision making regarding CT imaging within the Emergency department, leading to better patient overall care.

Our research indicates that a very simple intervention has the potential to significantly increase the adherence to the desired guidelines. This intervention uses simple easily accessible materials, is inexpensive, quick to set up, and reproducible for any guidelines and can target all areas of the workforce. It can be taken out of the Emergency department and used on wards, outpatient clinics, theatres within larger teaching hospital, not just a district general hospital.

## REFERENCE

National Institute for Clinical Excellence (NICE) September 2007.

**APPENDIX 1**

**A&E / Orthopaedics Head Injury Audit**

Please complete a form for all patients attending A&E with a head injury

Pt ID	Date of attendance
DoB	Time of arrival
	Triage time
(Use sticker, if available)	Time of assessment

Patient Assessment

Please indicate 'yes' or 'no' if any of the following signs / symptoms are present:

(\* see definitions at the foot of the page)

	Yes	No
PERLA		
Low /high blood pressure		
Injury linked to fit		
Injury linked to alcohol consumption		
GCS <13 at any point since the injury		
GCS = 13 or 14 at 2 hours after the injury		
Suspected open or depressed skull fracture		
Any sign of basal skull fracture *		
Post-traumatic seizure		
Focal neurological deficit		
>1 episode of vomiting (except in children – clinical judgement)		
Amnesia for >30 minutes of events before impact *		
Loss of consciousness since the injury		
Age ≤ 65 years		
Coagulopathy *		
Dangerous mechanism of injury *		
CT head Time .....		

**Definitions**

Signs of basal skull fracture =  
Haemotympanum, 'panda' eyes, cerebrospinal fluid otorrhoea, Battle's sign

Assessment of amnesia –  
Not possible in pre-verbal children & unlikely to be possible in <5 years of age

Coagulopathy =  
Hx of bleeding, clotting disorder, current treatment with warfarin

Dangerous mechanism of injury =  
Pedestrian struck by motor vehicle, occupant ejected from motor vehicle, fall ≥1 metre or 5 stairs (lower threshold for children <5 years)

**APPENDIX 2**

A CT head should be requested immediately in a patient with head injury where any one of the following criteria are met:

**Criteria 1.** CT imaging of the head is immediately requested for a patient with a head injury who has any *one* of the following :

- GCS less than 13 at any point since the injury
- GCS equal to 13 or 14 at 2 hours after the injury
- Suspected open or depressed skull fracture
- Any sign on basal skull fracture
- Post traumatic seizure
- Focal neurological deficit
- More than one episode of vomiting
- Amnesia for greater than 30 minutes of events before impact

*Standard* – 100% of patients with head injury assessed in the emergency department.

*Exception* – Children of 12 years and younger for whom the clinician considers that episodes of vomiting do not warrant immediate CT imaging.

**Criteria 2.** CT imaging of the head is requested immediately for a patient with head injury who has any one of the following if he or she has experienced some loss of consciousness or amnesia since the injury –

- Age ≥ 65 years
- Coagulopathy
- Dangerous mechanism of injury

*Standard* – 100% of patients with head injury assessed in the A&E department.

*Exception* – None.

Explanation of the definitions within the NICE head injuries Guidelines

*Signs of basal skull fracture* = Haemotympanum, 'panda' eyes, cerebrospinal fluid otorrhoea, Battle's sign

*Assessment of amnesia* – Not possible in pre-verbal children & unlikely to be possible in <5 years of age

*Coagulopathy* = Hx of bleeding, clotting disorder, current treatment with warfarin

*Dangerous mechanism of injury* = Pedestrian struck by motor vehicle, occupant ejected from motor vehicle, fall ≥1 metre or 5 stairs (lower threshold for children <5 years)