An audit of head injury care in a District General Accident and Emergency Department

Dr Ivo Dukic
United Lincolnshire Hospitals NHS Trust  
Accident and Emergency Department, Grantham and District Hospital

An audit of head injury care in a District General Accident and Emergency Department

Author

Dr Ivo Dukic, SHO in Accident and Emergency, Grantham and District Hospital  
All correspondence to ivo@dukic.co.uk  
Proforma and database available at http://www.clinicalaudit.org

Background

Head injury is a common presenting complaint in the Accident and Emergency (A&E) department accounting for between 5 and 7% of all attendances. The majority of patients presenting to A&E departments are assessed and sent home having minor head injuries. Minor head injury is defined as a patient with a history of loss of consciousness, amnesia, or disorientation and a Glasgow Coma Scale (GCS) score of 13–15. Prior to the development of the Canadian Computer Topography (CT) Head Rules, patients with minor head injuries presented a diagnostic problem for Accident and Emergency physicians and there was frequent over investigation of patients and unnecessary costs. The introduction of NICE guidelines, recommending the implementation of the Canadian CT Head Rules, in June 2003, has led to a decreased use of Skull X-rays and an increased reliance on CT head scanning.

Aims

1. To ensure appropriate assessment, management and documentation of head injuries in the Accident and Emergency Department

2. To avoid discharging potentially serious head injuries and improve record keeping.

3. To assess effectiveness of care compared to other Accident and Emergency departments

Methodology

Retrospective review of all casualty cards of patients presenting to Accident and Emergency from 01/03/2006 to 31/3/2006. All patients with anatomical part ‘head’ on the anatomical site part of the casualty card who were verified with a diagnosis of head injury on retrospective case not review. A Microsoft Access database was created to assess all head injury patients and to allow further repetition of the audit based upon any recommendations. Results were analysed and graphed with Microsoft Excel.

Guidelines

NICE guidelines for management of head injury, 2003, were used as the main criteria against which care should be assessed within an Accident and Emergency Department. Additionally, the original Canadian Head injury rules were reviewed although not directly used for assessment of care.
Criteria for assessment

The criteria for assessment are roughly in four groups focusing on the record of initial assessment, history and examination, appropriate imaging and further treatment. Risk assessment is linked to the Computed Topography (CT) imaging of head criteria. Both risk assessment and CT imaging are based on careful history and examination. All criteria have been selected from the NICE guidelines for management of head injury and based on the section 1.4, Assessment and investigation in A&E\(^4\).

Initial assessment

All patients triaged within 15 minutes of arrival
High risk patients seen by clinician within 25 minutes of arrival
Low risk patients seen by clinician within 75 minutes of arrival

CT imaging of head and high risk criteria

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 of basal skull fracture (haemotympanum, ‘panda’ eyes, CSF otorrhoea, Battle’s sign)
Post-traumatic seizure
Focal neurological deficit
More than one episode of vomiting (clinical judgement)
Amnesia greater than 30 minutes before event

Loss of consciousness or amnesia since injury and
Age more than or equal to 65 or
Coagulopathy (history of bleeding, clotting disorder, current treatment with warfarin)

Recommended CT request immediately and CT within 1 hour of request being received (apart from amnesia of greater than 30 minutes).

Medium risk

Loss of consciousness or amnesia since injury and

Dangerous mechanism of injury (pedestrian struck by motor vehicle or a fall from height of greater than 1 meter or 5 stairs), lower threshold in children
Or amnesia of greater than 30 minutes before impact

Recommended CT with 8 hours of injury and admission for observation until CT scan is carried out.

Low risk

All other presentations with head injury

Skull X-ray recommendations for use:

Suspicion of non-accidental injury in infant and young children.
Where CT scanning resources are unavailable.
Additional criteria

Patients with head injury should not receive systemic analgesia until fully assessed so than an accurate measure of consciousness and other neurological signs can be made.

All patients with any degree of head injury who are deemed safe for appropriate transfer to the community from A&E or the observation ward should receive verbal advice and a written head injury advice card.

All patients with any degree of head injury should only be transferred to their home if it is certain that there is somebody suitable at home to supervise the patients. Patients with no carer at home should only be discharged if suitable supervision arrangements have been organised, or when the risk of late complications seems negligible.

For low risk patients head injury instructions should be given to a responsible adult who presents with the patient with head injury. All patients should go home with a responsible adult who should be with the patient for 24 hours.

For all aspects of record keeping if any mention was made either by the triage nurse or the attending clinician of the history or examination criteria it was assumed that the clinician had done an appropriate check e.g. writing motor exam normal meant a Central Nervous system exam was normal; writing no csf seen, meant that the clinician had checked for all other signs of basal skull fracture; writing PMH nil meant that there was no history of bleeding disorder or coagualopathy; writing DH nil meant that the patient was not taking anticoagulants etc. However, if drug history was not written it was not assumed the patient was not taking any medication and similarly if there was no past medical history it did not assume that the patient was not taking any medication. Amnesia and headache history was only assessed for the over 5 age group.
Results

The total number of patients seen in the Accident and Emergency Department from 01/03/2006 to 31/03/2006 was 2384 patients.

Total number of patients where head injury was ticked as diagnosis and verified as a diagnosis on clinical notes review was 81. Therefore head injuries represent 3.4% of the total Accident and Emergency diagnosis. This is likely to be an underestimate as only patients where anatomical part 'head' was ticked were included in the audit.

Age and Sex

Age of patients ranged from 1 to 98 years. The average age of patient presenting to Accident and Emergency was 32. Paediatric patients accounted for 43% (35) of all patients diagnosed with head injury. Patients over the age of 65 accounted for 21% (17) of all patients. Males 48% (39) and Females 52% (42) of all patients. Amongst paediatric patients 43% (15) were male.

Triage

<table>
<thead>
<tr>
<th></th>
<th>Triaged in 15 mins</th>
<th>Doctor within 25 mins</th>
<th>Doctor within 75 mins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>51% (41)</td>
<td>37% (30)</td>
<td>88% (71)</td>
</tr>
<tr>
<td>No</td>
<td>43% (35)</td>
<td>63% (51)</td>
<td>12% (10)</td>
</tr>
<tr>
<td>Not recorded</td>
<td>6% (5)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Figures listed are percentages of the total number of cases seen; figures in brackets represent actual numbers of cases.

Systemic analgesia

In 1% (1) of cases systemic analgesia was given. There was also no record of a neurological exam being carried out in this case so it was impossible to tell whether analgesia was given prior to assessment.

High risk patients

98% of people had a GCS of 15/15 on presentation. In one case the GCS was not recorded and in one case the patient was confused but was known to have dementia; their GCS remained at 14 at 2 hours post injury.

There were a total of 8 high risk patients which equates to 10% of all attendances with head injury. 75% of these patients were triaged in 15 minutes and 75% were seen by a doctor in 25 minutes.

Only one (12.5%) of these patients had a CT brain scan. The same patient was admitted for observation. The other 7 patients were not admitted for observation and were discharged home without scan. Of these high risk patients who were discharged, 25% (2) of patients had no record of being given head injury instructions. For 25% (2) there was no record of the patient being accompanied by a responsible adult.

No patients were transferred for neurosurgery or into other hospitals.
Medium risk patients

Patients not fitting the high risk criteria who had amnesia or a dangerous mechanism of injury.

There were 10 patients fitting the medium risk criteria (12% of all presentations). None of these patients were admitted. One patient had a skull x-ray (aged 17) and none had CT scanning. 60% (6) were not seen within 25 minutes of arrival, and 30% (3) were not seen within 75 minutes of arrival. All patients in this group were sent home with head injury instructions. In one case (10%) the presence of a responsible adult was not recorded.

Low risk patients

The majority, 77% (63), of patients presenting with head injury where low risk.

Admitted patients and neurosurgical transfer

2 patients were admitted, one specifically for head injury observation. These were not included in head injury instructions and in going home with a responsible adult analysis. No patients were transferred for neurosurgery intervention.

Head injury instructions

In 11% (9) of case notes there was no record of patients being given head injury instructions. Two patients were admitted so not included in being given written instructions. Any mention of head injury instructions was looked for on all aspects of case notes.

Home with responsible adult

In 23% (18) of cases there was no record of the patient going home with a responsible adult. All cases where the patient was accompanied by a spouse or friend it was assumed that instructions where given to the adult and the patient would stay with the responsible adult for 24 hours.

Record keeping

Recording of history and examination has also been split for children and adults for ease of interpreting as slightly different criteria are used especially in the under 5s.
Paediatrics patients (<16 years old)

History

**Percentage history not recorded**

- Dangerous mechanism of injury: 3%
- PMH of clotting or bleeding disorder: 60%
- Anticoagulants: 29%
- Drug history: 23%
- Post traumatic seizure: 83%
- Headache: 11%
- Vomiting >1 episode: 6%
- Loss of consciousness > 5 mins: 88%
- Amnesia for >30 mins: 0%

Examination

**Percentage of examination not recorded**

- Neurological exam: 31%
- Suspected skull fracture: 23%
- Any sign of basal skull fracture: 43%
- Pupil status: 9%
Adults

History

Various factors identified as important in the history of patients were identified and recorded. The graph below shows the percentage of each variable not recorded.

### Percentage of history not recorded

<table>
<thead>
<tr>
<th>History</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dangerous mechanism of injury</td>
<td>11</td>
</tr>
<tr>
<td>PMH of clotting or bleeding disorder</td>
<td>50</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>57</td>
</tr>
<tr>
<td>Drug history</td>
<td>11</td>
</tr>
<tr>
<td>Post traumatic seizure</td>
<td>83</td>
</tr>
<tr>
<td>Headache</td>
<td>57</td>
</tr>
<tr>
<td>Vomiting &gt;1 episode</td>
<td>17</td>
</tr>
<tr>
<td>Loss of consciousness &gt; 5 mins</td>
<td>15</td>
</tr>
<tr>
<td>Amnesia for &gt;30 mins</td>
<td>76</td>
</tr>
</tbody>
</table>

### Examination

### Percentage of examination not recorded

<table>
<thead>
<tr>
<th>Examination</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurological exam</td>
<td>41</td>
</tr>
<tr>
<td>Suspected skull fracture</td>
<td>35</td>
</tr>
<tr>
<td>Any sign of basal skull fracture</td>
<td>50</td>
</tr>
<tr>
<td>Pupil status</td>
<td>15</td>
</tr>
</tbody>
</table>
Discussion

The audit reaffirms that the majority of patients who present to Accident and Emergency at Grantham have minor head injuries.

The majority (64%) of patients with head injury were either children or elderly. Only 51% of patients were triaged within 15 minutes as stated in the NICE guidelines and in 6% the triage time was not recorded. 88% of patients were seen by a clinician within 75 minutes of arrival to the department. This would suggest we need to focus more on triaging the patients within 15 minutes of arrival if they present with head injury. This could be as a result of nurse understaffing during peak times of the day.

The results of the above audit show that we are currently not complying with NICE guidelines. All 7 out of 8 patients (88%) who were identified as being high risk retrospectively were sent home. The one patient who had a CT brain scan was identified as having a bilateral subdural haematoma. It is difficult to ascertain whether we are missing head injuries but with only one scan being done in the month, and the scan being positive it would suggest that more CT scans need to be carried out on the high risk and medium risk group of patients. More concerning is that 25% of high risk patients had no record of being given head injury instructions and 25% had no record of being sent home with a responsible adult.

In a similar audit in 2003, prior to the NICE guidelines being introduced, a similar retrospective audit on 420 case notes showed that of 55 patients who met requirements for CT scan on Canadian guidelines, only 6 were scanned (11%)\(^5\). We are currently operating a similar level for CT scanning as seen in the paper prior to the introduction of NICE guidelines.

The results of record keeping show that we are very poor at record keeping. Hopefully, this is only a record keeping problem and doctors and nursing staff are checking all of the NICE guideline criteria for serious head injury. However, compared to two district general hospitals in 2003 we are better at recording GCS and pupil size\(^5\). Ideally all the NICE guideline features should be carefully documented in the notes.

There is a need to switch to a proforma system of recording head injuries in an Accident and Emergency setting. This is part of the NICE head injury guideline for Assessment and Investigation in Accident and Emergency Departments and should be instigated with immediate effect. Samples of proformas from the Scottish Intercollegiate Guidelines Network (SIGN) and the Royal College of Surgeons of England are available from the respective websites\(^6-7\). A repeat audit is required using proformas to record the hospital episode with all care professionals using the proforma for assessment and observation of the patient.

Key recommendations of the audit

1. Introduction of a proforma for all head injury patients based upon NICE guidelines 2003
2. Improved focus on triage within 15 minutes and stratification of high risk and low risk patients
3. Improved record keeping for all patient contact
4. Increased use of CT scanning for high risk and medium risk patients
5. Head injury instructions to be given to all head injury patients and documented
6. Documentation of a responsible adult at home if discharging patients

Once the proforma is instigated this audit should be repeated to assess compliance with NICE guidelines and the improvement in record keeping.
Acknowledgements

My thanks to Miss Caroline Plant and our always friendly and helpful receptionists for helping with gathering the case notes and lists of patients.

References

6. Royal College of Surgeons of England, Managing the patient following Head Injury, 1999
7. Scottish Intercollegiate Guidelines Network, Publication Number 46, Early Management of patients with a Head injury, 2002