

NCEPOD audit pack

Trauma: Who cares?



A report of the National Confidential Enquiry into Patient Outcome and Death (2007)



What is clinical audit?



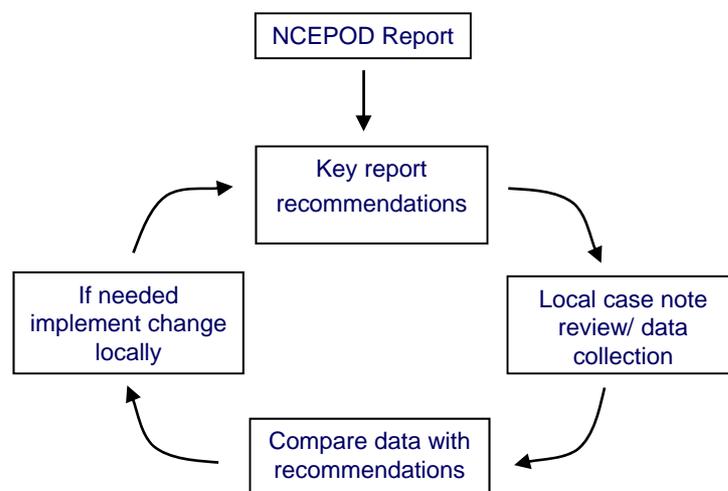
The National Institute for Clinical Excellence (NICE) endorsed definition of clinical audit is: 'A quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change. Aspects of the structure, processes, and outcomes of care are selected and systematically evaluated against explicit criteria. Where indicated, changes are implemented at an individual, team, or service level and further monitoring is used to confirm improvement in healthcare delivery'. Please refer to the Health Quality Improvement Partnership (HQIP) www.hqip.org.uk for more details.

NCEPOD – “Improving the quality of medical and surgical care”.

The overall aim of NCEPOD is to assist in maintaining and improving standards of medical and surgical care.

This is achieved by undertaking confidential questionnaire and peer review based studies, the findings of which are disseminated back to the medical profession and wider audience in the form of a report. Each NCEPOD report makes a number of key recommendations related to both clinical and organisational aspects of care. It is only when these recommendations are implemented that NCEPOD realises its function and overall aim.

The purpose of the NCEPOD audit pack is to provide clinicians with a tool to carry out local audits based on the findings of specific NCEPOD reports. Where appropriate report recommendations have been adapted to become more relevant to front line clinicians and case note review.



Introduction



Trauma remains the fourth leading cause of death in western countries and the leading cause of death in the first four decades of life. As the incidence of trauma is particularly high in the younger population; an average of 36 life years are lost per trauma death¹. Furthermore, trauma is also a major cause of debilitating long-term injuries. For each trauma fatality, there are two survivors with serious or permanent disability². Trauma is, therefore, not only a leading cause of death but also a large socio-economic burden. In 1998, the estimated cost to the NHS of treating all injuries was £1.2 billion per annum³. Reducing injuries is, therefore, a key government objective. By 2010, the Department of Health aims to have reduced the incidence of accidents by at least 20% from the baseline that was set in 1996³.

Road trauma accounts for over a third of all deaths due to injury⁴. In 2001-2003, there were (on average) 3,460 traffic related fatalities per annum in Great Britain⁵. The incidence of severe trauma, defined as an Injury Severity Score (ISS) of 16 or greater, is estimated to be four per million per week⁶. Given that the UK population in mid-2003 was in the region of 59.5 million⁷, there are approximately 240 severely injured patients in the UK each week.

In 1988, the working party report by the Royal College of Surgeons highlighted 'serious deficiencies in the management of severely injured patients'⁸. Following this report, there was increased focus on the care of trauma patients in the UK and consequently the fatality rate of trauma patients reduced. However, most of the improvement in the outcome of these patients occurred prior to 1995, with no further significant change occurring between 1994 and 2000⁹.

In 2000, a joint report from the Royal College of Surgeons of England and the British Orthopaedic Association recommended that standards of care for the severely injured patient should be nationally coordinated and systematically audited⁶. It was also recommended that standards and outcome measures be developed, against which institutions can audit the outcome of treatment. The standards of care recommended in the report include the use of advance warning systems by the ambulance service, the establishment of trauma teams, the involvement of a senior anaesthetist from the outset and criteria for the activation of the trauma team. The overall purpose of these recommendations was to improve the care of severely injured patients in terms of reduced mortality and unnecessary morbidity.

A number of UK-based single and multi-centre studies have addressed specific issues relating to the care of trauma patients¹⁰⁻¹⁵. The use of ambulance crews to alert hospitals of severely injured patients, the effect of inter-hospital transfers and the determinants affecting outcome have all been studied. One of the largest UK-based studies looked at the treatment of neurosurgical trauma patients in non-neurosurgical units¹⁶. There has not, however, been a national study to examine the overall care of trauma patients in the UK to date.

Much of the research on trauma care in the UK has been carried out using data from the Trauma Audit and Research Network (TARN), which was established in response to the Royal College of Surgeons working party report. Approximately 50% of trauma receiving hospitals submit data to TARN¹⁷. The Trauma Network Database is now an important source of epidemiological data

Introduction



and, in 2000, it contained information on over 120,000 cases¹⁸. The Healthcare Commission is working with TARN to increase participation in TARN from 50% to 100% of hospitals and to expand the number of quantitative trauma audits. At a local level, the feedback provided by TARN to individual hospitals highlights, amongst others, those cases in which patient outcome was 'unexpected'. This markedly aids internal audit and the review of trauma cases by those multi-specialty clinicians who were involved in the care of particular patients. Together with national evaluations of trauma care, in particular head injury, processes of trauma care are also analysed and provide a factual basis for system review.

A lack of continued improvement in outcome is coupled with concern that the quality of care in hospital is not of a consistently high standard across the UK, despite the availability of guidelines that indicate referral pathways for optimum triage, management and access to specialist care^{6,19,20}. Furthermore, owing to the incidence of severe trauma, hospitals are unlikely to treat more than one severely injured patient weekly. It has been suggested, therefore, that as sufficient trauma experience cannot be achieved at all hospitals, optimal outcomes may be compromised. One of the overall recommendations of the 2000 report was the establishment of a National Trauma Service trauma hub and spoke network between hospitals in each geographic area⁶.

The organisation of trauma services in the UK remains highly topical. The recent report from The Royal College of Surgeons of England (2006) confirms that high quality trauma care is not consistently available within the NHS.

Recent public debate and government statements reflect the continuing controversies regarding the optimum system of delivering trauma services within the present resource constraints²¹. This study is therefore timely as it explores the organisation in trauma services from the perspective of the patient journey. NCEPOD have identified remediable factors and made recommendations for improvement in the management of the severely injured patient.

The Royal College of Surgeons Trauma Committee submitted the Severely Injured Patient Study proposal as part of NCEPOD's topic selection process in February 2004. The NCEPOD Steering Group selected the topic, which falls under NCEPOD's extended remit.

Method



Study aim

The aim of this study was to examine the process of care for severely injured patients and identify variations that affect the achievement of agreed endpoints.

The expert group identified six main thematic areas that would address the overall aim of the study:

1. Timeliness of events making up the clinical management process.
2. Issues associated with prehospital care at the site of injury and transfer to hospital.
3. Issues associated with the care team that performs the initial resuscitation.
4. Processes and procedures associated with secondary transfers.
5. Issues associated with pathways, handovers and communication.
6. Membership of the Trauma Audit Research Network (TARN).

Case identification

Patients were identified prospectively. A nominated contact in the emergency department identified patients as "severely injured" based primarily on their own, and their colleagues', clinical judgment.

Data collection ran for three months from February 1st 2006 to April 30th 2006. Patients of all ages were eligible for inclusion.

Questionnaires and casenotes

Three questionnaires were used to collect data for this study, two clinical questionnaires per patient and one organisational questionnaire per site.

1. A&E clinician questionnaire

This questionnaire was sent to the A&E clinician in charge of the patient's initial resuscitation.

2. Admitting consultant questionnaire

This questionnaire concerned information on the location and consultant specialty to which the patient was admitted.

3. Organisational questionnaire

This questionnaire concerned data on the staff, departments, facilities and protocols for each participating hospital.

To complement the data available from the above questionnaires, copies of all the casenotes, including the patient report form for patients' first 72 hours in hospital were requested. If the patient was transferred within 72 hours, the casenotes from the receiving hospital were also requested.

The casenotes were used by NCEPOD staff to calculate an injury severity score (ISS) for each patient. Patients with an ISS of 16 or more were included in the study.

Method

Advisor group

A multidisciplinary group of advisors was recruited to review the casenotes and associated questionnaires. The group of advisors comprised clinicians from the following specialties: emergency medicine, anaesthetics, general surgery, intensive care medicine, maxillofacial surgery, neurosurgery, nursing, paediatrics, plastics, orthopaedics and vascular surgery.

After being anonymised each case was reviewed by one advisor within a multidisciplinary group. At regular intervals throughout the meeting, the chair allowed a period of discussion for each advisor to summarise their cases and ask for opinions from other specialties or raise aspects of a case for discussion.



Key findings and recommendations

Organisational data

Key findings

Many severely injured patients are taken to hospitals that do not have the staff or facilities to provide definitive care.

In this study only 17 hospitals had the range of specialities available to be considered for a Level 1 Trauma Centre (under the verification system of the American College of Surgeons).

39.3% (72/183) of hospitals did not have a resident anaesthetist at SpR level or above.

65% (118/183) of hospitals stated that a consultant was not involved in the initial care of a severely injured patient who presented at 0200 on Sunday 5th February 2006

Recommendations

There is a need for designated Level 1 trauma centres and a verification process needs to be developed to quality assure the delivery of trauma care (as has been developed in USA by the American College of Surgeons). (Royal College of Surgeons of England, College of Emergency Medicine)

All hospitals receiving trauma cases should have at least four resuscitation bays. (Hospital trusts)

All hospitals receiving trauma patients should have a resident SpR or above with the skills to immediately secure the airway in trauma patients. (Hospital trusts)

There should be a CT scanner within or adjacent to the resuscitation room. (Hospital trusts)

Each trust involved in trauma care should develop a core group of clinicians with a special interest in trauma management. This trauma care delivery group should include a member of the trust executive staff. (Hospital trusts)

Overall assessment

Key findings

Less than half (47.7%) of the patients in this study received good care.

Patients were more likely to receive good care in centres that reported a high volume of cases (>20) compared to a low volume of cases (<20) – 57% v 39%

Key findings

13.4% of cases had an inappropriate initial hospital response. It was much more likely to be an inappropriate response if the team leader/first reviewer was an SHO (23.5%) than a consultant (3.1%).

If the initial hospital response was inappropriate, it was more likely that the patient's overall care would be compromised



Key findings and recommendations

Prehospital care

Key findings

In a third of cases (245/749), the ambulance patient report form was not available.

652/783 patients (83.3%) were transported to hospital by road ambulance and 92/783 patients (11.7%) by helicopter.

23/56 (41.1%) patients treated by a helicopter-based system were intubated on scene compared to 32/440 (7.3%) patients treated by a road ambulance system.

None of the patients treated by a helicopter based system were taken to an inappropriate hospital compared to 31/440 (7%) patients treated by a road ambulance system who were initially taken to an inappropriate hospital.

Blood pressure was recorded in 398/504 (80%) cases despite recommendations that this should not be measured in the prehospital phase.

Only 46/170 (27.1%) patients who suffered a severe head injury (GCS less than 9) were intubated prehospital.

Only 110/504 (21.8%) patients were given analgesia in the prehospital phase.

Recommendations

All agencies involved in trauma management, including emergency medical services, should be integrated into the clinical governance programmes of a regional trauma service. (All healthcare providers)

Ambulance trusts should work together to standardise the content and layout of the Patient Report Form (PRF), and ensure that it is fit for purpose and facilitates comparative audit. Clinicians must ensure that a PRF is received for every patient and secured in the medical record. (Emergency medicine physicians and ambulance crews)

It is important that where guidelines exist, they are widely disseminated to appropriate groups, and there is a robust system in place to monitor compliance with those guidelines. (Ambulance and hospital trusts)

It is vital that all patients who have sustained serious trauma should have a primary survey conducted at the earliest opportunity, and that critical resuscitation involving airway, breathing and circulation (with cervical spine control) should be undertaken and reviewed throughout the prehospital phase of care. This must be documented. (Emergency medicine physicians)

Airway management in trauma patients is often challenging. The prehospital response for these patients should include someone with the skill to secure the airway, (including the use of rapid sequence intubation), and maintain adequate ventilation. (Ambulance and hospital trusts)

Severely injured patients are likely to be in pain and the provision of adequate analgesia is required. If analgesia is not given there should be a clear record in the Patient Report Form of the reasons for this. (Ambulance trusts)



Key findings and recommendations

Hospital reception

Key findings

A pre-alert from the ambulance crew to the receiving emergency department was documented for only 50.1% of patients in this study.

One in five hospitals admitting severely injured patients did not have a formal trauma team.

When a pre-alert was made to the receiving emergency department, there was no trauma response in one in four cases.

A trauma team response was documented for only 59.7% of patients in this study.

A consultant was the team leader/ first reviewer in only 169/419 (40.3%) of cases.

Advisors felt that the patient's initial management was inappropriate in 23.5% of cases where an SHO was the team leader/ first reviewer compared to 3.1% of cases where a consultant was the team leader/ first reviewer.

If no trauma response was activated, then it was more likely that an SHO was the first reviewer or team leader for the severely injured patient.

176/419 (42%) patients were not seen by a consultant in the emergency department.

89/795 (11.2%) patients did not have a primary survey documented in their casenotes.

The initial management of the patient was thought to be inappropriate in 94/699 cases (13.4%)

Recommendations

Ambulance trusts and emergency departments should have clear guidelines for the use of pre-alerts in the severely injured patient population. The ambulance crew should be able to speak directly to clinical staff in the receiving emergency department to ensure an appropriate clinical response is available immediately. (Ambulance trusts and emergency departments)

Trusts should ensure that a trauma team is available 24 hours a day, seven days a week. This is an essential part of an organised trauma response system. (Hospital trusts)

Hospital and ambulance trusts should ensure there are agreed explicit criteria for issuing a pre-alert activation of the trauma team. (Hospital and ambulance trusts)

A consultant must be the team leader for the management of the severely injured patient. There should be no reason for this not to happen during the normal working week. Trusts and consultants should work together to provide job plans that will lead to better consultant presence in the emergency department at all times to provide more uniform consultant leadership for all severely injured patients. (Hospital trusts and clinical directors)

All patients should have a primary survey performed and clearly documented on admission to the emergency department. (Emergency medicine physicians)

Standardised documentation for the trauma patient should be developed. This will improve patient care and multidisciplinary communication. In addition, comparative audit will be facilitated. (RCS and College of Emergency Medicine)



Key findings and recommendations

Hospital reception (continued)

Recommendations

As previously recommended, a consultant must be the team leader for the management of the severely injured patient. However, it is appreciated that this will not be achievable immediately. In the absence of this standard all severely injured patients should be reviewed by a consultant as soon as possible; ideally this should be within four hours of arrival at hospital, but must be within 12 hours of arrival. (Hospital trusts



Key findings and recommendations

Airway and breathing

Key findings

One in eight patients arrived at hospital with either a partially or completely obstructed airway.

Prehospital intubation failed on 11/85 attempts (12.9%).

131 patients were intubated either on admission or within the first 30 minutes after admission to hospital.

Data on grade of medical staff performing tracheal intubation was poorly documented and not available in 223/362 cases (61.6%).

Management of the airway was considered unsatisfactory in 52/741 cases (7%).

The management of the potentially unstable spine was considered unsatisfactory in 55/660 cases (8.3%).

Recommendations

The current structure of prehospital management is insufficient to meet the needs of the severely injured patient. There is a high incidence of failed intubation and a high incidence of patients arriving at hospital with a partially or completely obstructed airway. Change is urgently required to provide a system that reliably provides a clear airway with good oxygenation and control of ventilation. This may be through the provision of personnel with the ability to provide anaesthesia and intubation in the prehospital phase or the use of alternative airway devices. (Ambulance trusts)

CT scanning of the cervical spine should be performed in adult patients who have any of the following features:

- GCS below 13 on initial assessment
- has been intubated
- is being scanned for multi-region trauma (Radiology heads)



Key findings and recommendations

Management of circulation

Key findings

51.3% (254/495) of the patients had a CT scan of the chest, abdomen and pelvis for assessment of blood loss.

In 55/254 (21.7%) cases there was a delay to CT scanning.

In 61/671 cases (9.1%) it was felt that the possibility of haemorrhage was not investigated satisfactorily.

110/795 patients (13.8%) underwent surgery or further procedures for the control of haemorrhage.

57/73 (78.1%) operations were performed by consultants.

In 37/110 (33.6%) poor documentation prevented the grade of the surgeon being determined.

The interventions performed were considered untimely in 27.6% (24/87) of patients.

Where operative intervention for haemorrhage was considered timely the 72 hour mortality was 23.8% (15/63) compared to 33.3% (8/24) where the intervention was considered delayed.

19/98 (19.4%) patients from whom data were available and who required surgery for management of haemorrhage had unsatisfactory overall management.

Recommendations

Rapid identification of patients who require immediate surgery for control of haemorrhage is essential. Ongoing fluid requirements and instability identify a group of patients who require immediate intervention rather than further investigation. Local protocols should clearly identify the patient population for whom it is inappropriate to delay the surgery/intervention for reasons of 'stabilisation' or further investigation. (Hospital trusts, clinical directors and emergency physicians)

Trauma laparotomy is potentially extremely challenging and requires consultant presence within the operating theatre. (Clinical directors)

CT scanning will have an increasing role in the investigation and management of trauma patients. In major centres, CT facilities should be co-located with the emergency department to provide a combined investigation/resuscitation area. (Hospital trusts)

If CT scanning is to be performed, all necessary images should be obtained at the same time. Routine use of 'top to toe' scanning is recommended in the adult trauma patient if no indication for immediate intervention exists. (Royal College of Radiology and radiology department heads)

Timely access to CT scanning is essential. CT radiographers should be available within 30 minutes of the patient arriving in hospital. In larger trauma centres, with a higher workload, CT radiographers should be immediately available at all times.



Key findings and recommendations

Management of circulation (continued)

Recommendations

In the setting of remote radiology facilities and/or lack of timely access to CT scanning, unstable patients should not be taken to the CT scanner. These unstable patients should have immediate surgery. (Trauma team leader)



Key findings and recommendations

Head injury management

Key findings

Head trauma is very common in the severely injured patient and has a negative impact on outcome.

Secondary insults (hypoxia, hypercapnia and hypotension) are common and these are known to worsen eventual outcome (higher mortality and more severe disability).

The prehospital management of the airway and ventilation was inadequate in 14.3% and 10.6% of cases respectively.

In a small number of cases steroids are being used in the routine management of the head injured patient, despite evidence that this therapy may cause harm.

One in five patients who required a head CT scan did not have this performed in a timely fashion.

Delays in CT scanning were primarily due to organisational factors rather than patient factors.

More than half of the patients who required neurosurgical advice or input were taken to hospitals where there was no onsite neurosurgical service.

Only 6/43 (14.0%) patients who required a secondary transfer to access neurosurgical services had an operation within four hours of injury.

There were delays to neurosurgery in 13/81 (16.0%) cases. Most of these cases were evacuation of traumatic space occupying lesions.

Recommendations

Prehospital assessment of neurological status should be performed in all cases where head injury is apparent or suspected. This should be performed using the Glasgow Coma Scale. Pupil size and reactivity should also be recorded. (Ambulance trusts)

A pre-alert should be made for all trauma patients with a GCS less than or equal to 8, to ensure appropriately experienced professionals are available for their treatment and to prepare for imaging. (Ambulance trusts)

Patients with severe head injury require early definitive airway control and rapid delivery to a centre with onsite neurosurgical service. This implies regional planning of trauma services, including prehospital physician involvement, and reconfiguration of services. (Ambulance and hospital trusts)

Patients with severe head injury should have a CT head scan performed as soon as possible after admission and within one hour of arrival at hospital. (Trauma team leader and radiology heads)

All patients with moderate or severe head injury should have case and CT findings discussed with a neurosurgical service. (Trauma team lead)

All patients with severe head injury should be transferred to a neurosurgical/critical care centre irrespective of the requirement for surgical intervention. (Strategic health authorities, hospital trusts, trauma team leaders)



Key findings and recommendations

Head injury management (continued)

Key findings

Only 9/48 (18.8%) patients who had major neurosurgical procedures as a result of trauma were operated on by consultant surgeons.

Less than half of the severely injured patients who suffered head trauma received a standard of care that was judged to be good practice

Recommendations

Consultant presence should be increased at operations requiring major neurosurgery. (Hospital trusts)



Key findings and recommendations

Paediatric care

Key findings

68/795 (8.6%) cases were aged 16 or less.

Only 54% of cases had consultant staff involved in the immediate management.

The pattern of assessment of overall care was similar to adults with less than half the cases judged as receiving care classified as good practice.

Advanced Paediatric Life Support (APLS) trained staff were not resident or available 24 hours in 20.2% of hospitals.

Only 22 out of 146 hospitals had Registered Sick Children's Nurse cover 24 hours a day, 7 days a week.

Recommendations

All recommendations in this report apply equally to severely injured children.

All sites accepting children for definitive trauma management should have protocols for their management in place. These protocols should be regularly reviewed and updated. (Hospital trusts)

All hospitals should have up to date guidelines on the management and referral of suspected non-accidental injury in children. (Hospital trusts)

Hospitals should use standard, universal definitions for neonates, infants and children. (Royal College of Paediatrics and Child Health)

Each receiving unit should have up to date guidelines for children which recognise the paediatric skills available on site and their limitations and include agreed guidelines for communication and transfer with specialised paediatric services within the local clinical network. (Strategic health authorities and hospital trusts)

An Advanced Paediatric Life Support (APLS) (or equivalent) trained consultant and a Registered Sick Children's Nurse (RSCN) or an APLS trained nurse should be involved in the immediate management of all severely injured children. (Hospital trusts)

If a hospital does not admit children for definitive care then a bypass protocol should be in place. (Hospital and ambulance trusts)



Key findings and recommendations

Transfers

Key findings

There was a lack of adherence to the numerous recommendations and guidelines that exist regarding the transfer of critically ill and severely injured patients.

The arrangements for the secondary transfer of severely injured patients were haphazard.

One in four severely injured patients required a secondary transfer to receive definitive care.

The use of a helicopter system reduced the need for secondary transfers compared to a road ambulance system.

The documentation of transfers was almost uniformly poor.

Despite the limited information available from the poor documentation, there was an apparent lack of consultant input into the arrangement and conduct of secondary transfers.

This study of a three month period suggests that there are approximately 800 transfers annually for severe trauma and that the situation of 'many critically ill patients are transferred between hospitals in an ad hoc manner by inexperienced trainees with little formal supervision and potentially serious complications can occur is correct. There does not appear to have been any significant change in the last five years.

Recommendations

A clear record of the grade and specialty of all accompanying staff involved in the transfer or retrieval of severely injured patients should be made and this documentation should accompany the patient on transfer. (Trauma team leader)

There should be standardised transfer documentation of the patients' details, injuries, results of investigations and management with records kept at the dispatching and receiving hospitals. (Trauma team leader, Department of Health)

Published guidelines must be adhered to and audits performed of the transfers and protocols. (Hospital trusts)

Local networks should develop protocols for the transfer of severely injured patients suitable for regional requirements. (Hospital trusts)

The number of transfers may be decreased if appropriate arrangements are made for cross cover in specialties, e.g. interventional radiology, between trusts. (Hospital trusts)



Key findings and recommendations

Incidence of trauma and organisation of trauma services

Key findings

129/141 (91.5%) hospitals in this study dealt with a severely injured patient less often than once per week.

High volume hospitals (>20 severely injured patients in this study) deliver a higher percentage of care assessed as good practice.

Only 77/183 (42.1%) hospitals participate in TARN.

Recommendations

A system should be initiated for identifying these patients so that the demand on the health service can be properly quantified and resources appropriate to that demand be made available. (Department of Health)

Given the relatively low incidence of severe trauma in the UK, it is unlikely that each individual hospital can deliver optimum care to this challenging group of patients. Regional planning for the effective delivery of trauma services is therefore essential. (Strategic health authorities, hospital trusts)

Given the importance of evaluation of processes and outcomes in the trauma patient, all units providing treatment for severely injured patients should contribute to the Trauma Audit Research Network. (Hospital trusts)

There should be a system of designation and verification of each hospital with regards to their function as a trauma centre, in a similar fashion to the system instituted by the American College of Surgeons. (Strategic health authorities, Royal College of Surgeons)



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