

The National Institute of Clinical Excellence Head Injury Guidelines: A Summary to Assist Implementation

The National Institute for Clinical Excellence guidelines aim to improve the quality of healthcare. They provide evidence based recommendations for the treatment and care of patients with specific disorders. The guidelines can be used to develop standards of care and provide a useful tool for auditing clinical practice. In 2003, NICE first published guidelines for the management of head injured patients (Clinical Guideline 4).¹ In September, 2007, an extensive update including amendments to existing advice and new recommendations was published (CG 56).² The guidelines and the update were compiled by a large panel of interested parties after an exhaustive review of the available literature. This paper aims to summarise the features of head injury care as recommended by the guidelines.

The objective of care for head injured patients is to ensure timely recognition and treatment of significant injuries in an appropriate healthcare setting. The NICE guidelines have led to a shift in management from an "admit and observe" strategy to a "diagnose and decide" approach. The guidelines provide advice on pre-hospital management, assessment in the emergency department, investigation for brain and cervical spine injuries (see

Boxes 1, 2 and 3), recommendations for referral and transfer to a neurosurgical unit (see Box 4) and guidelines regarding the admission, care and discharge of brain injured patients (see Box 5).

The key features of the guidelines include the following:

- Head injured patients should be transported to a facility with the resources to resuscitate, investigate and provide initial management of multiple injuries. The initial assessment and management should follow the principles of the Advance Trauma Life Support system. For patients with a GCS 3-8 the paramedic crew should make a stand-by call to ensure that appropriate personnel are available to treat the patient at the receiving hospital.



Peter Whitfield is a Consultant Neurosurgeon at the South West Neurosurgical Centre in Plymouth. He has previously worked in Glasgow and Aberdeen in addition to his higher surgical training in Cambridge. Peter has a PhD in the molecular biology of cerebral ischaemia. His clinical interests include vascular neurosurgery, image guided tumour surgery and microsurgical spinal surgery. He has a practical interest in medical education and is involved in implementation of the Phase 2 teaching in neurosciences at the Peninsula Medical School.

Correspondence to:

Peter Whitfield,
South West Neurosurgery Centre,
Derriford Hospital,
Plymouth PL6 8DH.
Email:
Peter.whitfield@phnt.swest.nhs.uk

With reference to boxes

NAI = non-accidental injury
= fracture

Box 1 – CT head imaging in adults

CT Head Imaging in adults

Immediate CT (within 1 hour of request):

GCS <13 when assessed in Emergency Department
GCS <15 2 hours after Emergency Department assessment
Suspected open or depressed #
Signs of basal skull #
Seizure
Focal neurological deficit
>1 episode of vomiting
Anticoagulant therapy or coagulopathy

CT within 8 hours:

Pre-traumatic amnesia >30 min
Age >65 years if any amnesia or loss of consciousness since the injury
Dangerous mechanism if any amnesia or loss of consciousness since the injury (e.g. pedestrian or cyclist hit by motor vehicle; ejected vehicle occupant; fall >1m or 5 stairs)

Box 2 – CT head scanning in children

CT Head in Children (under 16):

Age <1 year; GCS <15 on assessment in Emergency Department (Paediatric GCS)
Age >1 year; GCS <14 on assessment in Emergency Department (Paediatric GCS)
Age <1 year; bruise, swelling or >5cm scalp laceration
Dangerous mechanism (high speed RTA, fall >3m, high speed projectile injury)
?NAI (personnel should be trained to recognise NAI)
Witnessed loss of consciousness >5 min
Seizure (with no history of epilepsy)
Suspicion of open or depressed #
Tense fontanelle
Signs of basal skull #
Focal neurological deficit

Box 3

Cervical Spine Clearance

If undertaking urgent head CT the cervical spine should also be scanned

In patients who are alert it is safe to fully examine the neck if:

- Simple rear end collision
- Patient has been ambulant at any time since injury and there is no midline tenderness
- Patient can sit comfortably in emergency department
- Patient presents with delayed onset of neck pain

Requests for cervical spine radiographs in adults and children

For adults and children age 10-16 years use AP, lateral and odontoid peg views

For children age <10 years request AP and lateral views (no peg view)

Radiographs should be requested if:

- Not safe to assess neck (see above) and CT not indicated
- Active neck rotation is limited to <45 degrees to left and right
- Neck pain/midline tenderness + age >65
- Neck pain/midline tenderness + dangerous mechanism (fall >1m or 5 stairs; axial load; high speed RTA; ejection from vehicle; rollover; bicycle collision; recreational vehicle)
- Cervical spine status required e.g. pre-surgery

CT Cervical Spine requests in adults and children 10 years or older

CT Cervical Spine should be requested if:

- GCS <13 on initial assessment
- Patient is intubated
- Inadequate plain films
- Clinical suspicion persists despite normal plain films
- Undertaking scans for multi-region trauma

CT Cervical Spine requests in children under 10 years

Request CT Cervical spine if:

- GCS <9
- Inadequate plain films
- Strong clinical suspicion of injury despite normal plain films

- The spine should be immobilised for all patients with GCS < 15, any history of neck pain or tenderness, any extremity paraesthesia, any focal neurological deficit or any other suspicion of a cervical spine injury. Immobilisation should remain in place until a full assessment has been conducted (Box 3).
- Immediate clinical assessment should be conducted in the Emergency Department for all patients with a GCS <15. All patients with a GCS of 15 should be assessed by trained staff within 15 minutes of arrival.
- The admitting team should be competent to assess, observe, investigate and transfer patients. If the patient has sustained poly-trauma, admission should be under the care of the team who are dealing with the most severe and urgent clinical problem.
- All serious head injuries (GCS 3-8) should be transferred to a neuroscience unit. If logistics prevent transfer, neurosurgeons should assist and advise.
- Patients and carers should be aware of potential long-term symptoms and disabilities and should know how to seek help. GPs should be able to refer patients with long term sequelae to a suitable healthcare professional for specialist advice.

ERNIE database

The Evaluation and Review of NICE Implementation Evidence (ERNIE) database summarises the literature concerning the uptake of NICE guidance. References to external literature and a simple classification system are provided. ERNIE identifies 11 references that have assessed the implementation of the head injury guidelines.³ Although this information is far from complete, it provides a sound introduction to further investigation and dissemination of knowledge about the impact of the guidelines. Initially an increased use in resources was considered likely.^{4,5} However, this prediction has not been evident in studies published to date. The 2 to 5 times increased use of CT scans has been associated with a large decrease in admission rate. This has therefore led to a redistribution of patient management from the observation ward to the radiology department with no net increase in cost of care.^{6,7}

Areas for future research

The Guideline Development Group made several recommendations for further research to improve the evidence in specific areas of care. These are summarised below.

1. Should patients be transferred directly to a specialist neuroscience centre or to the nearest district general hospital?
2. The new guidelines regarding the use of CT head scans in children need validation in clinical practice.
3. The role of surgery vs. ICP and intensive care monitoring in patients with 'non-surgical' mass lesions requires further elucidation. Is there a role for 'pre-emptive' surgery?
4. Some evidence supports the transfer of patients with 'non-surgical' traumatic brain injury to a specialist neurosciences unit. This practice is not universal and further work is required to evaluate whether the

Box 4

When to involve a neurosurgeon

- All mass lesions on CT (including those of obvious and those of uncertain significance)
- GCS 3-8 after initial resuscitation
- Unexplained confusion >4 hours
- Deterioration in GCS after admission
- Progressive focal neurological signs
- Seizure without full recovery
- CSF leak
- Definite or suspected penetrating injury

The South West Neurosurgery Centre recommends that all patients not obeying commands after resuscitation and imaging are discussed with on-call neurosurgical SpR.

Transfer of Patients to the Neuroscience Unit

- All patients with GCS <9 should be transferred (unless GCS 3 with fixed and dilated pupils)
- Many other patients will be transferred depending on GCS and scan findings.
- Most transfers should be intubated and ventilated and managed according to AAGBI guidelines.
- Patients with persistent refractory hypotension should not be transferred until the cause has been identified and the patient stabilised.
- Maintain mean BP of 80 mmHg; PaO₂ >13 kPa and PaCO₂ 4.5-5.0 kPa

reported improvements in outcome can be achieved across the board.

5. Robust clinical decision tools need to be developed to help predict those patients with mild injury who are likely to develop long term sequelae.

Conclusion

In summary, the NICE Head Injury Guidelines provide the many clinicians involved in the care of brain-injured patients with a sound foundation upon which to build patient care. The challenge for neurosurgeons is to improve the efficacy of management for patients with intracranial mass lesions and to conduct further work to establish the best pathway of care for patients with diffuse brain injury. Neurosurgeons are well placed to aid national guideline implementation.

References

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4. Sultan HY, Boyle A, Pereira M, Antoun N, Maimaris C. *Application of the Canadian CT head rules in managing minor head injuries in a UK emergency department: implications for the implementation of the NICE guidelines*. *Emerg Med J* 2004;21:420-5.

Box 5 – Criteria for admission, observation, medical review and discharge

Admission Criteria

- New, significant abnormalities on imaging
- GCS <15 after imaging (even if imaging normal)
- Persistent vomiting or severe headache
- Other concerns e.g. drugs; alcohol; shock; meningism; CSF leak; other injuries; ?NAI
- Criteria for CT fulfilled but scan not performed within appropriate time period (e.g. non-availability; uncooperative patient).

Observations by trained, capable staff

Observations should include: GCS, pupils, limb movements, vital signs including oxygen saturations. The frequency of observations should be:

- GCS every 30 minutes until GCS = 15
- When GCS = 15; observe every 30 mins for 2 hours then 1 hourly for 4 hours; then 2 hourly.
- If GCS falls to <15 resume observations every 30 minutes.

Urgent Medical Review should be conducted if:

- Agitation or abnormal behaviour develop
- GCS drops by 1 point for 30 minutes duration
- Motor score drops by 2 points
- Verbal or eye opening score drop by 3 points
- Severe or increasing headache occur
- Persistent vomiting occurs
- New signs e.g. pupil changes, facial weakness are detected

Discharge of Mild and Moderate Head Injured Cases

- All patients must be GCS 15
- Ensure a support structure exists to avoid a "home alone" situation
- If the patient met the criteria for a CT scan or hospital admission a review should be conducted by the GP after 1 week. The GP should receive written details of the episode.
- All patients should receive a head injury advice card and be aware that some patients can develop delayed complications warranting further medical advice.

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