Development of a guide for neurological observations

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Following publication by the Scottish Intercollegiate Guidelines Network (SIGN) of *Early Management of Patients with a Head Injury*, local practices were reviewed in a Glasgow trust. This led to both organisational and clinical changes. This article discusses how a training programme in performing neurological observations was developed to meet staff learning needs regarding head injury, and explains changes to the Glasgow Coma Scale (GCS) charts used in the trust.

Thousands of people attend Scottish hospitals every year with a head injury and a large number are admitted. In a small group of patients, their outcome might be made worse by a failure to detect or deal with complications in a timely and effective manner. It is therefore vital that non-specialist staff who assess people with head injuries are able to assess them as detect any problems needing intervention as early as possible, so that they can be treated or referred for specialist care as soon as possible, minimising the potential for their injury to result in long-term problems.

**Background**

In 2001 an implementation group was convened within South Glasgow University Hospitals Trust to review the recommendations of the Scottish Intercollegiate Guidelines Network guideline *Early Management of Patients with a Head Injury* (SIGN, 2002). The group consisted of representatives from A&E, radiology/radiography, neurosurgery/neuroanaesthesia, orthopaedics, nursing staff and a guidelines implementation nurse. Their remit was to consider ways of implementing the guidelines within the trust’s two hospital sites and Institute of Neurological Sciences.

Informal consultation within the trust identified several areas of the guidelines that would require detailed work and staff development to implement. These included neurological observations on patients with minor head injury and the provision of patient information.

**Method**

An audit was performed to ascertain the current level of knowledge among nurses caring for patients who had sustained a head injury and how they acquired that knowledge. A questionnaire was sent to every nurse working in A&E, all orthopaedic wards and departments, and three wards within the Institute of Neurological Sciences.

A total of 220 staff were sent forms and 122 responded (55 per cent). The nurses were asked about the training they had received and which method of training or education they considered most beneficial. Options included classroom-based education, training in the clinical area and observation of another staff member. They were also given a brief, five-point clinical questionnaire (Box 1) to ascertain their knowledge of neurological observations and head injuries.

**Audit results**

In the orthopaedic areas, observation was the most common method of learning (28 per cent), followed by classroom teaching (22 per cent). The 14 per cent of respondents who accessed learning through all three routes (classroom, observation and clinical area) expressed the highest level of confidence in their abilities to perform neurological observations.

Eighty per cent of respondents said they wanted to receive education on performing neurological observations. The results suggest that a combination of both formal classroom teaching and education in the clinical area would be of most benefit to them.

The audit findings demonstrated that an education programme was needed to enable nurses to comply with the SIGN head injury guidelines. The clinical questionnaire indicated that there was a knowledge deficit in the theory behind neurological observations.

A rolling programme of nurse education in the theory and practice of neurological observations was established in 2002 and continues across the trust. It includes training in performing observations, education in relevant anatomy and physiology, and refers to the SIGN guidelines and the Code of Professional Conduct (NMC, 2002).

**Changes to practice**

It became apparent from the questionnaires and from the implementation group’s experience that the trust was using two different versions of the Glasgow Coma Scale (GCS) chart: one with a 14-
point scale (Teasdale and Jennet, 1974) and one with 15 (Teasdale and Jennet, 1976). After much consultation, which included seeking the opinion of the original author, Professor Teasdale, it was decided to adopt the 15-point scale referred to in the SIGN guidelines (SIGN, 2002) across the trust. The chart was also adapted to carry descriptions of each point on the scale rather than simply numbers.

The guide to observations
The basic guide summarises SIGN advice on neurological observations using the GCS and explains GCS terminology, and is summarised here.

**Frequency**
SIGN 46 says many factors should be considered when determining the frequency of observations. These include the time-lapse since injury, any history of post-traumatic amnesia, the evidence of previous GCS observations, X-ray scan findings and other risk factors. More frequent observations should always be performed if the clinical condition requires it.

When a patient arrives on the ward from another area such as A&E or scanning, the observations taken on admission should be compared with the previous recording and any differences discussed with medical staff. The guidelines recommend observations are carried out at 30-minute intervals for two hours, then one-hourly for four hours, two-hourly for six hours and then four-hourly thereafter until the patient is fit for discharge.

**Reporting**
Examples of neurological deterioration that should be reported immediately to medical staff include:

- Agitation or abnormal behaviour (do not assume the changes are due to alcohol or drugs);
- Sustained decrease in conscious level of at least one point in the motor/verbal response or two points in the eye-opening response;
- Severe or increasing unrelieved headache;
- Persistent vomiting;
- New or evolving neurological signs, for example pupil inequality, asymmetry of limb/facial movement.

**Eyes open**
- Conscious patients sense your approach and open their eyes spontaneously;
- Verbal stimulus may be normal, repeated or loud. Use their name (do not apply touch sensation at this time);
- Painful stimulus is applied by the trapezius squeeze – use thumb and two fingers to hold and squeeze two inches of the trapezius muscle where the head/neck meets the shoulders. If eyes do not open in response then try the only other painful stimulus method allowed – squeeze one side of the patient’s finger between your thumb and a pen. Be aware of upper limb injuries.

**Best motor response**
- Obey commands – the patient understands and carries out instructions, for example to lift up their arms, hold up their thumb, or squeeze your hand (ensure the patient can release her or his grip on command to eliminate primal grasp reflex). Be aware of language/hearing disorders.
- Localise pain – the patient brings their hand up beyond the level of the clavicle in response to the painful stimulus (trapezius squeeze). They may also respond to local irritants such as oxygen masks, nasogastric tubes and cannulae. The best arm
response is recorded, as a leg response may be a spinal reflex.
- Flexion to pain – the patient may flex or bend an arm towards the source of pain but not actually localise it or try to remove the source. Response is variable with each stimulus.
- Abnormal flexion – the patient may flex or bend the arm at the elbow and rotate the wrist (spastic posture) while drawing the arm across the chest. Response is slower than in normal flexion to pain.
- Extension to pain – the patient may extend or straighten the arm at the elbow or may rotate the arm inwards (decerebrate posture).
- No response to pain. But note that an absence of response may be due to high spinal injury or muscle-paralysing drugs.

**Best verbal response**
- Orientation – the patient knows who they are, where they are, the month/year and why they are here.
- Confusion – the patient holds a conversation but cannot answer accurately. They may talk in sentences but be unaware of themself or their environment.
- Inappropriate words – the patient replies in words said at random, often shouts or swears.
- Incomprehensible sounds – you may have to use both verbal and painful stimuli to elicit a response. The patient may moan or groan. However, be aware that English language ability varies.
- If the patient doesn’t respond, this may be because of hearing or speech disorders.

**Pupils**
- Size – look at pupils before shining light into the eyes. They should be equal in size (note that drugs affect size). Shape is normally round, but be aware of any pre-existing irregularities, for example cataracts, blindness and so on.
- Reaction – should be consensual, in other words both pupils should constrict as light is shone into one (bring light in from the side of the eye).

**Vital signs**
- Temperature – alterations may be due to hypothalamus damage. Raised temperature increases the brain’s need for oxygen, so regulation is important.
- Blood pressure and pulse – haemorrhage from an extracranial site, for example in long bone fractures, may lead to falling blood pressure and rising pulse, and if under-treated, shock may cause neurological deterioration. Signs of rising intracranial pressure may include rising blood pressure (hypertension) and falling pulse (bradycardia).
- Respirations – reduced consciousness may cause hypoxia through inadequate respiration or an obstructed airway. Hypoxia may cause neurological deterioration. Changes in respiratory rate and pattern may indicate a rise in intracranial pressure.

**Limb movement**
- Normal power – the patient matches resistance applied to any joint movement (they pull you towards them or push you away). Beware of any underlying injuries.
- Mild weakness – the patient moves against resistance but is easily overcome.
- Severe weakness – the patient is able to move their limb, but not against resistance.
- Spastic flexion – the patient may flex or bend the arm at the elbow and rotate the wrist (spastic posture) while drawing the arm across the chest. Response is slower than in normal flexion to pain.
- Spastic extension – the patient may extend or straighten the arm at the elbow or may rotate the arm inwards (decerebrate posture).
- No response – be aware that the absence of response may be due to a high spinal injury or muscle-paralysing drugs.

**Discussion**
Following the successful training programme, a resource pack was developed for all ward and department areas. This contained all the training materials used on the taught programme, including anatomy diagrams, guidelines, referral documents and patient information.

A self-assessment questionnaire was designed to enable nurses to test their level of knowledge before using the resource pack. This has now become an integral part of the newly appointed nurses preceptorship programme within the trust’s orthopaedic directorate.

The formal education programme is still delivered throughout the year on both of the main trust sites. Formal audit of this programme is undertaken by the practice development department and continues to show a favourable response from those attending.

The multidisciplinary working group that was convened to implement the SIGN guidelines has seen many changes to working practices throughout the various departments that were represented.

**Conclusion**
Maintaining quality of care in the early management of patients with a head injury is essential to detect and deal with potential complications in a timely manner.

The implementation of the guidelines for performing basic neurological observations represents a significant step towards addressing a lack of knowledge in the nursing workforce. Together with the resource pack and formal education programme, we are ensuring that our nurses are maintaining their professional knowledge and competence. This allows them to deliver a high quality of care to those patients who require early management of a head injury.