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Outlook

Trauma corner

Head injury: The importance of trending and reporting assessments

By Carole Rush, RN, MEd, CEN, Calgary, Alberta

An all-too-familiar scenario presents to the emergency department (ED) at 0200 involving alcohol and trauma. This time, it is a 48-year-old male who sustained an unwitnessed fall down eight stairs. He was found by family members who promptly called EMS. At the scene, EMS found the patient lying with a pool of blood around his head. Their initial neurological assessment revealed a Glasgow Coma Score (GCS) of three with unequal and sluggish pupils (Rt pupil = 2, Lt pupil = 6). EMS performed a Rapid Sequence Intubation using Rocuronium and Fetanyl. Due to the patient's focal neurological findings, a 20-gram dose of Mannitol 20% solution was administered.

Emergency department care

On arrival to the ED, this patient's GCS remained at three. Initial physical assessment findings included bilateral hemotympanium. He was promptly taken for a CT of the head which showed a right subdural hematoma, a right basal skull fracture and a left depressed skull fracture. On return to the ED, sedation was wearing off and the patient was found to be spontaneously moving all extremities. Basic trauma care of an orogastric tube, urinary catheter and chest x-ray were completed. Plain extremity films revealed a fractured left radius. The plan of care included a return to the radiology department for CT scans of the neck, chest, abdomen and pelvis.

Assessment findings while awaiting a return to CT scan showed a trend of hypertension and bradycardia, which are classic findings in Cushing's response.

The patient's blood pressure increased from 122/76 to 146/86 and on to 154/90 over an hour. His corresponding low heart rate of 46/minute was cause for concern.

The patient was rushed back to radiology for a repeat CT of the head, which revealed a left epidural hematoma. Initial lab results included a hemoglobin of only 115 g/L (normal range

for adult males is 137 to 180 g/L). He was assessed by neurosurgery urgently and underwent a left craniotomy and removal of the epidural hematoma.

Post-operative course

A total of two weeks of intensive care was required for this patient as he developed a number of complications. The immediate post-operative period involved episodes of bradycardia that were treated with a pacemaker and spontaneously resolved. The patient returned to the OR for a tracheostomy 10 days post-injury due to his slow progression as well as a ventilator-acquired pneumonia. He began to improve neurologically as evidenced by spontaneous eye opening, localizing stimuli to three limbs, but was still quite confused. Other complications included hypertension and thrombocytosis. His stable fractured radius was casted and showed signs of healing well.

Rehabilitation

This patient was transferred to a neurosurgical ward with a tracheostomy, PICC line and gastric tube. Inpatient rehabilitation services were started one month post-injury and included intensive physiotherapy and occupational therapy. He required Posey restraints for continued agitation and confusion. Despite attempts by rehab staff to encourage the patient to progress, his motivation for learning remained low.

The family requested to take the patient home two months post-injury and Home Care services were arranged for three hours per day. This patient still required 24-hour supervision on discharge.

Table One:

Major predictors of poor outcome after closed head injury

(Bergsneier & Kelly, 2003)

Clinical Findings	CT Findings
Older Age	Mass lesions (subdural, intracerebral hematoma, multiple contusions)
Lower GCS	Compressed or absent mesencephalic cisterns
Abnormal motor response	Midline shift greater than 3 mm
Abnormal papillary response	Subarachnoid hemorrhage
Sustained ICP greater than 20 mm Hg	
Hypotension SBP less than 90 mm Hg	
Hypoxia Pa02 less than 60 mm Hg	
Systemic complications	

Section editor's teaching points

The emergency department assessment trending that contributed to the subsequent finding of an epidural hematoma is an important contribution to the outcome of this case. Since there are no characteristic neurologic findings that reliably distinguish epidural, subdural or intracerebral hematomas from one another, clinicians rely on the CT scan to define intracranial lesions and determine whether urgent neurosurgical intervention is required (Bergsneier & Kelly, 2003). The initial CT results did not mandate emergent interventions; the initial plan was supportive care and monitoring in the ICU. It was the nurses' reporting the trend of hypertension and bradycardia that prompted a second lifesaving CT scan and subsequent surgical intervention. We learn in the Trauma Nursing Core Course (TNCC) that Cushings response (increased systolic blood pressure, widening pulse pressure and decreased pulse rate) is a late sign of increased intracranial pressure (Pons, 1998), and to watch for these signs. The need for accurate documentation and prompt reporting of our findings is reinforced with this case.

A dilated pupil can also be an indication of an expanding intracranial hematoma, brain stem compression and elevated intracranial pressure (Bergsneier & Kelly, 2003). In most cases, the hematoma is on the same side as the dilated pupil. This patient had an enlarged (6 mm) and sluggish left pupil on initial assessment.

A second observation or teaching point with this case is the long recovery and rehabilitation that is often experienced with traumatic brain injury. Emergency nurses do not often have the opportunity to follow patients through this process or learn of the patient's outcome. We have the impression that if an epidural hematoma is promptly evacuated, the patient's neurological recovery will be good. In fact, there are a number of predictors of poor outcome after closed head injury. Refer to Table One for a summary of these factors. This patient's age, lower GCS, abnormal papillary response and systemic complications contributed to his less-than-optimum recovery two months post-injury. The brain does not heal the same way as other body tissues and it takes time to develop compensatory mechanisms for the injured brain areas. Brain injury survivors will make the greatest progress towards return of functioning in the first two years post-injury. It is also important to remember that, despite intensive intervention, long-term disability occurs in a large portion of survivors of severe head injury (Pons, 1998).

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