A Validation Study of the OMMC Department of Surgery Protocol on Head Injuries on Pediatric Patients

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Protocol on Head Injuries on Pediatric Patients

Abstract:

Objective To validate the protocol formulated by the OMMC Department of Surgery in diagnosing pediatric patients with head injuries.

Methods A validation study of the department protocol on head injuries. It is a prospective study. Pediatric patients aged 0-13 years old are included in the study.

Results From January 1, 2005 up to August 31, 2005, data collection done on pediatric patients with head injuries. Persistent vomiting was identified as a possible indicator for head injury on a pediatric patient and subsequent CT scan.

Conclusion Persistent vomiting has been shown to an ineffective indicator for head injury in pediatric patients. The routine use of CT scan is therefore not advocated as part of the management of head injury in pediatric patients.

The department policy of the Department of Surgery, Ospital ng Maynila Medical Center, regarding the non-use of routine CT scan in pediatric head trauma patient is validated.

Key words: pediatric head injuries, CT scan

Introduction:

The diagnosis of head injury has always caused controversies. While there is no problem in diagnosing patients with obvious head injuries, patients with mild head injuries present more difficulties. Physicians have always been wary of discharging patients with apparent mild head injuries for fear that these patients may be harboring an occult injury.

The advent of different imaging modalities have provided the clinician some sense of security in the diagnosis and management such patients. Computer aided tomography scans (CT-scans) and magnetic resonance imaging (MRI) have become part of the armamentarium of the clinician in diagnosing head injury.

Pediatric patients with head injuries are more difficult to diagnose that your usual adult patient. These may be due to inability to communicate freely with the physician, especially those in the very young age group. Should we now consider using the routine use of the CT scan?

Current literature has defined the following as the indications for CT scan in a pediatric patient: posttraumatic seizures, amnesia, progressive headache, unreliable history or examination because of possible alcohol or drug ingestion, loss of consciousness for longer than 5 minutes, physical signs of basilar skull fracture, repeated vomiting or vomiting for more than 8 hours after injury, and instability following multiple traumas.

The Department of Surgery in Ospital ng Maynila Medical Center believes that routine CT scan in all pediatric patients is an unnecessary financial burden to the patient and it result in unnecessary exposure to radiation. As such, the Department formulated a Health Process Evidence Based Clinical Practice Guideline with regards to patients with head injury. Validation of this protocol would mean less health costs for the patient and elimination of unnecessary exposure to radiation thus improving the quality of care given to them.

Objective:

This study aims to validate the protocol formulated by the OMMC Department of Surgery regarding the diagnosis of patients with head injuries in the pediatric age group. The author wishes to prove whether or not the use of persistent vomiting can be used as an indicator for traumatic brain injury.

Methods

This will be a validation study of the department protocol on head injuries. It is designed as a prospective study. All pediatric patients aged 0-13 years old who seek consult at the ER due to head injuries will be examined. Patients fulfilling the inclusion criteria will be included in the study and records will be kept.

All pediatric patients with persistent vomiting and have no evident fractures on the skull x-ray will be included in this study

All pediatric patients with persistent vomiting without changes in GCS for twenty four hours do not have to undergo a CT scan. All patients with persistent vomiting with changes in GCS greater than or equal to two (≥2) should undergo a CT scan.

Persistent vomiting is defined as vomiting of at least 4 times 8 hours from time of consult. The following will be taken note of: those with persistent vomiting, changes in GCS status, CT scan results, morbidities and mortalities.

All patients will have to come in for follow up at the Surgery OPD 10 days from date of discharge.

A checklist/form would be formulated to facilitate standardization of examination at the ER, ward and upon follow up at the Surgery OPD.

The following GCS scoring will be used (1):

Eye Opening

Score	≥1 Year	0-1 Year
4	Opens eyes spontaneously	Opens eyes spontaneously
3	Opens eyes to a verbal command	Opens eyes to a shout
2	Opens eyes in response to pain	Opens eyes in response to pain
1	No response	No response

Best Motor Response

Score	≥1 Year	0-1 Year
6	Obeys command	N/A
5	Localizes pain	Localizes pain
4	Flexion withdrawal	Flexion withdrawal
3	Flexion abnormal (decorticate)	Flexion abnormal (decorticate)
2	Extension (decerebrate)	Extension (decerebrate)
1	No response	No response

Best Verbal Response

Score	>5 Years	2-5 Years	0-2 Years
5	Oriented and able to converse	Uses appropriate words	Cries appropriately
4	Disoriented and able to converse	Uses inappropriate words	Cries
3	Uses inappropriate words	Cries and/or screams	Cries and/or screams inappropriately
2	Makes incomprehensible sounds	Grunts	Grunts
1	No response	No response	No response

Results:

Table 1 shows the age distribution of pediatric patient patients with vomiting secondary to head trauma from Jan 1, 2005 to August 31, 2005. During this time period. there were forty-eight patients aged thirteen and below who sought consult at the OMMC – Surgery – Emergency Room due to vomiting as a result of head trauma. Of these patients, only thirty-three had persistent vomiting. Majority of the patients with persistent vomiting are aged two to three.

Table 2 shows the age distribution of pediatric patients who sought consult due to head trauma with positive findings on x-ray of the skull. Two out of the thirty-three patients were excluded because of positive initial skull x-ray readings.

Table 3 shows the number of pediatric patients seeking consult due to head trauma with changes in their GCS (≥2). There were 4 patients who showed a change in GCS of more than two. One was excluded from the study because of positive initial findings on skull x-ray.

Table 4 shows the number of pediatric patients who sought consult due to head trauma and eventually underwent CT scan. CT scan was eventually performed on four patients. Three out of these four had normal CT scan results. One patient showed a subdural hematoma on CT scan. One patient who had a normal CT was excluded from the study because of positive initial findings on skull x-ray.

Discussion

Diagnosing traumatic head injury continues to be one of the challenges confronting clinicians, both within and outside our local setting. Pediatric patients with head injuries confound the problem because of the difficulty of establishing an effective communication between the physician and the patient.

Patients with obvious head injuries and those whose skull x-rays showed positive findings are easier for the physician to diagnose and therefore institute the appropriate treatment. It is those patients who present with a history of head trauma, with some signs of head injuries like a history loss of consciousness, and vomiting and yet upon closer examination show no signs of neurologic deficit that are somewhat more difficult to diagnose with a high degree of certainty.

From January 1, 2005 up to August 31, 2005, the author has been collecting data on pediatric patients with head injuries. Persistent vomiting was identified as a possible indicator for head injury on a pediatric patient.

There were thirty-three patients who fulfilled the inclusion criteria. Four of them underwent CT scan. Three of those who underwent CT scan showed normal results while one patient showed evidence of intracranial bleeding. It must be pointed out however, that only one patient who presented with vomiting had an actual traumatic head injury. All other patients were discharged without any neurologic deficit. Follow up of these patients showed no recurrence of symptoms or downgrade in their neurologic status.

Other studies have shown that clinical signs of brain injury are insensitive indicators of intracranial injury in infants and that only significant scalp hematomas would indicate an intracranial injury necessitating radiographic imaging. Asymptomatic infants older than 3 months of age who have no significant scalp hematoma may be safely managed without radiographic imaging. *(1)*

Another study has shown that Glasgow Coma Scale (GCS) score of 12 or lower and the presence of focal neurological deficits were significant predictors of an abnormal CT scan. Ninety-five per cent of those with abnormal CT scans and 100% of those with intracranial injury could be identified by the presence of one or more of the nine clinical findings, particularly by a GCS score of 12 or lower, and the presence of focal neurological deficits. Identification was also possible to a lesser degree by loss of consciousness, ataxia, amnesia, drowsiness, headache, seizure or vomiting. *(2)* Headache and nausea did not increase the risk of skull fracture and intracranial lesions on the CT. *(3)*

For some head injuries, there is little debate about which patients need an imaging test. The accepted high-risk indicators include: (a) loss of consciousness for more than 5 minutes, (b) depressed or decreasing level of consciousness (c) focal neurological findings (d) seizure (e) failure of the mental status to improve over time in an alcohol-intoxicated patient (f) penetrating skull injuries (g) signs of a basal or depressed skull fracture *(4,5,6,7)* (h) confusion or aggression on

examination. Headache, dizziness, scalp hematomas, lacerations, contusions, and abrasions are not considered high-risk factors. *(8,9,10,11)*

Clearly it can be seen that even international studies support the idea that routine CT scan should not be included in the management of head injuries in pediatric patients. Furthermore, vomiting is clearly not an indicator for requesting a CT scan.

Conclusion:

Persistent vomiting has been shown to an ineffective indicator for head injury in pediatric patients. Thus, requesting for a CT scan, just because the patient presents with persistent vomiting may not be cost effective. The clinician must look at other clinical findings to determine the need for further imaging studies. The routine use of CT scan is therefore not advocated as part of the management of head injury in pediatric patients.

It is also concluded that the department policy of the Department of Surgery, Ospital ng Maynila Medical Center, regarding the non-use of routine CT scan in pediatric head trauma patient is validated.

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Table 1. Age distribution of pediatric patient patients with vomiting secondary to head trauma from Jan 1, 2005 to August 31, 2005.

AGE	VOMITING	PERSISTENT VOMITING
0-1	8	3
2-3	17	10
4-5	10	7
6-7	6	6
8-9	1	1
10-11	4	5
12-13	2	1
Total	**47**	**33**

Table 2: Age distribution of pediatric patients who sought consult due to head trauma with positive findings on x-ray of the skull.

AGE	SKULL AP/L
0-1	0
2-3	2
4-5	0
6-7	0
8-9	0
10-11	0
12-13	0
Total	**2**

Table 3: Number of pediatric patients seeking consult due to head trauma with changes in their GCS (>2).

AGE	GCS CHANGES
0-1	0
2-3	1
4-5	0
6-7	1
8-9	1
10-11	1
12-13	0
Total	**4**

Table 4: Number of pediatric patients who sought counsult due to head trauma and eventually underwent CT scan.

AGE	CT SCAN
0-1	0
2-3	1
4-5	0
6-7	1
8-9	1
10-11	1
12-13	0
Total	**4**