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BEATA BATOR-RAMOTOWSKA, RADOSŁAW RAMOTOWSKI,
MAREK PASŁAWSKI, JANUSZ ZŁOMANIEC

Head trauma in children treated on an outpatient basis in Rzeszów district between 2000 and 2004

Head injury is one of the most common injuries. In the Western world it is one of the leading causes of disability, especially in the young population (1, 2). Brain injury is the leading cause of death and disability in pediatric trauma victims (4). Most patients (80% to 90%) sustain a mild head injury and do not need admission to hospital or complex health care (2). They are usually treated on an outpatient basis. The primary management goal in mild head injury is to identify those patients who are at risk of developing complications, specifically an intracranial haemorrhage requiring surgery. Clinical assessment alone is inadequate for the detection of intracranial haemorrhage, and radiological procedures are therefore used as additional screening tools (2).

MATERIAL AND METHODS

Material consisted of 1,361 children treated in Child Surgery Outpatient Clinic of ZOZ (Health Centre) No 2 in Rzeszów. There were 426 girls and 936 boys: forty-two patients aged below 1 year, 205 patients aged between 1 and 3 years, 299 patients aged between 4 and 6 years, 633 patients aged between 7 and 12 years, and 182 patients aged between 13 and 15 years.

The aim of the study was to assess direct and delayed complications of the cranial traumas, their correlation with the clinical state of the patients, the neurological symptoms and value of imaging examinations in determining the right management.

RESULTS

The head traumas were divided into the following groups: 1 – without internal lesions, 2 – with lacerations of the epicranium, 3 – with cerebral concussion, 4 – with skull fracture, 5 – head and neck trauma, 6 – trauma of head and other parts of the body. Eighty-three patients were finally hospitalized. The fracture fissures were seen on head radiograms in 35 patients, and in 6 of them they overlapped over the skull sutures, which make them difficult to find out. The fracture of temporal bone in 6 patients involved petrosal bone, and in 4 of them it was longitudinal fracture, and transverse fracture in 2 of them. In patients with the fracture of the cranial base bleeding from the external auditory duct appeared in 4 patients, and flow out of cerebrospinal fluid from the external auditory duct in 2 patients; in those cases the Sanvers', Guillen's and Chausse's III radiographic projections were performed. The fracture of the facial skeleton usually involved nasal bone, and zygomatico-maxillary complexes. The transient loss of consciousness appeared in 18% of patients. Headaches, severe at the beginning became less severe with time. Up to 4–6 week the anxiety, depression, and

difficulty with concentration was seen. In 2 cases of hospitalized head trauma, the cerebral edema was seen resulting from hyperemia, with increased density of white matter, and blurring of contours of intra-cerebral structures. Early post-traumatic epilepsy (in the first week after the trauma) was found in 3 patients.

DISCUSSION

The traumatic head complications may be primary or secondary. The primary involve diffuse neuronal injury, cortical and subcortical contusions, especially involving corpus callosum and the brain stem, and cerebral hemorrhages. The secondary involve cerebral infraction, diffuse brain edema, with dislocation and lateral herniation of ventricular system under the falx. The organic brain disease may result in persistent headaches, dysmnesia, intellectual disorders, dysfunction of concentration, increased irritability. Recognition of surgically remediable abnormalities such as epidural or subdural haematomas is important for acute patient management. Recognition of massive diffuse or focal injury does indicate a worse prognosis than would have been predicted by the clinical features alone and should alert the medical staff to the likelihood of very poor outcome (7). It is well known that patients with a skull fracture have an increased risk of intracranial haematoma. A skull fracture by itself has few clinical consequences, except in cases of a depressed skull fracture. The potential clinical usefulness of radiological assessment for skull fracture depends on the ability to distinguish between patients with mild head injury with and without intracranial haemorrhage. The mean prevalence of intracranial haemorrhage in patients with mild head injury was 0.10, the range 0.03–0.18 (1, 2). The low sensitivity implies that if a skull fracture is not seen on plain skull radiography, the diagnosis of intracranial haemorrhage still cannot be ruled out. If patient selection increases the likelihood of intracranial haemorrhage, CT becomes the modality of first choice (1, 2).

Wardlaw et al. in their study have determined that three easy to identify clinical variables (age, Glasgow coma score, and pupil reaction) and two easy to identify CT scan variables (the presence of subarachnoid haemorrhage and the "overall appearance" of the scan) are independent prognostic variables for survival after head injury. These variables are all readily identifiable at the time of admission allowing an immediate assessment of prognosis to be made. Although abnormalities tend to become more visible on CT if the scan is delayed for a day or more after injury, clinical practice demands information on which to base management decisions immediately (7).

CT appearance of the brain edema include symmetrical compression of the ventricular system, while in brain hematoma the compression of the ventricle was unilateral, with evident dislocation. The posttraumatic complications may involve posttraumatic brain atrophy. Epidural hematoma and chronic subdural hematoma are not frequent complications of head trauma in children. In CT examination epidural hematoma with skull fracture was found in 4 patients hospitalized after early ambulatory treatment. In a child with headache and temporal loss of consciousness CT revealed subdural hematoma. Out of 83 hospitalized children intracranial complications after head trauma were found in 6 children on CT examination.

Headache is a symptom that is difficult to elicit in the young and often not quantified in the literature pertaining to minor head injury (1). Significant loss of consciousness is regarded by most American hospitals as a criterion for admission and CT scanning. Dunning et al. in their study concluded that loss of consciousness increases a patient's risk for intracranial injury (1). Focal neurological signs have been a classical indication for head tomography following head injury. Reduced level of consciousness, focal neurology, skull fracture, and loss of consciousness are predictors for intracranial haemorrhage in the paediatric population with minor head injury (1).

Based on these data and a review of the literature, we have developed guidelines for our own practice that others might find useful. Head CT is recommended for head-injured children with altered mental status, focal neurologic deficits, signs of a basilar skull fracture, seizure, or a palpable depression of the skull (4, 5, 6).

Lee et al. in their study concluded that independent predictors of intracranial injury include altered mental status, focal neurologic deficit, signs of a basilar skull fracture, seizure, and skull fracture. However, intracranial injury may also occur with few or subtle signs and symptoms, especially in infants younger than one year. Furthermore, the majority of patients with intracranial injury were neurologically intact; therefore, CT scans should be considered in children with symptoms such as vomiting, headache, drowsiness, amnesia, and a history of loss of consciousness, or coagulopathy even in the absence of the independent predictors of intracranial injury we identified (3, 4).

CONCLUSIONS

Although most patients (80% to 90%) sustain a mild head injury and do not need admission to hospital or complex health care, the cranial CT imaging seems necessary in children who exhibit at least one of the following risk criteria: evidence of significant skull fracture; altered level of alertness; neurologic deficit, persistent vomiting, presence of scalp hematoma, abnormal behaviour, and coagulopathy.

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SUMMARY

Within 1,362 children after head trauma treated on an outpatient basis between 2000 and 2004 in Rzeszów, the skull fractures were found in 35 patients (2.5%). Most of the fractures (4%) were connected with lacerations of the epicranium, the symptoms of cerebral concussion were found in 152 cases (11%). Eighty-three patients (6%) were hospitalized, and in 6 of them CT revealed intracranial complications. Although most patients (80% to 90%) sustain a mild head injury and do not need admission to hospital or complex health care, the cranial CT imaging seems necessary in children

who exhibit at least one of the following risk criteria: evidence of significant skull fracture, altered level of alertness, neurologic deficit, persistent vomiting, presence of scalp hematoma, abnormal behavior, and coagulopathy.

Urazy głowy u dzieci leczonych ambulatoryjnie w powiecie rzeszowskim w latach 2000–2004

W materiale 1361 dzieci po urazach czaszki, leczonych ambulatoryjnie w latach 2000–2004 w Przychodni Chirurgii Urazowej ZOZ Nr 2 w Rzeszowie, stwierdzono w 35 przypadkach (2,5%) złamania kości czaszki. Najczęściej (548 przypadków; 4%) urazy połączone były ze zranieniami powłok czaszki, objawy wstrząśnienia mózgu wystąpiły u 152 (11%) pacjentów. Hospitalizowano 83 dzieci (6%), spośród których powikłania śródczaszkowe stwierdzono w badaniu TK u 6. Chociaż w ogromnej większości spotyka się lekkie urazy głowy (80–90%), niewymagające leczenia szpitalnego, badanie TK głowy jest konieczne w przypadku obecności złamania czaszki, zaburzeń świadomości, ubytków neurologicznych, uporczywych wymiotów, krwiaka powłok czaszki, zaburzeń zachowania i koagulopatii.