Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.elsevier.com/locate/poamed

Case Report

Exploration of assistance and rehabilitation possibilities for neurosurgical patients with late complications after craniocerebral injuries based on one patient case

Joanna Białkowska[a,b,*], *Mariusz Sowa*[a,b], *Wojciech Maksymowicz*[a,b]

[a]*Division of Neurosurgery, the University of Warmia and Mazury Hospital with the Independent Health Care Center in Olsztyn, Poland*
[b]*Department of Neurology and Neurosurgery, Faculty of Medical Sciences, University of Warmia and Mazury in Olsztyn, Poland*

ARTICLE INFO

Article history:
Received 27 June 2011
Accepted 1 November 2011

Keywords:
Craniocerebral injuries
Late complications
Long-term plan

ABSTRACT

Introduction: Craniocerebral injuries (CCIs) are the most frequent causes of death and long-term disability concerning people younger than 25 years of age in Poland. Their incidence is 180–220 per 100 thousand people. According to available data, 10% of patients after head injury suffer from severe craniocerebral trauma defined as a condition in which the level of awareness and responsiveness remains significantly decreased after resuscitation or worsens within 48 h following injury. Currently, due to the advances in knowledge and development of technology in the field of neurosurgery and anesthesiology, more and more patients survive and consequently require additional diagnosis, surgery and prolonged rehabilitation.

Aim: The aim of this work was to present the case of a patient with craniocerebral trauma, who remained in a vegetative state for 8 months, and then, following the surgical treatment of late complications in the form of hydrocephalus performed in the Division of Neurosurgery at the University Hospital in Olsztyn and long-term rehabilitation, regained full mobility.

Materials and methods: The study is based on the analysis of medical records concerning a patient treated in numerous centers for 16 months after craniocerebral trauma.

Results and discussion: The most common complications after CCIs include coma, impaired cognition, multiple joint contractures, hydrocephalus, ossification mainly related to hips, knees, shoulders and elbows, urinary tract infections and respiratory tract infections. Often these patients have undergone a tracheotomy, have had catheters inserted into their bladders, and are fed by probe. Inadequate care and a deficiency in protein and vitamin supplements can result in the development of decubitus ulcers. A patient after craniocerebral trauma requires intense movement rehabilitation, neuropsychological and neurologopedic rehabilitation. It is necessary to proceed appropriately in order to achieve bladder automaticity. After the stabilization of vital signs, the patient should be included in a comprehensive diagnostic and rehabilitation program provided by neurologists, neurosurgeons, orthopedic surgeons, ENT physicians, specialists in rehabilitation and physiotherapy, based on specified standards. Nurses and other care providers, medical and other

*Correspondence to: Department of Neurology and Neurosurgery, Faculty of Medical Sciences, University of Warmia and Mazury, Warszawska 30, 10-082 Olsztyn, Poland. Tel.: +4889 728 32 33 18; fax: +4889 524 53 84.
E-mail address: bialkowska.j@gmail.com (J. Białkowska).

http://dx.doi.org/10.1016/j.poamed.2012.04.001

health care personnel dealing with such patients should be adequately trained. The patient's family needs to be educated as well.

Conclusions: Patients after CCIs require long-term interdisciplinary monitoring and periodic diagnostic tests. Consequently, a long-term plan concerning the treatment of such patients should be developed.

1. Introduction

Craniocerebral injuries (CCIs) are one of the most frequent causes of death and long-term disability concerning people younger than 25 years of age in Poland. They are the major contributor of multiple organ injuries. CCIs are most frequent in males aged 15–24 years old. Their incidence is 180–220 per 100 thousand people annually. Out of this number, 15–30 per 100 thousand cases are fatal. The most frequent causes for CCIs include: traffic collisions (50%), falls (30%) and violence victims (10%). One of the major factors (40%) associated with such traumas is alcohol. Over 10% of patients after head injury suffer from severe craniocerebral trauma.[5,6] This condition is defined as a significantly reduced awareness and responsiveness immediately following the injury or within 48 h afterwards. CCIs accompanied with brain contusion, direct injury or quickly progressive hematoma are frequently associated with immediate focal brain injury. If compensatory mechanisms activated by the organism are insufficient or if therapeutic activities are not undertaken immediately, secondary pathological changes develop.

Primary brain injuries include: skull fractures, diffuse axonal injury (DAI), concussion, contusion, laceration as well as those associated with vessel injuries: subarachnoid hemorrhage, intracerebral hemorrhage, paracerebral hematomas.[4] Most frequently primary brain injuries result from a sudden acceleration or delay of force affecting a given organ. These injuries involve gray and white matter of the brain in immediate approximation of the area exposed to the external impact and, frequently, on the side opposite the area that was impacted as a result of hypotension (contrecoup injury). Brain areas at the highest risk of such mechanical injuries include: frontal poles, cranial basis, temporal poles, structures approximate to the cerebral falx and the tentorium of the cerebellum. The most significant brain injuries, especially involving white matter and brain vessels, occur when the head gets turned during the injury.[5]

The secondary brain injury is attributable to the organism's response to the primary or co-occurring injuries. Secondary brain injuries include: cerebral edema, decreased perfusion pressure, increased intracranial pressure (secondary brain herniation), hydrocephalus, central nervous system (CNS) infection, and posttraumatic epilepsy. Unlike in the case of the majority of primary brain injuries, discontinuing the development of the cascade of secondary changes early can stop or even in some situations regress symptoms associated with secondary brain injuries.[3]

CCIs cause late complications, usually in connection with irrevocable brain damage. The most frequent complications include: posttraumatic cerebrasthenia, posttraumatic encephalopathy, posttraumatic epilepsy, normotensive hydrocephalus – Hakim syndrome,[5,7] multiple joint contractures, periskeletal ossifications predominately involving hip and knee joints as well as shoulder and elbow joints, urinary tract and respiratory system infections. Considering the possibility of such complications, the treatment of patients after serious CCIs necessitates the cooperation of specialists in various medical fields, especially neurosurgery, anesthesiology and rehabilitation. Currently, due to the advances in knowledge and development of technology in the aforementioned fields, more and more patients survive and consequently require additional specialist diagnostics, neurosurgical interventions, treatment at intensive care units and prolonged rehabilitation.[8,9]

2. Aim

The aim of this work is to present the case of a patient with craniocerebral trauma, who remained in a vegetative state for 8 months, and then, following the surgical treatment of late complications in the form of hydrocephalus performed in the Division of Neurosurgery at the University Hospital in Olsztyn and long-term rehabilitation, regained full mobility.

3. Materials and methods

The study is based on the analysis of medical records concerning a patient treated in numerous centers for 16 months after craniocerebral trauma.

4. Results and discussion

A 59-year old male patient was admitted on 10 March 2009 to the Division of Neurosurgery due to posttraumatic normotensive hydrocephalus. The patient had a history of multiple organ injuries with a CCI resulting from a traffic collision (a cyclist knocked down by a car). The accident happened on 8 August 2008. On admission to the Emergency Department on the day of the accident the patient presented a moderately severe clinical condition, was cardiovascularly and respiratorily stable, and received a Glasgow coma score of 8. Cranial computed tomography (CT) revealed multiple brain contusions within the left frontal lobe, poles bilaterally and basis of the temporal lobes, small paracerebral hematomas above both hemispheres, multiple skull fractions in the right temporoparietal region, fracture of the right lateral orbital wall and the right zygomatic arch fracture. Moreover, chest