

Conclusion: The evidence for permanent traumatic brain damage as the cause of the postconcussion syndrome following mild closed head injury is weak.

P0473 The Postconcussion Syndrome After Mild Head Trauma: Is Migraine Underdiagnosed?

S. Margulies. *Uniformed Services University of Health Sciences, USA*

P0474 Neurological Sequelae of Cervical Spine Manipulation: A Survey of Neurologists in the UK

W. Honan¹, C. Stevinson², B. Cooke², E. Ernst². ¹Department of Neurology; ²University of Exeter, UK

The study's objective was to provide preliminary data for the UK on neurological complications of manipulation of the cervical spine. A retrospective survey was undertaken of all 323 members of the Association of British Neurologists who were asked to indicate the number of cases of neurological complications within 24 hours of cervical spine manipulation seen within a 12 month period (1 August 1998 to 31 July 1999).

The response rate was 74%. Twenty four respondents reported at least one case each, contributing to a total of 35 cases. Sixteen respondents were able to provide further details about the nature of the complication reported. These included seven cases of stroke in brain stem territory, four with confirmation of vertebral artery dissection; two cases of stroke in carotid artery territory and one case of acute subdural haematoma. There were three cases of myelopathy and three cases of cervical radiculopathy. To our knowledge none of these cases have been previously reported in the medical literature.

In conclusion, concern about neurological complications following cervical spine manipulation in the UK appears to be justified according to preliminary data. Although the number of reported cases is small in absolute terms, it represents a major issue given the serious nature of the complications. A large, long term prospective study is planned to detect all serious cases and allow the size of the problem to be defined.

P0475 Neurological and Psychological Evaluation of Patients with Severe Brain Injury

S. Soldo-Butkovic¹, D. Janculjak¹, B. Barac¹, M. Vladetic¹, L. Prlic-Sturman². ¹Osijek University Hospital; ²Osijek Health Center, Croatia

Background/Objective: After the Croatian Defensive War (1991-5) special rehabilitation centers were formed in Croatia to provide complete rehabilitation of the traumatized people. We had to find a suitable method to follow-up patients with severe brain injury.

Methods: We employed the European Brain Injury Society (EBIS) questionnaire to 20 male patients (aged 18 to 46 years) with severe brain trauma to assess their neurological deficit and psychological profile after treatment.

Results: The functional handicap of patients was caused mostly by the central motor neuron impairment (12 cases), followed by chronic pain in 10 patients, gait disorder (9), spasticity (5), visual impairment (5), hearing loss (5), and peripheral paresis in one case. The most affected activity of daily life was mobility (15), followed by impaired communication skills (7) and earning capacity (7). Basic activities of daily life were less affected: grooming (6), dressing

(6), immediate transfer (6), feeding (5), and bladder control (2). The most frequent cognitive deficit was dyscalculia (in 18 patients, followed by attention-related problems (17), speech expressive disorder (17), dyslexia (13), impaired writing (10), and verbal fluency (1). Short-term verbal memory (word recall) seemed to be spared in most of the patients. We found difficulties in spatial and temporal orientation in 9 and 12 patients respectively. Reasoning, verbal reception and construction ability was only slightly changed. Most frequent emotional disorders were depression and anxiety (12 and 1 patients respectively). Six patients didn't emotionally adapt to a new situation, and in 8 cases closest relatives couldn't accept patients' new status.

Conclusion: Early evaluation of neurological deficit and psychological profile may indicate a possible functional handicap in patients with severe brain trauma. The EBIS Questionnaire could be a useful screening tool for the follow-up of those patients.

P0476 Lateralization of the Memory Deficits in Patients with Closed Head Injury

D.M. Pavlovic, A.M. Pavlovic. *Institute of Neurology, Serbia*

Background: Memory lateralization is still a matter of debate.

Objective: To explore lateralized memory deficits in closed head injury (CHI) patients.

Methods: Wechsler Memory Scale - Revised (WMS-R), Ray complex figure (RCF) and Rey Auditory Verbal Learning Test (RAVLT) were presented to 41 CHI patients. Lateralization of brain lesions was determined with computerized tomography. Lesion only in the right hemisphere (R) had 11 (26.83%), lesion only in the left hemisphere (L) had 12 (29.27%), and lesion in both hemispheres (RL) had 18 (43.90%) patients.

Results: WMS-R: Mean Memory Quotient (MQ) was in R 88.63, in L 73.00 and in RL 69.44 (significantly low). Mean verbal MQ was in R 91.00, in L 76.67 and in RL 75.72 (significantly low). Mean visual MQ was in R 87.00, in L 80.42 and in RL 74.61 (significantly low). Delayed memory MQ was in RL 68.11, in L 68.08 and in R 78. RAVLT: the lowest scores were in RL in verbal learning, recognition and spontaneous evocation after 30 minutes. RCF: low scores were found in R (copy 28.68, delayed evocation after 30 minutes 15.45) and RL (27.39, 12.33).

Conclusions: Verbal memory was lateralized to the left side while visual did not show lateralization so it may be of different grade for two domains. Bilateral lesions may preclude the actions of compensatory mechanisms.

P0477 Mild Traumatic Brain Injury, Diagnostic and Therapeutic Situation in Austria

C. Stepan¹, H. Binder¹, F. Gerstenbrand². ¹Neurologisches Krankenhaus, MTS, Vienna; ²Ludwig Boltzmann Inst. for Restorative Neurology, Austria

An inquiry about mild traumatic brain injury in all departments and hospitals for Neurology, Neurosurgery and Traumatology in Austria was carried out between March and June 2000. A detailed questionnaire was developed based on the questionnaire of J. D. Kruijk presented at the 4th EFNS Congress in Seville 1998. The aim was to get information about nomenclature, the use of additional examinations and the treatment program. 64 institutions were contacted, the return rate was 65 %.

In more than 95 % the term commotio cerebri or "Gehirnerschütterung" was used synonymously, in only 5 % mild traumatic brain injury is the diagnostic term. Retrograde amnesia is the main

diagnostic symptom in 88 %, loss of consciousness in 86 %, post-traumatic amnesia in 82 %. The diagnostic criteria of the definition of commotio cerebri-"Gehirnerschütterung" generally follow the definition of mild traumatic brain injury, defined by the American Committee for Mild Traumatic Brain Injury 1993. Guidelines for the diagnosis are used in only 10 of the 64 departments. The duration of hospitalisation ranges from 12 hours to 3 days. The use of additional examinations and medical treatment is different. X-ray of the skull was done in 86% of patients with mild traumatic brain injury, X-ray of the cervical spine in 83 %. cCT was performed in 73 % of patients.

There is no common concept for diagnosis and therapy in the different units in Austria which admit patients with traumatic brain injury. National as well as international harmonisation of diagnosis and treatment of patients with mild traumatic brain injury is necessary.

P0478 Kinematics of Head Movement After Acceleration/Deceleration Injury of the Neck

M. Berger¹, S. Lechner-Steinleitner². ¹University Innsbruck; ²Institute for Space Neurology Innsbruck, Austria

Background: Acceleration-deceleration injuries of the neck (ADT, whiplash injuries) can cause long-lasting and complex disabilities. Their leading symptoms are neck pain and reduced neck mobility in the acute as well as in the chronic stage.

Objectives: Neck pain induces typical spatial and temporal changes in head motion. The analysis of kinematic parameters of these disturbed head motion patterns offers important information for differentiation between patients and healthy controls.

Methods: A method was developed for recording three-dimensional head movements (Cervicomotography, CMG). The test movements concerned slow repetitive voluntary movements along two main axes (yaw and pitch). 276 patients suffering from classical whiplash injury underwent CMG-analyses after routine neurological examination. For control group CMG-recordings of 193 healthy volunteers were used.

Results: 96 kinematic parameters were calculated from each test movement and reduced by statistical methods (t-tests, regression analyses, principal component analysis) to 14 relevant ones which proved to be significantly different between patients after ADT and healthy volunteers. For each test movement two orthogonal factors, motility and quality, could be quantified.

Conclusion: Functional tests with respect to test criteria as standardization, reliability, validity and independency of the examiner were developed. They allow to objectivate the quality and quantity of posttraumatic head motion disturbances and to classify automatically their degree. For patients after "whiplash injuries" this offers relevant information for diagnosis, medical expertise and treatment control.

P0479 The Application of Laser - Radiation of Blood in Patients with Severe Brain Trauma

A.M. Khelimsky¹, V.V. Germanovich². ¹Far Eastern State Medical University, Russia; ²Regional Hospital 2, Poland

Background: Some studies have demonstrated that treatment of severe brain trauma (SBT) with intravenous low energy helium-neon laser-ray therapy (ILRT) improves long-term behavioral recovery. Objective and methods. SBT in 2 groups of rats was done and the 1st group was treated with ILRT. Baseline measurements were taken on motor tasks involving forelimb placing and walking. One

month after SBI the macroscopic views of brain trauma areas were estimated.

Hemiplegia was reduced on an average in 4,5 $\pm$ 0,3 days after ILRT in the 1st group of rats. In the 2nd (control) group hemiplegia was reduced on an average in 10,0 $\pm$ 0,4 days ($p < 0,05$).

The macroscopic views of brain trauma areas in the 2nd group of rats showed deep defect of cerebral tissue caused by resorption, whereas there was mild defect in the 1st group.

60 patients in acute period of SBI were treated with ILRT through jugular vein. ILRT with wavelengths of 633 nm and power of 2,5 mW was 60 min. duration a day, during 8-10 days.

The dynamics of oxidized hemoglobin (OHb) and reduced hemoglobin (RHb) concentrations in jugular vein and common carotid artery, jugular bulb oxygen saturation (SjO2), arterial oxygen saturation (SpO2), end-tidal CO2 partial pressure (Pet CO2), CT - scans and neurological disorders were examined.

Results: The concentration of OHb and SpO2 were increasing after ILRT. There was a minimal decreasing of Pet CO2 and SjO2 during ILRT. Thus, oxygen-transport function of erythrocytes and saturation of hemoglobin by oxygen were improving, and hemic hypoxia of the brain tissue was reducing.

Clinical observation has confirmed good results of ILRT. There was diminishing of neurological signs in a short time, vegetative homeostasis has improved.

Conclusions: We can recommend the introduction of intravenous laser-radiation of blood along with a complex therapy of SBI, as an effective method of treatment.

P0480 Implementation of a Guideline for Mild and Moderate Traumatic Brain Injury in the Emergency Department

F. Coelho. Hospital Fernando da Fonseca, Portugal

Background: In our country we have no uniform rules to observe and decide what to do with these patients, so a team of neurosurgeons have made a guideline for patients evaluated at level 3 hospital which means without neurosurgeon.

Objective: The purpose of this study is to present the results of one year implementation of the guideline for mild and moderate traumatic brain injury in the emergency department.

Methods: The guideline consists of collecting data such as: Glasgow scale, arterial blood pressure, pulse, pupillary size and reaction to light, trauma causes (car accident, downfall, ...), risk factors (epilepsy, alcoholic, drug addict, use of anticoagulation therapy, age > 65, ...), headache, level of conscience. With those elements and 5 algorithms we decide the following actions like computed tomographic scan, from 6 to 24 hours observation (observation room), transfer to neurosurgeon.

Results: During one year, we analyse 480 guidelines with 110 incomplete.

10 patients have been transferred to neurosurgeon and as far as we know, no casualties reported.

Conclusions: Despite the difficulty of the implementation of these guidelines, we consider that a methodological approach is helpful.

P0481 Two Years Follow Up Surveillance of Patients Observed at Emergency Department

F. Coelho. Hospital Fernando da Fonseca, Portugal

Background: As a full time neurologist at emergency department for the last two years I observed more than 150 patients with different pathology. Some stay inside the hospital (different services)

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