Mortality After Head Injury: Effect of Neurosurgical Care

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Objective: To determine whether treatment of patients in neurosurgical centres vs. non-neurosurgical centres impacts on mortality after head injury.


Subjects: All patients with a GCS < 9 or those requiring intubation after a head injury were identified. Patients were grouped according to whether they were treated in a neurosurgical or non-neurosurgical centre. Patients with incomplete transfer records were not included (n = 750).

Outcome measure: Odds of death of patients treated in non-neurosurgical centres vs. neurosurgical centres adjusted for age, injury severity (ISS) and presenting physiology (RTS).

Results: 3131 patients were treated in neurosurgical centres, whilst 2124 were treated exclusively in non-neurosurgical centres. Crude mortality was increased in patients treated in non-neurosurgical centres (59%, (CI 57–61) vs. 36%, (CI 34–39)). The age and severity adjusted odds of death for patients treated in non-neurosurgical centres was 2.14 (1.8–2.4, 95% CI) times that for patients treated in neurosurgical centres.

Conclusion: These data suggest that all patients with a severe head injury should be treated in a neurosurgical centre.

Keywords: Head injury; outcome.

Relationships Between Age and Outcome in Head Injured Patients in Newcastle

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Objective: To investigate the relationships between age and outcome in head injured patients.

Methods: A prospective study of all patients with a head injury admitted to the regional centre at Newcastle General Hospital, UK between 1987 and 2000 (excluding 1989 and 1991) has been carried out. Data collected included cause of injury, age and gender of patient, GCS at admission, presence of haematoma, whether surgery was performed and outcome at discharge using GOS.

Results: During the 12 years of the study a total of 7154 patients were admitted: 28% were aged under 10, 20% 10–19, 15% 20–29, 10% 30–39 and 26% 40 or over. The age span was from 8 days to 99 years (median 21 years) and three quarters were male. GCS was 15 for 54%, 17% had a mild injury (GCS 13 & 14), 9% a moderate injury (GCS 11 & 12) and 19% a severe injury (GCS ≥ 8). One fifth had a haematoma of which 11% were subdural, 6% extradural and 4% ICH. Over two thirds (70%) made a good recovery by the time of discharge or transfer from the regional centre while 7% died or were vegetative. The main causes of head injury were a fall (49%) road traffic accident (24%) and assault (16%). During the period of the study there was little change in the age profile of patients admitted in each year. Older patients were more likely to be female and to have a subdural or intracerebral haematoma that required surgery. Their GCS on admission tended to be lower than younger patients and the cause of their head injury was more likely to be from a fall. Age, initial GCS and presence of a haematoma were significant factors in relation to outcome.

Conclusions: The profile of head injury admissions over the 14 years of this study has remained constant in relation to age, injury severity and mortality. The unfavourable outcome for older patients remains even after adjusting for their lower admission GCS and subdural or intracerebral haematomas.

Keywords: Head injury; age; outcome.

Does Preinjury Anticoagulation or Alcoholic Coagulopathy Affect Outcome in Traumatic Brain Injury Patients?

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Objectives: The incidence of intracranial haemorrhage has increased markedly in line with the increased use of oral anticoagulant agents. Coagulopathies and associated complications, such as bleeding, are also frequent among the alcohol misusers. The objective of this study was to determine whether the preinjury disturbance of coagulation (in anticoagulated patients or in chronic alcoholics) had an adverse impact on patients sustaining head injury.
Patients and methods: A retrospective review of 123 traumatic brain injury patients admitted to Maribor General Hospital between January 1999 and December 2001 showed 12 patients (9.8%) with iatrogenic anticoagulation. In addition, we also identified 21 patients (17.1%) as regular alcohol consumers. To compare outcomes of anticoagulated and non-anticoagulated patients we selected a matched (age, Glasgow Coma Scale (GCS) score) control group from the pool of other 90 patients. Similarly, another control group matched with the group of chronic alcoholics was formed. Charts were reviewed for demographic data, mechanism of injury, preinjury alcohol consumption, regular excessive alcohol consumption, preinjury anticoagulation, assays of coagulation, GCS, pupils’ reactions on the admission, CT scan of the head, treatment of coagulopathy and neurosurgical management. The neurological outcome was rated according to the Glasgow outcome scale (GOS). The GOS 5 or 4 was rated as a good outcome, the GOS 3 to 1 as a poor one.

Results: Before trauma 7 out of 12 patients (58.3%) with iatrogenic anticoagulation were treated with aspirin. Four (33.3%) were on warfarin and one (8.4%) was on therapy with low-molecular-weight heparin. Most of the patients with preinjury anticoagulation suffered from the subdural haematoma. We noticed that on admission anticoagulated patients had significantly higher GCS score compared to the non-anticoagulated non-alcoholic group. One of the most frequent characteristics of victims on anticoagulant therapy was the worsening of their clinical state because of the delayed haemorrhage. In our study 66.7% of the anticoagulated patients needed delayed surgical procedures and 16.7% of them reoperation. There was no significant difference in outcome among subgroups of our patients, however we have to stress that the worst outcome was noticed among the chronic alcohol misusers.

Conclusions: Despite the fact that the outcome in our group of anticoagulated patients did not significantly differ from those in the non-anticoagulated group, one should be aware of possible rapid deterioration of those patients due to haematoma enlargement. Patients on anticoagulation could develop intracranial haematoma even after minor head trauma. Careful clinical observation and repeated CT scans are therefore mandatory. Prompt identification of the disturbance in the haemostasis and the correction of the coagulation state immediately after the admission is the most important factor in achieving favourable outcome in those patients. Results suggest that morbidity and mortality after the brain injury of the patients with long term anticoagulation could be reduced by early diagnosis and treatment of the coagulopathy. However, the indications of the long term anticoagulation should be critically reassessed. Regarding the alcohol consumption a strong public promotion of healthy life is necessary.

Keywords: Head trauma; iatrogenic anticoagulation; alcohol coagulopathy; outcome.

Lateral Head Impacts and Protection of the Temporal Area by Bicycle Safety Helmets
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Objectives: Bicycle accidents are an important cause of head injury in children. While the protective effectiveness of bicycle helmets has been shown in several epidemiological studies, it can easily be observed that the temple region is only minimally covered by most helmet models. In the present study, impact tests were performed on human cadavers to investigate whether the current bicycle helmets are capable of preventing direct contact with the temporal area in flat anvil side impacts and, if not, whether the contact loading is reduced below the fracture threshold.

Materials and methods: Lateral head impacts, corresponding to a force load of 15 kN on an non-helmeted head, were applied on helmeted cadavers by a steel pendulum with a flat impact surface. The impact conditions were supported by accident reconstruction data. In six tests the contact between the impactor plate and the temporal and zygomatic arch area was investigated by means of paint. We tested five common helmet types and one model, meant for 2 year old children that provided a better temporal coverage. The skulls were inspected for fractures. Two additional tests were performed to measure the force load on the temple region using two common helmet models.

Results: In five of the six paint tests contact with the area anterior of the ear, mainly the skin overlying the zygomatic arch, had occurred and in one of these a linear skull fracture was seen. The one helmet that had prevented the contact was the helmet with the better temporal coverage. The additional force measurement tests confirmed that contact with the temple region had occurred in spite of the helmet, but failed to quantify the peak force. All helmets stayed in place and showed a crushed area with cracks after the impact.

Discussion: Protection of the temple region is important since this anatomical region is predisposed for fractures and extradural haematomas. It is known from studies on bicycle accidents in helmeted cyclists that 25 to 41% of impacts occurred on the helmet rim immediately cranial to the temporal area [1, 2]. Seventy-five percent of these victims suffered from head injuries.

Conclusion: The common bicycle helmet models do not prevent direct contact loading on the temporal and zygomatic arch region in lateral head impacts. The contact loading was severe enough to cause a fracture in one of the tests. We believe that a better temporal coverage can improve the protective effectiveness of bicycle safety helmets.

Keywords: Bicycle safety helmet; lateral head impact; temporal area; skull fracture.

References

Self-Reported Head Trauma Among College Students with Learning Disabilities and Attention Deficit Disorders: An Exploratory Study
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Background: Persons with learning disabilities (LD) or attention deficit disorders (ADD/ADHD) may exhibit similar symptoms or complaints as persons with TBI. These can include: short-term memory loss; long-term memory loss, slowed ability to process information, trouble concentrating or focusing for periods of time, difficulty keeping up with a conversation, communication difficulties such as word retrieval, spatial disorientation, organizational problems and impaired judgment, unable to do more than one thing at a time, and a lack of initiating activities, or once started,