Acute Coagulopathy in Isolated Blunt Traumatic Brain Injury

Arash Wafaisade · Rolf Lefering · Thorsten Tjarde · Sebastian Wutzler · Christian Simanski · Thomas Paffrath · Philipp Fischer · Bertil Bouillon · Marc Maegle · Trauma Registry of DGU

Published online: 6 October 2009
© Humana Press Inc. 2009

Abstract

Background The role of acute coagulopathy after traumatic brain injury (TBI) on outcome has gained increasing appreciation over the recent years. This study was conducted to assess the frequency, outcome, and risk factors associated with this complication.

Patients and Methods Using the large, multi-center population-based Trauma Registry of the German Society for Trauma Surgery (TR-DGU), we retrospectively analyzed adult patients with isolated blunt TBI (intracranial AIS1 (FAD) ≥ 3 and extracranial AIS scores <3) for the presence of acute post-traumatic coagulopathy upon emergency room (ER) arrival. Coagulopathy was defined as prothrombin time test (Quick’s value) < 70% and/or platelets < 100,000/µl.

Results From a total of 3,114 eligible patients with isolated TBI, 706 (22.7%) presented with coagulopathy upon ER arrival. Coagulopathy was associated with higher rates of craniotomies (P = 0.02), of single and multiple organ failure and with less intubation-free days. In surviving patients, ICU length of stay and hospital length of stay were significantly longer, if coagulopathy had been present at admission. The overall hospital mortality was 50.4% (n = 356) in patients with coagulopathy vs. 17.3% (n = 417) in non-coagulopathic patients (all P < 0.001). Multivariate analysis identified AISHEAD severity grade, GCS ≤ 8 at scene, the presence of hypotension at scene and/or at ER, pre-hospital i.v.-fluids ≥2,000 ml and age ≥75 years as independent risk factors for coagulopathy after TBI. Acute coagulopathy in TBI had an adjusted odds ratio for hospital mortality of 2.97 (CI95: 2.30–3.85; P < 0.001).

Conclusion Coagulopathy upon ER admission is frequent after isolated blunt TBI and represents a powerful, independent predictor related to prognosis. Future research should aim to determine the beneficial effects of early treatment of TBI-associated coagulopathy.

Keywords Traumatic brain injury · Coagulopathy · Outcome · Mortality · Pre-hospital care

Introduction

Management of patients with traumatic brain injury (TBI) centers around preventing secondary brain injury from factors such as hypoxia, systemic hypotension, and intracranial hypertension which have been shown to have a profound effect on outcome [1, 2]. Recently, acute post-traumatic coagulopathy has been recognized as another major complication contributing to secondary brain injury and impaired outcome after TBI [3–13], but detailed