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Frequency and Impact of Intensive Care Unit Complications on Moderate-Severe Traumatic Brain Injury – Early Results of the Outcome Prognostication in Traumatic Brain Injury (OPTIMISM) Study

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ABSTRACT

Background: Known predictors of adverse outcomes in patients with moderate-severe TBI (msTBI) explain only a relatively small proportion of patient-related outcomes. The frequency and impact of intensive care unit complications (ICU-COMPL) on msTBI-associated outcomes is poorly understood.

Methods: In 213 consecutive msTBI patients admitted to a Level-I-Trauma-Center neuro-trauma-ICU, twenty-eight ICU-COMPL (21 medical and 7 neurological) were prospectively collected and adjudicated by group consensus, using pre-defined criteria. We determined frequencies, and explored associations of ICU-COMPL and functional neurological outcomes measured by Glasgow Outcome Scale (GOS) at hospital discharge using multivariable logistic regression.

Results: The average age of the study sample was 53 years, and the median presenting Glasgow Coma Scale and Injury Severity Scores were 5 and 27, respectively. Hyperglycemia (79%), fever (62%), systemic inflammatory response syndrome (60%), and hypotension requiring vasopressors (42%) were the four most common medical ICU-COMPL. Herniation (39%), intracranial rebleed (39%), and brain edema requiring osmotherapy (37%) were the three most common neurological ICU-COMPL. After adjusting for admission variables, duration of ventilation, and ICU length-of-stay, patients with brain edema (OR 5.8; 95% CI 2,16.7) had a significantly increased odds for dying during hospitalization whereas patients with hospital-acquired urinary tract infection (UTI) had a decreased odds (OR 0.05; 95% CI 0.005,0.6). Sensitivity-analysis revealed that UTI occurred later, suggesting a non-causal association with survival. Brain herniation (OR 15.7; 95% CI 2.6,95.4) was associated with an unfavorable functional status (GOS 1-3).

Conclusion: ICU-COMPL are very common after msTBI, have a considerable impact on short-term outcomes, and should be considered in the prognostication of these high-risk patients. Survival associations of time-dependent complications warrant cautious interpretation.

