Severe traumatic brain injury mortality

Traumatic brain injury (TBI) is a worldwide social, economic, and health problem related to premature death and long-term disabilities. There were no prospective and multicentric studies analyzing the predictors of TBI related mortality and estimating the burden of TBI in Brazil. To address this gap, we investigated prospectively: (1) the hospital mortality and its determinants in patients admitted with severe TBI we analyzed in three reference centers; (2) the burden of TBI estimated by the years of life lost (YLLs) due to premature death based on the hospital mortality considering the hospital mortality. Between April 2014 and January 2016 (22 months), all the 266 patients admitted with Glasgow coma scale (GCS), ≤ 8 admitted in three TBI reference centers were included in the study. These centers cover a population of 1,527,378 population of the Santa Catarina state, Southern Brazil. Most patients were male (n = 230, 86.5%), with a mean (SD) age of 38 (17) years. Hospital mortality was 31.1% (n = 83) and independently associated with older age, worse cranial CT injury by the Marshall classification, the presence of subarachnoid hemorrhage in the CT, lower GCS scores and abnormal pupils at admission. The final multiple logistic regression model including these variables showed an overall accuracy for hospital mortality of 77.9% (specificity 88.6%, sensitivity 53.8%, PPV 67.7%, and NPV 81.1%). The estimated annual incidence of hospitalizations and mortality due to severe TBI were 9.5 cases and 5.43 per 100,000 inhabitants, respectively. The estimated YLLs in 22 months, in the 2 metropolitan areas were 2,841, corresponding to 1,550 YLLs per year and 101.5 YLLs per 100,000 people every year. The hospital mortality did not change significantly since the end of the 1990s and was similar to other centers in Brazil and Latin America. Significant predictors of hospital mortality were the same as those of studies worldwide, but their strength of association seemed to differ according to countries income. Present study results question the extrapolation of TBI hospital mortality models for high income to lower- and middle-income countries and therefore have implications for TBI multicentric trials including countries with different income levels [1)].

Han et al. performed a systematic review and meta-analysis aimed at determining the effect of intracranial pressure monitoring on the traumatic brain injury mortality.

A systematic search for articles was conducted on PubMed, Scopus, Cochrane Central Register of Controlled Trials (CENTRAL), and APA PsycNet for articles published from 1 January 2000 to 1 August 2022. Manager 5.4 was used to carry out statistical analysis.

The article search yielded 1421 articles, but only 23 cohort studies were included in the systematic review and meta-analysis. The total number of study participants is 80,058. Seventeen studies reported unadjusted odds ratios (OR), and only 8 reported the adjusted odds ratio (OR). Nine out of seventeen studies reported an unadjusted OR of less than 1, and five out of eight studies reported an adjusted OR of less than 1. From this paper's analysis, the OR for in-hospital mortality was 1.01 [95% CI, 0.80, 1.28], with a p-value of 0.92. OR for ICU mortality was 0.84 [95% CI, 0.52, 1.35], with a p-value of 0.47.

But due to conflicting results, as evident above, it is unsatisfyingly challenging to draw any substantial conclusions from them [2)].

Traumatic brain injury is a significant cause of morbidity and mortality in children.

The use of prognostic models is becoming increasingly important in traumatic brain injury (TBI) research for baseline risk stratification in clinical trials and standardization of case-mix in comparative effectiveness research [3)]

The traumatic brain injury (TBI) category accounted for the highest annual mean years of potential life lost (YPLL) at 361,748 (33.9% of total neurologic YPLL). Intracerebral hemorrhage, cerebral ischemia, subarachnoid hemorrhage, and anoxic brain damage completed the group of five diagnoses with the highest YPLL. TBI accounted for 12.1% of all inflation adjusted neurologic hospital charges and 22.4% of inflation-adjusted charges among neurologic deaths. The in-hospital mortality rate has been stable or decreasing for all of these diagnoses except TBI, which rose from 5.1% in 1988 to 7.8% in 2011.

Missed or delayed detection of progressive neuronal damage after traumatic brain injury (TBI) may have negative impact on the outcome.

Wurmb et al, investigated whether routine follow-up CT is beneficial in sedated and mechanically ventilated trauma patients in a retrospective chart review. A routine follow-up cCT was performed 6 hours after the admission scan in 2 groups of patients, group I: patients with equal or recurrent pathologies and group II: patients with new findings or progression of known pathologies.

A progression of intracranial injury was found in 63 patients (42%) and 18 patients (12%) had new findings in cCT 2 (group II). In group II a change in therapy was found in 44 out of 81 patients (54%). 55 patients with progression or new findings on the second cCT had no clinical signs of neurological deterioration. Of those 24 patients (44%) had therapeutic consequences due to the results of the follow-up cCT.

They found new diagnosis or progression of intracranial pathology in 54% of the patients. In 54% of patients with new findings and progression of pathology, therapy was changed due to the results of follow-up cCT, concluding that in trauma patients who are sedated and ventilated for different reasons a routine follow-up CT is beneficial [4)].

The mortality in severe TBI (STBI) ranges from 35 to 45% [5) 6) 7) 8)].

Traumatic brain injury mortality prediction

Traumatic brain injury mortality prediction.

1)
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