

Comparison of Outcomes in Level I versus Level II Trauma Centers in Patients Undergoing Craniotomy or Craniectomy for Severe Traumatic Brain Injury

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Introduction

Traumatic brain injury (TBI) still carries a devastatingly high rate of morbidity and mortality. This study is the first to assess whether patients undergoing a craniotomy or craniectomy for severe TBI fare better at level I than level II trauma centers.

Methods

The data were extracted from the Pennsylvania Trauma Outcome Study database (the Pennsylvania Trauma Systems Foundation statewide trauma registry) which contains data collected by each of the 31 accredited Level I and II trauma centers in the state. Inclusion criteria were patients older than the age of 18 years with severe TBI (Glasgow Coma Scale (GCS) score of lower than 9) undergoing craniotomy or craniectomy in the state of Pennsylvania between January 2002 and September 2017.

Results

Of 3980 patients, 2568 (64.5%) were treated at level I trauma centers and 1412 (35.5%) at level II centers. Baseline characteristics were grossly similar between the 2 groups except for significantly worse GCS scores at admission in level I centers ($p=0.002$). The rate of in-hospital mortality was 37.6% in level I trauma centers versus 40.4% in level II trauma centers ($p=0.08$). Likewise, mean FIM scores at discharge were significantly higher in level I (10.9 ± 5.5) than level II centers (9.8 ± 5.3 ; $p<0.005$). In multivariate analysis, treatment at a level II trauma center significantly predicted in-hospital mortality (OR, 1.2; 95% CI, 1.03–1.37; $P=0.01$) and worse FIM scores (OR, 1.4; 95% CI, 1.1–1.7; $P=0.001$). Mean hospital and ICU length of stay were significantly longer in level I centers ($p<0.005$).

Conclusions

Even in a mature trauma system, patients undergoing craniotomy or craniectomy for severe TBI have superior functional outcomes and lower mortality rates in level I compared with level II trauma centers. The findings support the rapid transfer of such patients to level I trauma centers.

Learning Objectives

By the conclusion of this session, participants should be able to:

- 1) Discuss the differences in outcome between level I and level II trauma centers for patients with severe TBI undergoing a neurosurgical procedure,
- 2) Optimize the treatment of patients with severe TBI

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