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**Case-mix, care pathways, and outcomes in patients with traumatic brain injury in CENTER-TBI: a European prospective, multicentre, longitudinal, cohort study.**

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**Abstract**

**BACKGROUND:**

The burden of traumatic brain injury (TBI) poses a large public health and societal problem, but the characteristics of patients and their care pathways in Europe are poorly understood. We aimed to characterise patient case-mix, care pathways, and outcomes of TBI.

**METHODS:**

CENTER-TBI is a Europe-based, observational cohort study, consisting of a core study and a registry. Inclusion criteria for the core study were a clinical diagnosis of TBI, presentation fewer than 24 h after injury, and an indication for CT. Patients were differentiated by care pathway and assigned to the emergency room (ER) stratum (patients who were discharged from an emergency room), admission stratum (patients who were admitted to a hospital ward), or intensive care unit (ICU) stratum (patients who were admitted to the ICU). Neuroimages and biospecimens were stored in repositories and outcome was assessed at 6 months after injury. We used the IMPACT core model for estimating the expected mortality and proportion with unfavourable Glasgow Outcome Scale Extended (GOSE) outcomes in patients with moderate or severe TBI (Glasgow Coma Scale [GCS] score ≤12). The core study was registered with ClinicalTrials.gov, number [NCT02210221](http://clinicaltrials.gov/show/NCT02210221), and with Resource Identification Portal (RRID: SCR\_015582).

**FINDINGS:**

Data from 4509 patients from 18 countries, collected between Dec 9, 2014, and Dec 17, 2017, were analysed in the core study and from 22 782 patients in the registry. In the core study, 848 (19%) patients were in the ER stratum, 1523 (34%) in the admission stratum, and 2138 (47%) in the ICU stratum. In the ICU stratum, 720 (36%) patients had mild TBI (GCS score 13-15). Compared with the core cohort, the registry had a higher proportion of patients in the ER (9839 [43%]) and admission (8571 [38%]) strata, with more than 95% of patients classified as having mild TBI. Patients in the core study were older than those in previous studies (median age 50 years [IQR 30-66], 1254 [28%] aged >65 years), 462 (11%) had serious comorbidities, 772 (18%) were taking anticoagulant or antiplatelet medication, and alcohol was contributory in 1054 (25%) TBIs. MRI and blood biomarker measurement enhanced characterisation of injury severity and type. Substantial inter-country differences existed in care pathways and practice. Incomplete recovery at 6 months (GOSE <8) was found in 207 (30%) patients in the ER stratum, 665 (53%) in the admission stratum, and 1547 (84%) in the ICU stratum. Among patients with moderate-to-severe TBI in the ICU stratum, 623 (55%) patients had unfavourable outcome at 6 months (GOSE <5), similar to the proportion predicted by the IMPACT prognostic model (observed to expected ratio 1·06 [95% CI 0·97-1·14]), but mortality was lower than expected (0·70 [0·62-0·76]).

**INTERPRETATION:**

Patients with TBI who presented to European centres in the core study were older than were those in previous observational studies and often had comorbidities. Overall, most patients presented with mild TBI. The incomplete recovery of many patients should motivate precision medicine research and the identification of best practices to improve these outcomes.

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