Abstract

Title: Identification of an Isolated Epidural Hematoma Using Blood-Based Biomarkers in Traumatic Brain Injury

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Background: Blood-based biomarkers have shown promise in identifying head injury patients with acute traumatic intracranial findings, however their capacity in detecting patients with isolated extra-axial hematomas remains unknown. The objective of this study was to assess the potential S100 calcium-binding protein B (S100B), glial fibrillary acid protein (GFAP), total tau (t-tau), neurofilament light (NF-L), ubiquitin C-terminal hydrolase L1 (UCH-L1), and neuron specific enolase (NSE) to identify mild TBI (mTBI) patients with epidural hematoma (EDH).

Materials and methods: This prospective study included 1043 patients (median age 46 years, interquartile range 29-63) with mild traumatic brain injury [mTBI (GCS ≥13)] with 1) all six serum blood biomarker levels measured and 2) acute head computed tomography (CT) scan within 24 hours of injury. The main outcome measure was the area under the curve of the receiver operating characteristic (AUC) for each biomarker in distinguishing between patients with CT-negative findings and those with EDH without coexisting surgical findings, i.e. subdural or intraparenchymal haemorrhage. An AUC≥0.7 was considered clinically adequate. A distinction was made between i) isolated EDH and ii) EDH occuring concomitantly with non-surgical findings (e.g. subarachnoid haemorrhage, intraventricular haemorrhage, and/or signs of axonal injury).

Results: Of the patients, 37 (3,5%) patients had an isolated EDH, 30 (2,5%) patients had EDH with non-surgical lesions and 976 patients had CT-negative findings (94%). In discriminating between any EDH versus CT-negative, the AUCs were 0.83 for GFAP, 0.65 for NSE, 0.66 for t-tau, 0.60 for NF-L, 0.57 for S100B, and 0.67 for UCH-L1. For

discriminating between isolated EDH and CT-negative, the AUCs were 0.77 for GFAP, 0.63 for NSE, 0.58 for t-tau, 0.52 for NF-L, 0.51 for S100B, and 0.60 for UCH-L1.
Conclusion: Blood levels of GFAP adequately discriminated mTBI patients with EDH.