AI-Driven Prognostication of Traumatic Brain Injury Patients in the ICU
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BACKGROUND

Traumatic brain injury (TBI):
- Over 50 million cases occur annually worldwide.¹
- 66% of patients admitted to Intensive Care Unit (ICU) die or suffer long-term neurological deficits

PROBLEM

- Existing models do not incorporate physiological time series data
- Clinicians cannot reliably predict mortality or level of neurological function (GCS Score)

DATA

TBI patients in the ICU for > 1 day
With Data (n = 1973)

PCA
Mean/Var
Indicator

RESULTS

Motor GCS ROC
Mortality ROC

Sensitivity: .820
Specificity: .910
PPV: .617

Sensitivity: .789
Specificity: .854
PPV: .488

CONCLUSIONS

In this study, we built a model that was able to outperform the existing patient mortality prediction baseline (APACHE) on a TBI patient population of 1973. In addition, we were able highly effectively predict patient GCS score upon discharge (Test AUC = 0.92). This model could be leveraged to improve prognostication of TBI patients and streamline resource allocation in the ICU. These results motivate follow up studies using additional data modalities including continuous EEG signals and imaging data.

REFERENCES