Intracranial pressure monitor enhancement for cerebral hemodynamic monitoring

AWARD AMOUNT: $104,433

THE TEAM

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EMERGENCY MEDICINE
NEUROLOGY
NEUROSURGERY
MECHANICAL ENGINEERING
BIOMEDICAL ENGINEERING

THE PROBLEM

Many TBI interventions are currently performed to prevent secondary injury due to restricted blood flow to the brain. However, there is currently no method to continuously track changes in blood flow, or arterial response within the brain to interventions, that might help guide therapies.

Replicate hemodynamic monitoring capabilities for TBI through alteration of an existing intraparenchymal catheter used for ICP monitoring

- No increased invasiveness
- Differential beat-to-beat arterial waveform comparison rejects slow-varying disturbances
- Continuous blood flow measurement may be measurable
- Continuous cerebral arterial autoregulation may be measurable
- Low cost

Continuously monitor changes in blood flow and vascular reactivity

Added to the exterior of a traditional intracranial catheter, are smart materials allowing real-time tracking of changes in arterial diameter and other properties to provide feedback on responsiveness to clinical interventions and an estimate of blood flow trajectory.

Fine optical fibers measure volume
Piezoelectric polymer thin-films sense pressure and create arterial waveforms

THE SOLUTION

THE TECHNOLOGY