MedicalXpress

New data-driven machine learning method effectively flags risk for post-stroke dangers

October 3 2013

A team of experts in neurocritical care, engineering, and informatics, with the Perelman School of Medicine at the University of Pennsylvania, have devised a new way to detect which stroke patients may be at risk of a serious adverse event following a ruptured brain aneurysm. This new, data-driven machine learning model, involves an algorithm for computers to combine results from various uninvasive tests to predict a secondary event. Preliminary results were released at the Neurocritical Care Society Annual Meeting in Philadelphia.

Comparing 89 patient cases retrospectively, the team found that automated features of existing ICU data were as effective as the transcranial doppler procedure currently used to detect a dangerous constriction of blood vessels in the brain. Transcranial doppler tests require a skilled technician to be available and are often only conducted once a day, and while the test is selective and accurately detects people who are risk, it is not as efficient (sensitivity of 56%) at ruling out which patients are not at greater risk of this serious adverse event .

"There is a great opportunity to utilize abundant existing data to provide guidance and clinical decision support, as this model was as effective and much less resource-intensive," said senior author Soojin Park, MD, assistant professor of Neurology at Penn. "However, while this simple method may be valuable, most ICUs don't have the IT infrastructure to synergize data in such a way."

The team plans to look at prospective cases to compare this method

directly with other assessments and clinical decisions.

This study is one of a dozen Penn Medicine studies and talks being presented at the Neurocritical Care Society Annual Meeting. In addition to studies being presented on cerebral blood flow and end of life care in the Neuro Intensive Care Unit, Penn experts are also leading talks on traumatic brain injury, airway management and therapeutic temperature management. Monisha Kumar, MD, assistant professor of Neurology, is also serving on the Society's consensus conference on multimodal monitoring.

Provided by University of Pennsylvania School of Medicine