



Smarter Is: Saving Minds, Saving Lives

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Columbia University Medical Center’s Neuro-ICU uses InfoSphere Streams to isolate early warning signs of a damaging and often deadly stroke complicationDavid Geer

Imagine being a doctor. The patient has suffered a type of stroke called subarachnoid hemorrhage (SAH). He’s currently stable, but a terrifying danger looms ahead. In roughly one-third of SAH victims, the blood vessels suddenly constrict, slowing the flow of oxygen-rich blood to the brain and causing a condition known as *delayed ischemia*. When that condition happens, there’s a 50 percent chance that the patient will suffer irreparable damage or death.*

Physicians currently monitor for delayed ischemia by performing an hourly neurological exam. For example, nurses ask questions of patients each hour. If they answer one hour but the next they slur their speech, this often indicates a change in their condition. But further diagnostic tests would have to follow, and the tests available today have proven largely unreliable. Worse, if the physician waits until these symptoms start before beginning treatment, it is too late for fully half of those patients, who go on to have ischemic strokes, according to Dr. J. Michael Schmidt, director of clinical neuro-monitoring and informatics at the Neuro-ICU of the Columbia University College of Physicians and Surgeons.

Physicians in the Neuro-ICU believe indicators of delayed ischemia appear somewhere in 200 treatment-related data points 24 to 48 hours before the complication’s devastating arrival. But no human mind can process data from that many variables.

Instead, IBM researcher Nagui Halim and Dr. Schmidt are using IBM InfoSphere Streams to analyze floods of prerecorded clinical data, including CT scan blood findings, electroencephalogram outputs, blood pressure readings, and blood oxygen levels taken from a pool of more than 300 past patients.

The main feature we are looking at is reductions in heart rate variability that relate to inflammation, which is part of the pathogenesis of delayed ischemia,” says Dr. Schmidt. “We are seeing enough indicators in the heart rate signal to make us think this is a promising pursuit.”

The team hopes to have some preliminary data models this summer. The next step would be to validate the models against data from new patients. If the data and models prove to be solid, physicians could soon be able to detect when a patient is at high risk of delayed ischemia. Ultimately, analyzing these streams of data could save a mind, or a life.

* "Calcium Antagonists for Aneurysmal Subarachnoid Haemorrhage," by S. Dorhout Mees, G. Rinkel, V. Feigin, et al., *Cochrane Database of Systematic Reviews*, Issue 3: CD000277, doi: 10.1002/14651858.CD000277.pub3, 2007.

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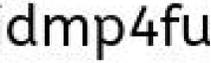


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