

New heart attack test better informs of underlying condition

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A new blood test developed by a University of Alberta physician promises to eliminate the guesswork clinicians face with an apparent heart attack.

The current gold standard test used for the clinical diagnosis of myocardial infarction (MI or death of [heart](#) muscle due to lack of blood supply)—the cardiac [troponin](#) blood test—doesn't indicate the extent of cardiac damage, said Peter Hwang, a clinician-scientist in the Faculty of Medicine & Dentistry at the U of A.

Cardiac troponin is a protein unique to the heart, so elevated levels in the blood indicate that the heart has been damaged, explained Hwang. After digging deeper into what's going on in the troponin release process, he found that patients with a true [heart attack](#) had more fragmented troponin than those with increased cardiac strain.

"We postulated that when cells die during a heart attack, not only would they release troponin into the bloodstream, but they would also digest the troponin through the action of activated intracellular proteases—enzymes that digest other proteins," he said.

The study included 29 inpatients from the University of Alberta Hospital and Mazankowski Heart Institute with elevated troponin levels either with known heart attacks, or other conditions that increase cardiac demand.

"As predicted, we found that the degree of proteolytic digestion increased with increasing severity of heart injury," he said.

"The highest degree was observed in patients with type 1 MI (the classic "heart attack"), where you have an acute blockage of a coronary artery, while the least degree was found in patients with type 2 MI, where the heart is just working harder."

Hwang added that, while the existing troponin test is still very useful, the new test would enable clinicians to make objective decisions about treating patients when faced with less clear-cut situations.

Currently, doctors rely on clinical context when interpreting an elevated troponin level because it could just as easily be caused by running a marathon or fighting a life-threatening infection as it could by a heart attack, explained Hwang.

"Sometimes the correct answer to the question—is it a heart injury or merely strain—isn't always obvious, even with all the clinical information," he added.

"Suppose there is a critically ill patient (say, fighting a severe life-threatening infection) with an elevated troponin level. Is the patient having a heart attack? Or is the troponin level elevated because the heart is working hard?"

The decision clinicians make could result in sending the patient for cardiac catheterization—an invasive procedure with some risks—or continuing current management, he explained.

"This is a very real diagnostic dilemma faced by doctors treating [patients](#). This test could resolve the challenge," he said.

Further research is necessary before the new troponin [blood test](#) becomes the new standard in heart attack testing, added Hwang.

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