Spit in a tube to diagnose heart attack

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A saliva test could fast track heart attack diagnosis, according to preliminary research presented today at ESC Congress 2020.

The innovative technique requires patients to spit into a tube and provides results in 10 minutes, compared to at least one hour for the

standard blood test.

Heart attacks need urgent diagnosis, followed by treatment to restore blood flow to blocked arteries. Diagnosis is based on symptoms (such as chest pain), an electrocardiogram (ECG) and a blood test for cardiac troponin, a protein released into the blood when the heart muscle is injured.

"There is a great need for a simple and rapid troponin test for patients with chest pain in the pre-hospital setting," said study author Dr. Roi Westreich of Soroka University Medical Centre, Beer Sheva, Israel. "Currently troponin testing uses blood samples. In this preliminary study we evaluated the feasibility of a novel method using saliva."

The purpose of the study was to see if cardiac troponin could be detected in the saliva of patients with heart muscle injury. Saliva samples underwent a unique processing procedure to remove highly abundant proteins. A total of 32 patients with heart muscle injury (i.e. they had a positive cardiac troponin blood test) and 13 healthy volunteers were requested to provide saliva samples by spitting into a collecting tube. Then, half of each sample was processed, and the other half remained in its natural state.

The researchers then tested the processed and unprocessed saliva samples for cardiac troponin. "Since no test has been developed for use on saliva, we had to use commercially available tests intended for whole blood, plasma, or serum, and adjust them for saliva examination," said Dr. Westreich.

For patients, the researchers compared the results from the saliva samples (processed and unprocessed) with the blood samples. There was strong agreement between the blood findings and the processed saliva, but not saliva in its natural state. Some 84% of the processed saliva

samples tested positive for troponin, compared to just 6% of the unprocessed saliva.

Among healthy participants, no cardiac troponin was detected in the processed and unprocessed saliva samples.

Dr. Westreich said: "This early work shows the presence of cardiac troponin in the saliva of patients with myocardial injury. Further research is needed to determine how long troponin stays in the saliva after a heart attack. In addition, we need to know how many patients would erroneously be diagnosed with heart attack and how many cases would be missed."

The next steps in this research are to expand the number of patients being studied and create a prototype for a cardiac troponin test using saliva. "This prototype will be tailor-made for processed saliva and is expected to be more accurate than using a blood test on saliva," said Dr. Westreich. "It will be calibrated to show positive results when saliva troponin levels are higher than a certain threshold and show a yes/no result like a pregnancy test."

More information: Abstract title: Development of saliva-based cTnI point-of-care test: a feasibility study.

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