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Recognizing the risks of serious complications before discharge from hospital

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The University of Tampere and TAYS (Tampere University Hospital) Heart Hospital use artificial intelligence (A.I.) technologies developed by VTT Technical Research Centre of Finland in the home care of heart patients. The objective is to recognize serious difficult-to-predict complications as early as possible using the latest methods.

Recently, a clinical study led by Finnish researchers was launched in Tampere to use the latest analytical methods to recognize those myocardial infarction patients at high risk of complications. The project makes comprehensive use of data generated during treatment, but which is usually fragmented into separate systems, and complements it by continuing to monitor how the patient's heart is functioning after he or she has been discharged from hospital. The mass of data thus gathered is analysed using A.I. and machine-learning methods, which have been taught with the help of former patient-treatment data and developed to be applied to myocardial infarction patients.

What the study means for the patients in practice is that a small ECG recorder is attached to their chest when they are leaving the hospital. It can also be linked to the Internet for monitoring purposes for as long as the measurements require.

"The results can be used to enhance patient safety and to target the monitoring more accurately at the patients who would benefit the most from it. In the TAYS area alone, up to a thousand patients a year can benefit from the study", says Kari Antila, Senior Scientist at VTT.

High-risk patients the first group to be monitored

The method that can predict complications, while targeting the monitoring at high-risk patients enables device manufacturers to offer services to professionals and consumers in the international markets.

"High risk patients are identified during treatment, and monitoring is at first targeted at them. In this way, the sensitivity and specificity of the method can be maximised in those situations where the projected probability is high", emphasizes Niku Oksala, Associate Professor of Surgery and the project leader responsible.

"Combining the existing fragmented information into meaningful refined data that supports decision-making is probably the most significant measure for improving cost-efficiency in the context of the current debate concerning Finland's social and health care reform. In addition, it is an important step aimed at enhancing patient safety," says Jussi Hernesniemi, Cardiology Specialist and lead researcher of the project.

The clinical study related to the MADDEC (MAss Data in the Detection and prevention of serious adverse Events leading to complications in Cardiovascular diseases) -project was launched at TAYS Heart Hospital in May, 2017, and the research will be presented at the international EMBEC 2017 conference on 15 June in Tampere.

Provided by VTT Technical Research Centre of Finland