

New test predicts sudden cardiac death in hemodialysis patients

May 4 2015

A new test has been developed to predict sudden cardiac death in hemodialysis patients in whom such forecasts were previously impossible. The novel method was presented at ICNC 12 by Dr Akiyoshi Hashimoto, a cardiologist at Sapporo Medical University in Japan. The test uses a combination of nuclear medicine, C-reactive protein and electrocardiogram (ECG).

ICNC is organised by the Nuclear Cardiology and Cardiac CT section of the European Association of Cardiovascular Imaging (EACVI), a registered branch of the European Society of Cardiology (ESC), the American Society of Nuclear Cardiology (ASNC), and the European Association of Nuclear Medicine (EANM). ICNC 12 is held 3 to 5 May 2015 in Madrid, Spain.

Dr Hashimoto said: "Hemodialysis [patients](#) are at increased risk of sudden cardiac death because they often have latent [ischaemic heart disease](#) which reduces blood flow to the [heart](#). Latent means they don't have any clinical signs or symptoms, making it very difficult to predict a future heart attack."

He continued: "Ischaemic [heart disease](#) should be diagnosed at an early stage so that preventive therapies can be given. But exercise stress testing is inappropriate for diagnosis in [hemodialysis patients](#) who have multiple complications including muscle weakness, osteoporosis and peripheral arterial disease."

The current study investigated the ability of three methods, alone or in combination, to predict the risk of sudden cardiac death in hemodialysis patients. All three methods were performed at rest. The first was a [nuclear medicine](#) radioisotope technique called beta-methyl-p-iodophenyl-pentadecanoic acid (BMIPP) scintigraphy which measures fatty acid uptake by the heart. ECG was used to assess the Q wave and C-reactive protein levels in the blood were measured.

The study included 677 patients from the multicentre, prospective cohort study B-SAFE. BMIPP scintigraphy, ECG and C-reactive protein assessment was performed in all patients. During the 3 year follow up, 20 sudden cardiac deaths occurred. Patients who suffered sudden cardiac death were more likely to have abnormal BMIPP scintigraphy, abnormal Q wave and a greater C-reactive protein level compared to patients who did not experience sudden cardiac death. There were no differences between the two groups in other clinical, laboratory or hemodialysis parameters.

Taken on their own, patients with a BMIPP score greater than 16 had an 11-fold increased risk of sudden cardiac death, while an abnormal Q wave conferred an 18-fold increased risk, and a C-reactive protein level greater than 2.38 mg/dl predicted a seven-fold increased risk. Patients with two or three of the predictors had a sudden cardiac death risk that was 145 times greater than patients with normal levels on all three measures.

Dr Hashimoto said: "The most powerful way to predict sudden cardiac death was to combine the measures. Hemodialysis patients who had two or three abnormal measures were at 145 times [increased risk](#). In hemodialysis patients, abnormal uptake of BMIPP has an independent and incremental value in the prediction of sudden cardiac death in combination with C-reactive protein and Q wave. This indicates impaired fatty acid metabolism by the heart which could be caused by

latent ischaemic heart disease and may lead to fatal cardiac events."

He added: "An abnormal Q wave indicates the presence of previous myocardial infarction or serious myocardial injury responsible for low cardiac output, heart failure and/or potentially fatal arrhythmias. High C-reactive protein levels reflect any active inflammatory reactions such as infection or atherosclerosis."

Dr Hashimoto continued: "For the first time there is a way to predict sudden cardiac death in hemodialysis patients. In a clinical setting, BMIPP scintigraphy can be used in hemodialysis patients who are identified as high risk by abnormal Q wave and increased C-reactive protein. Abnormal BMIPP identifies specific myocardial injury which could be an effective therapeutic target for preventing sudden [cardiac death](#)."

He concluded: "Further diagnostic tests should be considered in high risk patients with abnormal BMIPP scintigraphy. Cardiac function assessment for heart failure, coronary angiography for ischaemic heart disease and Holter ECG monitoring for lethal arrhythmias can identify the type of myocardial injury and help physicians select a prophylactic therapeutic strategy against [sudden cardiac death](#) in hemodialysis patients."

More information: "Sudden death prediction by C-reactive protein, electrocardiographic findings and myocardial fatty acid uptake in patients undergoing hemodialysis: a multicenter prospective cohort sub-study" poster presentation (marked FP22 in the final programme) to be held on 3 May 2015 at 10:00 hours

Provided by European Society of Cardiology

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