

Blood sugar levels in heart failure patients predict risk of early death

6 January 2015

New research suggests that people who arrive at hospital emergency departments with acute heart failure should have their blood sugar levels checked on arrival. This simple and inexpensive measure could identify patients at high risk of early death, further hospitalisations, or the development of more health problems, such as diabetes.

Results of a large study published online today (Wednesday) in the *European Heart Journal*, show that even if someone arrives at hospital with no prior diagnosis of [diabetes](#) and with [blood sugar levels](#) within a range that could be considered as "normal", if their [levels](#) are above 6.1 mmol/L they are at higher risk of developing diabetes and [early death](#).

Researchers from the Institute for Clinical Evaluative Sciences (ICES), the Peter Munk Cardiac Centre at the University Health Network, and the University of Toronto, Canada, analysed the outcomes for 16,524 people who arrived at hospital emergency departments in Ontario, Canada, with [acute heart failure](#) between 2004 and 2007. The patients were aged between 70-85 years old and 56% (9,275) of them did not have pre-existing diabetes.

The researchers compared the outcomes of the patients against a reference group of patients whose [blood glucose levels](#) ranged between 3.9-6.1 mmol/L.

They found that patients without pre-existing diabetes had a risk of death within 30 days from any cause that was 26% higher than the reference group if their blood [glucose levels](#) were between 6.1-7.8 mmol/L, rising to 50% higher if their levels exceeded 11.1 mmol/L. Their risk of death from cardiovascular causes was 28% higher for levels between 6.1-7.8 mmol/L, rising to 64% higher for levels between 9.4-11.1 mmol/L. As their blood glucose levels rose, so did their risk of subsequently developing diabetes; for levels

between 6.1-7.8 mmol/L, their risk of diabetes was 61% higher, and this rose by 14% for every 1 mmol/L increase in blood glucose. If their levels exceeded 11.1 mmol/L, their risk of diabetes was 261% higher.

Associate Professor of Medicine, Dr Douglas Lee, a senior scientist at the ICES, who led the research, said: "Among patients without pre-existing diabetes, the majority (51%) had blood glucose levels on arrival at hospital that were within 'normal' limits but greater than 6.1 mmol/L. Our results suggest that all such patients should undergo further testing for diabetes before discharge. If the hospital tests show that their fasting blood glucose is not elevated, then they should be monitored subsequently for the development of diabetes as outpatients.

"Although diabetes is a known risk factor for developing [heart failure](#), this is the first time that it has been shown that heart failure predisposes people to developing diabetes."

Among the 7,249 patients with pre-existing diabetes, 2,286 (31.5%) had blood glucose levels higher than 11.1 mmol/L and their risk of death from any cause within 30 days of arriving at hospital with heart failure was increased by 48% when compared to the reference group of patients, and they had a 39% increased risk of being hospitalised for diabetes-related reasons, such as hyperglycaemia (high blood sugar levels), skin and soft tissue infections and amputations.

Among all patients, with and without pre-existing diabetes, blood sugar levels above 9.4 mmol/L increased the risks of hospitalisation by 9-15% for heart failure or cardiovascular causes.

Dr Lee said: "Our findings suggest that the measurement of blood sugar levels in all patients arriving at emergency departments with acute heart failure could provide doctors with useful prognostic

information and could help to improve outcomes in these patients. It is a rapid, readily available and inexpensive test that could be used to enable doctors to quickly assess a patient's risk for a wide range of possible outcomes and to suggest appropriate screening strategies that should be put in place.

"Further measures could include greater attention to finding the best medical therapy and drug doses, in those with heart failure and adverse blood glucose profiles. Our prior work suggests that hospitalisations for heart failure and cardiovascular causes are often increased amongst those with coronary heart disease. Ruling out significant coronary heart disease may also be important in those who also have diabetes and heart failure. For diabetics with heart failure and abnormally high [blood glucose](#) levels on arrival at hospital, better control of these glucose levels, which could lead to further disease if not successfully treated, may also be important."

More information: "Presentation blood glucose and death, hospitalization, and future diabetes risk in patients with acute heart failure syndromes", by Maneesh Sud et al. *European Heart Journal*. [DOI: 10.1093/eurheartj/ehu462](https://doi.org/10.1093/eurheartj/ehu462)

Provided by European Society of Cardiology

APA citation: Blood sugar levels in heart failure patients predict risk of early death (2015, January 6) retrieved 19 October 2019 from <https://medicalxpress.com/news/2015-01-blood-sugar-heart-failure-patients.html>

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