

DIABETES

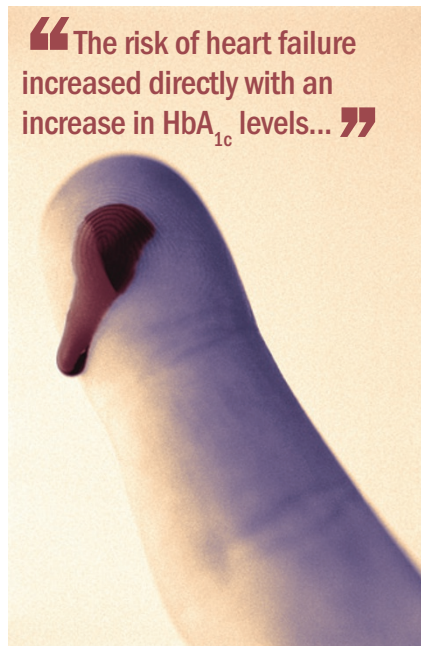
Prevention of heart failure in T1DM—is glycemic control the key?

Patients with type 1 diabetes mellitus (T1DM) who have high levels of HbA_{1c} are at increased risk of heart failure, reveals a new study.

Cardiovascular disease is common in patients with diabetes mellitus, in whom the risk of death from cardiovascular causes, in particular heart failure, is much higher than that in the general population. The possible relationship between glycemic control and risk of heart failure has been investigated in populations of patients with type 2 diabetes mellitus (T2DM), but the studies have produced conflicting results. In addition, in this patient population, intensive glycemic control was not shown to be effective in preventing heart failure. However, the incidence of heart failure in patients with T1DM, and the relationship between glycemic control and heart failure in these patients had not previously been evaluated.

Marcus Lind and colleagues searched the Swedish national diabetes registry to identify all patients aged ≥ 18 years with T1DM and no known heart failure registered between January 1998 and December 2003; 20,985 patients were identified. Data from hospital discharge and death registries were also obtained. Patients were followed up until December 2009 or until occurrence of death or hospitalization owing to heart failure. The mean age of patients at baseline was 38.6 years and the median follow-up period was 9 years. The researchers classified patients into six categories according to their mean HbA_{1c} levels (<6.5%, 6.5% to <7.5%, 7.5% to <8.5%, 8.5% to <9.5%, 9.5% to <10.5% and $\geq 10.5\%$) and calculated the incidence of heart failure within each category. The investigators also collected patient data for several other factors that might be associated with heart failure.

The frequency of hospital admission owing to heart failure was high (3% of the population) despite the young age



of the patients, with 3.38 events per 1,000 patient-years. According to the researchers, their results indicate that “the risk of heart failure in patients with T1DM is similar to that in people 15–20 years older in the general population”. Heart failure “should hence be regarded as a major diabetic complication,” says Lind.

The risk of heart failure increased directly with an increase in mean HbA_{1c} levels, independently of age, sex, duration of diabetes, smoking status, BMI, blood pressure, cardiovascular comorbidities and use of drug therapy. “Each 1% increase [in HbA_{1c} levels] was associated with a 30% higher risk of heart failure during follow-up,” comment the authors of the paper. Patients with very poor glycemic control were nearly four times more likely to experience heart failure than those with optimum glycemic control: HR 3.98 (95% CI 2.23–7.14), when comparing the $\geq 10.5\%$ HbA_{1c} group with the <6.5% HbA_{1c} group. This result suggests that, in contrast to the situation in patients with

T2DM, in T1DM use of intensive glycemic control as a strategy to prevent heart failure might bear fruit.

Age, duration of diabetes, BMI, systolic blood pressure and smoking status were also independently associated with the risk of heart failure in the study population. In addition, by analyzing cholesterol levels in the 18,281 patients for whom these data were available, the researchers showed that high HDL cholesterol levels were associated with a low risk of heart failure, whereas no link was found in relation to LDL cholesterol levels.

As the study was observational, “we do not know whether the high risk of heart failure in patients with poor glycemic control is reversible,” say the researchers. However, as effective therapies exist for heart failure, the identification of patients at high risk could decrease mortality and improve quality of life. The investigators plan to use echocardiography in patients with a variety of risk factors for heart failure to assess whether this technique should be routinely performed in specific patient groups.

“Good glycemic control is probably of importance in preventing hospitalizations for heart failure in patients with T1DM,” concludes Lind, in addition to “keeping the weight normal, avoiding smoking and having a beneficial blood lipid profile.” Furthermore, “clinicians should be aware that hospitalizations for heart failure are much more common in T1DM than in the general population and potentially consider screening with echocardiography in patients with a history of poor glycemic control, long diabetes duration or other risk factors for heart failure”.

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Original article Lind, M. *et al.* Glycaemic control and incidence of heart failure in 20,985 patients with type 1 diabetes: an observational study. *Lancet* doi:10.1016/S0140-6736(11)60471-6