Dysglycemia and Heart Failure Hospitalization
What Is the Link?

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Large epidemiological studies, including the Framingham Heart Study, the National Health and Nutrition Examination Survey, and the Cardiovascular Health Study, have shown that diabetes mellitus is an independent risk factor for the development of heart failure.\(^1\)\(^-\)\(^3\) Overall, the risk is approximately doubled, but the relative increase may be greater in younger compared with older individuals (and in younger women compared with younger men).\(^1\)\(^-\)\(^9\) In diabetic individuals, the risk of developing heart failure is greatest in those with an elevated body mass index, poor glycemic control (as indicated by hemoglobin A\(_1c\) level), nephropathy, retinopathy, and coronary heart disease.\(^1\)\(^-\)\(^9\)

In an investigation of 20,810 nondiabetic patients receiving care in Veterans Affairs medical centers, Nielson and Lange\(^11\) found that higher morning glucose was independently associated with hospitalization for heart failure even in nondiabetic individuals (but unfortunately did not report other cardiovascular outcomes for comparison). These observations support 2 earlier studies. From the Department of Cardiology, Glasgow Royal Infirmary (M.P.), and Department of Cardiology, Western Infirmary (J.J.V.M.), Glasgow, UK.

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Advanced glycosylation end products also have been proposed to cause modification of sarcoplasmic/endoplasmic reticulum Ca\(^{2+}\) ATPase 2a. Hyperglycemia also may be
associated with oxidative stress, altered intracellular signaling, decreased production of vascular endothelial growth factor, and altered gene expression. Similarly, autonomic neuropathy and microangiography are recognized complications of diabetes mellitus but may develop in early stages of dysglycemia. Another important consideration is myocardial metabolism, which may become more dependent on free fatty acids in dysglycemic states, resulting in uncoupling of oxidative phosphorylation and potentially reduced contractility.\textsuperscript{15,16}

The authors of the present report correctly point out that proof of the hypothesis that dysglycemia causes heart failure is a trial of blood glucose lowering. This notion is premature. As summarized above, the relationship between dysglycemia and heart failure remains an association without a clear mechanistic basis (which may not be direct). Of even greater and practical importance, the choice of blood glucose-lowering strategy would currently be problematic. Few would wish to use a thiazolidinedione for fear of precipitating heart failure.\textsuperscript{18} Metformin would have to be stopped after development of heart failure in view of its current (but probably unjustified) “black box” warning. Do we really want to start insulin in this population?

Held and colleagues\textsuperscript{10} have taken the field an important step forward and illustrated the importance of cardiovascular and diabetic physicians working together to better understand the relationship between dysglycemia and heart failure.

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None.

References

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