Letters to the Editor

Diastolic abnormalities might precede systolic abnormalities of left ventricular function in Type 1 (insulin-dependent) diabetes mellitus

Dear Sir,

Thuesen et al. [1] recently reported on an increased myocardial contractility in Type 1 diabetic patients which was related to the state of metabolic control. They used echocardiography to measure left ventricular fractional shortening and mean circumferential shortening velocity to assess myocardial function. Left ventricular performance depends on intrinsic myocardial contractility, preload and afterload. Both echocardiographic parameters are affected by loading conditions. No differences in left ventricular diastolic diameters compared with controls were noted by the authors. Therefore, no differences in preload might be assumed. On the other hand, an increase in cardiac output was observed in diabetic patients, despite a similar mean arterial pressure. Therefore, peripheral vascular resistance has to be lower in the diabetic study group. This might account for the increase in fractional shortening and mean circumferential shortening velocity. We therefore suggest that poor metabolic control in diabetic patients alters loading conditions by decreasing afterload. Whether intrinsic myocardial contractility is enhanced remains to be established.

In addition, we performed an echocardiographic study on well controlled Type 1 diabetic patients with a similar mean duration of disease (8 ± 6 years) without evidence of significant diabetic microangiopathy [2]. Our study group consisted of 50 Type 1 diabetic patients (26 ± 8 years), educated and treated as previously described [3]. Long-term metabolic control was assessed throughout 12 months by multiple HbA_{1c} measurements; one-third had HbA_{1c} values in the range of nondiabetic subjects. No significant difference in left ventricular systolic performance could be observed when well-controlled Type 1 diabetic patients were compared with age- and sex-matched nondiabetic controls [2]. A significant prolongation of the isovolumetric relaxation period, reflecting an early diastolic event, could be demonstrated even in diabetic patients with HbA_{1c} concentrations in the physiologic range. Therefore, systolic performance of the left ventricle in short-term Type 1 diabetic patients with near normoglycemia might be normal, although subtle alterations of diastolic function might already be present.

Yours sincerely,
C. Punzengruber and G. Schernthaner

References

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Increased myocardial contractility and improved glycaemic control

Dear Professor Berger,

We were interested to read the recent report by Thuesen et al. [1], in which the authors demonstrated that increased myocardial contractility was reduced with improved glycaemic control in 8 newly diagnosed or poorly controlled Type 1 (insulin-dependent) diabetic patients. However, as their patients had significant metabolic disturbance, presumably factors such as dehydration, hypovolaemia, hyperdynamic circulation, increased levels of circulating catecholamines, altered peripheral resistance and venous return would be present to a greater or lesser degree. The haemodynamic effect of these factors would be sufficient to explain the abnormal echocardiographic findings, and it would not be surprising to find that these improved significantly when such factors were corrected. Similar echocardiographic abnormalities would be found in any patient subject to similar haemodynamic insults, and cannot be considered to be a specific finding in diabetes.

We have also recently reported studies in recently diagnosed Type 1 diabetic patients using nuclear angiography, and have demonstrated marked variation in left ventricular function in recently diagnosed patients compared with stable diabetic patients when the measurements are repeated [2]. In our subjects, the initial studies were done at a time when the metabolic and circulatory abnormalities associated with recently diagnosed diabetes had been corrected. We would, therefore, agree with Thuesen et al. [1] that, during conditions of poor metabolic control, abnormalities of left ventricular function may be discovered and these may be reversible with improvement of control.

In the larger group of 24 diabetic patients, there is a considerable overlap with the control group for the values of left ventricular fractional shortening. Like the mean circumferential shortening velocity, this is a derived variable and may be significantly affected by heart rate. As the diabetic group had a higher heart rate, which is not discussed or explained, this could contribute to the observed differences between the groups. In both their patient groups, the abnormal echocardiographic findings could be explained by extra cardiac factors such as changes in circulating fluid volume, catecholamine secretion, peripheral resistance, venous return, and so on. Normalisation would be expected if these factors were related to poor diabetic control and could be corrected by improved control.