Short Term Insulin Improves Cardiac Function in Diabetic Patients

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Aims: To study: a. the potential role of insulin in reversing diastolic abnormalities, b. its effective level and c. it's applicability in the routine clinical setting.
Methods: Seven male patients were compared to a group of healthy persons, aged 46.7 vs. 28.4 yrs, diabetes duration 12.9 vs. 0 yrs, BMI 28.3 vs. 24.8 kg/m2 and HbA1c 6.7 vs. 4.8%, respectively. Each diabetic subject was evaluated for hemodynamic parameters and for insulin-induced glucose disposal rates, during a 2-steps euglycemic hyperinsulinemic clamp technique. Echocardiographic systolic and diastolic left ventricular function parameters were taken at baseline, and at the end of each 2-hr clamp step.
Results: On the first insulin load, both systolic and diastolic blood pressure had significantly decreased, by 7 mm and 4 mmHg, respectively, and remained stable during the second insulin load. First insulin load significantly increased left ventricular systolic function, in terms of ejection fraction and fractional shortening by 9% and 12%, respectively. The second insulin load did not change further these two parameters. In contrast, left ventricular diastolic function measurements revealed no significant change after insulin administration. However, under 1st and 2nd insulin loads, Maximal mitral flow velocity had improved by 20% and 26% respectively.
Conclusion: Insulin acutely affected the diabetic heart at a therapeutic insulin blood level, within a time course of two-hour. Insulin mainly affected positively systolic left ventricular function, a leading parameter in the clinical settings of acute pulmonary edema and acute myocardial infarction.

Fig. 1 - Left ventricular ejection fraction vs. insulin loads. Baseline value was 68±2%. 1st insulin load increased LVEF to 74±3.5% ($p<0.05$). 2nd insulin load increased LVEF to 74.5±3.8% in (p= insignificant).