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Effects of diabetes on myocardial capillary density and serum biomarkers of angiogenesis in male rats

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Background and Aims: cardiovascular disease is one of the main causes of mortality and morbidity in diabetic subjects. This study evaluates the effect of diabetes on myocardial capillary density and some serum angiogenic factors including nitric oxide, vascular endothelial growth factor and its soluble receptors.
Methods: twelve male rats were divided into two groups; control and diabetic (n=6 each). Diabetes was induced by single dose of streptozotocin (50 mg/kg, intraperitoneal). After 21 days, capillary density in myocardial tissue was evaluated by immunohistochemical staining and reported as capillaries per mm2. Blood samples were collected before and after experiment.
Results: in diabetic group, serum nitric oxide and soluble vascular endothelial growth factor receptor-2 concentrations were lower and soluble vascular endothelial growth factor receptor-1 was significantly higher than control group. There was no significant change in serum vascular endothelial growth factor concentration between diabetic and control group, however, vascular endothelial growth factor/vascular endothelial growth factor receptor-1 ratio was significantly decreased in diabetic animals. Myocardial capillary density in diabetic group was lower than control group (1549 ± 161 vs. 2156 ± 202 / mm2, respectively).
Conclusions: reduced serum nitric oxide and vascular endothelial growth factor receptor-2 levels, increased serum vascular endothelial growth factor receptor-1 and lower vascular endothelial growth factor/vascular endothelial growth factor receptor-1 ratio may be responsible for decreased myocardial capillary density in diabetic rats.

Keywords: Diabetes; Capillary density; Vascular endothelial growth factor; Nitric oxide; Myocardium