

Microcirculatory changes following reperfusion insult in diabetic rat skeletal muscles

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摘要

Abstract

We investigated the microcirculatory changes of ischemia/reperfusion injury in the diabetic rat cremaster muscle as well as the therapeutic effect of insulin. Streptozotocin-induced diabetic rats were maintained hyperglycemic for up to 8 weeks or were treated with insulin in the diabetic period. The rat cremaster muscle was prepared as an island flap and subjected to 2-h clamp ischemia followed by 1-h reperfusion. In nonischemic conditions, effective concentrations for 50% response (EC50) of serial orders of arterioles to norepinephrine were higher in diabetic muscles. Ischemia/reperfusion insult significantly decreased the EC50 of arterioles in the normal group, but not in the diabetic group. Light microscopy showed that the diabetic cremasters had more collapsed capillaries and smooth muscle-disarranged arterioles. Insulin therapy showed significant improvement in the diabetes-caused reduction of perfused capillary density, but not in the contractility of the diabetic arterioles. These results indicate that diabetes mellitus may damage the skeletal muscle microvasculature irreversibly and make it less responsive to autonomic regulation. Insulin therapy can improve capillary perfusion, but not the microvascular reactivity of diabetic muscles. Copyright 2000 Wiley-Liss, Inc