

Cardiac Protective Effect of Olive Oil against Ischemia Reperfusion- Induced Cardiac Arrhythmias in Isolated Diabetic Rat Hearts

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Abstract : Olive oil is the primary source of fat in the Mediterranean diet which is associated with a low mortality for cardiovascular disease. Olive oil is rich in monounsaturated fatty acids, and has been reported for variety of beneficial cardiovascular effects including blood pressure lowering, anti-platelet, anti-diabetic and anti-inflammatory effects. Growing number evidences from preclinical and clinical studies have shown that olive oil improves insulin resistance, decrease vessels stiffness and prevent thromboembolism. We evaluated the effects of olive against streptozotocin-induced physiological disorders in the animal models of diabetes and ischemia and reperfusion (I/R)- induced cardiac arrhythmias. Diabetes was induced in male rats with a single intraperitoneal injection of streptozotocin (60 mg/kg), rats were treated for two months with olive oil (1 ml/kg p.o). Control animals received saline. Blood glucose, body weight were monitored every 14 days. At the end of the treatment rats were sacrificed hearts were isolated for mounting on langendorff's apparatus. The blood glucose and body weight was not significantly different in the control and olive treated animals. The control diabetic animals exhibited 100% incidence of I/R -induced ventricular fibrillation which was reduced to 0% with olive oil, treatment. The duration of ventricular fibrillation reduced from 98.8 ± 2.3 (control) to 0 seconds in the olive oil treated group. Diltiazem, a calcium channel blocker (1 $\mu\text{m/L}$) showed similar results and protected the I/R-induced cardiac disorders. The biochemical analysis of the cardiac tissues showed that diabetes and I/R produce marked pathological changes in the cardiomyocytes including decreased glutathione (GSH) and increased oxidative stress (Malondialdehyde; MDA). Pretreatment of animals with olive oil (1 ml/kg p.o) increased GSH and MDA levels. Olive oil also improved the diabetic-induced histopathological changes in the cardiomyocytes. These finding indicates that olive possesses cardiac protective properties. Further studies are under way in our lab to explore the mechanism of the cardio-protective effect of olive oil.

Keywords : diabetics, ischemia-reperfusion, olive oil, rats heart

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