Influence of enalapril, quinapril and losartan on lipopolysaccharide (LPS)-induced serum concentrations of TNF-α, IL-1β, IL-6 in spontaneously hypertensive rats (SHR)

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Abstract:
Immunopharmacological studies of drugs used in cardiovascular diseases provide new data concerning their modulating effect on the levels of proinflammatory cytokines, chemokines and adhesion molecules. Therefore, we have made an attempt to find out whether enalapril, quinapril and losartan (drugs used in the treatment of arterial hypertension) are able to modulate lipopolysaccharide (LPS)-induced proinflammatory cytokine serum concentrations (tumor necrosis factor alpha – TNF-α, interleukin-1β – IL-1β, interleukin-6 – IL-6) in spontaneously hypertensive rats (SHR). The animals were divided into four groups as follows: SHR + M (control rats receiving 1% solution of methylcellulose), SHR + E (rats receiving enalapril – 10 mg/kg), SHR + Q (rats receiving quinapril – 10 mg/kg) and SHR + L (rats receiving losartan – 20 mg/kg). 1% solution of methylcellulose and hypotensive drugs were administered by a gavage for 21 days. Arterial blood pressure was measured in conscious rats, using the tail-cuff method. Twenty four hours after the last administration of enalapril, quinapril, losartan or 1% solution of methylcellulose, the rats received a single dose of LPS (ip; 0.1 mg/kg). After 2 h, the rats were anesthetized with ether and the blood samples were collected by heart puncture. Serum TNF-α, IL-1β and IL-6 concentrations were measured with enzyme-linked immunosorbent assay kits. Additionally, total cholesterol and high density lipoprotein (HDL) cholesterol were evaluated. Enalapril, quinapril and losartan significantly decreased LPS-stimulated TNF-α and IL-1β level after 21 days. Three-week administration of quinapril lowered IL-6 serum concentration after LPS stimulation. Enalapril and losartan did not affect the IL-6 level. The results were accompanied by a statistically significant decrease in systolic, diastolic and mean blood pressure. Hypotensive drugs also showed no effect on lipid level. The latest data indicate additional properties of hypotensive drugs. However, further studies are necessary to elucidate precisely the role of proinflammatory cytokines in arterial hypertension.

Key words:
enalapril, quinapril, losartan, proinflammatory cytokines, SHR