Role of polymorphonuclear leukocyte infiltration in the mechanism of anti-inflammatory effect of amiodarone

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Abstract:
In many physiological bodily functions, and in the pathogenesis of inflammation, ions are exchanged between intracellular and extracellular areas. Amiodarone is a multiple ion channel (Ca⁺, Na⁺, K⁺) blocking drug, effective anti-arrhythmic drug, and phospholipase inhibitor. The aim of this study is to examine a role of polymorphonuclear leukocyte infiltration in amiodarone’s anti-inflammatory effect on experimental paw inflammation.

After rats had been assigned to groups, their normal right hind paw volumes were measured using a plethysmometer. Amiodarone (25, 50 and 100 mg/kg) and distilled water were administrated to the experimental and control groups, respectively, by ip route. Thirty minutes later, paw edema was induced in rats by subplantar injection of 0.1 ml of histamine (0.1%) to those paws. Subsequent volume readings for those paws were carried out at 30-min intervals. Results were expressed as percentages of change from the initial volumes. After the final measurements, the animals were killed by decapitation and their paw tissues were cut for pathological investigation.

Amiodarone dose-dependently decreased the paw edema (25.05, 48.71 and 74.97%), and reduced polymorphonuclear leukocyte infiltration in the paw tissue (55.65, 69.76 and 84.58%).

Our findings support the view that amiodarone dose-dependently exerts a powerful anti-inflammatory activity. This effect of amiodarone may be due to the activation of nitric oxide resulting from its calcium channel antagonistic effects, to the inhibition of phospholipase A2 and/or to a reduction in neutrophil movement and activation, which may reduce free radical production and proteolytic enzyme release.

Key words:
amiodarone, histamine, inflammation, polymorphonuclear leukocytes, rat