

**EFFECT OF UROGRAFIN ON THE KIDNEY OF ADULT
FEMALE ALBINO RAT AND THE POSSIBLE PROTECTIVE
ROLE OF NEBIVOLOL: A MORPHOLOGICAL AND
ULTRASTRUCTURAL STUDY**

Thesis

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Summary

The present work was designed to study the histological and ultrastructural changes in the kidney of the adult female albino rat, following intravenous administration of urografin and the possible protective role of nebivolol if used concomitantly with urografin.

Fifty adult female albino rats were used in this study. They were divided into five groups, ten rats each; group **I** (normal control), group **II** (dehydrated sham) dehydrated for 3 days, group **III** (dehydrated nebivolol treated group) dehydrated for 3 days and received nebivolol by oral route at a daily dose of 2 mg/kg for 5 days, group **IV** (dehydrated contrast medium administration group) dehydrated for 3 days and injected urografin intravenously at a dose of 6 ml/kg at day 4, group **V** (dehydrated contrast medium and nebivolol administration group) dehydrated for 3 days, received nebivolol by oral route at a dose of 2 mg/kg for consecutive 5 days and injected urografin intravenously at a dose of 6 ml/kg at day 4.

Twenty four hours after the end of the experiment, all animals were sacrificed by cervical decapitation. Both kidneys were extracted and prepared for either light microscopic or transmission electron microscopic studies.

In this study, dehydration of the animals resulted in nephrotoxic changes, as dehydration is one of the causes of pre-renal failure. These changes were in the form of shrinkage of glomeruli, widening of the urinary space and capillary congestion. Some of the renal tubules were dilated and exhibited pyknotic nuclei, partial loss of the apical brush border and cytoplasmic vacuolations. Interstitial peritubular exudates in

the medulla were visualized .

These changes were supported by electron microscopic examination of both epithelial cells lining proximal convoluted tubules and medullary thick ascending limb of Henle that revealed nuclear pyknosis and severe mitochondrial affection .

Administration of urografin resulted in severe nephrotoxic changes both in cortex and medulla. Glomerular affection included shrinkage of most of glomeruli, congestion of glomerular capillaries, widening of urinary space. Tubular lesions included complete loss of apical brush border of the cells lining proximal convoluted tubules, cytoplasmic vacuolations, pyknotic nuclei, dilatation of tubular lumen and exfoliation of tubular epithelial lining cells. These findings were supported by ultrastructural study of proximal convoluted tubules and medullary thick ascending limb of Henle that revealed nuclear pyknosis, marked mitochondrial degeneration , cytoplasmic rarefaction of tubular epithelial lining cells .

Administration of nebivolol in dehydrated rats(group **III**) improved shrinkage of glomeruli ,nuclear affection and mitochondrial changes . Concomitant administration of nebivolol in (group **V**) afford a partial protection to renal glomeruli and the renal tubules with marked improvement of shrinkage of glomeruli ,cell necrosis ,mitochondrial affection and medullary congestion .Few tubules were affected in comparison with urografin administration group (group **IV**).

It could be concluded that administration of urografin causes significant alterations in the renal histological structure that are

irreversible in 2 % of normal healthy individuals. Concomitant administration of nebivolol afford a partial protection against urografin-induced nephrotoxicity due to its vasodilator and antioxidant effects. It can be recommended to use nebivolol to protect against urografin-induced nephropathy especially patients who undergo coronary angiography .