

BLOOD FLOW AND ISCHEMIC CHANGES OF THE RAT BLADDER TO SHORT TERM PARTIAL OUTLET OBSTRUCTION

Hypothesis / aims of study

This study aimed to evaluate the expression of type I, III collagen, inducible nitric oxide (iNOS), hypoxic inducible factor-1 α (HIF-1 α), vascular endothelial growth factor (VEGF) and hemodynamic changes of bladder during the acute stages of partial bladder outlet obstruction (PBOO) in adult rats.

Study design, materials and methods

Bladder specimens were aseptically removed from 35 Sprague-Dawley adult rats (8 week old, weight 250-300 gm) of sham groups and from 35 rats of experimental groups at 6 hours, 12 hours, 24 hours, 2 days, 3 days, 5 days and 7 days after establishing partial bladder outlet obstruction. Bladder blood flow was measured at the left vesicular artery by laser flowmeter. Type I, III collagen, iNOS, HIF-1 α and VEGF expression for changes of bladder wall were evaluated by immunohistochemical staining and Western blot assay.

Results

There was a significant difference of vesical blood flows between sham and experimental groups after PBOO. Bladder blood flow of experimental groups was significantly decreased after PBOO 3days. Type III collagen and iNOS expression of bladder by immunohistochemical staining were markedly increased during the acute stages of PBOO. HIF-1 α and VEGF expression of bladder by Western blot increased with time of obstruction.

Concluding message

Decreased bladder blood flow during the acute stages of PBOO generally enhanced the expressions of the iNOS and collagen type III. This study suggests that hypoxia of bladder after PBOO induces HIF-1 α , and then enhances the production of NO by activation of iNOS, which finally results in bladder growth and the decrease of bladder wall compliance.