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Renal Regulation of mTOR Signaling Pathway and Autophagy in Rats with Ureteral Obstruction

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Background: Chronic unilateral ureteral obstruction (UUO) is a well-characterized model of renal injury leading to tubulointerstitial fibrosis and apoptosis. The present study was aimed to investigate a role of the mammalian target of rapamycin (mTOR) signaling pathway and autophagy in the pathogenesis of tubulointerstitial fibrosis and apoptosis in the kidney in UUO.

Methods: Male Sprague-Dawley rats were unilaterally obstructed of left proximal ureters for 7 days. Control rats were treated in the same way, except that no obstruction was made. The protein expression of transforming growth factor (TGF)-β1, Bax, Bcl-2, phosphorylated phosphatidylinositol 3-kinase (p-PI3K), phosphorylated Akt (p-AKT), and phosphorylated mTOR (p-mTOR) was determined in the kidney by semiquantitative immunoblotting. The expression of autophagy marker Beclin-1 was also determined.

Results: In the obstructed kidney, the expression of TGF-β1 was increased. The expression of Bax was increased and that of Bcl-2 decreased. The expression of p-PI3K, p-Akt and p-mTOR was increased, while that of Beclin-1 decreased.

Conclusion: In the obstructed kidney, the upregulation of mTOR signaling pathway and downregulation of Beclin-1 may play a role in the pathogenesis of tubulointerstitial fibrosis and apoptosis.

Key Words: mTOR, Autophagy, 섬유화
mTOR, Autophagy, Fibrosis, Apoptosis