ABSTRACT

Antimicrobial proteins (AMP) are variably expressed during an urinary tract infection in the kidney. These proteins along with cytokines and interleukins maintain the sterility of the urinary system. This study aims to understand the expression pattern of the various AMPs of the renal milieu during an uropathogenic E.coli induced pyelonephritis in experimental mouse model and during subsequent treatment with phyto-based drugs.

A pyelonephritic mouse model was generated by transferring E.coli RRL – 36 into the bladder by trans-urethral catheterization. The pyelonephritic mice were grouped as sham control, infection control, amoxicillin, chandraprabhavati (CPV), cardamom seed (C.Seed), cardamom pod (C.Pod), CPV + C.Seed, CPV + C.Pod, administered animals and treated for 20 days by oral gavage of the extracts. Ficolin, Tamm Horsfall protein and Transferrin were observed to be down regulated during pyelonephritis, while Cathelicidin, Lipocalin and the inflammatory markers were up-regulated due to the infiltration of neutrophil’s into the kidney to combat the infection.

Upon treatment, a restoration in the expression of AMP’s and inflammatory markers were noticed by Immuno-histochemistry that was validated by qPCR and immunoblotting. The administered CPV and Cardamom extracts were effective in reducing infection in the kidneys and bringing down the inflammation in the tissues. This indicated that combinatorial action between phyto - compounds of the extracts was effective in treating pyelonephritis. In addition, an increase in pH, along with a reduction in the elevated levels of leukocyte and nitrite in the urine of treated animals was observed. Tissue biochemistry indicated a restoration in the protein levels and tissue antioxidant enzymes such as, Catalase and SOD in the kidney upon treatment.

The levels of AMPs were restored to normal in the infected mice upon treatment. The effect of treatment could be mentioned as follows: Amoxicillin > CPV > CPV + C.Seed + CPV extracts > Cardamom seed > Cardamom pod > CPV + C.Pod extracts. Regulation in the levels of Tamm Horsfall protein, indicate its probable role in preventing urinary tract infection, however further studies are required to shed light on the mechanism involved.