

Sialic acids and hyaluronan expression in the renal tubulointerstitial space of rat in an experimental sepsis model

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Sialic acids and hyaluronan play important roles in maintaining structure and functionality of the kidney tubulointerstitial space. In several investigations, performed on some renal pathologies, morpho-functional changes of the tubulointerstitial space showed correlation with altered expression of these anionic components; no data are available on the expression of these molecules in this space during sepsis. Therefore, the aim of this study was to evaluate the expression of sialic acids and hyaluronan in the renal tubulointerstitial space in the early stages of an experimental animal model of polymicrobial sepsis. Experiments were performed on adult male rats assigned to two groups: 1) sham-operated (n=20); 2) Caecal Ligation and Puncture (CLP) (clinically model of polymicrobial infection that mimics human sepsis) (n=25). The groups were divided into 3 subgroups related to 3 time points after CLP or sham-operated: t1=0 h, t2=3 h and t3=7 h. For evidence of sepsis TNF- α plasma level was measured and microbiology of peritoneal fluid was examined with bacteriologic techniques. Urinary protein levels were measured to test the renal functional damage. Kidney samples of each group were processed to analyse the morphology, sialic acids expression, by using lectin histochemistry, and hyaluronan expression, by using immunohistochemistry. The results showed that plasma TNF- α level significantly increased after CLP induction when compared to sham-operated animals. Bacteriologic techniques revealed a polymicrobial infection after CLP. The proteinuria was significantly increased in CLP group. Morphological changes, such as edema and epithelial lesions, were observed in the tubulointerstitium space in CLP group. Lectin histochemistry showed decrease of sialic acids in the tubular wall of septic rats with respect to the control ones. The largest amount of acetylated sialic acid was evidenced in the sepsis group. Immunohistochemistry demonstrated hyaluronan presence only in the medullary interstitium in the control group; in the septic rats hyaluronan appeared also in the cortical interstitium and tubular wall. The findings indicate the existence of a correlation between sialic acids and hyaluronan altered expression and morpho-functional changes in the kidney tubulointerstitial space during sepsis. In addition, an important role of these anionic molecules in protection/defence and repairing processes may be suggested.

Keywords: Sialic acids, hyaluronan, sepsis, renal tubulointerstitial space.