In the early stage of sepsis, impairment of the renal microcirculation is a key complication potentially leading to renal failure through hypoxia-induced tubular epithelial cell injury and acute tubular necrosis. Fluid resuscitation during sepsis is considered crucial for the preservation of adequate intravascular volume and blood pressure and thereby promotion of microvascular perfusion and renal oxygenation. Balanced fluids are able to improve renal oxygenation, oxidative stress, and renal function under septic conditions remains to be elucidated where titration of an optimal dose is still an area of uncertainty. Balanced 6% HES (130/0.4) dissolved in Ringer’s acetate solution (HES-RA; Volulyte® 6%, Fresenius Kabi) or a new experimental solution (AQIX®RS-I), or isotonic saline 0.9% NaCl were investigated as to their efficacy in renal tissue in a rat model of LPS-induced endotoxemia.

Male Wistar-albino rats were randomized in 5 groups (n=6 per group) to receive intravenous administration of 10 mg/kg lipopolysaccharide (LPS; Escherichia coli serotype: A127:B8, Sigma) or vehicle (time control) in 30 min. An amount of 20 ml/kg/hr Volulyte® 6% (Fresenius Kabi), 20 ml/kg/hr and 40 ml/kg/hr a new balanced solution AQIX®RS-I and 20 ml/kg/hr and 60 ml/kg/hr of 0.9%NaCl was continuously given for a period of 180 min after a period of 120 min a mean arterial pressure (MAP) of about 60 mmHg was reached. After the experiments, kidneys were isolated and analyzed immunohistochemically for inducible nitric oxide synthase (iNOS), fatty acid binding protein (FABP), interleukin-6 (IL-6) and myeloperoxidase (MPO) expression. AQIX®RS20 or AQIX®RS40 administration reduced the increased levels of iNOS and IL-6 reactions, and MPO-stained leukocytes in LPS group compared with control group. AQIX®RS20 decreased the L-FABP reaction, whereas AQIX®RS40 did not decrease its reaction in LPS group.

In conclusion, these results showed that AQIX®RS was effective partially on prevention of oxidative stress and inflammation in renal tissue.

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