A rapid metabolization of acetate or lactate present in resuscitation fluids for correction of acidosis following shock without excessive edema formation can be considered an important expectation when resuscitating with balanced crystalloid solutions. However whether this actually occurs and what the respective contribution to the control of acid base of either acetate or lactate in crystalloid solutions is, especially during conditions of critical illness and cardiovascular compromise is uncertain. In this study we aimed to compare the efficacy of an acetate-gluconate based fluid Plasmalyte (PL) versus other crystalloid fluids (Ringer Lactate solution; RL, Ringers Acetate; RA and Saline (0.9% NaCl)) to demonstrate its superior ability to resuscitate in a hemorrhagic shock and resuscitation model with liver dysfunction.

Male Spraque dawley rats were randomized in 6 groups (n=6 per group). Liver resection (LR) was achieved by ligaturing the hepatic arterial portal venous and removing the ligatured 70% part of liver. For hemorrhagic shock (HS) after stabilization, the animals were bled from the left femoral artery catheter at a rate of 1 ml/min using a syringe pump till reaching a mean arterial pressure (MAP) of 30 mm Hg. This pressure was maintained for 1 hour by re-infusing or withdrawing blood. At the end of this phase, the animals were resuscitated for 60 minutes with intravenous administration of RL, RA, PL, %0.09 NaCl until a target of MAP=65 mmHg is reached. Also, this study was consisted two groups as time control and an LR+HS without resuscitation. After the experiments, kidneys were isolated and analyzed immunohistochemically for inducible nitric oxide synthase (iNOS), liver fatty acid binding protein (L-FABP), interleukin 6 (IL-6) and Tumor necrosis factor-alpha (TNF-α) expression. Saline, RA, and RL administration after LR and HS reduced the increased levels of iNOS, TNF-α and IL-6 reactions. PL did not decrease iNOS and IL-6 reactions, whereas it decreased TNF-α reactions in LR+HS group. All fluids were decreased L-FABP reactions in LR+HS group. In conclusion, these results demonstrated that these crystalloid fluids have a role on oxidative stress and cytokine expression in kidney tissue in a hemorrhagic shock and resuscitation model with liver dysfunction.