

Effects of Enhanced Recovery Pathways on Renal Function

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Background: Aggressive intravenous fluid replacement regimens are traditionally employed with the intention of protecting patients from perioperative decreases in renal blood flow. In contrast to these regimens, Enhanced Recovery Pathways (ERPs) often employ intraoperative goal-directed fluid therapy and postoperative fluid restriction with permissive oliguria. While ERPs have been proven to reduce physiologic stress and improve outcomes in general, their impact on postoperative renal function remains unknown.

Methods: Patients undergoing major colorectal surgery within an ERP (2/2010 to 3/2013) were compared with a matched-control group undergoing surgery without an ERP (10/2004-10/2007) at a single institution.

Multivariable regression models were employed to examine the effect of ERPs on the change in postoperative creatinine and incidence of acute kidney injury (based on the RIFLE criteria).

Results: A total of 1054 patients were included: 590 patients in the ERP group, and 464 patients in the control group. Patient age, gender and race were similar between groups. The ERP group more often had significant comorbidities (62% ASA ≥ 3 vs. 40% ASA ≥ 3 , $p < 0.001$), non-benign indications for surgery (81% vs. 74%, $p = 0.045$), and more extensive surgery (48% vs. 12% proctectomy, $p < 0.001$) compared to control. Unadjusted median increase in postoperative creatinine was slightly higher in ERP vs. control (0.1 vs. 0 mg/dL, respectively). After multivariable regression adjustment, postoperative change in creatinine was similar in ERP vs. control ($p = 0.25$). Compared to control, ERP associated with similar rates of postoperative acute kidney insufficiency (3.7% ERP vs. 3.7%) and acute Kidney failure (0.8% vs. 0.9%).

Conclusions: Implementation of an ERP in colorectal surgery is not associated with a clinically significant increase in the level of perioperative creatinine change or an increased incidence of postoperative acute kidney injury. Further studies should be conducted to address the risks and benefits of ERP in other surgical populations.