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Impact of the colostomy formation on acute kidney injury occurrence in patients undergoing colorectal surgery

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Objectives : Colostomy is a frequently performed surgical procedure which provides an alternative passage for feces after colorectal surgery. Colostomy creation is associated with complications such as stoma ischemia, prolapse, and hernia. In addition, excessive output from the stoma often results in electrolyte imbalance and dehydration which could lead to renal dysfunction. Nonetheless, the impact of colostomy formation on the occurrence of acute kidney injury (AKI) is not well identified. This study aimed to elucidate the relationship between colostomy formation and AKI occurrence. In addition, the risk factors related with AKI development after colostomy formation were investigated.

Methods : Patients who underwent colorectal surgery between November 2005 and December 2015 at Yonsei University Health System were enrolled. Patients who met the following criteria were excluded: (i) age < 18 or > 80 years old (ii) follow-up less than 3 month (death or follow-up loss) (iii) post-renal AKI (iv) peri-operative AKI (v) underlying chronic kidney disease at baseline. Patients were divided into groups with or without colostomy. The primary outcome was occurrence of AKI during 1 year after surgery. AKI was defined as > 50% decline in eGFR within 7 days. Patients were followed up until December 2016.

Results : Among 501 patients who underwent colorectal surgery, 245 patients had colostomy formation. The mean age was 57.7 ± 13.9 years, and 295 patients (58.9 %) were men. During a mean follow-up duration of 9.6 months, AKI occurred in 80 patients with colostomy (32.7%) and 9 patients without colostomy (3.5%). Hypovolemia was the most common cause of AKI in patients with colostomy (n = 45, 56.3%). Multivariate Cox proportional hazard model showed that colostomy formation was an independent risk factor for AKI (hazard ratio [HR]; 11.517, confidential interval [CI]; 5.600-23.685; p<0.001).

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In patients with colostomy formation, AKI occurrence was independently associated with age at the time of surgery (HR; 1.024, CI; 1.004–1.043, p = 0.015), preoperative hemoglobin (HR; 0.832, CI; 0.700–0.989; p = 0.037), and serum albumin levels (HR; 0.588, CI; 0.381–0.906; p = 0.016).

Conclusions : Patients with colostomy formation are prone to AKI. Risk stratification and preventive measures should be applied to avoid dehydration in these patients.

Keywords : Acute kidney injury, Colorectal surgery, Colostomy formation