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## ORIGINAL ARTICLE

# Impact of prior abdominal surgery on postoperative prolonged ileus after ileostomy repair

Im-kyung Kim, Jeonghyun Kang\*, Seung Hyuk Baik, Kang Young Lee, Nam Kyu Kim, Seung-Kook Sohn

Department of Surgery, Yonsei University of College of Medicine, Seoul, South Korea

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**KEYWORDS**

ileostomy repair;  
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**Summary** *Background and aims:* Postoperative ileus (POI) is one of the most common reasons for sustained hospital stays after ileostomy repair. Although many factors have been investigated as POI risk factors, the investigation of the impact of prior abdominal surgery (PAS) before rectal cancer surgery has been limited. This study aimed to identify the impact of PAS as a risk factor for POI after ileostomy repair.

*Material and methods:* A total of 220 consecutive patients with rectal cancer who underwent ileostomy repair were enrolled. The patients were divided into PAS-positive and PAS-negative groups according to the history of PAS before rectal cancer surgery. Univariate and multivariate analyses were performed to identify the clinicopathological factors associated with POI. *Results:* The PAS-positive group had a longer operation time (111 min vs. 93.4 min,  $p = 0.029$ ) and a greater length of hospital stay (10 days vs. 7.8 days,  $p = 0.003$ ) compared with the PAS-negative group. POI was more frequent in the PAS-positive group (23.1% vs. 6.2%,  $p = 0.011$ ). The POI rate in the entire cohort was 8.1%. The repair method (stapled side-to-side vs. hand-sewn end-to-end, odds ratio OR = 3.6, 95% confidence interval CI = 1.2–11.1,  $p = 0.022$ ) and PAS (odds ratio = 4.0, 95% confidence interval = 1.2–12.8,  $p = 0.017$ ) were significant predictors of POI in the multivariate analysis.

*Conclusions:* This study suggests that PAS before rectal cancer surgery is associated with POI after ileostomy repair.

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\* Corresponding author. Department of Surgery, Gangnam Severance Hospital, Yonsei University College of Medicine, 211 Eonju-ro, Gangnam-gu, Seoul, 06273, South Korea.

E-mail address: [ravic@naver.com](mailto:ravic@naver.com) (J. Kang).

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## 1. Introduction

Ileostomy repair after rectal cancer surgery is a relatively simple technique in daily practice. A recent systematic review reported morbidity rates of 17.3–33.0% following ileostomy repair,<sup>1,2</sup> and postoperative ileus (POI) is one of the most common reasons for sustained hospital stays with increased healthcare costs.

POI is defined as either the absence of bowel function for five or more days or the need for reinsertion of a nasogastric (NG) tube after the start of oral diet in the absence of mechanical obstruction.<sup>3</sup> Although several studies have investigated clinical risk factors for POI,<sup>4–7</sup> the pathophysiology of POI is not yet clear. One possible explanation is the finding that prior abdominal surgery (PAS) results in the formation of adhesions in 51–93% of patients,<sup>8</sup> prolonging operative time and raising the possibility of unintentional bowel injury, leading to increased risk of POI or obstruction.<sup>9–11</sup>

Prior research has focused on POI following major bowel resection in open or laparoscopic colorectal surgeries.<sup>4,6,12</sup> As far as we know, the risk factors for POI after ileostomy repair have received little attention. The aim of this study was to identify the impact of PAS as a risk factor for POI after ileostomy repair.

## 2. Materials and methods

This retrospective study was granted exempt of approval by the Institutional Ethics Review Board at the Gangnam Severance Hospital. Written informed consent was obtained from all patients. Patient records or any other information were anonymized and de-identified prior to analysis.

### 2.1. Study population

A total of 220 consecutive patients who underwent ileostomy repair after rectal cancer surgery from September 2008 to July 2012 were enrolled. Patient data were collected from the electronic medical records system. Among the 220 patients that were enrolled in the study, 26 had a history of PAS before rectal cancer surgery (PAS-positive group) and 194 had no history of PAS before rectal cancer surgery (PAS-negative group; [Figure 1](#)).

### 2.2. Operative technique and postoperative outcome evaluation

Diversion was performed either during or after rectal cancer surgery. For some patients, a protective ileostomy was made during the initial rectal cancer surgery based on the operating surgeon's individual judgment rather than on a routine protocol. For other patients, postoperative leakage

was diagnosed on the basis of clinical signs of pain or fever, the spillage of bowel contents through the indwelled drain, and localized or generalized peritonitis which was confirmed by contrast radiography. In these cases, ileostomy was performed to rescue the patients from pelvic sepsis.

In our center, the ileostomy repair technique for each patient was selected according to the surgeon's preference. Side-to-side anastomosis using a linear stapler was defined as "stapled side-to-side anastomosis". Hand-sewn end-to-end anastomosis was performed either with bowel resection or without bowel resection (the so-called fold-over technique).<sup>13</sup>

Fast-track approach was not used for postoperative management. Postoperative outcomes were evaluated including the time interval between ileostomy formation and reversal, the operative time, postoperative complications, and the length of hospital stay. Postoperative morbidity was defined as adverse events within 30 days of the operation. Along with the patients' symptoms, laboratory and radiologic evaluations were performed to confirm and to categorize the postoperative complications. POI was defined as the absence of bowel function for 5 or more days or the need for insertion of an NG tube after the start of oral diet in the absence of mechanical obstruction.<sup>3</sup> After the diagnosis of POI, the patients were regularly monitored for return of bowel function, as well as clinical symptoms such as nausea, vomiting, and abdominal distension. The NG tube was removed after passage of flatus.

### 2.3. Statistical analysis

All statistical analyses were performed using SPSS software, version 20.0 (SPSS, Chicago, IL, USA). Categorical variables were analyzed either by a Chi-square test or by Fisher's exact test. Continuous variables were analyzed using the Student *t* test. Univariate and multivariate analyses were performed using logistic regression analysis. A *p* value < 0.05 was considered statistically significant.

## 3. Results

The characteristics of each patient group are shown in [Table 1](#). There were no statistically significant differences between the two groups, except that minimally invasive techniques for the initial rectal cancer surgery were more often used in the PAS-negative group (PAS-positive vs. PAS-negative = 61.5% vs. 84%, *p* = 0.013). The duration of ileostomy maintenance did not differ between the two groups.

Among 26 patients in the PAS-positive group, there were 28 events of prior abdominal surgeries. The most common operation performed previously was appendectomy by open

<b>PAS-positive group</b>	PAS	→	Rectal cancer surgery ileostomy formation	→	Ileostomy repair
<b>PAS-negative group</b>	No history of abdominal surgery	→	Rectal cancer surgery ileostomy formation	→	Ileostomy repair

**Figure 1** Definition of the PAS-positive group and the PAS-negative group. PAS = prior abdominal surgery.

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