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Incisional hernia following closure of loop ileostomy: The main predictor is the patient, not the surgeon

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ABSTRACT

Background: Incisional hernia at the ileostomy site occurs in 0–48% of patients undergoing loop ileostomy closure. Risk factors for ileostomy-site hernia are not currently well understood. We explored the predictive value of patient and clinical factors for ileostomy-site hernias.

Method: Loop ileostomy reversals undertaken between 1st January 2009 and 31st December 2013 were retrospectively evaluated. Preoperative patient data (BMI, age, gender, blood pressure, diabetes), surgical variables (preoperative ileostomy marking, intraoperative management (suture type, closure method), postoperative complications (≤30 days), approach, urgency, and chemotherapy, hospital stay, stoma closure interval, follow-up duration) were collected. Patients were followed up by clinical examination and postoperative imaging.

Results: 193 loop ileostomy reversals were identified. Operative indications included: colorectal cancer (n = 102, 52.8%); inflammatory bowel disease (n = 47, 24.3%); diverticulosis (n = 20, 10.4%); assorted indications (n = 19, 9.8%); and inflammatory fistulae (n = 5, 2.6%). Median duration of clinical follow-up was 20.5 months (0–69). Hernia occurred in 26 patients (13.5%), detected at a median of eight months post-reversal. Radiological follow-up occurred in 72% of patients and, as a reference standard, in 100% of patients diagnosed with a hernia. Concordance between clinical and radiological findings was 88.5%. Postoperative complications predicted higher hernia risk. BMI and preoperative blood pressure were significant hernia predictors. Differences in the type of suture material to close the defect (absorbable vs. non-absorbable) and stoma skin closure method (primary vs. secondary intention healing) were non-predictive of hernia.

Conclusion: Whilst BMI and patient comorbidity are the major hernia predictors, variability in surgical practice does not constitute a significant risk factor for ileostomy-site incisional hernia.

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Introduction

The formation of a defunctioning loop ileostomy is a common strategy to allow temporary faecal diversion following colorectal surgery.[1] A loop ileostomy offers protective cover of a distal anastomosis, reducing the high morbidity associated with anastomotic leak.[2] The faecal stream is restored by ileostomy reversal, which is usually considered a technically undemanding procedure compared to the initial operation, but still associated with significant post-operative morbidity.[2] One of the most common late complications of reversal is the development of a stomal hernia, with an incidence ranging from 0 to 48%.[1] Patients may be asymptomatic, or experience pain, intermittent bowel obstruction and reduced quality of life, with up to 20% of patients requiring surgical repair.[3]

Predicting those patients at higher risk of hernia after reversal of ileostomy may influence surgical technique when closing the abdominal wall defect and overlying skin wound. Accepted risk factors for incisional hernia include age, female gender, obesity, and comorbid state[4] and smoking.[5] Surgical factors such as closure method, suture material[6] and surgical-site infection[4] have also been suggested as potentially contributory. Study heterogeneity, selection bias, variability in hernia definitions and inconsistent follow-up limit the generalisability of many of these conclusions. Risk factors for incisional hernias following midline incisions may not be representative of those at the stoma site where abdominal wall biomechanics and size of defect are different. The specific risk factors for ileostomy-site hernias are poorly understood.[1] We examined the patient and surgical risk factors for ileostomy-site hernia.

Methods

Patients

Patients undergoing loop ileostomy closure at our institution between 1st January 2009 and 31st December 2013 were identified from electronic clinical records.

Study design

This was a single institution retrospective cohort study.

Ethical approval

This study was approved locally as an institutional review of surgical practice and all data anonymised.

Data collection

Data were collected from paper records and computerised clinical systems. Preoperative patient demographics were gathered including age, gender, smoking status, body mass index, and blood pressure. Preoperative marking as undertaken by the specialist stoma nursing team was recorded. Primary surgical indication was also recorded and categorised into the following groups: colorectal cancer, inflammatory bowel disease, diverticulosis, inflammatory fistulae, and other (obstetric sphincter injuries, post-colonoscopy bowel perforations, sigmoid volvulus and other miscellany).

Intraoperative decision making (choice of non-absorbable or absorbable suture material for fascia, primary vs. secondary skin closure) was recorded from the operation note. Choice of suture was determined at the operating surgeon's discretion. Length of stay was calculated as the interval from the date of admission to discharge. Postoperative complications and hospital readmission (<30 days) were recorded.

The primary outcome is the occurrence of an ileostomy-site hernia. Secondary measures are time of hernia identification and reoperation for hernia repair. We define incisional hernia using the European Hernia Society (EHS) description: "*Any abdominal wall gap with or without a bulge in the area of a postoperative scar perceptible or palpable by clinical examination or imaging*".[7] Computed tomography (CT) and/or abdominal soft tissue ultrasound were used as a radiological reference standard for hernia detection. In each hernia case, we independently scrutinised the Trust-wide virtual archive of radiological images and reports. We assessed operation for ileostomy-site incisional hernia repair by review of computerised clinical records detailing subsequent surgery.

Statistics

Data were analysed using SPSS version 21 (IBM Corporation, Hampshire, UK). An *a priori* power calculation at the outset of the study indicated that for the number of planned predictors in multiple regression, assuming a moderate effect size (f^2 0.15) with a power of 0.80 and probability value of <0.05 a minimum sample size of 131 cases would be required. Data normality was evaluated and data expressed as median (range) or mean (standard deviation). Continuous data is scrutinised with independent sample t-tests. Age, BMI, time to reversal and total follow-up duration had skewed distributions and were log transformed for parametric testing. Mean (+/− SD range) are presented as backtransformed antilogs (Table 2). Categorical variables are assessed using Chi-squared statistics. A Kaplan–Meier curve was used to visually demonstrate event (hernia) occurrence with follow-up time in different patient groups and is considered gold standard in the assessment of hernia formation by EuraHS (European Registry for Abdominal Wall HerniaS).[7] Binomial logistic regression allowed adjustment for multiple interactions. $P < 0.05$ is considered statistically significant.

Results

Patient characteristics

A total of 193 loop ileostomy reversals were identified (Table 1).

Ileostomy-site hernias

Twenty six (13.5%) patients experienced an ileostomy-site hernia (Fig. 1), occurring a median of 8 months post-reversal months (95% CI 6.0–15; range 2–43). Patients were followed

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