The American Journal of Surgery 214 (2017) 468–473

Contents lists available at ScienceDirect

The American Journal of Surgery

journal homepage: www.americanjournalofsurgery.com

Outcome of incisional hernia repair in patients with Inflammatory Bowel Disease

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ARTICLE INFO

Article history:
Received 24 December 2016
Received in revised form
7 May 2017
Accepted 29 May 2017

Keywords:
Incisional hernia
Mesh repair
Hernia recurrence
Crohn's disease
Ulcerative colitis
Enterocutaneous fistula

ABSTRACT

Background: Incisional Hernia (IH) repair in patients with Inflammatory Bowel Disease (IBD) has not been well studied.
Methods: Outcomes of 170 patients with IBD who underwent IH repair were included in the study.
Results: The incidence of recurrence after IH repair in IBD is 27%. Patients with Crohn's disease (CD) had larger defects at the time of repair, higher proportion of bowel resection and a longer postoperative stay when compared to Ulcerative colitis (UC). The only significant predictor of recurrence after IH repair was the number of previous bowel resections prior to hernia repair (HR 1.59, $p < 0.01$). Three cases (10%) of late onset enterocutaneous fistulas were identified in patients who underwent IH repair with synthetic mesh inlay.
Conclusion: Surgical repair results in a recurrence of IH in 27% of patients with IBD. The number of previous bowel resections is the only factor that correlates with development of recurrent IH in IBD.
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1. Introduction

Incisional hernia (IH) is a common postoperative complication in patients with Inflammatory Bowel Disease (IBD) undergoing open bowel resection. A review of 1000 IBD cases showed an IH rate of 20%.[1] In other studies of patients with IBD, the incidence of IH ranged from 4% to 14%.[2–7] Patients with IBD often have risk factors such as multiple previous abdominal surgeries, immunosuppressive medication and nutritional issues that may predispose them to development of IH.[8] Furthermore, the outcome of repair of IH in patients with IBD has not been well studied. The effect of the type of IH repair and other surgical factors related to IBD such as concomitant bowel resection, presence of ileostomy, wound complications and their relationship to subsequent development of recurrence of IH remain unclear. The purpose of this study is to determine the outcome of IH repair in patients with IBD and the factors that correlate with recurrence of IH.

2. Materials and methods

The medical records of 1000 patients with IBD undergoing open bowel resection at the Mount Sinai Medical Center from January 1976 to December 2014 were reviewed. The study was approved by the Institutional Review Board after expedited review. The patients who developed IH following the surgery were identified. Only patients who underwent surgical repair of the IH were included in the study. Perioperative data was recorded during the hospital stay at the time of surgery for the hernia repair in a prospectively maintained database. Follow-up information was subsequently added by reviewing the medical records of each patient. The duration of follow-up was defined as the number of months from the date of surgery to the last recorded visit. IH was defined as the development of a hernia in a midline incision and/or ileostomy closure site. Patients with only a parastomal hernia were not included in the study. Recurrence of IH was diagnosed by clinical examination, radiologic imaging and/or operative report. Other variables recorded include age at diagnosis of IBD, age at hernia repair, gender, smoking status, Body Mass Index (BMI), hemoglobin, albumin, type of hernia repair, size and number of hernia defects, type of closure, concomitant bowel resection, presence of ileostomy at the time of procedure and time to

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http://dx.doi.org/10.1016/j.amjsurg.2017.05.019
0002-9610/Published by Elsevier Inc.

recurrence. Hernia size was determined at the time of surgery by measuring the largest dimension of the defect in any direction from the fascia edge to edge. Repair with onlay mesh was defined when the mesh was placed on top of the fascia. Inlay mesh repair was defined as placement of the mesh inside the peritoneal cavity. Preoperative treatment with steroids and/or immunosuppressive therapy within 6 weeks of surgery was recorded. Postoperative stay, septic and non-septic complications and wound infection were also recorded during the hospital stay. Significant wound infection was defined as presence of purulent drainage from the wound.

Statistical analysis was performed using the IBM SPSS software version 20.[9] Categorical variables were analyzed with χ^2 and Fischer's exact test. Unpaired Student t-test was employed to compare continuous variables. Variables with a p value of less than 0.1 in the above tests were used as independent variables in a Cox proportional hazard regression analysis and statistical significance was considered if p value was less than 0.05. Independent factors were reported with Hazard Ratio (HR) and 95% Confidence Intervals (CI). Kaplan-Meier curves were used to study the time to development of recurrence of IH and were stratified by UC and CD. The data analysis was performed collectively for the entire IBD group and separately for UC and CD.

3. Results

One thousand patients with IBD undergoing open bowel resection were studied. Of these, 203 (20%) developed IH. One hundred and seventy (85%) patients underwent IH repair and were included in the data analysis of this study. Ninety-two patients (54%) had Ulcerative Colitis (UC) and 78 patients (46%) had Crohn's disease (CD) (See Fig. 1). There was no significant difference in gender between UC and CD. The age at the time of hernia repair was also nearly identical (46 vs 47 years). The age of onset of IBD was not significantly different in the two groups (31 vs 28 years for UC and CD). Baseline characteristics such as BMI at hernia repair, proportion of patients with anemia, hypoalbuminemia, history of immunosuppressive therapy and previous history of wound infection were comparable between UC and CD. The duration of disease was longer in patients with CD (15 vs 10 years, $p = 0.001$). A significantly higher proportion of patients with CD were active smokers at the time of IH repair (14% vs 4%, $p = 0.03$). The majority of patients in this study underwent open IH repair (92%). There was no significant difference in the rates of open versus laparoscopic repair between UC and CD. The use of mesh, its placement for reconstruction and the incidence of post-operative complications were similar in both groups. Patients with CD were more likely to have larger hernia defects (greater than 5 cm) than patients with UC (80% vs 65%, $p < 0.05$). They also had a significantly higher rate of concomitant bowel resection and/or presence of an ileostomy at the time of hernia repair (33% vs 13%, $p < 0.01$). The postoperative stay was significantly longer in patients with CD when compared to the UC group (6 vs 4 days, $p < 0.01$) (See Tables 1–3).

Sixty-one patients had IH repair with onlay synthetic mesh. Of these, only 1 patient (1.6%) developed mesh infection and required removal of mesh and complex abdominal wall reconstruction. Thirty-one patients (33%) had inlay synthetic mesh repair. Of these, three patients (10%) (1 UC and 2 CD) developed late-onset enterocutaneous fistula at 3–7 years postoperatively requiring reoperation, bowel resection and removal of the mesh.

The mean duration of follow-up following hernia repair was 56 months. The overall rate of hernia recurrence after IH repair was 27% (46 cases). Thirty eight of these patients then underwent a second IH repair and 10 (26%) recurred again and needed further surgery. Patients with UC undergoing primary repair had a higher recurrence rate than those undergoing mesh repair (37% vs 12%). Patients with CD had similar recurrence rates for primary IH repair (33%) while those undergoing mesh repair had a higher rate of recurrence than patients with UC (33% vs 12%, $p < 0.05$) (See Fig. 1). Fig. 2 shows the Kaplan- Meier curve for the time to recurrence after IH repair in the overall population.

Univariate analyses revealed that the number of previous bowel resections, primary repair, use of biological mesh for reconstruction, postoperative complications, septic complications and post-operative wound infection correlated significantly with a higher recurrence of hernia after IH repair (See Tables 4 and 5).

Table 6 shows the results of the multivariate Cox regression analyses. The only statistically significant independent predictor for recurrence of hernia after IH repair was the number of previous

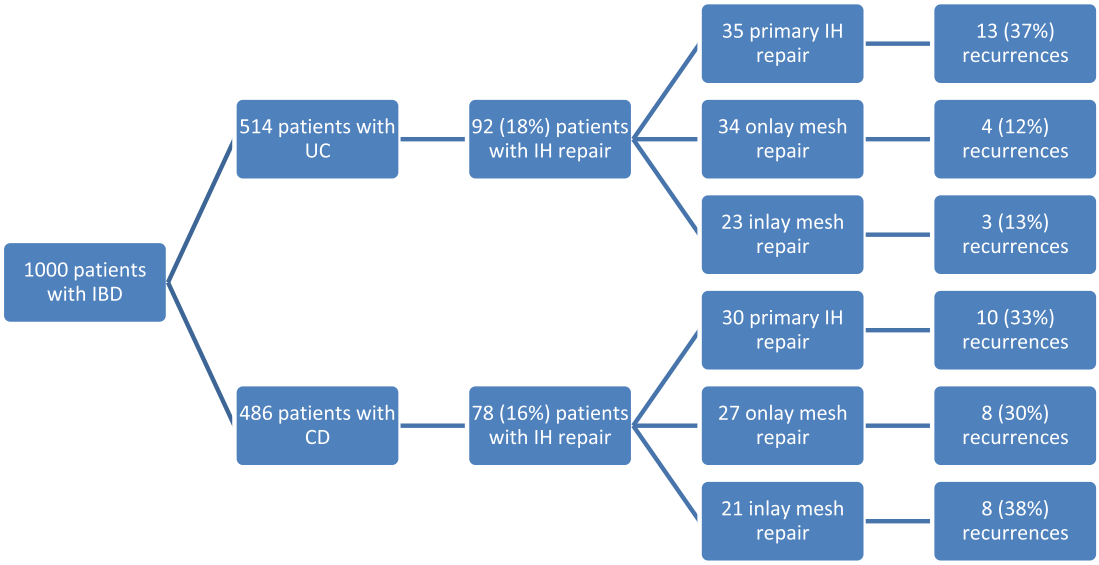

Fig. 1. Flow-chart showing the distribution of incisional hernia in patients with IBD and recurrence after the various types of repair.