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Original research

Effect of omentum removal on the risk for postoperative adhesive small bowel obstruction recurrence: A case-control study

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HIGHLIGHTS

- The importance of omentum as a risk factor for postoperative ASBO recurrence.
- Recurrence rate significantly more in omenectomy than omentum preserved groups.
- Omentum prevents SBO from abdominal wall adhesions with small bowels.
- Consider prophylactic anti-adhesion agents if omentum preservation not possible.

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ABSTRACT

Background: Surgical treatment for adhesive small bowel obstructions (ASBOs) is the only way to release the obstructive structure; however, opening the peritoneal cavity may cause new adhesions, possibly leading to recurrent episodes of ASBO. The risk factors for recurrent ASBO, after surgical treatment, are not fully understood. **Methods**: The hospital records of 113 patients undergoing surgery for ASBO at Shirakawa Kousei (Japan) General Hospital, between 2002 and 2013, were studied. We compared the pre- and postoperative factors, intraoperative findings, and surgical histories of 18 patients with and 95 patients without recurrent ASBO. The risk factors for ASBO recurrence, after surgery, were determined using Cox-proportional hazard ratios. **Results**: The 5-year cumulative rate of overall recurrence was 20.8%. Among the 18 patients of recurrence, 11 (61.1%) were readmitted within 1 year of surgical treatment. Multivariate analysis revealed that a history of omentectomy was an independent risk factor for recurrence (hazard ratio, 2.98; $p = 0.027$). After omentectomy, the rate of adhesions to the peritoneum was significantly higher (with omentectomy, 54.5%; without omentectomy, 21.3%; $p < 0.001$), and the risk of adhesion or matted adhesion was increased (with omentectomy, 87.9%; without omentectomy, 53.8%; $p < 0.001$), compared with patients not undergoing omentectomy. **Conclusion**: Omentectomy significantly increases the likelihood of ASBO recurrence. Therefore, patients undergoing omentectomy may be candidates for prophylactic anti-adhesion agents, particularly when there is a risk of matted abdominal wall adhesions.

1. Introduction

Peritoneal cavity incisions lead to the formation of potentially obstructive structures (adhesions or bands) in 95% of patients [1]. These structures are frequent causes of adhesive small bowel obstruction (ASBO) [2], which occur after 3% of laparotomies [3]. Surgical (laparotomy and adhesiolysis) or nonsurgical (nasogastric decompression and bowel rest) procedures are used to treat ASBO [4–8]. Nonsurgical treatment is less invasive, but the adhesions responsible are left in place [9,10] and do not resolve without surgery. Therefore, patients undergoing nonsurgical treatment have earlier and more frequent recurrences than those undergoing surgical treatment [11–13]. Although surgical treatment removes the adhesions and releases the obstruction, the peritoneal surgery creates new adhesions, potentially causing new obstructions [14–16]. Thus, ASBO recurrence remains a major clinical problem [11–13,17,18].

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To prevent postsurgical recurrence, the risk factors for recurrence should be considered. The literature demonstrates that the number of previous ASBO episodes is a significant factor influencing the risk of recurrence and that an increased number of admissions also elevates the rate of recurrence [11,13,17]. Further, the literature also indicates that the type of prior surgery influences the postsurgical ASBO recurrence rate [11]. Although the reasons why the number of admissions and the type of prior surgery influence the recurrence rate are unclear, obstructive structures have some influence on the mechanisms of recurrence [11,18]. Duron et al. and Miller et al. reported that matted adhesions were associated with a greater risk of recurrence and with a greater readmission rate than were band adhesions [11,18]. Matted adhesions are also more common in patients having undergone several ASBO operations [11]. Some types of operations have also shown higher odds of developing multiple matted adhesions [11]. These data suggest that a patient's operative history influences their rate of developing obstructive structures, and the rate of recurrence after subsequent surgeries. This study investigated the risk factors that influence postoperative ASBO recurrence and the method for preventing adhesion recurrence.

2. Material and methods

2.1. Eligibility criteria

Patients having undergone at least 1 operation for ASBO at Shirakawa Kosei (Japan) General Hospital between January 1, 2003 and December 31, 2012 were eligible for the study. ASBO was diagnosed based on the patient's clinical presentation, including the presence of abdominal pain, abdominal fullness, vomiting, complete constipation (gas and feces), and radiological findings. Patients with ASBO occurring in the absence of a previous abdominal operation were excluded. Patients were also excluded if obstruction was caused by inflammatory bowel disease, abdominal cancer or peritoneal carcinomatosis, abdominopelvic irradiation, or intussusception caused by a hernia, or were under 16 years of age.

2.2. ASBO treatment

The only absolute criterion for surgical treatment was a suspected strangulated obstruction with small bowel ischemic changes evident by computed tomography. In the absence of symptoms such as abdominal pain or pyrexia, ASBO patients were managed non-surgically. If nausea or abdominal dilatation was observed at the time of admission, tube drainage was performed; there were no distinct criteria for selecting short- or long-tube drainage. If the symptoms did not improve after conservative treatment, surgical treatment was performed; the decision regarding the need for and timing of surgery was at the surgeon's discretion. The patients were informed of the possibility of readmission and/or surgery after conservative treatment; if they consented, ASBO-relieving surgery was performed.

2.3. Data collection

This study design (a retrospective review of medical records) was reviewed and approved by our Institutional Review Board. All the demographic, medical, and follow-up data were collected from patient medical records and the hospital database. The follow-up data were collected on March 1, 2014 by checking each patient's history of hospital visits and by telephone calls.

2.4. Endpoint

Recurrence rates were calculated from the date of the ASBO operation to the date of recurrence or the date on which the patient was censored. “Censoring date” was defined as the date of study conclusion (March 2014) for patients not experiencing recurrence, or the date of death or loss to follow up. Recurrence was strictly defined as a new hospital admission with a clinical presentation characteristic of ASBO, such as abdominal fullness, nausea, and vomiting after at least 1 ASBO surgical treatment. Patients with small bowel obstructions during the first 30 days after an ASBO operation were excluded because the obstruction may have occurred for other reasons, such as early postoperative obstruction with inflammatory phenomena [19].

2.5. Risk factors

The preoperative risk factors that were examined included age, sex, body mass index (BMI), and time elapsed from the most recent operation to the subject postoperative ASBO operation.

The examined surgical history included 7 specific categories of operations, including gastrectomy, colorectal resection, appendectomy, surgical treatment of a small bowel obstruction or female reproductive tract morbidity, cholecystectomy, and omentectomy. Omentectomy included a wide range of omentum resections; partial resections, including those for adhesion release, were not included.

The intraoperative surgical risk factors examined include operative times, blood loss, surgical approach (open or laparoscopic), surgical procedure (adhesiolysis or other method including small bowel resection or bypass), obstructive structures, number of structures requiring obstruction release, site of obstruction (peritoneum or other organs), intestinal status (viable, nonviable), and use of an indwelling drainage tube. When a strangulated (ischemic) bowel was found and the surgeon decided that resection was required, the strangulated bowel was classed as “nonviable.” If resection of a strangulated bowel not needed, the bowel was considered to be viable. In prior publications, obstructive structures have been defined as bands, simple adhesions, or matted adhesions [18]. In this study, obstructive structures were defined as band adhesions or other adhesions, including both simple and matted adhesions. Band adhesions were linear adhesions that only constricted the small bowel and which required only resection of the adhesion to release the obstruction.

Postoperative risk factors included the length of postoperative hospital stay and any postoperative complications arising, according to the Clavien-Dindo classification.

2.6. Statistical analysis

All values are expressed as means ± SD. Frequencies were compared using Pearson's chi square test. Continuous variables were analyzed non-parametrically, using the Mann–Whitney *U*-test. Cumulative event rates were calculated using the Kaplan–Meier method (1 minus the “survival rate”), and the differences between the recurrence and recurrence-free groups of patients were assessed using the log-rank test. For multivariate analysis, the Cox regression model was used. A P-value <0.05 was considered statistically significant. Statistical analyses were performed using JMP version 8 (SAS, Cary, NC, USA).