Readmission for small-bowel obstruction in the early postoperative period: etiology and outcome

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Objectives: To determine the frequency of readmission for early postoperative small-bowel obstruction (SBO), to highlight factors that may predispose to this condition, to define the risks of strangulation and to compare the immediate and long-term risks and benefits of operative versus nonoperative treatment. **Design:** A chart review. **Setting:** The Sir Mortimer B. Davis-Jewish General Hospital, a university-affiliated teaching hospital in Montreal. **Patients:** Out of a total of 1001 cases of SBO in 552 patients, 30 patients were readmitted within 50 days of a previous laparotomy with the diagnosis of SBO. **Intervention:** Selective nonoperative management and exploratory laparotomy. **Main outcome measures:** The value of nonoperative management and need for operation. **Results:** Adhesions were the cause of the obstruction in most cases (24); other causes were Crohn's disease (2), hernia (1), malignant neoplasm (1) and a combination of adhesions and malignant disease (2). Thirteen (43%) of the procedures preceding the obstruction were primary small-bowel operations. There was only 1 episode of strangulated bowel. Of the patients readmitted for SBO, 7 (23%) were treated operatively with a long-term recurrence rate of 57% compared with 63% for those treated nonoperatively for the SBO. The median time to recurrence was 0.1 years (range from 0.02–6 yr) for those whose SBO was managed operatively, compared with 0.7 years (range from 0.08–5 yr) for those managed nonoperatively for the SBO. The median length of stay for patients managed operatively for SBO was 12 days (range from 9–17 d) compared with 6 days (range from 2–33 d) for those managed nonoperatively. **Conclusions:** Readmission for SBO within 50 days of a previous laparotomy represents a small percentage of all cases of SBO. They frequently follow small-bowel operations. Cases of strangulation are no more common than in general cases of SBO. Patients treated nonoperatively for SBO did not experience less favourable outcomes with respect to resolution of symptoms, length of stay, risk of recurrence and reoperation. Thus, operative intervention is not necessary in an otherwise stable patient.

Objectifs : Déterminer la fréquence des réadmissions à cause d'une occlusion de l'intestin grêle (OIG) au début de la période postopératoire, afin de mettre en évidence les facteurs qui pourraient prédisposer à cette affection, de cerner les risques d'étranglement et de comparer les risques et les avantages immédiats et à long terme du traitement chirurgical avec ceux du traitement non chirurgical. **Conception :** Étude de dossiers. **Contexte :** L'Hôpital général juif Sir Mortimer B. Davis, hôpital d'enseignement affilié à une université, à Montréal. **Patients :** Au nombre des 552 patients chez lesquels 1001 cas d'OIG se sont présentés au total, 30 patients ont été réhospitalisés pour motif d'OIG au cours des 50 jours suivant une laparotomie. **Intervention :** Traitement non chirurgical sélectif et laparotomie exploratoire. **Principales mesures de résultats :** Valeur du traitement non chirurgical et besoin d'une intervention. **Résultats** : Dans la plupart des cas (24), l'occlusion était causée par des adhérences. Les autres cas étaient attribuables à la maladie de Crohn (2), à une hernie (1), à un néoplasme malin (1) ou à une combinaison d'adhérences et d'affection maligne (2). Treize (43 %) des interventions qui ont précédé l'occlusion étaient des chirurgies primaires de l'intestin grêle. Il n'y avait qu'un cas d'étranglement intestinal. Sept (23 %) des patients qui ont été réhospitalisés pour motif d'OIG ont reçu un traitement

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chirurgical et présentaient un taux de récidive à long terme de 57 %, comparativement à un taux de 63 %, chez les patients qui ont reçu un traitement non chirurgical de l'OIG. La période médiane écoulée avant la récidive s'établissait à 0,1 an (intervalle de 0,02 à 6 ans) chez les patients ayant reçu un traitement chirurgical de l'OIG, comparativement à 0,7 an (intervalle de 0,08 à 5 ans) chez les patients ayant reçu un traitement non chirurgical de l'OIG. La durée médiane du séjour s'établissait à 12 jours (intervalle de 9 à 17 jours) chez les patients ayant reçu un traitement chirurgical de l'OIG, comparativement à 6 jours (intervalle de 2 à 33 jours) chez les patients ayant reçu un traitement non chirurgical. **Conclusions :** Les réadmissions pour motif d'OIG au cours des 50 jours suivant une laparotomie représentent un faible pourcentage de tous les cas d'OIG. Elles surviennent souvent suite à des chirurgies de l'intestin grêle. L'étranglement n'est pas plus courant que dans l'ensemble des cas d'OIG. Les résultats aux chapitres de l'élimination des symptômes, de la durée du séjour, du risque de récidive et de la pratique d'une nouvelle intervention n'étaient pas moins favorables chez les patients ayant reçu un traitement non chirurgical de l'OIG. C'est pourquoi il n'est pas nécessaire de pratiquer une intervention chirurgicale chez les patients dont l'état est par ailleurs stable.

Readmission for small-bowel obstruction (SBO) in the "early" postoperative period is a frustrating clinical entity for many surgeons. Diagnosis often proves difficult because symptoms may be clouded by incisional pain or masked by the continued use of analgesics. Although many authors have advocated a heightened vigilance for this entity after laparotomy,[1–6] their approach to treatment varies considerably. Some have found benefit in long nonoperative waiting periods for early SBO;[4,5] others cite strangulation rates as high as 27%[1] and advocate immediate early operation.[1–3] Risk factors for early postoperative obstruction remain poorly understood, and signs or symptoms indicating the absolute need for operation are imprecise. Furthermore, comparative recurrence rates and long-term outcomes after operative and nonoperative management have not been clearly defined. Outcomes in immediate postoperative SBO have been studied, and we focus specifically on SBO in patients readmitted after bowel function has returned, thus eliminating the possibility of postoperative ileus.

Goals of this historical cohort study were to clarify the natural history of early postoperative SBO, note the frequency of readmission for early postoperative SBO, highlight factors that may predispose to this entity and define the relative risks of strangulation. Finally, we compared the long-term prognosis and recurrence rates of operative versus nonoperative treatment. The definition of "early" postoperative obstruction varies widely in the literature from the same admission as the index operation to 6 weeks postoperatively. Any precise cutoff is ultimately arbitrary. We chose 50 days in an effort to be inclusive in light of our relatively large cohort who presented between 35 and 50 days postoperatively.

Patients and methods

The medical records of all patients hospitalized at the Sir Mortimer B. Davis-Jewish General Hospital in Montreal between January 1986 and December 1996 with the discharge diagnosis of SBO were reviewed. Patients whose records indicated a previous admission to another hospital for SBO were excluded to ensure that information for each patient was complete. Our cohort included 552 patients accounting for 1001 admissions for SBO.[7] The medical records of patients who were admitted for SBO within 50 days of a previous laparotomy were reaudited and selected for this study. The etiology of SBO was determined from the clinical presentation and context, operative and radiologic findings and the reports of consultants. Patterns of recurrence of SBO as well as the nature and outcome of treatment were documented. Data were collected onto forms and transferred onto Microsoft Excel software creating a computerized database from which results were analyzed.

The very small number of patients with readmission for SBO within 50 days after discharge means that the power of any statistical comparisons among groups would be too low. Therefore, we limited our results to a descriptive analysis. Continuous variables are presented as medians with ranges because most variables were not normally distributed. Dichotomous variables are presented as percentages (and standard errors). Survival analyses were estimated using the product-limit method

Findings

Of the 1001 cases of SBO, 30 (3%) occurred in patients readmitted within 50 days of a previous laparotomy. Of these 30 patients, 16 (53%) were women, and the median age was 46 years (range from 24–90 yr). This was the first episode of SBO for 19 (63%) patients. The laparotomy directly preceding the obstruction was the patient's only previous abdominal operation in 12 (40%) cases. The most frequent index procedure (Table 1) was a small-bowel operation (13), usually related to a previous SBO. The median interval between the index operation and SBO was 24 days (range from 8–50 d). In

Table 1

Index Operations Preceding Small-Bowel Obstruction

Previous operation	No.
Small-bowel procedure	13
Colorectal procedure	9
Gynecologic procedure	6
Hernia repair	1
Unknown	1

the majority of cases, adhesions were the cause of obstruction (24 cases). Other causes were Crohn's disease (2), hernia (1), malignant neoplasm (1) and a combination of adhesions and malignant disease (2). In all cases, plain abdominal radiographs were used to diagnose SBO. Additional studies such as enteroclysis (5 cases), computed tomography (2) and ultrasonography (2) were occasionally employed.

Of the 30 cases of SBO, 7 (23%) were treated operatively. The median interval between presentation with obstructive symptoms and operation was 18 hours (range from 5–96 h). The corrective operations included lyses of adhesions (5 cases), small-bowel resection (1) and herniorrhaphy (1). There was 1 episode of strangulated bowel attributed to a loop of "volvulized" jejunum associated with dense adhesions. Of the 5 patients with adhesions treated by operation, 4 were found to have multiple matted adhesions, and 1 had a single obstructive band. A comparison of symptoms and laboratory data between operatively and nonoperatively treated patients is shown in Table 2. Because of the small numbers, no definitive conclusions can be made. However, patients with more signs and symptoms had a greater tendency to be treated operatively (Table 3).

In the long term, the crude recurrence rate was 71%, with a median time to recurrence of 0.1 years (range from 0.02–14 yr) for patients treated operatively for SBO, and 48%, with a median time to recurrence of 0.7 years (range from 0.075–5 yr) for those managed nonoperatively. In fact, 2 of the operatively treated patients were again admitted shortly after discharge with an early reobstruction. Because the crude recurrence rate does not account for differing lengths of follow-up, we used survival analysis to estimate the true recurrence rate (Fig. 1). The estimated 5-year recurrence rate was 57% in operatively treated patients and 63% in nonoperatively treated patients. Finally, median length of hospital stay was 12 days (range from 9–17 d) for operatively treated patients and 6 days (range from 2–33 d) for nonoperatively treated patients. There were no perioperative deaths.

Discussion

A number of retrospective studies have looked at the outcome of SBO in the immediate postoperative period. However, the distinction between mechanical obstruction and uncomplicated postoperative ileus is often dubious.[1,4–6] This is the first review that looks at outcome exclusively in patients readmitted with obstruction who had clearly established bowel function. The definition of "early" postoperative obstruction varies widely. We arbitrarily chose 50 days because of our relatively large cohort who presented between 35 and 50 days postoperatively. The earliest readmission was on the eighth postoperative day. However, even with our expanded definition, the incidence of early obstruction in this study was only 3% of all cases of SBO. It is also of interest that whereas the majority of cases were due to adhesions, 23% resulted from other causes such as volvulus, hernia, Crohn's disease and malignant disease.

In this series, 43% of laparotomies immediately preceding the obstruction were small-bowel-related (Table 1). Only 30% were colon or rectal procedures. In a number of reported series,[1,3,5] colorectal procedures were noted to be a risk factor for early postoperative obstruction whereas small-bowel procedures only accounted for a fraction of cases. Stewart and colleagues[6] also noted a high relative risk for early obstruction after small-bowel procedures.

Diagnosis of SBO in the early postoperative period is a particular challenge for the surgeon, because symptoms are frequently attributed to incisional pain and altered bowel function, and may be masked by continued use of narcotics. Signs and symptoms may be typical of those seen in patients with SBO remote from a previous operation, so vigilance is necessary to detect this entity. The treatment of these patients remains controversial. Some, alarmed by strangulation rates as high as 27%,[1] advocate immediate early operation.[1–3] Others, however, recommend prolonged nonoperative waiting periods.[4,5] Our operative rate of 23% was not dissimilar to our operative rate

Table 2

Comparison of Signs, Symptoms and Leukocyte Count for Patients Treated Operatively and Nonoperatively

	Treatment	
Signs/symptoms	Operative (n = 7)	Nonoperative (n = 23)
Distension, %	71	43
Nausea/vomiting, %	100	61
Crampy pain, %	71	87
Fever, %	14	4
Gas/bowel movement, %	29	74
Bowel sounds, %	86	70
Median leukocyte count, $\times 10^9$/L	12.7	11.3

Table 3

Relationship Between the Number of Clinical Features of Small-Bowel Obstruction Present and the Need for Operation

Clinical features, no.*	Patients, no.	Patients requiring operation, %
1	3	0
2	5	20
3	8	0
4	7	29
5	5	80

*Clinical features are those cited in Table 2 (a leukocyte count ≥ 12.0 $\times 10^9$/L was considered positive).

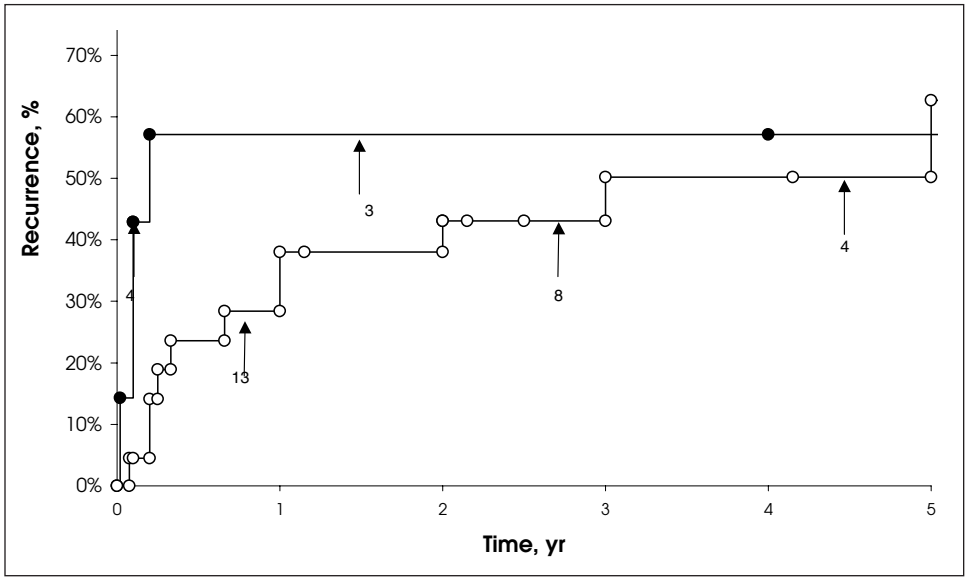

FIG. 1. The cumulative frequency of readmission for cases of small-bowel obstruction after operative procedures, managed operatively (closed circles) and nonoperatively (open circles). Patients are censored at time lost to follow-up. Note that 1 nonoperatively treated patient with an unknown time to follow-up was excluded from the figure.

for all cases of SBO (31%).[7] Other series looking at immediate postoperative SBO have reported operative rates ranging from 23%[4] to 62%[2] for early postoperative obstruction.

In the current review we had 1 case (3% of admissions, 14% of operated cases) of strangulated bowel, a rate comparable to the that in our general SBO population (8% of admissions, 24% of operations).[7] Previous reviews have reported strangulation rates ranging from 0%[4] to 27%[1] of patients operated on for early SBO. A comparison of the presenting signs, symptoms and laboratory data of those who did and did not require operation does not suggest any obvious discrepancies. A further effort was made to draw up a guideline to indicate the need for operation by determining the relationship between the number of clinical features and the need for operation (Table 3). In fact, patients with an increasing number of positive clinical features tended to be treated operatively.

A comparison of long-term outcome of the operatively and nonoperatively treated patients with SBO revealed no advantage with operation. This is not to say that patients need not be closely monitored to detect any signs or symptoms suggestive of compromised bowel. It only suggests that, in the long term, in the absence of a deteriorating clinical picture there is no pressing need for operation. We found a 57% recurrence rate with SBO for the operative group compared with a 63% recurrence rate for the nonoperative group. The median time to recurrence was nearly 8 months longer for patients treated nonoperatively. Also, the reoperation rate was greater and the median length of hospital stay was 6 days longer for those treated by operation. However, it should be noted that the follow-up was an average of 2.7 years longer for patients managed operatively.

In summary, hospital admission for SBO within 50 days of a previous laparotomy is relatively uncommon. Such admissions most commonly follow small-bowel procedures for previous obstruction. Our overall rate of strangulation was only 3.3%, much lower than others have suggested.[1–3] Furthermore, nonoperative treatment in stable patients did not result in less favourable outcomes with respect to resolution of symptoms, length of stay, risk of recurrence and reoperation. Because of these findings there does not appear to be a need for immediate operative intervention, and we favour nonoperative management in an otherwise stable patient.

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