



Evaluation of efficacy of gastrografin in adhesive small bowel obstruction

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Abstract

Background: Various conservative means of managing ASBO have been reported, including nasogastric tube suction and fluid resuscitation, and administration of water-soluble contrast agents, such as gastrografin, which may also serve to determine the need for surgery. In adults, conservative treatment of ASBO is frequently used and has been found to be effective in a relatively large, but somewhat variable (approximately 40% to 70%), proportion of cases.

Aim: To evaluate the effectiveness of gastrografin in adhesive small bowel obstruction.

Materials and Method: The present study was conducted in the Department of General Surgery of the medical institution. For the study we selected a total of 80 patients diagnosed for ASBO. Patients were randomized to receive Gastrografin (Group 1) or Placebo (Group 2) with 40 patients in each group. In patients with of Group 1, 60 ml of Gastrografin admixed with 40 ml of normal saline was administered after two hours of active stomach decompression through nasogastric tube. Patients of both groups were closely monitored by repeated clinical examination without further radiological examination. The criteria for discharge were patient free from obstructive symptoms and tolerating normal diet.

Results: Out of the 35 patients in Group 1, 28 patients received treatment of ASBO with conservative management with surgery required in only 7 patients. SBO was resolved within first twenty four hours of admission in 26 patients of Group 1 and 13 patients of Group 2 ($p < 0.05$). Patients who were managed conservatively in Group A and Group B had a mean hospital stay of 5.2 ± 1.2 days and 8.8 ± 1.9 days respectively.

Conclusion: The administration of oral water soluble agent in cases of ASBO has a definite therapeutic role in their management.

Keywords: ASBO, gastrografin, conservative treatment, surgical treatment.

Introduction

Adhesive disease is the most frequently encountered disorder of the small intestine. In one review of 87 studies including 110,076 patients, the incidence of adhesive small bowel obstruction (aSBO) following all types of abdominal

operations was 2.4%.¹ Small-bowel obstruction is usually caused by postoperative adhesions, which develop in about 95% of adult patients after abdominal surgery.² Different factors, such as powder from surgical gloves and tissue retraction, have been reported to cause fibrous adhesions.

Considerable controversy exists concerning the management of postoperative adhesive small-bowel obstruction.³ Treatment for ASBO may be operative or conservative/non-operative.

Operative treatment, adhesiolysis through laparoscopic or open approaches, can be effective (and essential in some cases ie, those involving strangulation), but carries a risk of associated morbidity and mortality.⁴ Various conservative means of managing ASBO have been reported, including nasogastric tube suction and fluid resuscitation, and administration of water-soluble contrast agents, such as gastrografin, which may also serve to determine the need for surgery. In adults, conservative treatment of ASBO is frequently used and has been found to be effective in a relatively large, but somewhat variable (approximately 40% to 70%), proportion of cases.⁵ Gastrografin, a water-soluble contrast medium, has been found useful in the management of adhesive small bowel obstruction. A few studies reported that gastrografin could accurately predict the need for surgical treatment.⁶ Hence, the present study is planned to evaluate the effectiveness of gastrografin in adhesive small bowel obstruction.

Materials and Method

The present study was conducted in the Department of General Surgery of the medical institution. For the study we selected a total of 80 patients diagnosed for ASBO. An informed written consent was obtained from each subject after explaining them the protocol and procedure of the study verbally. Ethical clearance for the study was obtained from the ethical committee of the institution. A thorough clinical checkup carried out to confirm the diagnosis and detailed medical history was obtained from each subject. Inclusion criteria included all cases of post-operative intestinal obstruction more than 12 years, who presented with clinical and radiological evidence of SBO. Exclusion criteria included patients presenting within four weeks of previous surgery, patients who underwent

abdominal radiotherapy, patients with history of hypersensitivity to iodine, patients presenting after 48 hours of conservative treatment and patients with signs of strangulation or peritonitis. All patients were promptly hydrated with intravenous fluids on the basis of pulse, blood pressure, central venous pressure urine output and electrolyte imbalances were corrected. Nasogastric tube was placed. Close monitoring of vital and abdominal signs was done. Patients were randomized to receive Gastrografin (Group 1) or Placebo (Group 2) with 40 patients in each group. In patients with of Group 1, 60 ml of Gastrografin admixed with 40 ml of normal saline was administered after two hours of active stomach decompression through nasogastric tube. It was clamped for next three hours. Control Group 2 received 100 ml of normal saline in similar fashion. Patients of both groups were closely monitored by repeated clinical examination without further radiological examination. End points were taken as resolution of obstruction ie passage of flatus and/ or bowel motion, length of hospital stay and failure of conservative management. The indications for surgery were: persistence of ASBO for 48 to 72 hours after admission or clinical deterioration with persistence or worsening of obstruction and signs with symptoms of strangulation or peritonitis. The criteria for discharge were patient free from obstructive symptoms and tolerating normal diet. The statistical analysis of the data was done using SPSS software version 20.0 for windows. Student's t-test and Chi-square test were used to check the statistical significance of the data. A p-value less than 0.05 were predefined as statistically significant.

Results

Patients in this study tolerated Gastrografin well without any adverse effects. Out of the 35 patients in Group 1, 28 patients received treatment of ASBO with conservative management with surgery required in only 7 patients. Surgery was required in 15 patients in Group 2 with successful treatment of ASBO with conservative

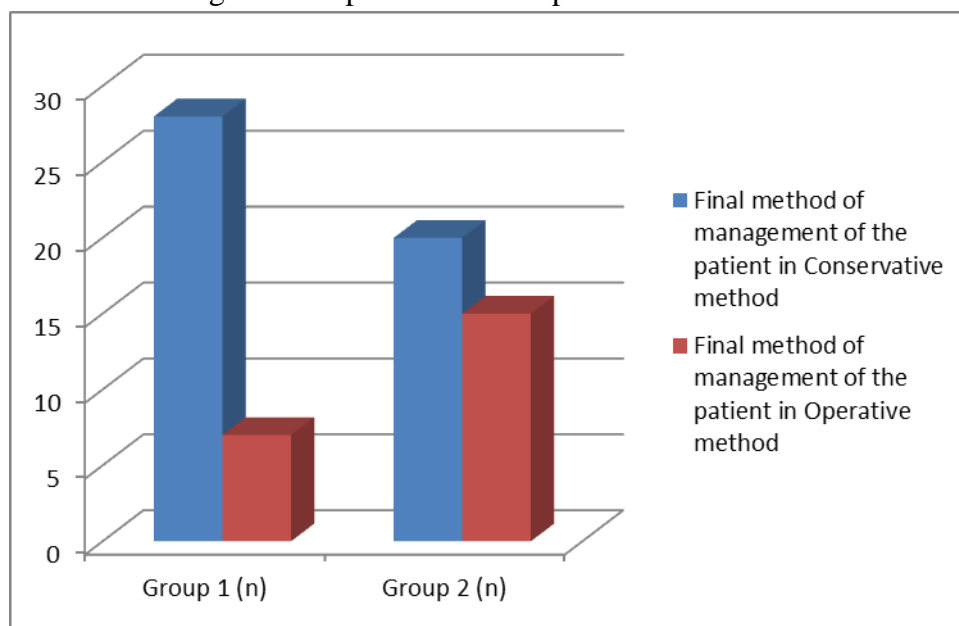
management in only 20 patients ($p < 0.05$). SBO was resolved within first twenty four hours of admission in 26 patients of Group 1 and 13 patients of Group 2 ($p < 0.05$). Patients who were managed conservatively in Group A and Group B

had a mean hospital stay of 5.2 ± 1.2 days and 8.8 ± 1.9 days respectively. Patients who underwent an operation in Group 1 had a mean length of hospital stay of 8.8 ± 1.9 days as comparable to 12.22 ± 2.03 in Group 2 ($p > 0.05$).

Table 1: Final outcome of the patients with different treatment options for Group 1 and 2

	Final method of management of the patient		Time taken for treatment			Mean hospital stay	
	Conservative	Operative	0-24 hours	24-48 hours	48-72 hours	Conservative	Operative
Group 1 (n)	28	7	26	7	2	5.2 ± 1.2	11.02 ± 2.1
Group 2 (n)	20	15	13	13	9	8.8 ± 1.9	12.22 ± 2.03
p-value	0.002		0.01			0.27	

Figure 1: Final method of management of patients in Group 1 and 2



Discussion

Post-operative small bowel obstruction leads to repeated hospital admissions with significant high morbidity and significant mortality. The most common cause of small bowel obstruction is adhesive obstruction. Post-operative adhesions cause SBO in about 11% of all patients undergoing laparotomy. SBO can be a complication of any abdominal operation. In the present study we evaluated 80 patients diagnosed with ASBO. We observed that study group which received treatment with gastrograffin had significantly higher success rate as compared to control group. Majority of patients receiving treatment of ASBO with gastrograffin were resolved in within 24

hours of admission. Choi H-K et al evaluated the effectiveness of gastrograffin in adhesive small bowel obstruction when conservative treatment failed. Patients with adhesive small bowel obstruction were given trial conservative treatment unless there was fear of bowel strangulation. Those responded in the initial 48 h had conservative treatment continued. Patients who showed no improvement in the initial 48 h were given 100 mL of gastrograffin through nasogastric tube followed by serial abdominal radiographs. Patients with the contrast appeared in large bowel within 24 h were regarded as having partial obstruction and conservative treatment was continued. Patients in which the contrast failed to

reach large bowel within 24 h were considered to have complete obstruction and laparotomy was performed. Two hundred and twelve patients with 245 episodes of adhesive obstruction were included. Fifteen patients were operated on soon after admission due to fear of strangulation. One hundred and eighty-six episodes of obstruction showed improvement in the initial 48 h and conservative treatment was continued. Two patients had subsequent operations because of persistent obstruction. Forty-four episodes of obstruction showed no improvement within 48 h and gastrografen was administered. Seven patients underwent complete obstruction surgery. Partial obstruction was demonstrated in 37 other cases, obstruction resolved subsequently in all of them except one patient who required laparotomy because of persistent obstruction. The overall operative rate in this study was 10%. There was no complication that could be attributed to the use of gastrografen. The authors concluded that the use of gastrografen in adhesive small bowel obstruction after unsuccessful conservative treatment is safe and reduces the need for surgical intervention. Loftus T et al implemented a standardized protocol for the management of aSBO and reviewed their experience retrospectively. Patients with symptoms of aSBO were admitted for intravenous fluid resuscitation, bowel rest, nasogastric tube decompression, and abdominal examinations every 4 hours. Laboratory values and a computed tomography scan of the abdomen and pelvis with intravenous contrast were obtained. Patients with peritonitis or computed tomography scan findings suggesting bowel compromise were taken to the operating room for exploration following resuscitation. All other patients received 80 mL of Gastroview (GV) and 40 mL of sterile water via nasogastric tube. Abdominal plain films were obtained at 4, 8, 12, and 24 hours. If contrast did not reach the colon within 24 hours, then operative intervention was performed. Over 1 year, 91 patients were admitted with aSBO. Sixty-three patients received GV, of whom 51% underwent surgery. Twenty-four

patients went directly to the operating room because of clinical or imaging findings suggesting bowel ischemia. Average time to surgery was within 1 day for the no-GV group and 2 days for the GV group. Patients passing GV to the colon within 5 hours of administration had a 90% rate of resolution of obstruction. There was a direct relationship between the duration of time before passing GV to the colon and hospital length of stay (HLOS). Patients who received GV and did not require surgery had lower HLOS. This was concluded that the GV protocol facilitated early recognition of complete obstruction. Administration of GV had diagnostic and therapeutic value and did not increase HLOS, morbidity, or mortality.^{7,8}

Di Saverio S et al determined the therapeutic role of Gastrografen in patients with ASIO. The study was a multicenter, prospective, randomized, controlled investigation. The primary end points were the evaluation of the operative rate reduction and shortening the hospital stay after the use of Gastrografen. A total of 76 patients were randomized into two groups: the control group received traditional treatment (TT), whereas the study group (GG) received in addition a Gastrografen meal and follow-through study immediately. Patients with Gastrografen in the colon within 36 hours were considered to be partially obstructed and submitted to non operative management. If after 36 hours, the Gastrografen had not entered the colon, the subjects were submitted to laparotomy. No significant differences were found in age, sex, intravenous administration of prokinetics, incidence and characteristics of the previous procedures in surgical history of the patients, previous episodes of ASIO and surgery for adhesiolysis, or duration of symptoms before admission. In the GG group obstruction resolved subsequently in 31 of 38 cases (81.5%) after a mean time of 6.4 hours. The remaining seven patients were submitted to surgery, and one of them needed bowel resection for strangulation. In the control group, 21 patients were not submitted

to surgery (55%), whereas 17 showed persistent untreatable obstruction and required laparotomy: 2 of them underwent bowel resection for strangulation. The difference in the operative rate between the two treatment groups reached statistical significance. The time from the hospital admission for obstruction to resolution of symptoms was significantly lower in the GG group. The length of hospital stay revealed a significant reduction in the GG group. This reduction was more evident in the subset of patients who did not require surgery. No GG-related complications or significant differences in major complications and the relapse rate were found. Data showed that the use of Gastrografin in ASIO is safe and reduces the operative rate and the time to resolution of obstruction, as well as the hospital stay. Assalia A et al evaluated therapeutic effect of oral Gastrografin in adhesive, partial small-bowel obstruction. A total of 107 episodes of adhesive, partial small-bowel obstruction in 99 patients were randomized into a control group (48 episodes), who were treated with conventional methods, and a trial group (59 episodes), who were treated with 100 ml of Gastrografin administered through the nasogastric tube. The following variables were examined: time to resolution of partial small-bowel obstruction, the need for operation, complications, and hospital stay. Mean timing of the first stool was 23.3 hours in the control group and 6.2 hours in the patients receiving Gastrografin. Ten obstructive episodes (21%) in the control group required operative treatment compared with six (10%) in the trial group. Mean hospital stay for the patients who responded to conservative treatment was 4.4 days and 2.2 days in the control and trial groups, respectively. One patient in each group died after operation. No Gastrografin-related complications were observed. They concluded that the orally administered Gastrografin is safe and has a therapeutic role in adhesive, partial small-bowel obstruction. It significantly prompts the resolution of the obstructive episodes and shortens hospital stay.^{9,10}

Conclusion

Within the limitations of our study, we conclude that the administration of oral water soluble agent in cases of ASBO has a definite therapeutic role in their management.

References

1. Ten Broek R, Issa Y, van Santbrink E, Bouvy N, Kruitwagen R, Jeekel J, Bakkum E, Rovers M, van Goor H. Burden of adhesions in abdominal and pelvic surgery: systematic review and meta-analysis. *Br Med J*. 2013;347:f5588.
2. Menzies D, Ellis H. Intestinal obstruction from adhesions--how big is the problem? *Ann R Coll Surg Engl*. 1990;72:60-63.
3. Onoue S, Katoh T, Shibata Y, Matsuo K, Suzuki M, Chigira H. The value of contrast radiology for postoperative adhesive small bowel obstruction. *Hepatogastroenterology*. 2002;49:1576-1578.
4. Chen SC, Lin FY, Lee PH, Yu SC, Wang SM, Chang KJ. Water-soluble contrast study predicts the need for early surgery in adhesive small bowel obstruction. *Br J Surg*. 1998;85:1692-1694.
5. Choi HK, Chu KW, Law WL. Therapeutic value of gastrografin in adhesive small bowel obstruction after unsuccessful conservative treatment: a prospective randomized trial. *Ann Surg*. 2002;236:1-6.
6. Cox MR, Gunn IF, Eastman MC, Hunt RF, Heinz AW. The safety and duration of non-operative treatment for adhesive small bowel obstruction. *Aust N Z J Surg*. 1993;63:367-371.
7. Choi H-K, Law W-L, Ho JW-C, Chu K-W. Value of gastrografin in adhesive small bowel obstruction after unsuccessful conservative treatment: A prospective evaluation. *World Journal of Gastroenterology: WJG*. 2005;11(24):3742-3745. doi:10.3748/wjg.v11.i24.3742.
8. Loftus T, Moore F, VanZant E, et al. A protocol for the management of adhesive

small bowel obstruction. The journal of trauma and acute care surgery. 2015;78(1): 13-21.

doi:10.1097/TA.0000000000000491.

9. Di Saverio S, Catena F, Ansaloni L, Gavioli M, Valentino M, Pinna AD. Water soluble contrast medium (gastrografin) value in adhesive small intestine obstruction (ASIO): a prospective, randomized, controlled, clinical trial. World J Surg. 2008 Oct;32(10):2293-304. doi: 10.1007/s00268-008-9694-6.
10. Assalia A, Schein M, Kopelman D, Hirshberg A, Hashmonai M. Therapeutic effect of oral Gastrografin in adhesive, partial small-bowel obstruction: a prospective randomized trial. Surgery. 1994 Apr;115(4):433-7.