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Evaluation of Gastrografin Therapeutic Role in the Management of Small Bowel Obstruction

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ABSTRACT

Background: Small bowel obstruction is one of the most common surgical emergencies and main causes of hospital admissions. Diatrizoate Meglumine Gastrografin, a hyperosmolar water-soluble contrast agent, has been used to triage patients with small bowel obstruction for an operative or a non-operative management. It can also have a therapeutic effect by increasing the pressure gradient across obstructive sites that may result in resolving the obstruction.

Objectives: The aim of this study was to test the gastrografin effect in the resolution of small bowel obstruction.

Patients and Methods: In this cross sectional–descriptive study, gastrografin was given to patients diagnosed with small bowel obstruction in clinical and radiological grounds . The contrast passage was assessed by serial X-rays. If the contrast remained in the small bowel, a decision was made as to whether proceed to surgical intervention, based on clinical condition. The patients were divided into two groups: A, who finally required surgery, and B, who were resolved by gastrografin administration.

Results: Forty six patients were entered into the study. Thirty seven of the patients (80%) received a non-operative course in whom the contrast was observed in the large bowel. They had a mean hospital stay of 4.6 days. Nine patients (20%) required operative intervention. These patients had a mean hospital stay of 8 days.

Conclusions: This study has demonstrated that gastrografin was highly effective in the management of adhesive small bowel obstruction resulting in a decreased need for surgery and hospital stay.

▸ *Implication for health policy/practice/research/medical education:*
This article suggests a highly effective method for the management of adhesive small bowel obstruction which results in a decreased need for surgery and hospital stay.

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1. Background

Small bowel obstruction is one of the most common surgical emergencies and main causes of hospital admissions. Small intestinal obstruction is the most prevalent cause leading to bowel related surgical procedures. Almost 75% of the obstruction cases are considered to be the consequence of post-surgical adhesion (1-4). Emergency surgical procedure is necessary when strangulation or complete obstruction occurs. The management of small bowel obstruction is still a substantial clinical challenge (5, 6). Radio-opaque water-soluble contrast agents have been used to identify patients who might be managed non-operatively (7-9). The great diagnostic advantage of gastrografin in assessing the indication for surgical intervention in patients with complete obstruction has been established repeatedly (7-9). Gastrografin, a hyperosmolar water-soluble contrast agent, makes the fluid move into the intestinal lumen and increases the pressure gradient across obstructive sites that may result in resolving the obstruction (5, 10, 11). If the symptoms are still present after 24 to 48 hours, surgery will be required (9, 12, 13). Adhesive bands are considered to be the most common complication of abdominal surgery. Surgical procedures to resolve them may manifold the risk of further adhesions and obstructions (4, 6). While many studies have shown the diagnostic benefit of gastrografin, the therapeutic advantage was not found by some authors (8, 10, 14).

2. Objectives

The aim of this study was to assess the therapeutic role of gastrografin in patients with partial small bowel obstruction.

3. Patients and Methods

Our study included all the patients who referred to emergency department of Loqman Hakim Hospital, Tehran, IR Iran. They were diagnosed with acute intestinal obstruction based on clinical and radiological evidences (such as air fluid levels and intestinal wall thickening). All cases had a previous history of laparotomy with the diagnosis of adhesion band. Patients with renal failure and who had a contraindication for gastrografin administration and those with signs of strangulation (such as fever, leukocytosis, and severe abdominal tenderness) and urgent requirement for surgery were excluded from the study. Initially, physical examination was performed, I.V. line was fixed, and fluids were administrated. In the absence of strangulation signs, 80 to 100 mL of gastrografin was given orally or via nasogastric tube as soon as practicable. Further plain supine abdominal X- rays were taken after 4, 8, and 24 hours. Patients did not undergo more radiological investigation if the contrast passed illeocecal valve and, therefore, non-operative treatment was continued. Patients were observed for 48 hours and operative management was considered if strangulation signs were manifested or clinical condition deteriorated. The patients were divided into two groups: those who underwent surgery (A) and those who were managed non-operatively (B). Results were analyzed using descriptive statistical parameters by SPSS software version 13 (Inc., Chicago IL). Additional diagnostic investigations, however, were performed to find the etiology of obstruction being not related to the topic of this study.

4. Results

Forty six patients who referred with acute small bowel obstruction symptoms and accepted initial criteria, entered into the study. Among them, 37 patients (80%) did not require surgical intervention while nine (20%) patients failed to settle, and ultimately underwent the laparotomy. The mean age of patients was 44 years (ranging from 14 to 80 years) and male to female ratio 2 to 1. The interval between previous abdominal surgery and occurrence of symptoms varied from one month to more than 40 years (with an average of nine years).

The mean age of nine patients who were placed in group A and underwent laparotomy was 37 years (ranging from 14 to 78 years) consisting of six males (66.5%) and three females (33.5%). The patients stayed in the hospital for five to 12 days (average: eight days) .The interval between previous surgery and recent obstruction differed from one month to more than 40 years (the mean was 10 years). In group A, Eight patients were abdominally operated once and one patient twice, previously. Only one patient had a

Table 1. Comparing the Outcomes of Two Groups of Patient Managed Operatively and Non-Operatively

	Group A: Managed Operatively	Group B: Managed Non-Operatively
Patients, No.	9	37
Average age, y	37	46
Hospital stay, d	8	4.6
Interval between previous to recent surgery, y	10	9
Leukocytosis, %	7.84	21.57
Cases with more than one previous surgery, No.	1	7
Cases with admission due to intestinal obstruction, No.	1	6

surgical intervention due to previous intestinal obstruction. All the patients in this group had no bowel movement and seven patients no gas passing, too. All patients showed radiological signs of small bowel obstruction reported by a radiologist. Leukocytosis (WBC > 10000/μL) was demonstrated in seven patients. In these patients, the contrast medium was not seen in large bowel in further X-ray series. In regards to surgical findings, fibrotic adhesive bands were found in six patients, jejunal bezoar in two cases, and cecal tumor in one.

As shown in *Table 1* there were 37 patients in group B who did not require surgical management with a mean age of 46 years (ranging from 14 to 90 years). The group consisted of 23 males (62%) and 14 females (38%). The average length of hospitalization was 4.6 days for this group (ranging from two to 10 days). Their previous operation occurred in a range of one month to over 40 years (with an average of nine years) prior to recent obstruction. Five patients underwent a second surgery in less than one year from the first one while 29 patients were operated only once, previously. Seven cases underwent two abdominal operations and one had three records of surgery. Six Patients showed the history of hospitalization due to obstructive symptoms, four of them had undergone the surgery. All the patients of this group also showed the absence of bowel movement and signs of small bowel obstruction in X-rays reported by a radiologist. Thirty one patients (83%) had no gas passing. Leukocytosis was detected in 21 patients (57%). Gastrografin passage through ileocecal valve occurred in seven patients (19%) within the first four hours, in 19 patients (51%) within 12 hours, in 10 patients (27%) after 24 hours, and in only 1 patient after 48 hours from the time of administration. . It should be noted that during this period, the patients were observed for signs of peritonitis and deterioration of general condition. Mostly (80%) defecated in the first 24 hours and the others in 48 hours after gastrografin swallow. None of the patients showed further obstructive presentation during hospitalization. Oral nutrition was started within two to three days after admission and they were all discharged in good general conditions. A similar study randomized patients who were diagnosed with acute small bowel obstruction to receive gastrografin or placebo in a double-blinded fashion. Gastrografin accelerates resolution from bowel obstruction and decreased hospital stay (5).

5. Discussion

This study has investigated the therapeutic effect of gastrografin in enhancing resolution of acute small bowel obstruction. The study demonstrates the great effect of gastrografin in resolving obstructions due to adhesive bands eliminating the need for surgery in 80% of cases. Other studies have also revealed that there was a reduction in surgery requirement in 70 to 74 % of cases (9, 13, 15, 16). Both groups in our study had the same interval of one month to over 40 years between previous surgery and recent acute obstruction presentation. Most of the cases had just one earlier operation through a midline incision (75% in group A and 70 % in group B); no information was reported by previous studies on incision type of earlier surgery and the interval to symptoms presentation. Comparison between the two groups showed that the mean age of group A was 37 years and of group B was 46 years with a fairly similar male to female ratio of 2:1. Another finding was the average length of hospital stay which was eight days in group A and 4.6 days in group B demonstrating a reduced length of hospitalization for patients who received gastrografin; this result was also reported in similar studies (11). Considering the number of previous surgeries, no significant effect on the response to gastrografin was observed in either group. There was no significant difference in the number of earlier surgeries between group A and B. Contrary to the expectation, cases of group B had more previous admissions and operations which did not seem to be effective factors in gastrografin responsiveness. Almost 80% of cases in either group did not have gas passing and defecation, implying that they had no influence on the results. Group A included in a greater percentage of patients with leukocytosis (84%) compared to that in group B (57%).

In Conclusion, this study has demonstrated that gastrografin administration in the presence of acute small bowel obstruction symptoms decreased the need to surgery in 80% of patients who had a history of previous abdominal surgeries and were allowed to receive gastrografin (i.e. acceptable response to basic fluid replacement therapy, and no signs of intestinal strangulation or renal failure). According to the results, gastrografin administration under the patient monitoring is not only effective in the reduction of surgery requirement, but also decreases the length of hospital stay. As a contrast medium, gastrografin is also useful to detect obstruction level. Because of its therapeutic effect, it seems logical to try gastrografin administration before the decision for surgical intervention which may impose unwanted complications and excessive cost. It is noticeable that exact selection of patients for gastrografin administration will prevent further obstructive complications such as intestinal strangulation and gangrene.

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Authors' Contribution

First author and corresponding author contributed 100% and other authors 50%.

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