

The value of Gastrografin in Adhesive Small Bowel Obstruction: Prediction of need for Surgery and Therapeutic Effect

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ABSTRACT

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Background: Gastrografin is a hyperosmolar water-soluble contrast medium. Besides its predictive value for the need of operative treatment, a potential therapeutic role of this agent in adhesive small bowel obstruction has been suggested.

Aim: To evaluate the role of Gastrografin in predicting the need of surgery in post operative intestinal obstruction and its therapeutic effect in management of adhesive intestinal obstruction.

Material and Methods: This prospective nonrandomized controlled trial study was conducted on 30 patients with a diagnosis of adhesive small bowel obstruction. All patients were divided into Groups A and B. In 20 patients of Group A, Gastrografin dye was administered and serial abdominal X-rays were taken up to 24 hours. The patients, in whom contrast reached caecum within 24 hours, the result was positive for partial obstruction and they were treated conservatively. False positive included high-grade partial obstructions that ultimately required surgery. If the contrast failed to reach the large bowel within 24 hours, the patient was considered to have complete obstruction and was operated. In 10 patients of Group B, all these patients were treated conservatively and were operated when required. Qualitative data was analysed by Fisher exact test.

Result: The sensitivity, specificity, positive predictive value and negative predictive value of this study as an indicator for non-operative treatment were 100%, 57.14%, 81.2% and 100%. The patients who had the contrast, resolved earlier (Pvalue was 0.052) and need of surgery was lesser as compared to the control group.

Conclusion: Gastrografin was effective and safe for prediction of need for surgery in adhesive small bowel obstruction. Furthermore, it speeds the resolution of obstruction and reduces the need for operation.

Keywords: Gastrografin water-soluble contrast medium, Adhesive small bowel obstruction, Postoperative intestinal obstruction

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INTRODUCTION

Peritoneal adhesions are the most common cause of small bowel obstruction.¹ These adhesions make the subsequent operation more difficult and potentially hazardous.² The pathogenesis of post operative peritoneal adhesions has been described as follows- destruction of serosa results in an outpouring of fibrinogen, a fibrin clot forms causing the adherence of adjacent structures, this fibrinous attachment then becomes organized into permanent fibrous adhesions.

Adhesion obstruction can be managed conservatively, by intravenous fluid and electrolyte replacement and nasogastric tube suction. The use of long intestinal tubes has been advocated by some groups.³ Operative management is generally required by patients with complete bowel obstruction. Surgical procedures include adhesiolysis, intestinal intubation⁴ and laparo-

scopic adhesiolysis.⁵

Conservative management is done unless there are signs of strangulation. But in some cases it is not effective and eventually surgery is required due to late appearance of signs of strangulation. Surgery delayed beyond 48 hours in such patients entails significant complications.⁶ To overcome these difficulties early and accurate prediction as to whether an episode of adhesive small bowel obstruction would resolve spontaneously or operation is necessary.

Hyperosmolar water soluble contrast studies have been suggested as an objective method to decide on the line of management.^{7,8} Gastrografin transit time may allow for the selection of appropriate patients for non operative management. Furthermore, being hyperosmolar, water soluble contrast is therapeutic in resolving partial obstruction.^{9,10,11}

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Looking to the advantages of hyperosmolar contrast in cases of adhesion obstruction, we decided to conduct a study on the utility of this contrast in post operative intestinal obstruction.

The aims of this study were:

1. Evaluating the role of Gastrografin contrast study in predicting necessity of operative intervention in patients with post operative adhesion obstruction.
2. Assessing the therapeutic effect of hyperosmolar water soluble contrast medium in the resolution of adhesive small bowel obstruction.

MATERIAL AND METHODS

This nonrandomized controlled trial study was conducted on 30 patients admitted in Department of Surgery of a hospital from July 2006 to Jan. 2009 with a diagnosis of adhesive small bowel obstruction.

The study was approved by ethical committee of the hospital. The patients with clinical and radiological evidence of adhesive small bowel obstruction were included in this study. Patients with features of peritonitis, strangulation, intraabdominal malignancy or history of abdominal irradiation were excluded.

A detailed history, including information on previous abdominal surgery and adhesive obstruction, was taken and a complete physical examination was performed for every patient. A nasogastric tube was inserted for decompression, with strict measurement of output. Intravenous fluid replacement was given and electrolyte imbalances were corrected as required. Supine and erect abdominal radiographs were taken.

The contrast material used was Gastrografin® (Schering, Berlin, Germany). It is a palatable flavoured aqueous solution of diatrizoate meglumine and diatrizoate sodium. Each milliliter (ml) contains 660 mg diatrizoate meglumine and 100 mg diatrizoate sodium.

Twenty patients included in study were assigned as Group A and ten as Group B.

In Group A, radiographic contrast study was conducted, 60mL of Gastrografin dye mixed with 40ml distilled water was administered with nasogastric tube and clamped for 3 hours. Serial abdominal X-rays were taken at 6 hours, 12 hours, 18 hours and 24 hours and monitored closely for vital and abdominal signs. The patients, in whom radiographic contrast reaches caecum within 24 hours, were regarded to have partial obstruction, treated conservatively and monitored closely. If the contrast failed to reach the large bowel

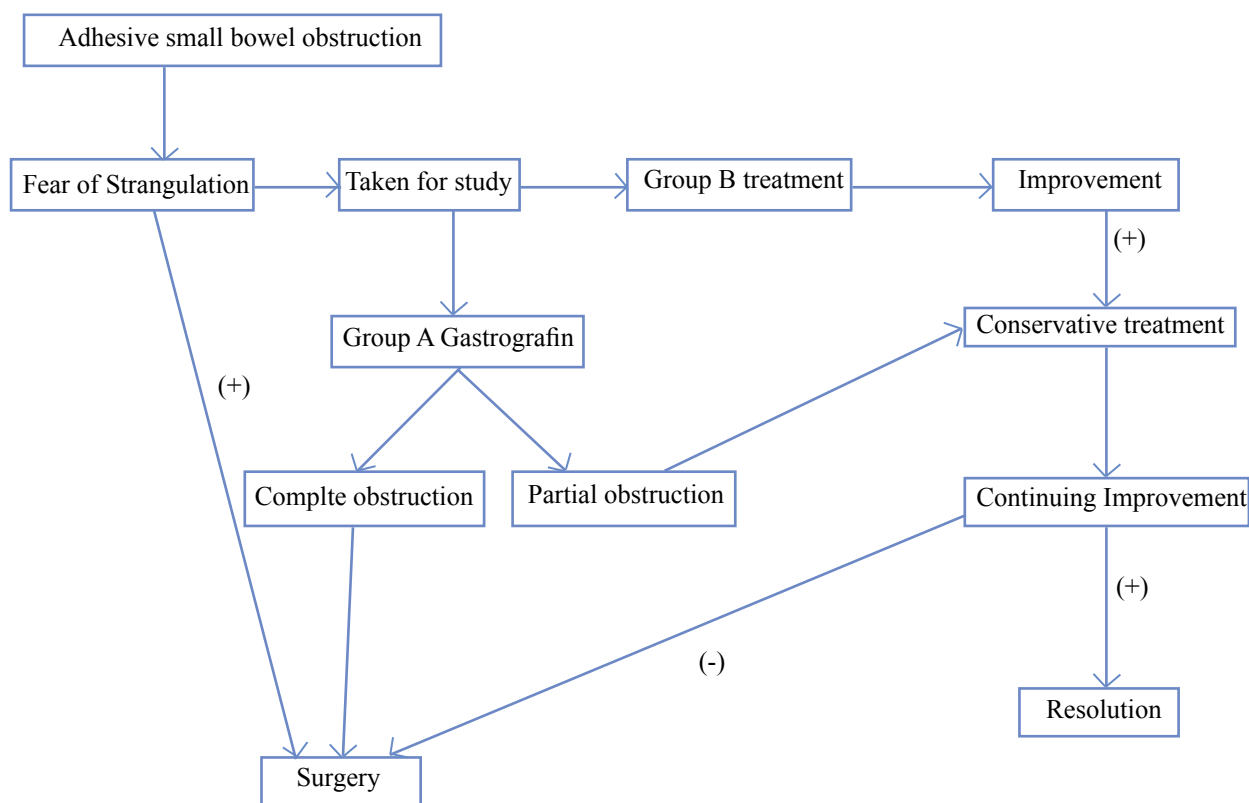


Figure 1. Protocol of study

within 24 hours, the patients were diagnosed with complete obstruction; these patients were treated with laparotomy. Patients who did not have improvement even after showing partial obstruction in Gastrografin study also underwent surgery.

In Group B, no radiographic contrast was administered. All these patients were observed clinically and were operated upon as and when found necessary depending on increasing signs and symptoms of obstruction or no response to conservative treatment.

The results were classified as:

- Those requiring surgery.
- Those treated conservatively within 48 hours.
- Those treated conservatively after 48 hours.

The findings were analysed using Fischer exact test. The P value lower than 0.05 was considered significant.

RESULTS

The male, female ratio in above series was 1.5:1. The maximum number of cases were in age group of 21–30 (36.6%). Gastrointestinal tract surgeries were the most common preceding surgeries in post operative adhesion obstruction cases present in 76.6% of cases. These included mainly the repair of peptic and enteric perforations. These were followed by gynaecological surgeries specifically abdominal hysterectomy—in 23.3% of cases.

Out of 20 patients in Group A administered with contrast material, in 16 (80%) the dye passed through the caecum within 24 hours and number of cases considered to be positive for partial obstruction and were put on conservative treatment. Remaining 4 patients (20%) did not show dye reaching caecum even in 24 hour X-ray abdomen and required surgery considering to have complete obstruction. In thirteen out of 16 cases with presence of dye in or beyond



Figure 3. Abdominal X-ray showing dye in colon at 12 hours

caecum within 24 hours, obstruction resolved conservatively but 3 patients required operative management and these were classified as false positive.

Therefore in this study the sensitivity value for partial obstruction as an indication for conservative management is 100 % and specificity is 57.14%.

There were 10 patients in group B and the surgical management remained the mainstay of successful treatment. Six (60%) patients required surgery and 4 patients (40%) resolved conservatively. While in Group A, 13 (65%) cases were treated conservatively and 7

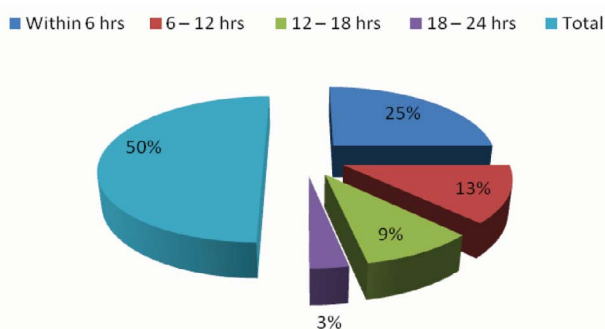


Figure 2. Time taken by the dye for passage through the caecum in group A No. of Cases



Figure 4. Abdominal X-ray showing dye not crossing caecum after 24 hours

(35%) required surgical intervention. On comparing statistically (Fisher exact test), the P value was 0.255 which is not significant.

Furthermore, 11 (84.7%) out of 13 patients of Group A who resolved conservatively, did so in 48 hours and only 2 (15.3%) patients took more than 48 hours to resolve. In comparison, out of 4 patients of group B treated conservatively, only one (25 %) resolved within 48 hours while other 3 (75%) took more than 48 hours. This indicates that patients who had the contrast, resolved earlier and suggests the therapeutic role of Gastrografin in addition to the diagnostic value. However on statistical analysis by Fisher exact test, P value obtained was 0.052.

DISCUSSION

Adhesive small bowel obstruction is a common surgical problem but there is no standard protocol for its management. There are no guidelines to direct the treating physician to consider the patient for operative or conservative management. The benefits of conservative treatment like decreased morbidity should be weighed against the increased risk of strangulation due to delay in surgery.⁶ There is an increased mortality when the obstruction is superadded with strangulation, necrosis or perforation of the bowel.¹⁰

In our study, it was found that detection of partial obstruction as an indicator for non-operative management has a sensitivity of 100%, specificity of 57.14%, positive predictive value of 81.25% and negative predictive value of 100%. It is thus concluded that Gastrografin study can better determine the need of surgery in cases of adhesive obstruction as compared to plain radiography. Although the specificity of our study is only 57.14% and better diagnostic tools are required to find true negative patients with accuracy.

Gastrografin may also have a therapeutic effect in adhesive small bowel obstruction because of its hyperosmolarity. Several previous studies have suggested the therapeutic effect of Gastrografin.^{9,10,11} Moreover, Gastrografin was found to be helpful even in the treatment of those cases of postoperative adhesion obstruction who failed to show any improvement after 48 hours of conventional conservative management.¹¹ A significant reduction in the need for operative treatment in the study group had also been reported.¹² In our study more number of patients administered with Gastrografin were treated conservatively (P value being 0.255 which is not significant) and that too, in a shorter period (P value being 0.052) as compared to

those who were not given the Gastrografin dye.

There was no complication or mortality that could be attributed to the use of Gastrografin in the present study. In fact, adverse effects due to the use of Gastrografin in small bowel obstruction have rarely been reported.

Limitation of the study was that the sample size was small. The strength of the study is that it can be done in small hospitals with no need of other specialists.

CONCLUSION

In patients with post operative intestinal obstruction, oral Gastrografin study is safe and help in prediction of the necessity of operative intervention. Also, it has a therapeutic effect in adhesive small bowel obstruction as it helps in faster resolution of symptoms and avoids the need for surgical management in the majority of patients.

END NOTE

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