

Role of Gastrograffin in the Management of Adhesive Small Bowel Obstruction – A Prospective Study

S Dalal, Nityasha, P Goyal, R Dahiya

Citation

S Dalal, Nityasha, P Goyal, R Dahiya. *Role of Gastrograffin in the Management of Adhesive Small Bowel Obstruction – A Prospective Study*. The Internet Journal of Gastroenterology. 2009 Volume 9 Number 1.

Abstract

Adhesive small bowel obstruction is a major cause of hospital admissions imposing a considerable burden on hospital resources. Early diagnosis and appropriate management of this condition is important to prevent unnecessary surgeries. Various studies have evaluated the efficacy of contrast agents in the management of adhesive small bowel obstruction. We carried out a prospective study to evaluate the diagnostic and therapeutic role of water soluble contrast agent, gastrograffin in patients with adhesive small bowel obstruction. The results of our study concluded that use of gastrograffin in patients with partial small bowel obstruction helps in resolution of symptoms and avoids the need of surgical management in the majority of patients.

INTRODUCTION

Adhesive small bowel obstruction is a common cause of acute abdomen requiring emergency surgical admission. The primary clinical problem is to decide whether the obstruction is incomplete or complete requiring conservative or surgical treatment respectively. Most importantly the presence of strangulation has to be excluded as it needs earlier surgical intervention and carries a higher mortality. Plain abdominal radiographs are not of much help to identify the cause, site and ischemic complications of adhesive small bowel obstruction. Several studies have evaluated the role of water soluble contrast media to predict the need of surgical treatment in adhesive SBO, but with variable results.^{1,2} We have carried out a prospective study to evaluate the diagnostic and therapeutic role of gastrograffin in adhesive SBO.

PATIENTS AND METHODS

Present study was conducted on 50 patients admitted in surgical department of our institute with clinical diagnosis of adhesive SBO. Patients with clinically obvious strangulation and documented intraabdominal malignancy were excluded from the study. After clinical and radiological diagnosis of adhesive SBO, all patients were promptly hydrated with Ringer lactate solution and their electrolytes and acid base imbalances were corrected. All 50 patients were put on conservative treatment with close monitoring of vital and abdominal signs and abdominal radiographs. 24 patients

with obstruction improved clinically or radiologically in the initial 24 hours, so continued to receive conservative treatment. The remaining 26 patients showed neither clinical nor radiologic improvement in 24 hours, were labelled as cases of failed conservative treatment and were considered for gastrograffin meal study.

One-hundred ml of gastrograffin was administered through a nasogastric tube and transit of the contrast was examined by serial abdominal radiographs at 4, 8, 12 and 24 hours. Patients in whom contrast appeared in large bowel within 24 hours were regarded as having partial obstruction and conservative treatment was continued for such patients. If contrast failed to reach the large bowel within 24 hours, the patients were regarded as having complete obstruction, and were proceeded for laparotomy. The criteria taken for therapeutic role of gastrograffin was passage of flatus/stool, within 24 hours of administration of contrast.

RESULTS

Majority of the patients were in the age group of 10-30 years, ranging from 14 to 70 years, with male to female ratio of 4:1 (Table I).

Figure 1

Table I : Demographic Profile

Total Number of patients = 50			
Age (in years)	No. of cases	Sex	No. of cases
10-19	- 12	Male	- 40
20-29	- 12	Female	- 10
30-39	- 8		
40-49	- 8		
50-59	- 6		
60-70	- 2		
< 70	- 2		

The patients admitted as a case of small bowel obstruction were having clinical symptoms of nausea, vomiting, distension abdomen, pain abdomen and obstipation; distension abdomen being the commonest presentation. Plain abdominal radiographs were taken in the erect and supine position for all patients. Dilated gut loops was the commonest finding in supine position followed by air fluid levels in standing position.

Out of 50 cases, 46 patients (92%) presented with obstruction after one previous surgery, while four patients (8%) had undergone two previous surgeries. Maximum number of patients (44%) had undergone small bowel procedures followed by appendicectomy (28%), as shown in Table II.

Figure 2

Table II : Antecedent Surgical Procedure

Procedure	Number of Cases	Percentage (%)
Small bowel procedure	22	44
Large bowel procedure	4	8
Appendicectomy	14	28
Hepatobiliary & upper gut	4	8
Gynecological procedure	2	4
Kidney	4	8
Total	50	100

The interval between a patient’s last surgical procedure and initial admission for adhesions was widely distributed. Majority of patients (72%), developed adhesive obstruction within one year of operation. However few patients presented as late as after 10 years of last operation.

All the 50 patients were kept on conservative treatment of adhesive SBO initially, and were reassessed after 24 hours. 24 patients, who improved in this time were continued with the same treatment while the remaining 26 patients were declared as cases of failed conservative treatment. In these 26 patients, gastrograffin (100 ml) was administered via nasogastric tube and serial abdominal radiographs were taken in supine position after 4, 8, 12 and 24 hours. In 23 patients (~ 88%), the contrast reached the colon within 24 hours (Fig.1) while in three cases contrast failed to reach the colon (Fig.2).

Figure 3

Fig. 1 – Contrast reached to the colon

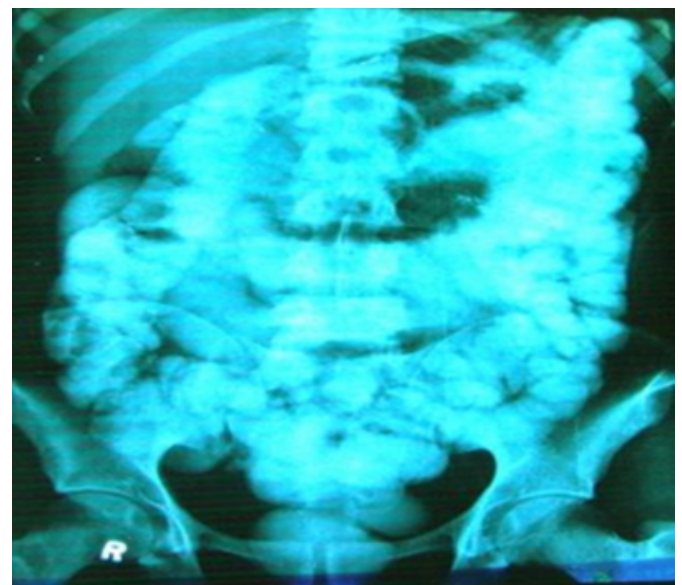
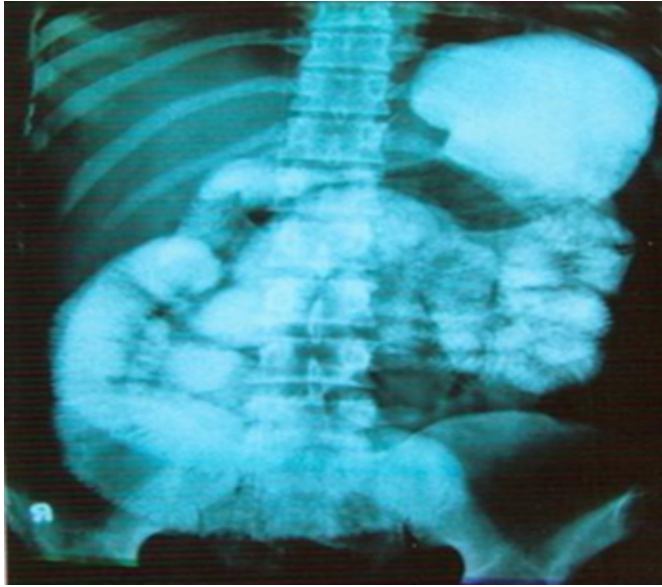


Figure 4

Fig. 2 – Contrast failed to reach the colon



The detailed radiological findings are shown in table III.

Figure 5

Table III : Radiological Findings

Total Number – 50	
Managed conservatively without gastrograffin – 24 cases	
Gastrograffin study performed – 26 cases	
Contrast study findings	No. of cases
A. Contrast passed to the colon in 24 hours	23
In < 4 hours	3
4-8 hours	5
8-12 hours	6
12-24 hours	9
B. Contrast failed to reach colon in 24 hours	3

Conservative treatment was continued in 23 patients, who were diagnosed as having partial obstruction on contrast study. All these patients passed flatus and stools within 48 hours of administration of gastrograffin. Out of three patients where contrast failed to reach the colon, two underwent emergency laparotomy and one was continued with conservative treatment as there was clinical improvement in this case. So out of 26 patients, two patients had to undergo surgery and both these cases were confirmed to be having complete obstruction on gastrograffin study preoperatively. The operative finding in these two cases were :

(i) Band near ileocecal junction with proximal dilated gut loops of small bowel with small perforation in distal jejunum.

(ii) Adhesions with band at ileocecal junction with rotation of gut over the band.

So it was observed that use of gastrograffin avoided surgical intervention in 23 of 26 (88%) patients who had failed conservative management of adhesive small bowel obstruction. There was no complication in any of the patient that could be attributed to gastrograffin.

DISCUSSION

Bowel obstruction was recognised, described and treated by Hippocrates.³ Today also bowel obstruction remains one of the most common intraabdominal problem faced by general surgeons in their practice. About 80% of bowel obstruction occur in the small intestine, the remaining 20% occur in the colon.² During the early part of 20th century, the most common cause of small bowel obstruction was obstructed hernias, but now the most common cause of SBO is postoperative adhesions.³ Some elements of adhesion formation is nearly universal after celiotomy and starts as early as first few hours after surgery. Irvin noted that 3.5% of all emergency surgical admissions that resulted in laparotomy, subsequently developed adhesive intestinal obstruction.⁴

The diagnosis of bowel obstruction is suspected clinically based on the presence of classic signs and symptoms, and then confirmed by some form of imaging test such as abdominal radiography or more recently by computed tomography. However, the sensitivity and specificity of plain film radiology for diagnosis of SBO is low and it is not possible to recognise the cause, level of obstruction and ischaemic complications by this modality.⁵ Contrast radiology using barium or water-soluble contrast medium have been used to determine whether SBO is present and whether it is partial or complete. However, barium study may be dangerous in cases of near complete obstruction as it may become inspissated above the level of obstruction or barium may spread into the peritoneal cavity if perforation occurs causing barium peritonitis.⁶ Water-soluble contrast media is safe and non-irritant to the peritoneal cavity. Gastrograffin is the most commonly used contrast agent for this purpose.⁷ The osmolarity of gastrograffin is 1900 mosm/l, approximately six times that of extracellular fluid, which promotes shifting of fluid into bowel lumen and increases the pressure gradient across the obstruction site leading to early resolution.

In present study, the cases were seen from all ages, with majority being in the age group of 10-29 years. This was

consistent with other studies.^{1,2,6} Regarding sex distribution, male dominated over female (4:1) by a huge margin, but in other western studies the sex ratio was almost same.^{2,6} This may be an indicator of the ignorance towards female in our society, specially in Haryana where this study was undertaken. Out of 50 patients included in the study, maximum number of patients (44%) had an antecedent history of small bowel procedure followed by appendicectomy (28%). In the western literature, small bowel procedures followed by large bowel procedures formed the main cause of adhesions.^{7,8} The amount of gastrograffin used varied from 50-100 ml in different studies and the timing of abdominal radiographs ranged from 4-24 hours.^{6,7} In our study we have used 100 ml of gastrograffin and cut off line taken was 24 hours. If contrast was seen in the colon in this duration, it was considered partial small bowel obstruction and conservative treatment was continued. On the other hand, if the contrast did not reach the colon in 24 hours, it was considered as complete obstruction and the patient was offered surgical treatment.

In the present study, out of 26 patients, gastrograffin passed to the colon in 23 patients and all these had successful conservative treatment. In three patients, the contrast failed to reach the colon in 24 hours, two out of them required surgery and one resolved with conservative management. These results are comparable with the other studies in the literature, which have suggested that presence of contrast agent in the colon indicated that the obstruction would resolve without surgical intervention with a sensitivity ranging from 95-100%.^{6,8,9} Some of the studies, have proved the therapeutic value of gastrograffin and have observed that it prompts the resolution of SBO and shortens the hospital stay.^{1,8} However, some others have denied the therapeutic advantage of gastrograffin.¹⁰ In the present study, sixty percent cases resolved within 24 hours of administration of gastrograffin suggesting that gastrograffin may also have a therapeutic role in adhesive SBO. Similar observations were made by Kapoor et al, where gastrograffin was given to 24 patients who failed to improve after 48 hours of conservative trial.¹¹ Contrast radiology was having diagnostic as well as

therapeutic value in their study.

From the findings of this study, it can be concluded that gastrograffin is a very accurate predictor for non-operative resolution of SBO. The ability of gastrograffin to make an early diagnosis and predict those patients who require surgery, leads to a reduction in overall morbidity and mortality that would have occurred because of delayed surgery. So use of gastrograffin avoids the need of surgical management in majority of patients, and also it helps in early resolution of symptoms in patients with partial adhesive SBO.

References

1. Burge J, Abbas SM, Roadley G, Donald J, Connolly A. Randomised controlled trial of gastrograffin in adhesive small bowel obstruction. *ANZ J Surg* 2005; 75: 672-74.
2. Abbas SM, Bisset IP, Parry BR. Meta analysis of oral water soluble contrast agent in the management of adhesive small bowel obstruction. *Br J Surg* 2007; 94: 404-11.
3. Houghton SG, Medina ARDL, Sarr MG. Bowel obstruction. In : Zinner MJ, Ashley SW, editors. *Maingot's abdominal operations*. 11th ed. New York: Mc Graw Hill; 2007: 479-507.
4. Irvin TT. Abdominal pain : A surgical audit of 1190 emergency admissions. *Br J Surg* 1989; 76: 1121-25.
5. Maglente DD, Reyes BL, Harmon BH, Kelvin FM et al. Reliability and role of plain film radiography and CT in the diagnosis of small bowel obstruction. *AJR* 1996; 167: 1451-55.
6. Enochsson L, Runold M, Fenyo G. Contrast radiography in small intestinal obstruction, a valuable diagnostic tool? *Eur J Surg* 2001; 167: 120-24.
7. Joyce WP, Delaney PV, Gorey TF, Fitzpatrick JM. The value of water soluble contrast radiology in the management of acute small bowel obstruction. *Ann R Coll Surg Engl* 1992; 74: 422-25.
8. Assalia A, Schein M, Kopelman D, Hirshberg A, Hashmonai M. Therapeutic effect of oral gastrograffin in adhesive, partial small bowel obstruction : a prospective randomized trial. *Surgery* 1994; 115: 433-37.
9. Onow S, Katoh T, Shibata Y, Matsuo K, Suzuki M, Chigira H. The value of contrast radiology for postoperative adhesive small bowel obstruction. *Hepatogastroenterol* 2002; 49: 1576-78.
10. Fevang BT, Jenson D, Fevang J, Sondenna K, Rokke Osborne. Upper gastrointestinal contrast study in the management of small bowel obstruction – a prospective randomised study. *Eur J Surg* 2000; 166: 39-43.
11. Kapoor S, Jain G, Sewkani A, Sharma S, Patel K, Varshney S. Prospective evaluation of oral gastrograffin in postoperative small bowel obstruction. *J Surg Res* 2006; 131: 256-60.

Author Information

Satish Dalal, M.S., F.A.I.S., F.I.C.S.

Associate Professor, Departments of General Surgery, Pt.B.D.Sharma Postgraduate Institute of Medical Sciences (P.G.I.M.S.)

Nityasha, M.S., D.N.B., F.A.I.S.

Assistant Professor, Departments of General Surgery, Pt.B.D.Sharma Postgraduate Institute of Medical Sciences (P.G.I.M.S.)

Pawan Goyal, M.S.

Senior Resident, Departments of General Surgery, Pt.B.D.Sharma Postgraduate Institute of Medical Sciences (P.G.I.M.S.)

R.S. Dahiya, M.S.

Senior Professor, Departments of General Surgery, Pt.B.D.Sharma Postgraduate Institute of Medical Sciences (P.G.I.M.S.)