

ORIGINAL RESEARCH

Therapeutic value of gastrografin (water soluble contrast medium) in the management of adhesive small bowel obstruction - Hospital based prospective study

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ABSTRACT

Background: Aim of this study was to assess the therapeutic value of Gastrografin (water soluble contrast medium) in the management of adhesive small bowel obstruction. **Materials and Method:** This Study was carried out in the Department of General Surgery, AIMS Bathinda after getting approval from the Research committee, AIMS and Ethics committee, Adesh University for a period of 18 months. Patients were selected as and when they present to Department of General Surgery, AIMS Bathinda after applying inclusion and exclusion criteria. After taking informed and written consent, a detailed history, general and systemic examination was done. All the cases presenting with small bowel obstruction were given a trial of conservative treatment unless there was a suspicion of strangulation. Those with a suspicion of strangulation were taken up for laparotomy. Rest of the patients were given oral gastrografin within 2 hours of presentation. In all of them, the conservative trial post-gastrografin was given and followed up for 2- 3 days. The said parameters- clinical improvement, the operative rate, hospital stay duration and resolution of the obstruction were analysed and evaluated. For patients who had conservative treatment for more than 48 hours, surgery was performed if there was no continuing improvement. Parameters used to reach the end point of adhesive intestinal obstruction were clinical improvement (decreased pain, distension, passage of flatus and /or stool, normal intestinal sounds, stool in P/R examination and decreased amount in Ryle tube output) and radiological improvement. Patients' data that included demographic data, number of previous surgeries, the length of hospital stay and operative rate, were recorded and analysed statistically. **Results:** In our study, we found operative rate is 18.33% which is at par with results found by Saverio et al (18.5%) in patients given conservative treatment with gastrografin. Also, in our study, the mean hospital stay decreased from 8.55 days (patients who required operative intervention) to 2.73 days (patients treated successfully with gastrografin), which is at par with results found by Biondo et al (hospital stay decreased from 8.5 to 4.1 days). There was no complication or mortality observed that could be attributed to the use of gastrografin in our study. **Conclusion:** We conclude that the use of gastrografin as a conservative management is a safe and effective method and should be primarily attempted in all patients of adhesive small bowel obstruction as it is beneficial in avoiding surgery in majority of patients (81% patients in our study) presenting with adhesive small bowel obstruction, thereby reducing the duration of hospital stay and cost for the patient as well as reducing the hospital bed occupancy and hospital load. Therefore, administration of oral gastrografin as a nonoperative treatment in adhesive small bowel obstruction is recommended but there is a need for randomised controlled studies with larger sample size for any guidelines/protocols to be established.

Keywords: Gastrografin, bowel obstruction

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INTRODUCTION

Adhesive small bowel obstruction accounts for more than 60 % of the Small Bowel Obstruction. ⁽¹⁾ A breach in the peritoneum during any abdominal surgery will lead to adhesions. Adhesions can occur in 95 % to 100 % of patients who undergo abdominal surgery. But occurrence of Adhesive Small Bowel Obstruction is only in 1 to 10 % of the Appendicectomy, 6 % of Open Cholecystectomy, 10 to 25 % of the intestinal surgeries and 17 to 25 % of the Colorectal surgeries⁽²⁾. The management of the Adhesive small Bowel Obstruction is either Conservative or Surgical. The natural course of this clinical problem is still unclear. Patients with this condition are often difficult to assess and require careful evaluation and management. Emergency surgery is mandatory when strangulation is suspected or in complete bowel obstruction. Nonoperative conservative management is indicated in the case of partial obstruction. The principles of non-operative treatment are *nil per os*, naso-gastric, or long-tube decompression, and intravenous supplementation with fluids and electrolytes.

Gastrografin is a radiopaque contrast medium³ commonly used for diagnostic examination of the gastrointestinal tract (GI) tract. Available evidence suggests it has therapeutic value in the management of adhesive small bowel obstruction. It is a water-soluble contrast medium composed of sodium diatrizoate, meglumine amidotrizoate and a wetting agent (polysorbate 80). It has an osmolarity of 1900mosm/L, which is approximately six times that of extracellular fluid. It promotes shifting of fluid into the bowel lumen and increases the pressure gradient across an obstructive site. The bowel content is diluted, and in the presence of the wetting agent, passage of bowel contents through a narrowed lumen is facilitated. So, Studies have suggested a possible therapeutic effect of this agent in adhesive small bowel obstruction, but the efficacy is still controversial. The present prospective study is being undertaken to evaluate the therapeutic effect of gastrografin in adhesive small bowel obstruction.

AIM AND OBJECTIVES

Aim: To assess the therapeutic value of Gastrografin (water soluble contrast medium) in the management of adhesive small bowel obstruction.

Primary Objectives: To assess the efficacy and safety of gastrografin in reducing the need for surgical intervention (operative rate) and shortening the hospital stay in adhesive small bowel obstruction. To assess the role of gastrografin in the resolution of adhesive small bowel obstruction.

MATERIAL AND METHODS

We carried out a comparative study of total 60 patients suffering from adhesive small bowel obstruction at Adesh institute of medical sciences based on inclusion and exclusion criteria.

INCLUSION CRITERIA

1. Patients with a history of previous abdominal operation.
2. Patients with clinical and radiological evidence of adhesive small bowel obstruction.
3. Patients willing to participate and giving consent.

EXCLUSION CRITERIA

1. Patients with large bowel obstruction.
2. Patients with early postoperative obstruction (within 4 weeks).
3. Patients with Ileus, documented intra-abdominal malignancy, inflammatory bowel disease.
4. Patients with history of abdominal irradiation.
5. Patients with hyperthyroidism, any sensitivity to iodine.
6. Patients in whom the final diagnosis was not adhesive small bowel obstruction.

Patients were selected as and when they present to Department of General Surgery, AIMSR Bathinda after applying inclusion and exclusion criteria and after obtaining their informed written consent.

Study was carried out in the Department of General Surgery, AIMSR Bathinda after getting approval from the Research committee, AIMSR and Ethics committee, Adesh University for a period of 18 months.

After taking informed and written consent, a detailed history, general and systemic examination was done. All the cases presenting with small bowel obstruction were given a trial of conservative treatment unless there is a suspicion of strangulation. Those with a suspicion of strangulation were taken up for laparotomy. Rest of the patients were given oral gastrografin within 2 hours of presentation. In all of them, the conservative trial post-gastrografin was given and followed up for 2- 3 days. The said parameters- clinical improvement, the operative rate, hospital stay duration and resolution of the obstruction were analysed and evaluated. For patients who have conservative treatment for more than 48 hours, surgery were performed if there is no continuing improvement. Parameters to be used to reach the end point of adhesive intestinal obstruction were clinical improvement (decreased pain, distension, passage of flatus and /or stool, normal intestinal sounds, stool in P/R examination and decreased amount in Ryle tube output) and radiological improvement. Patients' data included demographic data, number of previous surgeries, the length of hospital stay and operative rate, were recorded and analysed statistically.

RESULTS

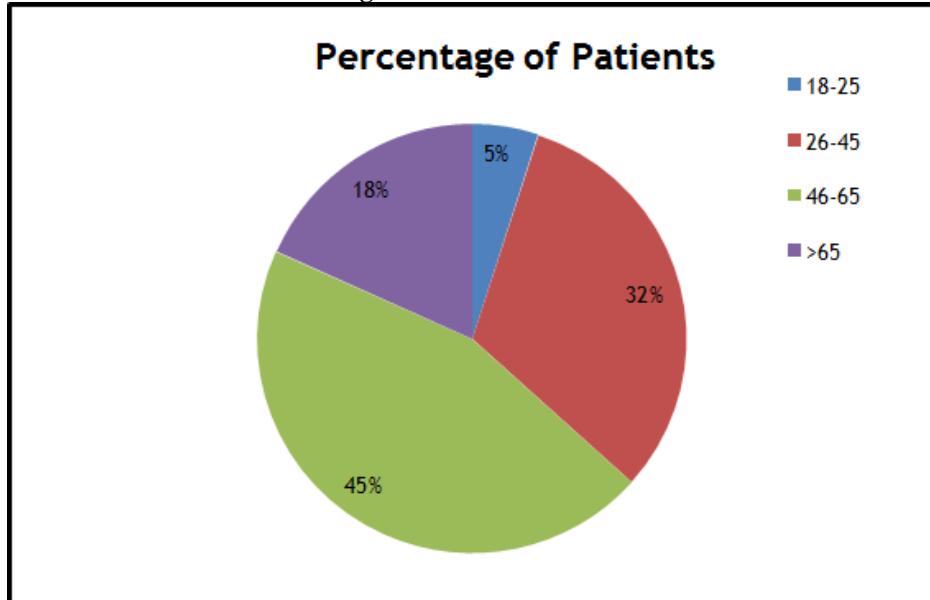
Age distribution of patients in the study

In this study, the study population was divided into four age groups. Most of the patients belong to 46-65 years of age accounting to 45%. Next is the age group 26-45 constituting around 31.67%. The least affected age groups are those older than 65 yrs (18%) and those in 18-25 yrs age group (5%).

AGE DISTRIBUTION OF PATIENTS - TABLE 1

Age Group	No Of Patients	Percentage Of Patients
18-25	3	5
26-45	19	31.67
46-65	27	45
>65	11	18.33

AGE DISTRIBUTION OF PATIENTS -Fig 1

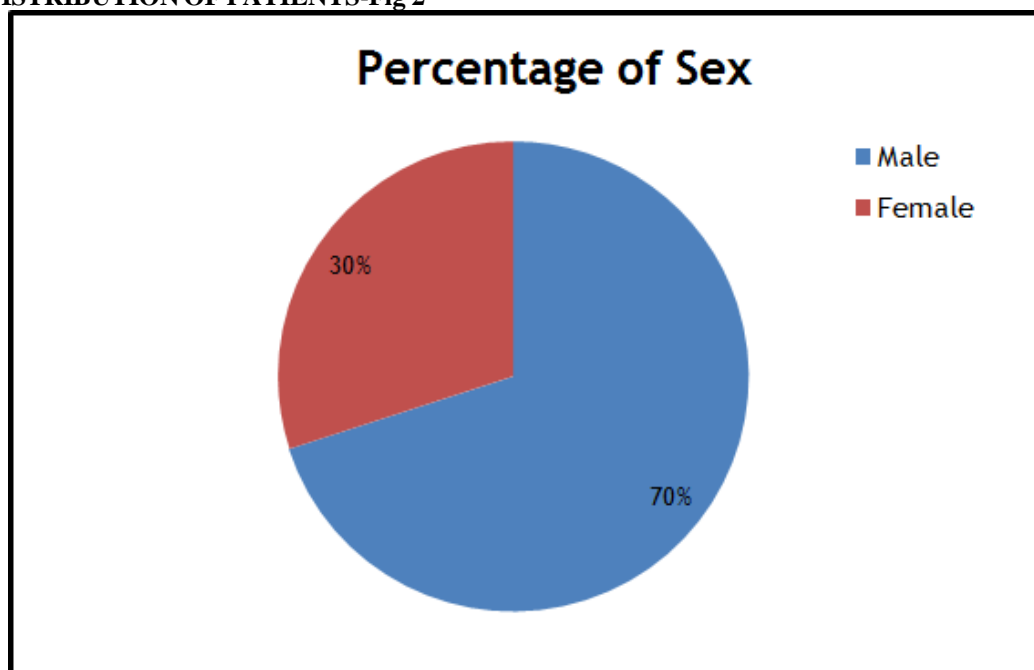


SEX DISTRIBUTION

SEX DISTRIBUTION OF PATIENTS - TABLE 2

SEX	No of Pts.	Percentage
MALE	42	70
FEMALE	18	30

SEX DISTRIBUTION OF PATIENTS-Fig 2



In this study, out of 60 patients, 70% of the patients who had adhesive small bowel obstruction were males and 30% were females.

SYMPTOM ANALYSIS

All the symptoms were analyzed regarding the frequency and significance with regard to the management of patients whether continuation of conservative management or surgical intervention was needed, duration of hospital stay, age group and gender.

ABD PAIN**ABDOMINAL PAIN FREQUENCY - TABLE 3**

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	0(absent)	12	20.0	20.0	20.0
	1(present)	48	80.0	80.0	100.0
	Total	60	100.0	100.0	

Abdominal pain was present in 48 patients out of 60 (80% of total patients).

ABD DISTENSION**ABDOMINAL DISTENSION FREQUENCY - TABLE 4**

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	0(absent)	20	33.3	33.3	33.3
	1(present)	40	66.7	66.7	100.0
	Total	60	100.0	100.0	

Abdominal distension was present in 40 patients out of 60 (66.7%).

VOMITING**VOMITING FREQUENCY - TABLE 5**

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	0(absent)	34	56.7	56.7	56.7
	1(present)	26	43.3	43.3	100.0
	Total	60	100.0	100.0	

26 out of total 60 patients under study (43.3%) presented with vomiting.

FEVER**FEVER FREQUENCY - TABLE 6**

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	0(absent)	48	80.0	80.0	80.0
	1(present)	12	20.0	20.0	100.0
	Total	60	100.0	100.0	

12 patients out of total 60 (20%) had fever.

CONSTIPATION/OBSTIPATION**CONSTIPATION/OBSTIPATION FREQUENCY - TABLE 7**

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	0(absent)	18	30.0	30.0	30.0
	1(present)	42	70.0	70.0	100.0
	Total	60	100.0	100.0	

42 patients out of total 60 under study (70%) had complaints of constipation/ obstipation.

DURATION OF STAY
DURATION OF STAY - TABLE 8

	Days	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	9	15.0	15.0	15.0
	2	16	26.7	26.7	41.7
	3	11	18.3	18.3	60.0
	4	5	8.3	8.3	68.3
	5	8	13.3	13.3	81.7
	7	5	8.3	8.3	90.0
	8	1	1.7	1.7	91.7
	9	2	3.3	3.3	95.0
	10	2	3.3	3.3	98.3
	13	1	1.7	1.7	100.0
	Total	60	100.0	100.0	

In our study, out of the total 60 patients, 16 patients (26.7%) had a hospital stay of 2 days, 11 patients (18.3%) of 3 days, 9 patients (15%) of day 1, 8 patients (13.3%) of 5 days, 5 patients (8.3%) each of 4 and 7 days, 2 patients (3.3%) each of 9 and 10 days, 1 patient (1.7%) each for 8 and 13 days.

CONSERV/OPERATIVE
CONSERVATIVE/OPERATIVE FREQUENCY -TABLE 9

	Frequency		Percent	Valid Percent	Cumulative Percent
Valid	C (Conservative)	49	81.7	81.7	81.7
	O (operative)	11	18.3	18.3	100.0
	Total	60	100.0	100.0	

In our present study, out of total 60, 49 patients (81.7%) responded to conservative trial with gastrografin whose symptoms resolved and did not require surgical intervention, whereas 11 patients (18.3%) required surgical intervention or operative rate.

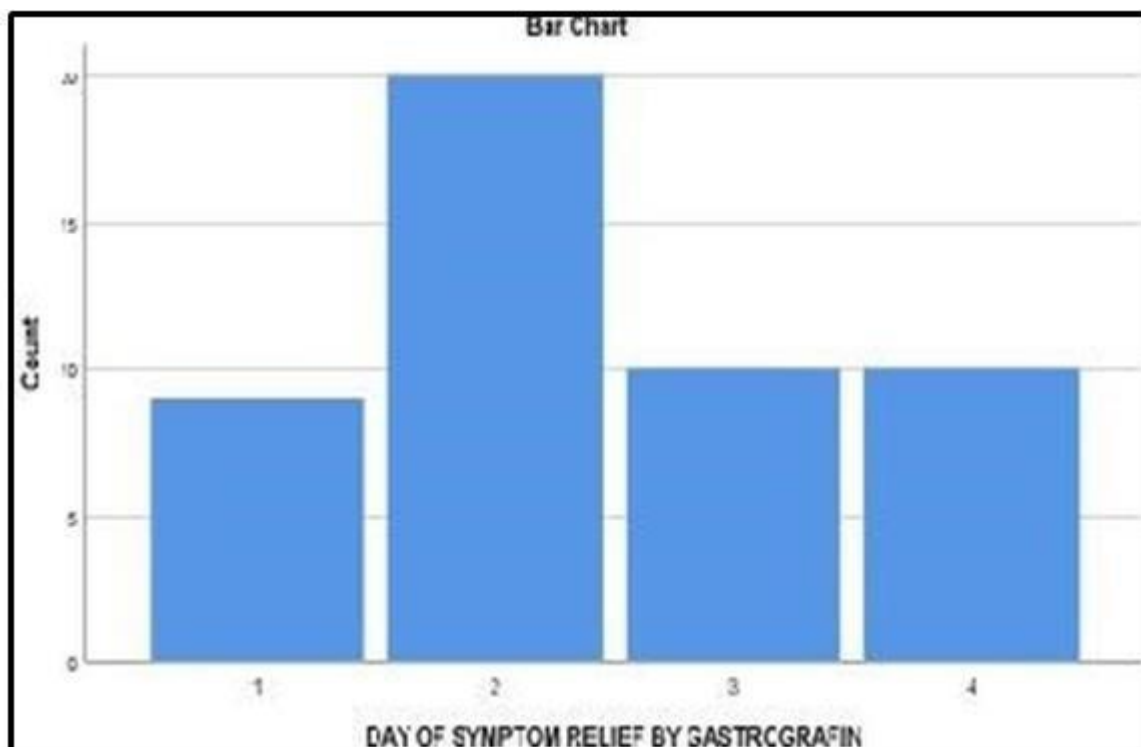


Fig 3

In our present study, out of the 49 patients whose symptoms resolved by conservative treatment with gastrografin, symptoms of 9 patients (15%) resolved on day 1, 20 patients (33.3%) on day 2, 10 patients (16.7%) on day 3 and day 4 each.

DISCUSSION

The role of Gastrografin, the most widely used water soluble contrast medium in adhesive small bowel obstruction, has been assessed recently with regard to diagnostic and therapeutic value [4]. Gastrografin dilutes the bowel content, it facilitates its passage and decreases edema of the intestine wall facilitating motility [5,6,7]. It is proposed that Gastrografin has therapeutic value because it reduces the operative rate and the length of hospital stay. However, findings are still conflicting, as some authors did not find a therapeutic advantage [4].

In our study, we have found operative rate is 18.33% which is at par with results found by Saverio et al (18.5%) in patients given conservative treatment with gastrografin.

Also, in our study, the mean hospital stay decreased from 8.55 days (patients who required operative intervention) to 2.73 days (patients treated successfully with gastrografin), which is at par with results found by Biondo et al (hospital stay decreased from 8.5 to 4.1 days).

Even though these studies showed a significant impact of the use of oral gastrografin, a metaanalysis done by Abbas et al, water-soluble contrast agent did not reduce the need for surgical intervention, but reduced the length of hospital stay for patients who did not require surgery compared with placebo (22,23), which is quite at par with the results displayed in our study i.e there is a significant decrease in the duration of hospital in patients requiring treatment with gastrografin as compared to patients who required operative intervention, but there is no significant results with respect to the need for operative intervention.

On the other hand, Feigin et al⁽¹²⁾ completely refuted the therapeutic effect of gastrografin and did not find any advantage with respect to the operative rate, resolution of symptoms and hospital stay.

However, in our current study we observed that the mean hospital stay in our study decreases significantly in patients who required only conservative treatment with gastrografin (2.73 ± 1.335) as compared to patients who needed surgical intervention (8.55 ± 1.916).

The operative rate in our study is 18.3333 % i.e. 11 patients out of 60 required surgical intervention after the conservative treatment with gastrografin failed to resolve the symptoms, in 49 patients (81.6666%) the symptoms resolved with the conservative treatment with gastrografin. However comparing these to the other studies (chi square and p value) the results are not statistically significant (p value not less than 0.05).

In Michel Scotte et al (2017), rate of operative intervention required in patients who received gastrografin was around 24%, and duration of hospital stay was 3.8 days, In our study we have found the operative rate to be around 18.3% and duration of hospital stay at around 2.73 days.

On one hand in our current study, we found that gastrografin reduced the duration of hospital stay similar to the results of the previous studies by Biondo et al, Di Saverio et al, Abbas metal and Assalia et al; however on the other hand, conflicting results were also observed in our study as the operative rate when compared to the other studies as mentioned did not reveal a statistically significant value.

In our study, there was no complication or mortality that could be attributed to the use of Gastrografin.

CONCLUSION

From the demographic analysis point of view, in our study the majority of patients belong to the age group of 46-65 yrs, followed by 26-45 yrs age group. Out of total 60 patients in our study, 42 (70%) were males and 18 (30%) were females.

In our study, among total 60 patients with adhesive small bowel obstruction, abdominal pain was the most common presenting symptom (80%), followed by constipation/obstipation (70%) and abdominal distension (66.7%).

The length of hospital stay was significantly reduced in patients who responded to gastrografin as compared to those who needed surgery. In comparison to other relevant studies, the operative rate in our study was similar. Of all the symptoms, fever and abdominal distension were the main presenting symptoms in patients who required surgical intervention.

Hence, we conclude that the use of gastrografin as a conservative management is a safe and effective method and should be primarily attempted in all patients of adhesive small bowel obstruction as it is beneficial in avoiding surgery in majority of patients (81% patients in our study) presenting with adhesive small bowel obstruction, thereby reducing the duration of hospital stay and cost for the patient as well as reducing the hospital bed occupancy and hospital load. Therefore, administration of oral gastrografin as a nonoperative treatment in adhesive small bowel obstruction is recommended but there is a need for randomised controlled studies with larger sample size for any guidelines/protocols to be established.

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