

## Role of orally administered Gastrografin in small bowel obstruction after unsuccessful conservative treatment

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### ABSTRACT

**Objectives:** Orally administered gastrografin is a hyperosmolar water soluble contrast medium. It is commonly used for the diagnosis of small bowel obstruction but it also has a therapeutic role in small bowel obstruction (SBO). The purpose of this study was to determine the diagnostic and therapeutic role of gastrografin in cases of small bowel obstruction who didn't respond to conservative treatment.

**Methodology:** This retrospective study was carried out from Jan 2004 to Oct 2009, in which 110 patients with diagnosis (clinical & radiological) SBO were included. An initial trial of conservative treatment was given after excluding the bowel ischemia. Every patient was observed for twenty four hours to assess the response to conservative treatment. After 24 hours non-responding patients were given 100 ml of gastrografin through Ryle's tube and transit of contrast was followed by repeated abdominal radiographs taken at 4,8,12 and 24 hours after administration of gastrografin. In partially obstructed patients in whom contrast appeared in large bowel no further intervention was performed. Laparotomy was performed in remaining patients in whom gastrografin failed to reach the large bowel within 24 hours.

**Results:** From Jan 2004 to Oct 2009, 110 patients (men =62 & women = 48) with small bowel obstruction were included in the study. The mean age of our patients was 34.1 years (15 - 40 years). In 22% (25) patients had bowel strangulation and they were operated soon after admission. Non operative treatment was continued in 10% (12) of patients who responded to the conservative treatment in first 24hrs. Twenty eight (25%) patients had history of single surgery while 10 (9%) of patients had history of more than one operation in the past. Gastrografin was given to 73 patients who didn't respond to conservative treatment in 24hrs. Thirty four percent (25 out of 73) patients were operated for complete obstruction after gastrografin administration. Forty five (61%) patients had partial obstruction after gastrografin administration and complete resolution of obstruction occurred in all of them except three patients who were operated for persistent obstruction. We found 92% reduction in the operative rate after gastrografin administration. No complications were noted with the use of gastrografin.

**Conclusion:** After unsuccessful routine conservative treatment gastrografin can be used safely and it can reduce the operative rate. In this study out of 73 patients who were administered gastrographin, obstruction was completely resolved in 42 patients (57.5%). It also helps in predicting the need for surgery thus it shortens not only hospital stay but also reduces the potential morbidity of late surgery due to prolong & unsuccessful non operative treatment.

**KEY WORDS:** Gastrografin, Small bowel obstruction, Surgery.

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### INTRODUCTION

Small bowel obstruction occurs due to post operative adhesion in 6-30% patients and only 20 to 30% require surgery.<sup>1</sup> The exact cause of adhesive SBO is not known. Gynaecological

surgery and appendectomy are the most common cause of SBO.<sup>2</sup> These patients are usually difficult to diagnose and manage. Patients with strangulation require emergency operation but management of remaining patients is more difficult.<sup>3</sup> In cases of partial obstruction a trial of conservative treatment can be given but the duration of this trial is not yet decided.<sup>2,3</sup> In addition delaying the conservative treatment for more than 24 hours increases the rate of post operative complications and hospital stay.<sup>4</sup> SBO either complete or incomplete is difficult to differentiate clinically or with radiographs.<sup>5</sup> The conventional approach is to offer conservative treatment for 24 hour as most obstruction that resolve is likely to do so within this time.<sup>6</sup>

The diagnostic and therapeutic role of contrast media in SBO has been evaluated in multiple studies.<sup>7,8</sup> These studies were mainly performed to know whether water soluble contrast media can differentiate in partial or complete obstruction or to know whether it has any therapeutic role in resolution of partial obstruction. Gastrografin is the most commonly used water soluble contrast agent. It comprises of a mixture of sodium diatrizoate & meglumine diatrizoate with an osmolarity of 1900mosm/l. It increases the intraluminal water content due to its osmotic activity, thereby decreasing the bowel wall edema. It also increases the contractility of smooth muscles.<sup>9,10</sup>

Due to presence of a wetting agent (polysorbate) it facilitates the movement of bowel content through its narrowed lumen. Administration of gastrografin and its appearance into large bowel allow to select the patients for non operative treatment. The aim of this retrospective study is evaluate the diagnostic & therapeutic role of gastrografin in patients of SBO who failed to respond to conservative treatment.

## METHODOLOGY

We included the patients over 18 years of age with an emergency admission to surgical Unit -II of JPMC. Patients with intra abdominal malignancy, inflammatory bowel disease or a history of irradiation to abdomen were excluded. A comprehensive history and detailed physical examination was performed in each patient with special emphasis on any previous abdominal surgery or episode/s of bowel obstruction. Patients were then put on conservative treatment by passing a Ryles's tube to monitor the nasogastric output, administering intravenous fluids and antibiotics. Electrolytes levels were checked and replaced as needed.

Patients were radiologically evaluated by performing supine and erect abdominal radiographs to count the number of dilated bowel loops and measure the maximum diameter of small bowel which led to the division of patients in two groups: first, with impending strangulation who were taken immediately for surgery and second, the remaining patients in whom conservative treatment was continued. This conservative treatment group was then followed clinically and radiologically for improvement and deterioration. Clinical improvement criteria were decreasing abdominal pain, decrease in nasogastric output and passage of stools if constipation was the main problem. Radiological improvement was identified by decrease in the number of dilated bowel loops and a decrease in their diameter as well. Responder to conservative treatment were maintained on the same regimen while the rest were given gastrografin after obtaining an informed consent.

One hundred milliliters of gastrografin was given to these patients via Ryle's tube and the tube was blocked to prevent back drainage. This was followed by abdominal supine films at 4,8,12,24 hours intervals. Appearance of gastrografin in the large bowel was considered the hallmark of response. These patients were labeled as being partially obstructed while the remaining had complete obstruction and were then operated. The patients with partial obstruction had their Ryle's tubes removed after the output decreased to 200ml /day and were started on liquids progressing gradually to solids. These patients were discharged as they tolerated the diet. Complications, death rate and hospital stay was recorded for each case.

## RESULTS

From January 2004 to October 2009, 110 patients with SBO were included. The mean age was 34.1 years (range = 15 to 60 years). Out of 110 patients 62 were male and 48 were female. Twenty eight patients had history of single while ten patients had history of more than one previous abdominal surgery. Most patients in our study had history of gynaecological surgery and second most common surgery was appendectomy. The mean duration of symptoms before admission was 3.6 days (range = 1 to 10 days). The duration of nasogastric decompression was different in different patients therefore we took the average nasogastric output of each patient for our study. Nasogastric output before the procedure was taken for patients who underwent gastrografin study or surgery. The mean

output was 540 ml / 24hours. After admission 25 patients were operated in emergency due to bowel strangulation.

Conservative treatment was continued in 85 patients. Twelve out of 85 patients responded to conservative treatment. The mean time of complete resolution was three days after admission (range = 1 to 5 days).

Gastrografin challenge was given to remaining 73 patients. The mean time of this challenge was 30 hours (range = 28 to 70 hours). After gastrografin administration 45 patients demonstrated partial and 28 patients had complete obstruction. In 42 out of 45 patients obstruction was completely resolved. Mean time of resolution was 46hours (range = 16-86 hours). The remaining three patients were operated for recurrent obstruction in the same admission. The cause of recurrent obstruction were post operative adhesion in one patient & tumour of ascending colon and an obstructing band in other two patients. In 28 patients laparotomy was performed in whom complete obstruction was present after gastrografin administration. (Table-I) No complications were noticed in patients who were treated with gastrografin. We found 92% reduction in operative rate after gastrografin administration.

## DISCUSSION

Any abdominal surgery can lead to adhesive SBO and incidence of complication varies from 6% to 30%.<sup>1</sup> Appendicectomy and colorectal surgery are the common surgical procedures which can lead to adhesive small bowel obstruction in different studies.<sup>2,3</sup> In our study we found that gynaecological surgery and appendicectomy are the commonest cause of adhesive SBO. There are controversies in the management of SBO. But a general consensus is that patient should receive a trial of conservative

treatment unless there is fear of strangulated bowel. However, there is no agreement on the duration of this trial. It was also found that significant complications can occur in those patients in which surgery is delayed for more than 48 hours.<sup>4</sup> Cox et al reported in his study that 88% of cases were resolved within 48hours who were treated with conservative treatment.<sup>6</sup> Assalia et al in his study continued the conservative treatment for 48 hours and if obstruction didn't resolved within this time he performed the surgery.<sup>9</sup> Sosa and Gardner found that patients without signs of strangulation could be treated non-operatively for 24 - 48 hours.<sup>11</sup> In our study we continued the conservative treatment for 48 hrs. Fourteen percent (12 out of 85) patient of adhesive SBO resolved after conservative treatment in our study. The risk factors which lead to failed conservative treatment are not known. But in our study we found that nasogastric tube output was very high in patients who respond to conservative treatment in comparison to those who failed to respond.

Chen et al studied the predictive role of gastrografin in adhesive small bowel obstruction and he found that surgery is required in 96% of patients in whom contrast failed to reach the colon within 24 hours.<sup>12</sup> Onoue et al study, in his study administered the gastrografin to patient on admission. He found 98% respond to conservative treatment if contrast appeared in colon within 24 hours and 80% failure rate to conservative treatment if contrast failed to reach the colon.<sup>13</sup> In our study in 92% patient contrast appeared in colon and obstruction was resolved while 98% of patients were operated in whom contrast failed to reach the large bowel within 24 hours. Previous studies have shown an operative rate of 27- 42% in cases of SBO. However the need for surgical treatment in our study was less than 10%. Assalia et al. and Biondo et al. found an early resolution of SBO and a decrease in hospital stay in their studies.<sup>9,14</sup> In our study the duration of hospitalization was also decreased mean  $44 \pm 18$  hours.

It is concluded that gastrografin administration in SBO is safe; it can be used therapeutically because it has a role in resolution of SBO. Gastrografin can also help in early diagnosis of cases of SBO who requires surgery. Thus it also shortens the hospital stay and morbidity.

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Table-I: Patients characteristics.(n=110)

No. of patients in the study (Male 62, Female 48)	110
Patients with single abdominal surgery in the past	28
Patients with more than one abdominal surgery in the past	10
Responded to conservative treatment	12(85)
Patients operated for recurrent obstruction	3
Patients with complete obstruction who had laparotomy after gastrografin administration	28

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## Authors Contribution:

Dr. Shabina Jaffar and Dr. Shamim Qureshi conceived, designed and were involved in data collection, statistical analysis & drafting of manuscript. Dr. Mumtaz Maher and Dr. Asghar Channa reviewed the manuscript and approved the final manuscript.

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