International Surgery Journal
Maharjan S et al. Int Surg J. 2024 Nov;11(11):1754-1758
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20243021

Original Research Article

Role of gastrograffin in adhesive bowel obstruction after unsuccessful conservative treatment: a prospective evaluation

Suresh Maharjan[1]*, Kishor Manandhar[1], Binita Singh[2], Niliza Shakya[1], Om P. Patel[3]

[1]Department of Surgery, National Academy of Medical sciences, Bir Hospital, Kathmandu, Nepal
[2]Department of Health Science, Child Health Division, Kathmandu, Nepal
[3]Department of Surgery, Armed Police Force Hospital, Chandragiri Municipality, Nepal

Received: 25 September 2024
Revised: 07 October 2024
Accepted: 10 October 2024

***Correspondence:**
Dr. Suresh Maharjan,
E-mail: sureshmaharjan89@gmail.com

ABSTRACT

Background: Water soluble gastrograffin (GG) administration via nasogastric (NG) tube has shown to resolve the obstructive features and reduced the need for surgery and reduced hospital stay in the patients presenting with adhesive small bowel obstructions (ASBOs). Thus the use of GG in patients who did not improve after 48 hours of conservative treatment was found to be very useful in the management of ASBOs.
Methods: 77 patients presenting with the features of ASBOs in Department of General Surgery, Bir Hospital were included in the study which took place from July 2021 to April 2022. Those patients who presented with the signs of strangulation, peritonitis, complete obstruction and clinical signs of large bowel obstruction were excluded from the study.
Results: The mean time at which the symptoms of abdominal pain resolved was 17.45 hours, 28.5 hours and 23.06 hours in patients improved with conservative management, with GG and who undergone surgery respectively. The mean time for passage of flatus was 57.42 hours in patients treated with GG. The mean time in which the patients passed stool was 36.92 hours, 66 hours and 74.8 hours in patients treated with conservative treatment, GG and operated respectively. It took 50.81 hours, 81.68 and 95.4 hours for improvement with conservative management, GG and surgery respectively.
Conclusions: The administration of GG in ASBOs after the failure of the initial 48 hours conservative management of ASBOs reduced the need for operative procedures and number of hospital days as most of them did not require surgery.

Keywords: Adhesive small bowel obstruction, Gastrograffin, Small bowel obstruction, Laparotomy

INTRODUCTION

Small bowel obstruction (SBO) is one of the leading cause of emergency surgical admissions all over the world. More than 3% of all emergency surgical admission in general hospitals being secondary to SBO and is considered to be the major cause of post-operative morbidity.[1-4] Following major abdominal surgeries, in >90% of patients adhesions occur.[7] The post-operatives adhesions were estimated to be causing 60% of the SBO.[5] 4-15% of patients, after intestinal surgeries, suffer SBO due to post-operative adhesion. Post-operative adhesion can occur at any time after the operation. Studies have showed about 20% of the obstruction appeared >10 years after the initial abdominal operation.[6,7]

Being one of the most common emergencies and major cause of morbidity and fatality, management of SBOs appropriately is a matter of concern. Previously, conservative management and operative procedures (laparotomy) were the techniques of management. In various researches and studies, water soluble gastrograffin (GG) administration via nasogastric (NG) tube has shown to resolve the obstructive features and reduced the need for

surgery in the patients presenting with adhesive small bowel obstructions (ASBOs). The use of GG also showed the reduced hospital stay in the patients. Thus, use of GG in patients who did not improve after 48 hours of conservative treatment was found to be very useful in the management of ASBOs. The purpose of this study is to determine the efficacy and safety of GG contrast in reducing the need for surgical intervention and reducing hospital stay in adhesive SBO.

METHODS

A prospective observational study was performed with convenient sampling in Department of General Surgery, Bir Hospital, NAMS, Mahaboudha, Kathmandu, Nepal over a period of 6 months from July 2021 to April 2022 in 77 patients presenting with the features of ASBOs. Those patients who presented with the signs of strangulation, peritonitis, complete obstruction and clinical signs of large bowel obstruction and those who have already undergone unsuccessful conservative management prior to consult at our center and those who did not give consent were excluded from the study. All the enrolled patients were managed conservatively for 48 hours. Patients responding to conservative management within the initial 48 hours continued the ongoing conservative treatment. Clinical improvement was defined as the presence of decreased abdominal pain, distension, tenderness or nasogastric tube output, or regular passage of flatus. Radiological improvement was defined as a decrease in number of air fluid level or decrease in the diameter of dilated small bowel or radiological evidence of air in the rectum Those who did not improve after the initial 48 hours were given GG 100 ml via NG tube and serial X-rays of abdomen were taken at 0, 0.5 hours, 6 hours, 12 hours and 18 hours. The passage of GG was studied and absence of the GG in the colon after 24 hours of GG administration was considered complete obstruction and they underwent surgery. The ethical clearance from the Institutional Review Board (IRB) of National Academy of Medical Sciences, (NAMS) was taken. The data was entered into the computer using statistical package for the social sciences (SPSS) 22.0 version and Microsoft excel software. Results were presented in tables, graphs and diagrams and expressed as percentages, mean, standard deviation and median for variables.

RESULTS

Total of 79 patients enrolled in the study, 77 patients were taken for the study while two were excluded as they were presented with features of strangulation and operated immediately. Out of 77 patients, 70.13% of the patients were male and 29.87% of the patients were female in our study (Figure 1).

Initially 53 patients out of 77 (68.8%) improved with the conservative management. GG was administered in 24 patients. Among those, in 19 patients, the GG reached upto the colon within 24 hours (79.2%) while in 5 patients out of 24 (20.8%), the GG did not reach the colon within 24 hours. In 3 of them, the GG reached till ileum while in 2 cases, the GG reached till jejunum. So, the surgery could be avoided in higher number of patients when GG was administered after the failure of the initial 48 hours of conservative management (Tables 1 and 2).

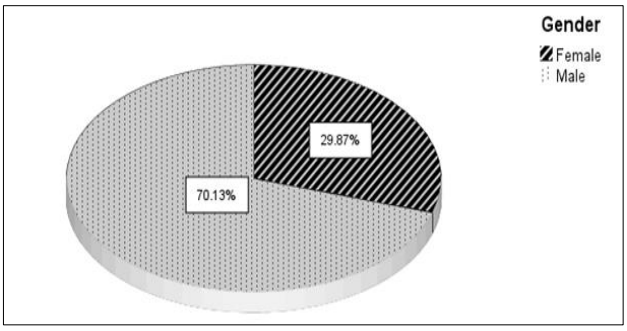

Figure 1: Percentage of patients according to sex.

Table 1: Number of patients improved with different modalities of treatment.

Treatment methods by which patients improved	Frequency
Initially excluded from study (due to features of strangulation)	2
Improved by GG administration (failed conservative management)	19
Initially improved with conservative treatment	53
Had undergone surgical intervention	5
Total	79

Among the patients who failed conservative treatment and improved with GG, 8 patients stayed at hospital for 3-7 days, 10 stayed for 7-2 days and only 1 patient stayed for >12 days. Among the patients who failed GG and underwent operation, 2 patients stayed at hospital for 7-12 days and 3 stayed for >3 days. So, the use of GG reduced the number of hospital stay days of the patients (Figure 2).

The mean time at which the symptoms of abdominal pain resolved in patients treated with various modalities were calculated. It was 28.5 hours in those patients improved with GG, it was 17.45 hours in patients improved with conservative management, and it took 23.06 hours in average for resolving of abdominal pain in patients where surgery had to be done (Table 3).

Also, the mean time at which flatus was passed was noted accordingly in patients improved with different modalities of treatment. The mean time for passage of flatus was 57.42 hours in patients treated with GG.

Again, the mean time in which the patients passed stool was 66 hours in patients treated with GG, 36.92 hours in those improved with conservative treatment and 74.8 hours in those who were operated.

Table 2: Number and percentage of successful GG treatment.

Total GG done	Successful GG		Unsuccessful GG	
	N	%	N	%
24	19	79.2	5	20.8

Table 3: Distribution showing mean hours of resolution of symptoms in separate treatment modalities.

Treatment modalities with which patient improved	Mean hours at which abdominal pain resolved	Mean hours at which flatus passed in patients	Mean hours at which patients passed stool
GG			
Mean	28.53	57.42	66.00
N	19	19	19
Conservative management			
Mean	17.45	27.55	36.92
N	53	53	53
Operation			
Mean	61.80	67.20	74.80
N	5	5	5
Total			
Mean	23.06	37.49	46.56
N	77	77	77

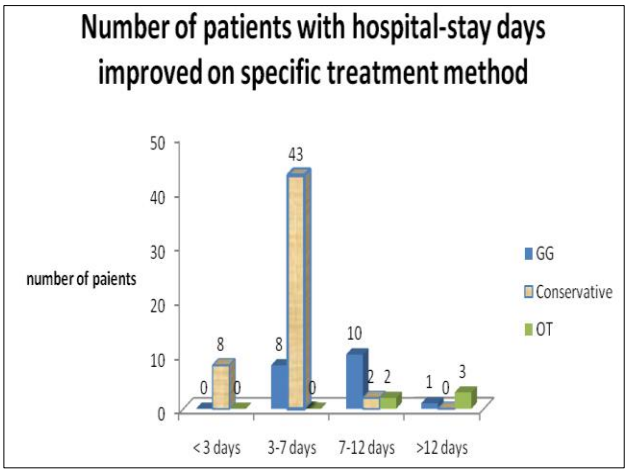

Figure 2: Number of patients with hospital stay and treatment methods.

The mean time in hours in which the patient treated with GG was 81.68 hours. It was only 50.81 hours for patients improved with conservative management and it took 95.4 hours in average for patients who needed surgery (Table 4).

Table 4: Mean hours when oral feeding was started during separate treatment modalities.

Improved with treatment modality	Mean hours of initiation of feeding	Total number
GG	81.68	19
Conservative	50.81	53
OT	95.4	5

DISCUSSION

In our study, 68.8% patients improved with the initial 48 hours conservative treatment while remaining 31.2% were given GG among whom 79.2% improved with the GG administration while 20.8% had to undergo surgery due to the failure of GG administration. The results in the study done by Kapoor et al in 2001 were similar to our study where 61.3% patients improved with initial conservative management of 48 hours, while 38.7% patients who did not improve were given GG among whom 91.6% improved with GG while the remaining 8.3% had to undergo surgery for failure of GG.[8] Similar to our study in the study done by Biondo et al, 85.6% patients improved with conservative management. Likewise, the use of GG decreased the need for surgery in the studies done by Assaliaet al where only 10% of the GG group required surgery.[9] Similarly, in the study done by Baghdadi et al, Singla et al, Saverio et al, Tresalet et al and Zielinski et al also, lesser patients had to undergo surgery for obstruction after administration of GG.[10-14]

Similarly, the study done by Choi et al in 1999 and 2001 also showed decrease in obstructive features after administration of GG.[7,15] This is because the GG, due to its hyperosmotic property, decreases the bowel edema and relieves the obstructive features. Roadley et al, Lopez et al, Gupta et al, Osman et al, Safamanesh et al and Shahid et al also had similar findings.[4,5,16-19] However, in contrast to our study, the study done by Abbas et al did not show the decrease in operative rate with the use of GG (p=0.300).[20] Feigin et al stated with their study that GG did not offer therapeutic advantage as 12% patients who were given GG needed operation while 16% needed operation in which no

GG was given with not much difference in the percentage.[21] Similarly, Biondo et al also stated in their study that GG did not reduce the need for operation.[22]

In our study, majority of the patients treated with conservative management stayed in the hospital for 3 to 7 days, majority of those treated with GG had hospital stay of 7-12 days and majority of those who needed surgery had hospital stay of more than 12 days. This Wadani et al, compared the mean hospital stay in GG patients (4 days) with that in operated patients (8.3 days).[23] Similarly, Bueno-Lledoet al, Gupta et al and Shahid et al also stated in their studies that the mean hospital stay in GG group was lesser that that in the operative group.[4,17,24] This is because the use of GG reduces the hospital stay as it reduces the need of surgery. In the study done by Farid et al, the mean hospital stay of patients administered GG was 3.8 days and the mean hospital stay of patients treated conservatively was 6.9 days.[21,25] Unlike our study, in the study done by Biondo et al, the mean hospital stay in GG administered patients was lesser than that in those treated conservatively (2.8 days versus 5.8 days).[22] This is because in this study, GG was administered simultaneously in the GG group while the control group was being managed conservatively. Likewise, Saverio et al, Hany et al and Weiss et al also grouped the patients into two groups in which the GG group had lesser hospital stay days than the conservative group.[12,18,26]

In our study, the initiation of the oral feeds was quicker in the conservative group than the GG group (50.81 hours versus 81.68 hours). This is because initially patients were managed conservative and the failed ones were only subjected to the GG administration. Similar to our study, in the study done by Haule et al, the oral feeds were initiated in 70.37 hours in the GG group and in 64.45 hours in the conservative group.[27] Also similar results were found in the study done by Farid et al where the oral feeds were initiated within 70.37 hours in the GG group and in 64.45 hours in the conservative group. in the study done by Hany et al, where GG and conservative management were done randomly as case and control groups, the initiation of oral feeding was quicker than in the conservative group.[18,25] This shows that along with decreasing the need for operation, GG administration also decreases the duration of resolution of symptoms and faster initiation of the oral feeds.

Limitations

Limitations of our study are relatively small sample size and single center study.

CONCLUSION

Management of ASBO is of immense importance and using the water soluble contrast like GG reduces the number of operations done for release of obstructions. With its hyperosmotic property, it increases the intra-luminal water content and decreases the bowel edema, thus helping in the sooner resolution of obstructive features. Our study shows that the use of GG in the patients in whom initial conservative management failed helps to reduce the number of surgeries by relieving the obstructive features in majority of patients in whom GG was given. Also, the duration of hospital stay thus got reduced in them.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Bevan PG. Bevan PG. Adhesive obstruction. Ann R Coll Surg Engl. 1984;66(3):164.
2. McEntee G, Pender D, Mulvin D, McCullough M, Naeeder S, Farah S, et al. Current spectrum of intestinal obstruction. Br J Surg. 2005;74(11):976-80.
3. Richards WO, Williams LF. Richards WO, Williams Jr LF. Obstruction of the large and small intestine. Surg Clin North Am. 1988;68(2):355-76.
4. Shahid MA, Bhatta P, Raya A, Rai BK. Shahid MA, Bhatta P, et al. Therapeutic Role of Gastrograffin in Adhesive Small Bowel Obstruction After Unsuccessful Conservative Treatment. Med Phoenix. 2020;5(1):26-31.
5. Roadley G, Cranshaw I, Young M, Hill AG. Roadley G, Cranshaw I, et al. Role of Gastrografin in assigning patients to a non-operative course in adhesive small bowel obstruction. ANZ J Surg. 2004;74(10):830-2.
6. Riemann JF, Bonvoisin S, Editors. Menzies D, Ellis H. Intestinal obstruction from adhesions--how big is the problem? Ann R Coll Surg Engl. 1990;72(1):60.
7. Choi HK, Chu KW, Law WL. Choi HK, Chu KW, Law WL. Therapeutic value of gastrografin in adhesive small bowel obstruction after unsuccessful conservative treatment: a prospective randomized trial. Ann Surg. 2002;236(1):1.
8. Kapoor S, Jain G, Sewkani A, Sharma S, Patel K, Varshney S, et al. Prospective evaluation of oral gastrografin in postoperative small bowel obstruction. J Surg Res. 2006;131(2):256-60.
9. Schein M, Assalia A. Assalia A, Schein M, Kopelman D, Hirshberg A, et al. Therapeutic effect of oral Gastrografin in adhesive, partial small-bowel obstruction: a prospective randomized trial. Surgery. 1994;115(4):433-7.
10. Baghdadi YM, Choudhry AJ, Goussous N, Khasawneh MA, Polites SF, Zielinski MD. Long-term outcomes of gastrografin in small bowel obstruction. J Surg Res. 2016;202(1):43-8.
11. Shingla R, Singh B, Kumar A. Role of gastrografin contrast study in intestinal obstruction. Int J Anat Radiol Surg. 2017;6:S001-5.
12. Di Saverio S, Coccolini F, Galati M, Smerieri N, Biffl WL, Ansaloni L, et al. Bologna guidelines for diagnosis and management of adhesive small bowel

obstruction (ASBO): 2013 update of the evidence-based guidelines from the world society of emergency surgery ASBO working group. World J Emerg Surg. 2013;8(1):1-4.
13. Trésallet C, Lebreton N, Royer B, Leyre P, Godiris-Petit G, Menegaux F. Improving the management of acute adhesive small bowel obstruction with CT-scan and water-soluble contrast medium: a prospective study. Dis Colon Rectum. 2009;52(11):1869-76.
14. Zielinski MD, Haddad NN, Cullinane DC, Inaba K, Yeh DD, Wydo S, et al. Multi-institutional, prospective, observational study comparing the Gastrografin challenge versus standard treatment in adhesive small bowel obstruction. J Trauma Acute Care Surg. 2017;83(1):47-54.
15. Choi HK, Law WL, Ho JW, Chu KW. Value of gastrografin in adhesive small bowel obstruction after unsuccessful conservative treatment: a prospective evaluation. World J Gastroenterol. 2005;11(24):3742.
16. López LM, Serra-Aracil X, Bayo HL, Soto SN. Use of Gastrografin® in the management of adhesion intestinal obstruction. Cirugía Española (English Edition). 2013;91(6):384-8.
17. Gupta R, Agrawal C, Pathania O, Yadav R, Shah P. Gupta RK, et al. A Prospective Study on the Gastrografin Contrast Radiology in the Management of Small Bowel Obstruction. Arch Clin Exp Surg ACES. 2013;2(1):24.
18. Hany AE, Osman S, Salah A, Yahya M. Clinical Values of Orally Administrated Gastrografin in Management of Adhesive Small Bowel Obstruction. Med J Cairo Univ. 2018;86(6):1171-7.
19. Safamanesh S, Pazouki A, Tamannaie Z, Mohammadalipour B, Ramezani K, Hajnasrollah E, et al. Evaluation of gastrografin therapeutic role in the management of small bowel obstruction. J Minim Invasive Surg Sci. 2013;1(3):90-3.
20. Abbas S, Bissett I, Parry B. Oral water soluble contrast for the management of adhesive small bowel obstruction. Cochrane Database Syst Rev. 2007;2007(3):CD004651.
21. Feigin E, Seror D, Szold A, Carmon M, Allweis TM, Nissan A, et al. Water-soluble contrast material has no therapeutic effect on postoperative small-bowel obstruction: results of a prospective, randomized clinical trial. Am J Surg. 1996;171(2):227-9.
22. Biondo S, Pares D, Mora L, MartíRagué J, Kreisler E, Jaurrieta E. Randomized clinical study of Gastrografin® administration in patients with adhesive small bowel obstruction. J Br Surg. 2003;90(5):542-6.
23. AI Wadani H, Al Awad NI, Hassan KA, Zakaria HM, Al MulhimAA, Alaqeel FO. Role of water soluble contrast agents in assigning patients to a non-operative course in adhesive small bowel obstruction. Oman Med J. 2011;26(6):454.
24. Bueno-Lledó J, Barber S, Vaqué J, Frasson M, Garcia-Granero E, Juan-Burgueño M. Adhesive small bowel obstruction: predictive factors of lack of response in conservative management with gastrografin. Digest Surg. 2016;33(1):26-32.
25. Farid M, Fikry A, El Nakeeb A, Fouda E, Elmetwally T, Yousef M, et al. Clinical impacts of oral gastrografin follow-through in adhesive small bowel obstruction (SBO). J Surg Res. 2010;162(2):170-6.
26. Weiss A, Sood D, Greenway SE, Tomassi M. Value of gastrografin in adhesive small bowel obstruction. Langenbeck's Arch Surg. 2017;402(8):1233-9.
27. Haule C, Ongom PA, Kimuli T. Efficacy of Gastrografin® compared with standard conservative treatment in management of adhesive small bowel obstruction at Mulago National Referral Hospital. J Clin Trials. 2013;3(4).

Cite this article as: Maharjan S, Manandhar K, Singh B, Shakya N, Patel OP. Role of gastrograffin in adhesive bowel obstruction after unsuccessful conservative treatment: a prospective evaluation. Int Surg J 2024;11:1754-8.