ORIGINAL ARTICLE

Management of High Output Stomas in Our Setup

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ABSTRACT

Objective: To assess efficacy of our regimen (Consisting of reducing hypotonic solutions, antisecretory or antimotility drugs and replacement of lost nutritional elements like magnesium and vitamin D along with high isomolar diet rich in fat and salt) in reducing stoma output in high output fistulas

Study design: Descriptive study

Patients and methods: Study was conducted in the Department of Surgery, Mayo Hospital Lahore, from Jan 2008 to Jun 2010. All patients with high output stomas (> 1 lit/day), within 3 weeks of surgery were included in the study.

Result: 31 patients were found to have output stomas. 9 had jejunostomies and 22 had Ileostomies. Age range was between 20 yrs to 55 years, 17 were males and 19 females. The most common cause for stoma formation was perforation due to tuberculosis, typhoid, iatrogenic gut perforation, covering ileostomy for rectal cancers, following resection anastomosis, blunt abdominal trauma, and anastomotic leaks were other indications. Tuberculosis was the commonest cause for ileal perforation which was seen in 11 (35.48%) patients, followed by typhoid which was present in 7 (22.5%) patients. With our treatment regimen 29 patients were able to stop parenteral infusions, and 2 needed early surgical reversal.

Conclusion: This regimen is effective in decreasing output from high output fistulas

Key words: Stoma, fistulas,

INTRODUCTION

Despite the key advancements in intestinal surgery, construction of stoma is still a common and frequently performed procedure[1]. Stomas are used to divert the fecal stream away from distal bowel in order to allow a distal anastomosis to heal as well as to relieve obstruction in emergency situation. One of the greatest challenges of ostomy care is the management of high-output stomas, which are annoying not only for the surgeon but also greatly effects the quality of life of patients as due to weight of the output, it was difficult for patients to wear clothing or even ambulate without disrupting the seal between the skin barrier and the pouch[2]. Reduction in the output from an ileostomy or jejunostomy makes its management easier and improves the quality of life as well as decreasing metabolic complications[2]. The average daily output from a small intestinal stoma is 500-800 ml, and a high-output stoma is defined as one producing an effluent volume greater than 1000 ml/day[3]. High output is one of the serious problems that can affect the overall condition of the patient postoperatively[4]. So in order to achieve this we have tried a new formula consisting of reducing hypotonic solutions, antisecretory or antimotility drugs and replacement of lost nutritional elements like magnesium and vitamin D along with high isomolar diet rich in fat and salt. (Table 1)

Table 1: Our Regimen for decreasing output from high output fistulas

Restricting oral fluids. Hypotonic fluids like tea, coffee and fruit juice it cause more loss of sodium and water, thus increasing output. So we keep patient nil by mouth for 24-48 h giving intravenous saline to reduce the stomal output and correct the dehydration. Then we restrict the oral hypotonic fluids to < 500 ml daily. The rest of fluid requirements are made up of glucose-saline solution.
Glucose-Saline solution. This solution helps in sodium absorption and water, thus markedly decreasing the output. We use the commonly available Dextrose/saline infusions, or sometime we can make it by adding salt in water. 2-3l is allowed daily.
Antimotility Drugs. Loperamide before meals in high doses is used. This reduces the output.
Antisecretory Drugs. We use proton-pump inhibitor (omeprazole) at 40mg/day, and it effectively decreases the gastric secretions and thus reducing stoma output. Although octreotide can be used but we didn't used it.
Magnesium Supplements. These are used to correct accompanying hypomagnesemia. We use in injectable MgSo4, weekly
Oral 1α-hydroxycholecalciferol increases intestinal and renal absorption of magnesium. The dose is gradually increased weekly, avoiding hypercalcemia.
Nutritional requirements. We give high isomolar diet rich in fat and salt. Osmolality of any feed should be < 300 mOsm/Kg. (Peptamen). Partial parentral nutrtion was also used as adjuant.
Surgical Treatment. Despite the entire measures patient remain undernourished and dehydrated. Plan is done for early reversal and closures of stomas wherever feasible

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MATERIALS AND METHODS

This descriptive study was carried out at Surgical Unit IV, Mayo Hospital, Lahore, from January 2008 to June 2010. All patients who had developed high output fistulas (>1L/24hrs) after ileostomy or jejunostomy during 3 weeks after operation were included after getting the written informed consent. Patients operated more than 3 months ago were excluded. Psychological and biochemical complications were also excluded from the study. The age, gender and amount of output from fistula were recorded. The time taken by this regimen to reduce output was also noted. End points were either decrease of output from fistula to < 1l/day or surgical reversal of the procedure.

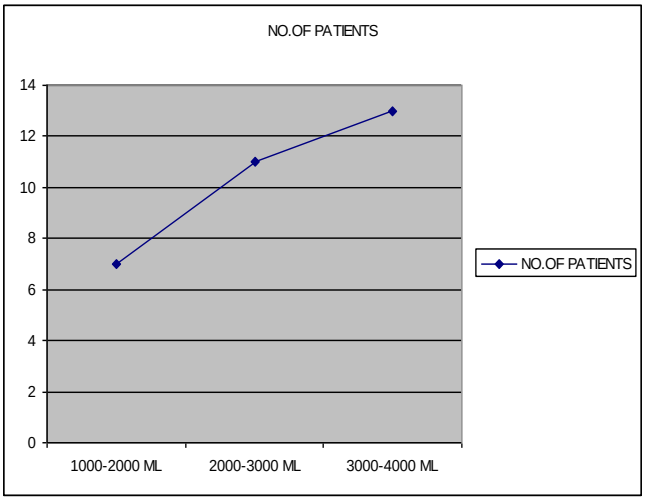
RESULTS

Thirty one patients having high output stomas were included in this study. 9 had jejunostomies and 22 had Ileostomies. Age range was between 20 yrs to 55 years, 17 were males and 19 females. The most common cause for stoma formation was perforation due to tuberculosis (Table 2).

Table 2: Indications for stoma formation

Indications Of Stoma Formation	=n	%age
Tuberculous stricture perforation	11	35.48
Typhoid perforation	7	22.5
Blunt trauma abdomen	4	12.9
Fire arm abdomen	2	6.45
Gangrenous bowel following intestinal obstruction	2	6.45
Anastomosis leak	2	6.45
Crohn's Disease	1	3.22
Carcinoma Colon	1	3.22
Iatrogenic perforation	1	3.22

Fig1: Output from fistulas



Seven patients had stoma output 1000-2000ml, 11 had 2000-3000 ml and 13 had output between 3000-4000 ml. out put was reduced gradually in average 5 to 10 days. The average time this regimen was continued 10 - 15 days. With our treatment regimen 29 patients were able to stop parenteral infusions, and 2 needed early surgical reversal.

DISCUSSION

An intestinal stoma is an opening of the intestinal tract into the abdominal wall. The first surgical stoma was created more than 200 years ago. The earliest stomas were actually unintentional ones, enterocutaneous fistulas resulting from penetrating abdominal injuries or complications of intestinal diseases such as incarcerated hernias[5]. The most common indication in this study was tuberculous perforation followed by enteric (typhoid) perforation.

Normally, in a healthy adult, about 4 L of intestinal secretions (0.5 L saliva, 2 L gastric acid and 1.5 L pancreaticobiliary secretions) are produced in response to food and drink each day. Some of these secretions will be lost if there is a high-output jejunostomy. Even in the fasting state there is an obligatory loss of intestinal secretions. Stomal output can be further increased by gastric-acid hypersecretion and rapid liquid gastric emptying due to a lack of negative feedback from PEPTIDE YY. The jejunal mucosa is unable to concentrate the luminal contents and sodium diffuses freely into the lumen through leaky intercellular junctions. The concentration of sodium in jejunostomy fluid is about 100 mM (range 90–140 mM). Hypomagnesemia occurs in approximately 60% of patients as a result of secondary hyperaldosteronism (sodium absorbed in a renal tubule in exchange for magnesium and potassium), loss of magnesium-absorbing gut (ileum and colon) and unabsorbed fatty acids binding free magnesium. Potassium problems are unusual.

The loss of fluid and electrolytes from a high-output stoma (>1200 ml/day) can quickly result in dehydration and if not properly managed may cause acute renal failure. The management of a high-output stoma is based upon three principles: correction of electrolyte disturbance and fluid balance, pharmacological reduction of stoma output, and treatment of any underlying identifiable cause. In the regimen we follow for high output fistulas there are certain important aspects:

Restricting oral fluids: Patients with high stomal output cannot quench their thirst by drinking large volumes of hypotonic solution (e.g. tea, coffee and fruit juice). As the jejunal mucosa is 'leaky', when a solution <90 mM is drunk, there will be a net efflux of sodium from serum into the bowel lumen. This

process continues until the luminal sodium concentration reaches 90-100 mM. As more hypotonic fluid enters the jejunum, sodium and water losses through the stoma are greater[6].

For such patients it is often quicker and simpler to keep them 'nil by mouth' for 24-48h, giving intravenous saline to reduce the stomal output and correct the dehydration. The next step is to restrict oral hypotonic fluids to <500 ml daily. The rest of the fluid requirement is made up of glucose-saline solution

Glucose-Saline solution: Sodium absorption in the jejunum is coupled with glucose absorption[7]; therefore, patients are advised to sip a glucose-saline solution (sodium concentration 90-120 mM) throughout the day. In this case the patient was encouraged to drink 2-3 l of glucose-saline solution daily. We used the commonly available Dextrose/saline infusions, or sometime we made it by adding salt in water. 2-3l was allowed daily.

Antimotility Drugs. Loperamide before meals, even at high doses, is preferred as it is nonaddictive, nonsedative and does not impair pancreaticobiliary secretions. It was effective in reducing the weight and sodium content of the ileostomy output and in various studies from 20-30%[8]. Both loperamide and codeine phosphate has been used in combination in various studies and is found to be useful.

Antisecretory Drugs. Antisecretory drugs can cause a marked reduction (0.5-2.0 l/day) in stomal output in net secretor patients. We used proton-pump inhibitor (omeprazole) at 40mg/day, and it effectively decreased the gastric secretions and thus reducing stoma output. Although octreotide can be used but we didn't used it. The proton-pump inhibitor omeprazole at 40 mg/day is as effective as intravenous octreotide 50 µg twice daily, providing the patient has at least 50 cm of jejunum[9].

Magnesium Supplements. The correction of sodium depletion can be the single most important factor in treating hypomagnesemia. Oral magnesium oxide can be given to a total of 12-24 mmol/day and does not appear to increase stomal output. This treatment is taken at night when intestinal transit is at its slowest, allowing more time for absorption. The patient took 12 mmol oral magnesium oxide at night.
Oral 1α-hydroxycholecalciferol increases intestinal and renal absorption of magnesium. The dose of 0.25-9 µg daily is gradually increased (every 2-4 weeks at 0.25 µg increments) while ensuring that hypercalcemia does not occur.[10] Some patients might need regular intravenous or subcutaneous saline and magnesium infusions.

Nutritional Requirements: We gave high isomolar diet rich in fat and salt. Osmolality of any feed was < 300 mOsm/Kg. Partial parentral nutrtion was also used as adjuant. Specific dietary restrictions in jejunostomy patients haven't been shown to be of benefit; such patients need a large oral energy intake of a polymeric, iso-osmolar diet that is relatively high in fat and with added salt. Hyperphagia is encouraged to compensate for malabsorption. Additional oral sip-feed can be given. The osmolality of any feed is kept low (300 mOsm/kg) by using large molecules such as polysaccharides, protein and triglycerides, and extra sodium is added to give a concentration of 90-120 mM[11,12]. In patients with Crohn's disease, if obstructive symptoms are present, a low-residue diet is recommended.

Despite adequate medical and nutritional therapy, 2 of our patient remained undernourished, and suffered from fluid depletion due to continued high output. They had greater effluent volume to start with (> 4 L/day). They underwent early reversal and closures of stomas. Fortunately both of them had intestines where stomas could be closed without much risk. Otherwise risk has to be weighed against benefits. Other option for surgeries include surgical procedures that slow intestinal transit or reconstructive surgery to lengthen the small bowel has been performed in children whereby the dilated remaining small bowel (diameter >4 cm) is divided longitudinally and anastomosed end to end.

So this study proved that this regimen is helpful in reducing high output from intestinal fistulas. Further studies are required with larger number of patients.

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