International Surgery Journal
Bagree R et al. Int Surg J. 2024 Nov;11(11):1797-1801
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20243231

Original Research Article

Tackling catabolic state in high output stoma cases: our experience with enriched stoma content refeeding

Rajendra Bagree, Naveen Kumar Saini*, Ritesh Kumar, Vinay Srinivas, Ayush Gupta, Nitish Kumar

Department of General Surgery, SMS Medical College and Hospital, Jaipur, Rajasthan, India

Received: 29 August 2024
Revised: 03 October 2024
Accepted: 10 October 2024

***Correspondence:**
Dr. Naveen Kumar Saini
E-mail: drnaveenkumar098@gmail.com

ABSTRACT

Background: Patients who have a high output stoma are prone to fluid and electrolyte imbalance and the expensive parenteral nutrition (PN) is necessary for management. In these cases, re-feeding can be beneficial with enriched stoma effluent.
Methods: In our study we included 25 cases which had high output stoma with maximum bowel length of 140 cm from duodeno-jejunal junction or output greater than 1.5l in 24 hours.
Results: Among these 25 cases, 16 were males and 9 females. The most common indications for making stoma were intestinal perforation (11) and gangrene (6). These cases were discharged on enriched re-feeding. No major complications were associated with re-feeding. None of the patients required parenteral nutrition after discharge from hospital. After getting body mass index (BMI) and serum albumin under normal parameters, we were able to close the stomas in all the patients.
Conclusions: Patients with high output stoma can be managed nutritionally with distal enriched re-feeding. It is a cost-effective and effective alternate for parenteral nutrition (PN), which is associated with complications.

Keywords: High output stoma, Jejunostomies, Parenteral nutrition, Re-feeding

INTRODUCTION

Several life-threatening gastrointestinal conditions can lead the surgeon to make a stoma either temporary or permanent. These stomas, especially when their output is high can lead to various complications resulting in hospital readmissions, such as acute or chronic dehydration, renal dysfunction, dyselectrolytemia, micro and macro nutrient deficiency and malnutrition which can ultimately lead to a catabolic state which deteriorates the clinical condition and can overall increase the morbidity and mortality in such patients.[1] Management of such high output stoma requires complex multi-disciplinary care and intravenous supplementation to prevent such complications.[2] A high-output stoma is defined as a stoma whose output is high enough to cause dehydration generally with output greater than 1.5l in 24 hours. The management of such patients requires proper input/output charting over 24 hours for complete evaluation. A high output stoma is usually seen in 16%-31% of patients after surgery.[3-5] Problems are more common in patients with proximal stomas involving duodenum, jejunum or ileum and are rarely seen with colostomies.

According to European society for clinical nutrition and metabolism (ESPEN), Intestinal failure is defined as reduction of gut function below minimum required for absorption of macronutrients and water/electrolyte, such that intravenous (IV) supplementation necessary to maintain health and growth.[6] Functional changes to

compensate the high output occur in bowel such as increased expression of transporting proteins and exchangers involved in nutrient and electrolyte absorption, along with an accelerated maturation of enterocytes, decreased transit time allowing decreased transit of nutrients through the intestine and thus increased contact time for absorption and thus increasing the overall absorptive capacity of the remnant bowel.[7]

High output stoma leading to dehydration also leads to the activation of renin-angiotensin-aldosterone system which helps to absorb sodium and water from the collecting duct in kidney.[8] The nutritional management of such patients usually requires total parenteral nutrition (TPN) for coping up with the catabolic state. But long term TPN lead to many complications like metabolic and other catheter related complications.[9]

Distal refeeding is the feeding of effluents of the stoma after adequate enrichment in the de-functioning distal loop as it is advantageous for gastrointestinal tract (GIT) protection, low incidence of infection, maintaining gut mucosa immunity, and limiting intestinal atrophy.[10] It is practiced in patients with short absorptive loop leading to intestinal failure (IF) who are not able to absorb nutrition orally and thus leading to a catabolic state.[11]

This refeeding demonstrated a reduction in total stoma output improved renal and liver functions and thus improving the overall nutritional status and weight of the patient making it a more feasible, affordable and better alternative to TPN.[12-15] The objective of this study is to prevent and manage the catabolic state in the patients with high output stoma with refeeding of enriched stoma effluent and thus decreasing the need for parenteral nutrition.

METHODS

Study design

Authors conducted a prospective study and then analysed the data of the cases who underwent stoma creation during. After taking approval from ethical review board,

Study place

The study place was in the Department of General Surgery in SMS medical college and hospital, Jaipur.

Study duration

Study period was from April 2022 to December 2023.

Inclusion criteria

It includes age>15 years, patients with high output stoma (stoma output>1.5 L in 24 hours) or proximal bowel length of 140 cm or less.

Exclusion criteria

Patients who did not give written and informed consent, patients who underwent previous stoma creation, patients who needed ICU care for more than 7 days post-surgery, patients who met the inclusion criteria were included in the study by random sampling technique. Written and informed consent was obtained from all subjects involved in the study. These cases were reinvestigated at discharge and on re-admission, either for closure or for management of complication of the high output stoma. Proper medical records were maintained and scrutinized for demographic data, comorbidities, type of stoma, indications, complications, medications, body mass index (BMI), serum albumin, renal function test (RFT) and liver function test (LFT).

The cases who underwent stoma creation were maintained on intravenous fluids and antibiotics till they were hemodynamically stable in the post-operative period. Oral feeding was started once the stoma was functional. To decrease the stoma output these patients were started on antimotility drugs and parenteral nutrition (PN). Refeeding was started after checking the distal bowel patency by saline test and the amount was increased gradually up to 2l. Before discharge they were kept completely on enteral nutrition, Parenteral nutrition was weaned off and stopped. The enrichment of stoma effluent was done by jaggery, honey, multivitamin syrup, iron folic acid syrup, protein powder etc. They were advised properly regarding enrichment, refeeding of stoma effluent and lifestyle changes for the stoma. Proper counselling was done regarding early identification of signs of dehydration at home and use of oral rehydration solution (ORS) and other electrolyte rich solutions to compensate for the shunted circulatory volume by the stoma. On a readmission, proper charting of various parameters was done including total output of the stoma, BMI, RFT, LFT, and serum Albumin levels. Data was collected, analysed and represented in form of proper tables and charts.

RESULTS

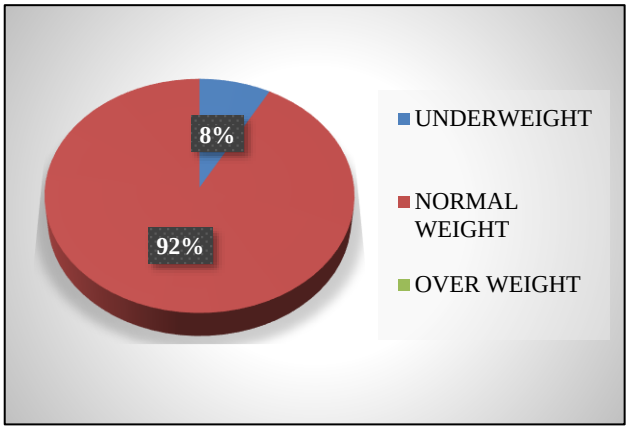

Figure 1: BMI category.

Total 25 patients were included in this study, 16 (64%) male and 9 (36%) female and maximum number of patients were from the age group 31-45 years as shown in Table 1.

The various reasons for stoma formation are shown as in Table 1, the most common of which was found to be perforation in 11 cases (44%) followed by gut gangrene in 6 cases (24%). 19 (76%) stomas were made as a result of emergency procedure and in only 6 (24%) patients the stoma was formed as an elective procedure (Table 1). All the stomas made were temporary and made with the purpose of closure within 6-8 weeks.

Table 1: Patient characteristics.

Variables	Number of patients (n=25)	%
Gender		
Male	16	64
Female	9	36
Age (in years)		
<15	0	0
15-30	7	28
31-45	10	40
46-60	5	20
>60	3	12
Stoma creation surgery		
Emergency procedure	19	76
Elective procedure	6	24
Reason for stoma formation		
Jejunal perforation	7	28
Ileal perforation	4	16
Jejunal stricture	1	4
Gut gangrene	6	24
GI tuberculosis	3	12
Obstructed hernia	2	8
Blunt and penetrating trauma	2	8

Table 2: Stoma characteristics.

Variables	Number of patients (n=25)	%
Type of stoma		
Temporary	25	100
Permanent	0	0
Reason for readmission		
Stoma closure	23	92
Dehydration	1	4
Obstructed stoma	1	4

Out of the 25 patients, maximum 23 (92%) were readmitted for stoma closure. One patient was readmitted due to dehydration and one due to obstruction of stoma. These two patients were optimized and stoma closure was done later on. The values of BMI, RFT, LFT and serum albumin of all the patients were compared before starting refeeding and before stoma closure was done and charted. It was found that 92% (23) patients maintained their BMI under normal range. Serum albumin levels of 88% (22) patients were in range of 3 to 3.5 gm/dl. Derangement in RFT and LFT was seen in 4% (1) cases each.

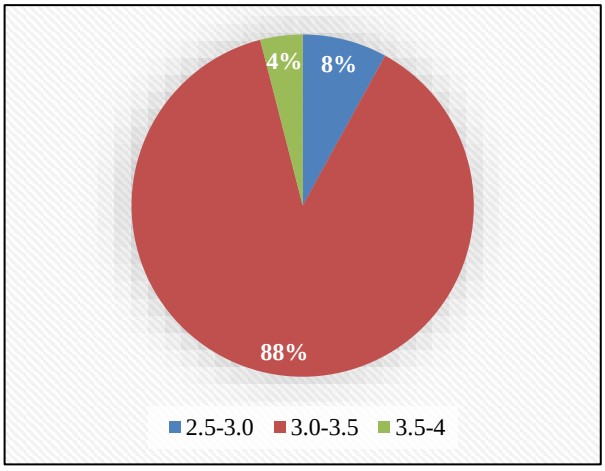

Figure 2: Serum albumin levels (gm/dl).

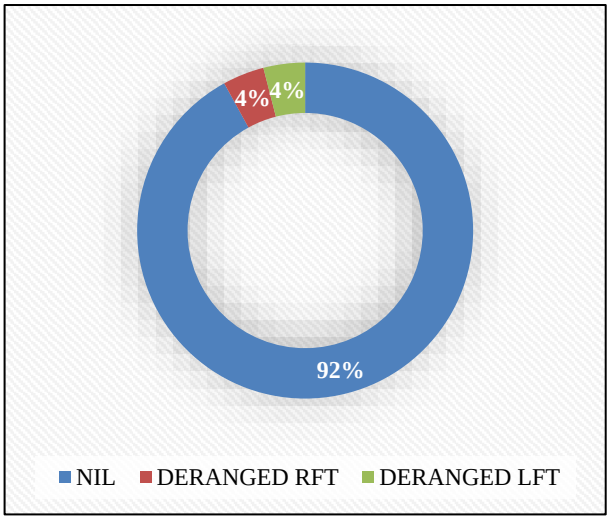

Figure 3: RFT and LFT imbalance.

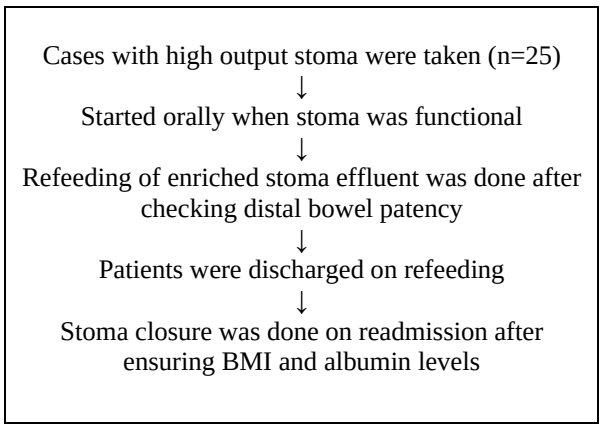

Figure 4: Study flow-chart.

DISCUSSION

The benefit of re-feeding is freedom from dependence on parenteral nutrition (PN). The patients and their attenders can be trained for refeeding at home and can maintain hydration and weight. The cost of expensive parenteral nutrition is saved. In our study, intestinal perforation was the most common cause for stoma creation followed by gangrene and tuberculosis. Enteral feeding in these patients with high output stoma or a short proximal bowel loop will not provide a sufficient calorie intake, and PN and intravenous fluids are needed that are associated with sepsis and other complications.

The European Society for Clinical Nutrition and Metabolism (ESPEN) estimated that the postoperative protein and energy requirements to maintain postoperative muscle mass are 1.5g/kg/day and 25–30 kcal/kg/day, respectively.[16] Parenteral nutrition is the provision of protein as amino acids (4 kcal/g), dextrose (3.4 kcal/g), fat (lipid 20% solution delivers 2 kcal/ml), vitamins, minerals, trace elements and fluid.[17]

During refeeding our aim was to ensure total caloric intake of patients was around 2000 Kcal/day along with macro and micronutrient supplementation via enrichment. Jaggery and honey contains minerals like iron, phosphorus, calcium, magnesium and vitamins (niacin, b6, pantothenic acid). Refeeding into the distal bowel loop in these patients helps in tackling this catabolic state. It also decreases cost substantially and permits early discharge and care at home. The procedure of refeeding is easy to understand. All the attenders were explained on how to enrich the distal stoma feeds and how to administer them.

In our study, refeeding was started after hemodynamic stability of the patients after surgery. Twenty-three patients out of 25 patients were able to maintain their BMI and nutritional requirements and 2 patients were underweight and had serum albumin levels between 2.5-3 gm/dl at the time of readmission. Most of these patients at the time of readmission were hemodynamically stable. The catabolic state of these high-output stoma patients was initially managed with iv drugs. Refeeding the effluent along with drugs decreased the dehydration episodes and helped in building up nutrition. We also used octreotide to decrease the secretions but not for longer than 10 days because it interferes with intestinal adaptation.

There were no major complications associated with the refeeding procedure. The most common minor issue was dispersion of feed during administration which was tackled by increasing the size of Foley's balloon. To avoid the blockage, we trained the attenders and the patient to flush the foley with plain water at the end of each feed. One of the major advantages of refeeding is the decrease in the requirement of PN. The average price of TPN (1000 ml) in India is 3000 rupees. Our experience in this study suggests that in developing countries like India enriched refeeding is affordable, safe, and easy method to tackle the catabolic state of the patients who have a high-output stoma. None of the patients required dependency on parenteral nutrition later on and only one patient was readmitted with dehydration and successfully managed conservatively. Stoma closure was done in all the patients after achievement of good nutritional status.

R Dogra et al studied that distal enteral feeding can replace total parenteral feeding to support nutrition in patients with high output stoma (jejunostomy). A case series.[18] Another study by Nagar et al, on distal Bowel re-feeding in patients with proximal jejunostomy shows that none of the patients required PN after discharge from hospital on refeeding.[19] More studies are needed to answer these questions. The limitations of our study are largely attributable to the sample size and the single institutional nature of our investigation which is prone to selection bias.

CONCLUSION

In this study we conclude that the catabolic state of patients with high output stoma can be tackled nutritionally via refeeding of enriched proximal stoma effluent. It is affordable, easy and effective alternate for parenteral nutrition which is associated with life threatening complications.

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

REFERENCES

1. Kennedy HJ, Al-Dujaili EA, Edwards CR. Water and electrolyte balance in subjects with a permanent ileostomy. Gut. 1983;24:702–5.
2. Baker ML, Williams RN, Nightingale JMD. Causes and management of a high-output stoma. Colorectal Disease. 2011;13:191-7.
3. Nightingale JMD, Lennard-Jones JE, Walker ER. Jejunal efflux in short bowel syndrome. The Lancet. 1990;336:765–8.
4. Arenas Villafranca JJ, López-Rodríguez C, Abilés J. Protocol for the detection and nutritional management of high-output stomas. Nutr J. 2015;14:1-10
5. Takeda M, Takahashi H, Haraguchi N, Miyoshi N, Hata T, Yamamoto H, et al. Factors predictive of high-output ileostomy: a retrospective single-center comparative study. Surg Today. 2019;49:482-7.
6. Pironi L, Arends J, Bozzetti F, Cuerda C, Gillanders L, Jeppesen PB, et al. Home artificial nutrition and chronic intestinal failure special interest group of ESPEN. ESPEN guidelines on chronic intestinal failure in adults. Clin Nutr. 2017;36(2):247-307.

7. O'Brien DP, Nelson LA, Huang FS, Warner BW Intestinal adaptation: structure, function, and regulation Semin Pediatr Surg. 2001;10:56-64.
8. Wall EA. An overview of short bowel syndrome management: adherence, adaptation, and practical recommendations. J Acad Nutr Diet. 2013;113(9):1200-8.
9. Maroulis J, Kalfarentzos F. Complications of parenteral nutrition at the end of the century. Clin Nutr. 2000;19:295-304.
10. Kudsk KA. Current aspects of mucosal immunology and its influence by nutrition. Am J Surg. 2002;183:390–8.
11. Kittscha J. Restoring gut continuity: reinfusion of effluent via distal limb of a loop jejunostomy. WCET J. 2012;36:28-31.
12. Picot D, Layec S, Dussaulx L. Chyme reinfusion restores intestinal function during temporary small bowel interruption with intestinal failure. 15-year experience of a referral centre. Clin Nutr. 2015;34:9-10.
13. Bhat S, Cameron NR, Sharma P, Bissett IP, O'Grady G. Chyme recycling in the management of small bowel double enterostomy in pediatric and neonatal populations: a systematic review. Clin Nutr ESPEN. 2020;37:1–8.
14. Sricharan R, Chawla AS, Kumar S, Sandhya PA. Reinfusion enteroclysis can successfully replace parenteral feeding in patients with high-output enteral fistula or ostomy awaiting definitive surgery. Indian J Surg. 2020:1-7.
15. Layec S, Seynhaeve E, Trivin F, Carsin-Mahé M, Dussaulx L, Picot D, et al. Management of entero-atmospheric fistulas by chyme reinfusion: a retrospective study, clinical nutrition. ISSN. 2020;39(12):261.
16. Weimann A, Braga M, Carli F. ESPEN guideline: clinical nutrition in surgery. Clin Nutr. 2017;36(3):623-50.
17. Abernathy's Surgical Secrets (Seventh Edition). Nutritional assessment, parenteral, and enteral nutrition. Elsevier. 2018: 37-46.
18. Dogra R, Chhabra MK, Chhibber P. Distal enteral feeding can replace total parenteral feeding to support nutrition in patients with high output stoma (jejunostomy)-A case series. Clin Nutr ESPEN. 2023;57:537-41.
19. Nagar A, Mehrotra S, Yadav A, Mangla V, Lalwani S, Mehta N, et al. Distal bowel re-feeding in patients with proximal jejunostomy. J Gastroint Surg. 2018;22(7):1251-7.

Cite this article as: Bagree R, Saini NK, Kumar R, Srinivas V, Gupta A, Kumar N. Tackling catabolic state in high output stoma cases: our experience with enriched stoma content refeeding. Int Surg J 2024;11:1797-801.