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Integrate Partial Hydrolyzed Guar Gum in Postoperative Ileostomy Nutritional Management

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Abstract
Objective: This case report aimed to share our clinical practice about the Partially Hydrolysed Guar Gum (PHGG) incorporation in conventional ileostomy management.
Case presentation: Patients A and B, who diagnosed with Diabetic Mellitus and Hypertension recto-sigmoid adenocarcinoma stage III, had high stoma output after anterior resection with covering ileostomy (more than 1200ml per day). PHGG was integrated into nutritional management and showed a positive effect in normalizing volume and the consistency of ileostomy stoma output.
Discussion: Postoperative ileostomy patients often faced a higher risk for malnutrition among cancer patients. Persistent high stoma output without proper management could cause dehydration, depletion of magnesium and sodium, acute renal injury and malnutrition. High protein and high calories normal diet would normally be prescribed to postoperative colorectal cancer patients with an ileostomy. The addition of PHGG showed a positive effect in improving ileostomy consistency and output.
Conclusion: The PHGG incorporation in the post-operative nutritional management for ileostomy revealed positive outcomes in consistency and volume of stoma output and nutritional intake.
Keywords: Postoperative, Ileostomy, PHGG, Nutritional Management

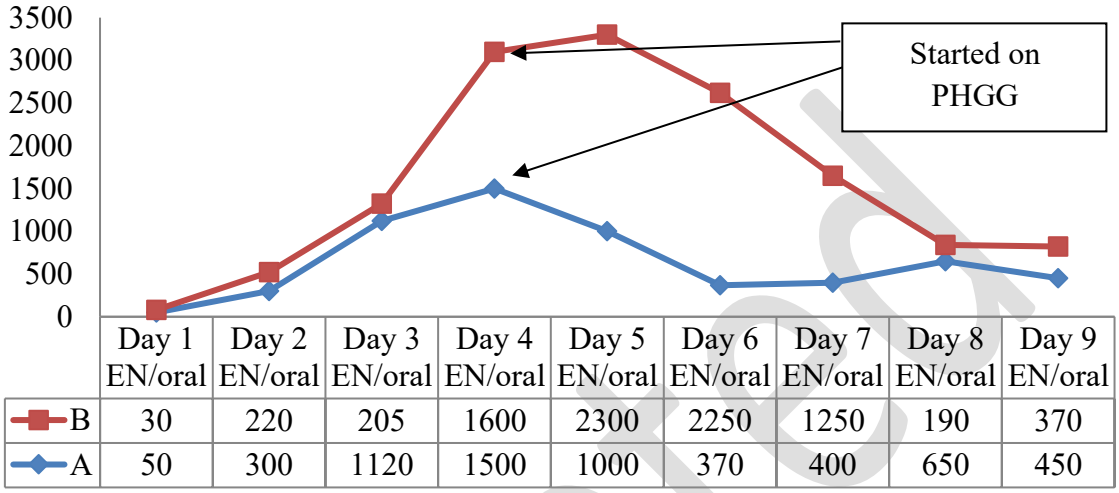
Introduction
Postoperative colorectal cancer patients with covering ileostomy often faced a risk of malnutrition because of resection of the colon and high output of stoma in the early postoperative stage (1, 2). The poor management of high-output stomas could cause dehydration, acute kidney injury and malnutrition (1). Partially hydrolysed guar gum (PHGG) is known as a prebiotic fibre which is water-soluble, colorless, taste-free, and stable at a low pH, heat tolerant. PHGG was recognized as competent management in the acute diarrhea treatment in an intensive care setting (3). This case series aimed to share our clinical practice about the PHGG incorporation in conventional ileostomy management. This case series was registered with National Malaysia Research Registration with research identification number NMRR-19-3056-51609.

Case Report
Patient A, a 70 year old male with co-morbid of Diabetic Mellitus and Hypertension was diagnosed for a recto-sigmoid adenocarcinoma stage T3N0M0. Percentage of weight loss was 4% within one-month with loss of appetite and diarrhoea. He underwent an elective laparoscopic anterior resection with covering ileostomy but developed ileus secondary to peritonitis and hospital-acquired pneumonia. An exploratory laparotomy was done the day after which revealed a perforation. Perforated bowel was then resected away and the stoma was refashioned. Total Parenteral Nutrition was initiated first with close monitoring of ileostomy output. Subsequently, Nasogastric (NG) feeding with standard diabetic formula was started concurrently and parenteral nutrition gradually weaned off after 60% energy requirement was achieved. After commencement of NG feeding, stoma output increased in trend although anti-motility and anti-secretory medications were optimised. PHGG was added into each feeding and it showed a positive effect in stoma output's volume and consistency.

Patient B, a 66-year-old male with co-morbid of Diabetic Mellitus, Hypertension and CVA was diagnosed for a low rectal adenocarcinoma stage T3N0M0. He underwent a neoadjuvant pelvic Radiotherapy (long course of 5 weeks). Percentage of weight loss was 4.2% before surgery. Subsequently, he had an elective anterior resection with covering ileostomy which was fashioned 15 cm from the ileocecal junction. He was started with a clear fluid 6 hours post-operative, followed by high protein high calories diabetic low fibre non-caffeine

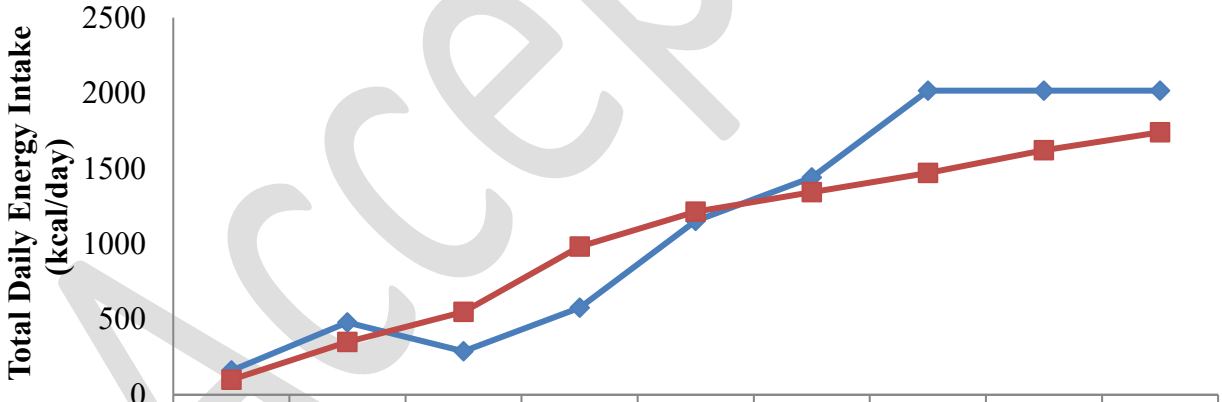
diet on day 1 post-operation. After initiation of oral feeding, stoma output was increasing despite anti-motility and anti-secretory medications optimised. Thereafter, PHGG was added into his oral nutritional supplement and thereafter volume and consistency of stoma output improved.

After integrating PHGG into nutritional management, ileostomy stoma output was improved and consistency of output was normalised as Figure 1. Patients' total daily energy (Figure 2) and protein intake (Figure 3) were increasing in trend.



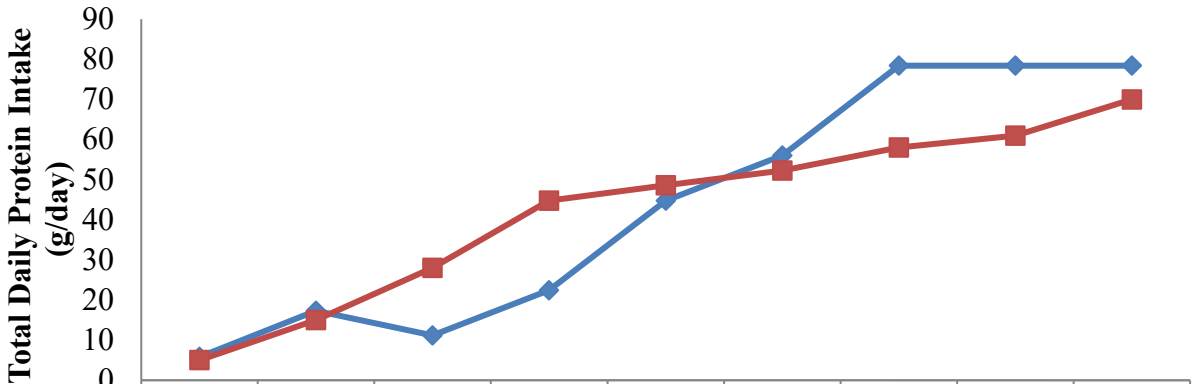
	Day 1 EN/oral	Day 2 EN/oral	Day 3 EN/oral	Day 4 EN/oral	Day 5 EN/oral	Day 6 EN/oral	Day 7 EN/oral	Day 8 EN/oral	Day 9 EN/oral
B	30	220	205	1600	2300	2250	1250	190	370
A	50	300	1120	1500	1000	370	400	650	450

Figure 1 Daily Ileostomy Stoma Output Trend



	Day 1 EN/oral	Day 2 EN/oral	Day 3 EN/oral	Day 4 EN/oral	Day 5 EN/oral	Day 6 EN/oral	Day 7 EN/oral	Day 8 EN/oral	Day 9 EN/oral
A	160	480	288	576	1152	1440	2016	2016	2016
B	100	350	550	982	1214	1344	1470	1620	1740

Figure 2 Total Daily Energy Intake



	Day 1 EN/oral	Day 2 EN/oral	Day 3 EN/oral	Day 4 EN/oral	Day 5 EN/oral	Day 6 EN/oral	Day 7 EN/oral	Day 8 EN/oral	Day 9 EN/oral
A	5.8	17.3	11.2	22.4	44.8	56	78.4	78.4	78.4
B	5	15	28	44.8	48.6	52.3	58	61	70

Figure 3 Total Daily Protein Intake

Discussion

Ileostomy, a type of stoma where part of the ileum, is used for diversion in colorectal surgery. Nutritional-related complications vary between types of the stoma (4). Since the function of the colon is to reabsorb fluids and electrolytes, ileostomy patients would experience malabsorption of nutrients and high or/and watery output (5-7). Definition of high-output stoma varies and is usually considered as output greater than 1.5litres per day (2, 4-6, 8). Persistent high stoma output without proper management could cause dehydration, depletion of electrolytes, acute renal injury and malnutrition (9). The risk of nutrient malabsorption and malnutrition would be greater with a shorter gastrointestinal length (4, 10).

Patients with ileostomy faced a greater risk of nutritional-related complication and require more intensive nutritional management (11). To prevent nutritional depletion, postoperative colorectal patients with ileostomy were prescribed with a high protein high calories normal diet (6, 12), insoluble fibre restriction (2, 8, 10), oral rehydration salts and oral fluid restriction (1, 8). Besides, table salt (8), starchy carbohydrate and gelatine containing food to increase the consistency (13) as well as avoidance of caffeinated drinks and hypo/hyperosmolar drinks to reduce osmotic diarrhoea (14). Artificial nutritional support; either enteral or parenteral might be required for those patients with limited length of remaining small intestine (less than 200cm) (12).

PHGG, a water-soluble polysaccharide and ability to form hydrogen bonds with water molecules and act as a thickener and stabilizer (15), has been demonstrated PHGG reduced the incidence of diarrhoea in septic patients receiving total enteral nutrition and improved the symptoms of irritable bowel syndrome (3, 16). There was a case report demonstrated similar findings with our current finding whereby PHGG reduced the high stoma (ileostomy) output which was induced by chemotherapy (17). Guar gum is categorized as dichoromous feature soluble fibre stool normalizing effect. It is able to soften the hard stool with increasing biomass frequency in constipation and firm the watery stool with decreasing biomass frequency in diarrhea (18). Current case report revealed that PHGG improved the consistency and volume of the ileostomy output and prevent complications triggered by the high stoma output. This case report intend to strengthen a shift in the conventional clinical management but these finding might not be served as shreds of evidence for the whole population.

Conclusion

Nutritional management is crucial in postoperative ileostomy case to prevent complications of high stoma output and malnutrition. The PHGG incorporation in the post-operative nutritional management for ileostomy was showed positive outcomes in consistency and volume of stoma output, and total daily energy and protein intake We hope this case series can be used as an example of the impact of the integration of PHGG in the nutritional management of postoperative ileostomy patients.

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