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THE BARIATRIC SURGERY PATIENT: LOST TO FOLLOW-UP; FROM MORBID OBESITY TO SEVERE MALNUTRITION

Gregory B. Dodell, MD¹, Jeanine B. Albu, MD¹, Lawrence Attia, MD², James McGinty, MD³,
F. Xavier Pi-Sunyer, MD¹, and Blandine Laferrère, MD¹

¹Division of Endocrinology, Diabetes and Nutrition, St. Luke's Roosevelt Hospital Center, New York, New York

²Division of Gastroenterology, St. Luke's Roosevelt Hospital Center, New York, New York

³Department of Surgery, St. Luke's Roosevelt Hospital Center, New York, New York

Abstract

Objective—To describe the potential long-term risk of malnutrition after Roux-en-Y gastric bypass (GBP) through an uncommon occurrence of inflammatory bowel disease (IBD) postoperatively, which posed a serious threat to the nutritional status and the life of the patient.

Methods—We present a case report of a 44-year-old woman in whom Crohn disease developed 4 years after she had undergone GBP. The double insult of IBD and GBP resulted in severe malnutrition, with a serum albumin concentration of 0.9 g/dL (reference range, 3.5 to 5.0), weight loss, and watery diarrhea necessitating 6 hospital admissions during a period of 7 months.

Results—Ultimately, the administration of total parenteral nutrition with aggressive macronutrient, vitamin, and mineral repletion resulted in substantial improvement in the patient's strength, function, and quality of life, in parallel with diminished symptoms of IBD.

Conclusion—Rarely, IBD develops after GBP, but the relationship between the 2 conditions remains unclear.

Regardless, in addition to the altered anatomy after bariatric surgery, the further insult of IBD poses a severe threat to the nutritional status of affected patients. Malnutrition needs to be recognized and aggressively treated. Nutritional markers should be followed closely in this population of bariatric patients in an effort to avert the onset of severe malnutrition.

INTRODUCTION

Bariatric surgery for morbid obesity leads to substantial and sustained weight loss in conjunction with impressive improvement in diabetes mellitus, blood pressure, and lipid profiles (1). In 2008, the number of bariatric surgical procedures performed in North

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Address correspondence to Dr. Gregory B. Dodell, Division of Endocrinology, Diabetes and Nutrition, St. Luke's Roosevelt Hospital Center, 1111 Amsterdam Avenue, 10th Floor, New York, NY 10025. gdodell@chpnet.org.

DISCLOSURE

The authors have no multiplicity of interest to disclose.

America was 220,000 (2), and the frequency of performance of such operations is predicted to increase. In response to the recognized need for effective nutritional follow-up in these patients after gastric bypass (GBP), clinical practice guidelines have recently been published (3,4).

Because of the duodenal bypass and an anastomosis far down into the jejunum, malabsorption occurs, and these patients are at risk for long-term complications (5). Protein malnutrition, defined as a serum albumin level <3.5 g/dL, remains the most severe macronutrient complication associated with malabsorptive surgical procedures. Intolerance of protein-rich foods is common postoperatively; therefore, many patients do not meet their recommended daily intake of protein (6). In addition, malabsorption contributes to the total reduction in protein absorption after bariatric surgery (7). Protein malnutrition causes an annual hospitalization rate of 1% per year after malabsorptive procedures and leads to considerable morbidity (8). After GBP, supplementation of vitamins and minerals to overcome deficiencies is also necessary because of the increased risk imposed by anatomic changes (9).

The further insult of inflammatory bowel disease (IBD) to the remaining intact intestine of a patient after GBP can result in a life-threatening situation, as demonstrated in the following case. In light of the increased susceptibility for malnutrition after GBP, irrespective of IBD, this double insult necessitates intensive nutritional evaluation and treatment.

CASE PRESENTATION

A 44-year-old woman developed IBD 4 years after Roux-en-Y GBP. Before bariatric surgery, she was severely obese, with a body mass index (BMI) of 38.5 kg/m^2 , and she had hypertension, hyperlipidemia, depression, and gastroesophageal reflux disease. Immediately postoperatively, all her medications for comorbidities were discontinued. By 7 months after GBP, she had lost 28 kg. During the first postoperative year, the patient was under close follow-up surveillance by the bariatric surgeon. The institution's regimen consisted of visits at 1 week, 1 month, and then every 3 months for 2 years, followed by annual visits.

The patient saw her primary physician annually for 3 years postoperatively but was then lost to follow-up. At 3 years, her weight was stable at 90 kg. She continued to take a multivitamin, calcium citrate (600 mg) plus vitamin D (400 U) twice daily, and ferrous sulfate (325 mg daily). Her serum albumin concentration was above 4 g/dL (reference range, 3.5 to 5.0) at 4 years postoperatively.

At 4 years after GBP, however, the patient developed 1 to 2 episodes per day of watery diarrhea. A colonoscopy biopsy demonstrated moderate chronic active colitis with focal cryptitis, consistent with Crohn disease, and treatment with mesalamine (800 mg 3 times a day) was initiated. The patient had lost an additional 9 kg from her plateau weight after GBP to a weight of 81 kg. A repeated colonoscopy 8 months later showed a good response to treatment with mildly diminished inflammation.

Several months later, however, the patient had a relapse with diarrhea and abdominal pain. She had lost an additional 11 kg to a weight of 70 kg, and a repeated colonoscopy revealed

worsening diffuse active colitis from the sigmoid colon to the hepatic flexure. Despite continued treatment of the colitis, the diarrhea persisted, and weight loss continued to 65 kg. The patient had 6 hospital admissions during a period of 7 months, for a total of 74 days in the hospital. The Endocrinology Service was consulted for nutritional management.

On the initial evaluation, the patient was cachectic with a BMI of 21.2 kg/m², and 3+ bilateral pitting edema of the lower extremities was present. She required assistance for ambulation and had decreased grip strength. Her serum prealbumin level was 5.2 mg/dL (reference range, 20 to 40), and anemia and other severe vitamin and mineral deficiencies were present (Table 1).

The diagnosis of severe protein malnutrition was made, and treatment with total parenteral nutrition (TPN) was initiated because malabsorption was suspected on the basis of the patient's continuous diarrhea with oral intake. In addition to TPN, elemental oral feedings (Vital 1.0) were given but ultimately had to be discontinued because of increased frequency of diarrhea. The daily TPN was titrated up to 1,949 kcal daily during 2 weeks of treatment. Supplementation with both intravenously and orally administered vitamins and minerals was initiated (Table 1). Throughout the hospitalization, the improvement in clinical and nutritional status was dramatic. The patient's strength improved to the point of independent ambulation, her edema resolved, and the diarrhea decreased.

At the time of hospital discharge, the patient was tolerating small meals and snacks. Medications included mesalamine (800 mg 3 times a day), prednisone (20 mg daily), vitamin B₁₂ (2,000 mg daily), vitamin D₃ (2,000 U daily), calcium carbonate (500 mg)-vitamin D₃ (200 U) twice daily, ferrous sulfate (325 mg twice a day), and a multi-vitamin. Overnight TPN was continued as an outpatient treatment for a period of 2 weeks and then was discontinued when the prealbumin level was 30 mg/dL (reference range, 20 to 40). Bowel movements were firm, 1 to 2 times daily, and the patient continued to tolerate oral intake. Her weight at that time was 69 kg, with a total weight regain of 14 kg since admission (see Figure 1 for weight trend). Strength improved with outpatient physical therapy, and she continued progression toward her previous function and quality of life. A dual-energy x-ray absorptiometry scan was done, which demonstrated normal bone density.

DISCUSSION

This 44-year-old woman, who underwent GBP for treatment of severe obesity and metabolic syndrome, subsequently developed severe malnutrition in conjunction with Crohn disease 4 years after bariatric surgery. A few reported cases have described Crohn disease associated with GBP and severe malnutrition that improved with standard therapy for IBD (10). The current case, as the others previously reported, raises the question of a possible association between GBP and IBD.

Investigators have speculated that, just as bacterial overgrowth can occur after gastrectomy, the altered anatomy after GBP may promote a bacterial milieu in genetically predisposed patients that triggers chronic inflammation and results in Crohn disease (11). The double

insult of GBP and IBD on the functioning bowel can clearly have a dramatic effect on a patient's nutritional health and functional well-being.

Malnutrition is a common feature of Crohn disease. The cause is multifactorial; postprandial pain, diarrhea, and malabsorption can be contributing factors (12). Vitamin deficiencies have been reported both in Crohn disease and after GBP (13,14). In the current patient, because of poor follow-up after GBP, it is unclear whether she was malnourished before the development of Crohn disease.

To our knowledge, only 3 cases of IBD after GBP have been reported (10). All were in women, 28 to 46 years old, who had undergone GBP from 11 months to 5 years before the development of IBD, with BMIs ranging from 43 to 75 kg/m² at the time of diagnosis of Crohn disease. The initial manifestations were abdominal pain and weight loss (up to 9 kg), and none of the patients had a family history of IBD. With treatment of the Crohn disease, diarrhea resolved and weight loss subsided. Although our currently described patient had a similar age and had no family history of IBD, her BMI at the time of her diagnosis of Crohn disease was lower (26.6 kg/m²). Unlike the other reported cases, despite management with mesalamine, antibiotics, and corticosteroids, this patient's Crohn disease remained uncontrolled until her overall nutritional status improved with use of TPN. In none of the other cases was use of TPN reported as part of the treatment regimen.

Hospitalization for TPN because of severe protein deficiency after weight loss surgical procedures has been described previously (15). Use of the nutrition risk index, incorporating the patient's weight and serum albumin level, can approximate the degree of malnutrition. If the nutritional status does not improve with oral intake, including supplemental enteral feedings, then TPN for a period of 3 to 4 weeks may be required (16).

The current recommendations for protein intake in bariatric patients are based primarily on clinical experience, including open-label studies, with few randomized controlled trials (17). On the basis of the available literature, protein intake should be 60 to 120 g daily to maintain lean body mass (4). Daily protein intake should be based on body weight, rather than as a percentage of total calories, to avoid protein deficiency in patients consuming a lowcalorie diet. Daily protein intake has been recommended as 1.5 g/kg of ideal body weight (6). For bariatric patients who have difficulty meeting these levels through intake of food alone, use of nutritional supplements can be effective (18). Both reduced intake and poor absorption of protein in the bariatric patient population can be related to anemia or zinc and thiamine deficiencies, based on the vitamin and mineral content in protein-rich foods (19).

Blood tests, including a complete blood cell count, comprehensive metabolic panel, vitamin B₁₂, 25-hydroxyvitamin D, intact parathyroid hormone, iron, and folate, should be performed, and any deficiencies noted should prompt replacement, at least every 6 months during the first 2 years after bariatric surgery and annually thereafter (4).

CONCLUSION

Malnutrition after GBP has been reported during short-term and long-term follow-up after bariatric surgery and may be advanced with the presence of another gut injury such as Crohn

disease. Accordingly, physicians must have a heightened awareness of this possibility to avoid life-threatening consequences in bariatric patients. When malnutrition is established and not easily corrected, a multidisciplinary team approach emphasizing aggressive nutrition assessment and restoration, including TPN, should be used early on to manage such patients.

Abbreviations

BMI	body mass index
GBP	gastric bypass
IBD	inflammatory bowel disease
TPN	total parenteral nutrition

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Fig. 1. Body weight changes of study patient. *First arrow* indicates time of gastric bypass. *Second arrow* indicates time of diagnosis of Crohn disease. *Third arrow* indicates time of nutritional intervention.

Table 1

Vitamin and Mineral Supplementation Trend in Study Patient

Analyte	Reference range	Initial consultation	Supplement	At hospital discharge (after 14 days of TPN)	Supplement	At 14 days after discharge
Prealbumin (mg/dL)	20-40	5.2	TPN	19.9	TPN/PO	30
Albumin (g/dL)	3.5-5.0	0.9	TPN	2.6	TPN/PO	3.6
Vitamin A (mg/L)	0.3-1.2	0.06	50,000 U IM $\times$ 2	0.26	...	...
25-Hydroxyvitamin D (ng/mL)	30-80	14	Vitamin D ₂ , 50,000 U $\times$ 3; vitamin D ₃ , 5,000 U daily	37	Vitamin D ₃ , 2,000 U daily	34
Vitamin E (mg/L)	5.5-18	6	TPN/multivitamin	10.5	...	...
Iron (μ g/dL) Ferritin (ng/mL)	37-170 10-291	34 144	Ferlecit, 125 mg IV $\times$ 2; ferrous gluconate, 325 mg daily	29	Ferrous sulfate, 325 mg BID	49
Vitamin B ₁ (nmol/L)	8-30	5	100 mg IV daily	22	Multivitamin	...
Vitamin B ₁₂ (pg/mL)	211-911	718	Multivitamin/TPN	848	2,000 mg PO daily	1,233

Abbreviations: BID = twice daily; IM = intramuscularly; IV = intravenously; PO = orally; TPN = total parenteral nutrition.