

Case Report



Nutritional Intervention for a Patient with Laparoscopic Sleeve Gastrectomy for Morbid Obesity: a Case Report

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Conflict of Interest

The authors declare that they have no competing interests.

ABSTRACT

Nutritional intervention for individual patients has a wide range of postoperative food adaptability, so an individual evaluation is required. The medical institution intends to examine the contents of nutritional arbitration conducted on patients who underwent gastric surgery, examine the results, identify the nutritional problems that can be seen through the course of the patient's meal process, and share the clinical experience. In this case study, a 46-year-old female patient was diagnosed with morbid obesity, impaired fasting glucose and hypertension. She was 153 cm tall and weighed 88 kg, with a body mass index 37.6 kg/m² at initial evaluation. The patient maintained normal biochemical data before and after surgery and shows postoperative weight loss, body fat reduction, and abdominal fat reduction. In this case, blood sugar and blood lipid levels improved after weight loss. The repeated nutritional intervention for a sleeve gastrectomy patient, which is performed by clinical dietitians, is as follows. A balanced diet, supplemented with vitamins and minerals, is very important for preventing nutritional complications after obesity surgery. In conclusion, for stomach surgery patients, a multidisciplinary approach and continuous nutritional management, motivation for weight loss, postoperative dietary adaptation, and individual access to patients are most important.

Keywords: Nutrition; Gastrectomy; Nutritional management

INTRODUCTION

Bariatric surgery improves obesity-related complications by reducing body weight and recovering body functions [1]. As surgical treatment increases in highly obese patients, interest in nutrition deficiency is also increasing [2]. In order to recover quickly after surgery, prevent weight regain, anemia, osteomalacia, and dumping symptoms, continuous nutrition management is required after gastric surgery. After bariatric surgery, digestive symptoms are very common, which can lead to nutrient deficiency requiring proper nutrition intervention and dietary management [3]. Since the surgery, nutritional deficiencies can occur due to the drastic reduction in the amount of food consumed, vomiting, and nausea [4]. Guidelines from the American Society for Metabolic and Bariatric Surgery, recommended that patients

take vitamin B₁₂, calcium, vitamin D, folic acid, and iron supplements, in addition to a high-dose multivitamin-mineral that contains 100 percent of the daily requirement every day after surgery [5].

Nutritional intervention for individual patients has a wide range of postoperative food adaptability, so an individual evaluation is required. The medical institution intends to examine the contents of nutritional arbitration conducted on patients who underwent gastric surgery, examine the results, identify the nutritional problems that can be seen through the course of the patient's meal process, and share the clinical experience.

CASE

This study was approved by the Institutional Review Board of Kyung Hee University Hospital at Gangdong (KHNMC 2020-02-014).

A 46-year-old female patient was diagnosed with morbid obesity, impaired fasting glucose and hypertension (3 years ago, telmisartan medication). The patient had gained weight after giving birth 3 years ago; she reported having regular menses. The patient had extensive weight control experiences (e.g., intermittent fasting, vegetarianism, use of appetite suppressant, etc.). Accordingly, the weight loss-weight gain cycle (a yo-yo phenomenon) was repeated. She was 153 cm tall and weighed 88 kg, with a body mass index 37.6 kg/m² at initial evaluation. The preoperative esophagogastroduodenoscopy (EGD) results showed that *Helicobacter pylori* were benign and it was treated. The patient underwent sleeve gastrectomy in August 2019. She was hospitalized at a rehabilitation hospital for one month after surgery because of neck and joint pain. She also underwent endometrial ablation because of abnormal uterine and vaginal bleeding in October 2019.

We collected anthropometric data, biochemical data, and food intake (24-hour food recall method) preoperatively, at postoperative day (POD), POD#12, POD#45, POD#135 and POD#195. The patient's biochemical data remained before and after surgery (**Table 1**) and shows postoperative weight loss, body fat reduction, and abdominal fat reduction (**Table 2**). Patients can see body fat decrease since body muscle is maintained after surgery. While calories are preoperatively maintained whenever nutritional education is repeated for patients, calcium, iron, and folic acid are on the rise (**Table 3**).

Clinical dietitians conduct nutritional interventions with sleeve gastrectomy patients at Kyung Hee University Hospital at Gangdong, as follows.

For this case study, the patient's first screening visit was on June 5, 2019. Her eating habits included 2 meals a day (she skipped breakfast), an unbalanced meal, irregular meal times, binge-eating, occasional snacks, bread, and ramen. She tended to eat steamed rice in small quantities and replaced it with snacks. The patient was unable to exercise regularly since she cared for her 4-year-old child.

Before admission (preoperatively), we restricted her eating energy intake (her estimated nutritional need was 20 kcal/kg adjusted body weight (ABW)/day with 1–1.2 g protein/kg ABW/day based on the Manual of Medical Nutrition Therapy, 3rd edition [6]). However, she did not

Table 1. Biochemical data

Biochemical data	Preop.	POD	POD#12	POD#45	POD#135	POD#195
Albumin (g/dL)	4.0	3.6	4.0	4.4	4.0	-
Hemoglobin (g/dL)	12.7	12.4	12.9	13.8	12.8	-
Hematocrit (%)	36.7	36.0	37.5	40.5	37.9	-
Total cholesterol (mg/dL)	236	171	233	244	210	-
LDL cholesterol	165	-	178	167	109	-
HDL cholesterol	48	-	39	52	53	-
TG (mg/dL)	128	-	-	154	109	-
BUN (mg/dL)	10	10	-	10	14	-
Cr (mg/dL)	0.53	0.62	-	0.57	0.57	-
Ca (mg/dL)	8.90	8.91	-	-	9.50	-
Vitamin A (retinol, $\mu\text{mol/L}$)	-	1.36	-	-	1.30	-
Vitamin B ₁ (nmol/L)	215.5	-	-	-	290.3	-
Vitamin B ₁₂ (pg/mL)	-	561.0	-	-	963.0	-
Methylmalonic acid ($\mu\text{mol/L}$)	0.17	-	-	-	0.12	-
Transferrin	-	246.9	-	-	301.6	-
Ferritin (ng/mL)	-	24.8	-	-	15.1	-
Iron ($\mu\text{g/dL}$)	-	71	-	-	122	-
TIBC ($\mu\text{g/dL}$)	-	328	-	-	364	-
UIBC ($\mu\text{g/dL}$)	-	257	-	-	242	-
Folate (ng/mL)	-	9.30	-	-	8.36	-
25-OH-vitamin D (ng/mL)	-	15.0	-	-	26.4	-
PTH (pg/mL)	-	53.7	-	-	-	-
HbA1c (%)	5.7	-	-	-	5.6	5.6
Insulin ($\mu\text{U/mL}$)	16.8	-	10.2	8.2	6.7	-
C-peptide (ng/mL) (0 min)	3.67	-	2.55	2.09	1.88	-
Fasting glucose (mg/dL)	103	-	96	93	93	99
HOMA-IR	4.272	-	-	-	1.539	-

Preop., preoperative; POD, postoperative day; LDL, low density cholesterol; HDL, high density cholesterol; TG, triglyceride; BUN, blood urea nitrogen; Cr, creatinine; TIBC, total iron binding capacity; UIBC, unsaturated iron binding capacity; PTH, parathyroid hormone; OH, hydroxyvitamin; HbA1c, hemoglobin A1c; HOMA-IR, homeostasis model assessment of insulin resistance.

Table 2. Anthropometric data

Anthropometric data	Preop.	POD	POD#12	POD#45	POD#135	POD#195
Height (cm)	151	-	-	-	-	-
Weight (kg)	89.6	88.6	86.9	83.9	78.8	78.9
BMI (kg/m^2)	39.3	38.9	38.1	36.8	34.6	34.6
Lean body mass (kg)	24.2	-	23.3	21.1	22.1	23.0
Body fat (kg)	45.5	-	44.4	44.0	38.2	36.6
Visceral fat area (cm^2)	143.7	-	150.5	171.3	136.9	133.8
Waist (cm) cir.	118.5	-	115.4	114.2	108.3	108.5
Blood pressure (mmHg)	138/84	132/78	118/72	127/79	125/85	115/75

Preop., preoperative; POD, postoperative day; BMI, body mass index; cir., circumference.

lose weight. Rather, the patient was unaware of the need for preoperative dieting and weight loss, thinking that she would not be able to eat much after surgery. Therefore, the clinical dietitian taught the patient the importance of losing weight before surgery.

The patient underwent sleeve gastrectomy surgery on August 1. After surgery, the clinical dietitian provided education, focusing on intake adaptation and preventing side effects each time. During the first postoperative educational session (POD#3), the clinical dietitian trained the patient on first meals, stomach function, and meal intake precautions. During the second postoperative session (POD#4), the clinical dietitian trained the patient on the post-discharge diet, such as how to follow a clear liquid diet, how to eat after discharge, how to cook, how to supplement protein, general nutritional supplements, and how to eat slowly. During the third session (POD#12), the clinical dietitian educated the patient after checking

Table 3. Nutrients intake

Nutrients	Preop.	POD#4	POD#12	POD#45	POD#135	POD#195
Energy (kcal)	979	104	313	994	1,012	959
Carbohydrate (g)	152	23	52	126	121	117
Protein (g)	28.0	1.7	10.2	56.5	51.6	43.0
Fat (g)	33.0	0	6.4	32.0	37.0	40.0
C:P:F ratio	62:12:30	89:6:0	66:13:18	51:23:29	48:20:33	49:18:38
Dietary fiber (g)	9.1	0.3	0.2	12.8	13.0	22.7
Vitamin A (μRE)	274.2	0.2	56.0	515.0	276.0	678.0
Vitamin C (mg)	10.5	0	2.0	44.2	32.3	259.8
Thiamin (mg)	0.80	0.04	0.10	0.80	1.10	0.90
Riboflavin (mg)	0.74	0.00	0.31	1.01	1.22	1.36
Niacin (mg)	4.20	0.27	1.29	11.40	17.70	11.20
Folate (μg)	192.10	7.28	22.13	432.90	294.70	831.70
Calcium (mg)	114.0	1.8	5.5	186.0	138.0	450.0
Iron (mg)	4.8	0.4	2.1	11.6	9.1	13.0
Animal iron (mg)	1.7	0	0.2	3.2	2.7	3.5
Plant iron (mg)	3.1	0.4	1.9	8.4	6.4	9.5

Preop., preoperative; POD, postoperative day; C:P:F, carbohydrate:protein:fat; RE, retinol equivalent.

her current intake through a 24-hour food recall survey, indigestion after ingestion, and nutrition education performance upon discharge. The overall nutrition management process is shown in **Table 4**. After surgery, the diet will be in 4 stages for 6 to 8 weeks. The patient will begin drinking water on the 1st and 2nd day after surgery, and maintain a clear liquid diet for up to 2 weeks after discharge. The patient will eat a pureed diet for the third and fourth week after discharge, then progress to a soft diet during the fourth to sixth week, and then progress to a general diet. However, the patient was unable to exercise continuously because of her 4-year-old child.

Table 4. Nutrition education steps and contents

Days	Description
Preop.	Meal planning (using a food exchange table)
POD	General characteristics collected at admission Nutrition assessment
POD#3	Sips of water after operation and diet start Attention at the beginning of the meal
POD#4	At discharge, clear liquid diet for up to 2 weeks with protein powder Recommended of multivitamin-mineral, calcium, and vitamin D 3 meals and 3 snacks per day (approximately 800 kcal/day) Side effect (nausea, vomiting, dumping syndrome, etc.) check and problems
POD#12	At 1 weeks post discharge, dietary assessment (24-hr food recall) Recommended of multivitamin-mineral, calcium, and vitamin D Progress diet (pureed diet up to 3–4 weeks and soft diet up to 4–6 weeks at discharge) Side effect (nausea, vomiting, dumping syndrome, etc.) check and problems
POD#45	At 6 weeks post discharge, dietary assessment (24-hr food recall) Recommended of multivitamin-mineral, calcium, and vitamin D Progress diet (general diet after 6 weeks of discharge) Balanced diet, 1,200 kcal diet planning, food choices, food recipes
POD#135	At 4 months post discharge, dietary assessment (24-hr food recall) Balanced diet, 1,200 kcal diet planning Recommended of multivitamin-mineral, calcium, and vitamin D
POD#195	At 6 months post discharge, dietary assessment (24-hr food recall) Balanced diet, 1,200 kcal diet planning Recommended of multivitamin-mineral, calcium, and vitamin D

Preop., preoperative; POD, postoperative day.

DISCUSSION

A low-fat, low-calorie diet for a few weeks before surgery can also help patients lose weight after surgery [7]. However, this patient did not lose weight preoperatively because she thought she would be unable to eat postoperatively and did not change her eating habits.

Other studies [8] show that the % excess weight loss was 55.4% (33%–85%) for patients with sleeve gastrectomy surgery, but was 27% for this patient. This is not yet a sufficient period for other studies, and is considered to be a factor for patients such as admission to a rehabilitation hospital, uterine surgery, and the resulting decrease physical activity. If the patient had been hospitalized before surgery and lost weight after limiting caloric intake, she may have a higher % weight loss.

Obesity surgery is an effective treatment for long-term weight loss and improved body functions, but nutritional management must be performed thoroughly before and after surgery [4]. A poor diet can cause a variety of nutritional problems, including malnutrition. Symptoms of diabetes, high blood pressure, and hyperlipidemia often improve after sleeve gastrectomy [1]. In this case, blood sugar and blood lipid levels improved after weight loss.

A balanced diet, supplemented with vitamins and minerals, is very important to prevent nutritional complications after obesity surgery. Repeated nutrition evaluation and nutrition management, through a multidisciplinary approach, are also essential. The patient's biochemical data show no nutritional deficiency since she had been trained with an emphasis on the importance of taking continuous multivitamin supplements, calcium, vitamin D, and a balanced diet. The patient was able to observe changes with an increasingly balanced diet and regular, nutritious eating habits (snacks reduction, 3 meals). This is considered to be the effect of continuing nutrition education.

In conclusion, for stomach surgery patients, a multidisciplinary approach and continuous nutritional management, motivation for weight loss, postoperative dietary adaptation, and individual access to patients are most important.

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