

**Case report****Protein Energy Malnutrition with Refeeding Syndrome after Bariatric Surgery**

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**ABSTRACT** *Background and purpose:* Protein energy malnutrition (PEM) with refeeding syndrome might develop post-bariatric surgery. Case report aimed to describe the clinical practice on a morbidly obese patient post-bariatric surgery, presented PEM with refeeding syndrome. *Case presentation:* A 50 years old-morbidly obese patient presented PEM (prolonged inadequate oral intake with 12kcal/kg/day and 0.5 g/kg/day protein intake; low biological value protein source), low electrolyte profile and anasarca (gained 10.9 kg with generalized edema) 20-months post-bariatric surgery (51% weight reduction) in bariatric clinic. During the hospitalization (42 days), oral full enteral feeding with standard formula and protein modular supplement was implemented for the first 2-weeks and followed by high protein diet with oral nutrition supplementation. There were clinical and nutrition improvement upon discharged including resolved anasarca, improved energy protein intake, increased in handgrip strength (from 7.8 kg to 11.2 kg) and serum albumin level (from 23 g/L to 32 g/L). She achieved progressive recovery in body weight (gained 7.4 kg, without edema); improved energy protein intake and handgrip strength during 2-month post-discharged follow up in bariatric clinic. *Discussion and Conclusion:* PEM in obese patient post-bariatric surgery has high risk of refeeding syndrome upon rapid advancement in nutritional intake. Progressively nutrition commencement with full enteral feeding and followed by high-protein normal diet with oral supplement support is prescribed to optimize nutrition status during hospitalization. As conclusion, individualized and routine follow-up by dietitian post-bariatric surgery is recommended to early detection of PEM and followed by appropriate intervention to prevent further nutrition deterioration.

**Keywords:** Protein energy malnutrition, refeeding syndrome, bariatric surgery

**INTRODUCTION**

Prevalence of obesity increased in recent decades and reach alarming level. Obesity is a chronic life-threatening disease and leads to worldwide public health concern (1). Studies on bariatric surgeries were proven as an effective and enduring treatment for clinically severe obesity (2, 3). The two main operations are laparoscopic sleeve gastrectomy and Roux- en- Y gastric bypass (4). Gastric bypass procedures are associated with increased nutritional deficiencies because the procedure is more complex and changes the gastrointestinal anatomy. Protein energy malnutrition (PEM) with refeeding syndrome might develop post-bariatric surgery (5). Case report aimed to describe the clinical practice on a morbidly obese patient post-bariatric surgery, presented PEM with refeeding syndrome.

**CASE PRESENTATION**

There A 50 years old-morbidly obese patient, with underlying diabetes mellitus and hypertension, underwent bariatric surgery (gastric bypass) in August 2019. Diabetes mellitus and hypertension were resolved and not on any medication post-bariatric surgery. About 20-months post-bariatric surgery, she achieved 51% weight reduction but she presented protein energy malnutrition (PEM), low electrolyte profile and anasarca (gained 10.9kg with generalized edema) upon clinic follow up. She attended 7 follow up sessions under surgeon in bariatric clinic but only first

and second follow up sessions with dietitian. After assessment, dietitian identified a few nutrition problems including prolonged inadequate oral intake with 12kcal/kg/day and 0.5g/kg/day protein intake past 6 months; low biological value protein source and food myths. Due to afraid of weight gain, she restricted her food choices and amount of meal intake.

During the hospitalization (42 days), oral full enteral feeding with standard formula and protein modular supplement was implemented for the first 2-weeks. In order to address refeeding syndrome, the feeding strength was initiated at low calories level and stepped up gradually concurrently with electrolyte correction. On the third week of admission, high-protein normal diet and oral supplement support 3-times per day were started after oral feeding was established. Moreover, frequent comprehensive and individualized nutrition counseling includes nutrition education, calories counting, food labeling, customized dietary planning, and the empowerments to live a healthier lifestyle were carried out. There were clinical and nutrition improvement upon discharged including resolved anasarca, improved total daily energy and protein intake, increased in handgrip strength (from 7.8kg to 11.2kg) and serum albumin level (from 23 g/L to 32g/L). She achieved progressive recovery in body weight (gained 7.4kg, without edema); improved total daily energy and protein intake and handgrip strength during 2-month post-discharged follow up in bariatric clinic.

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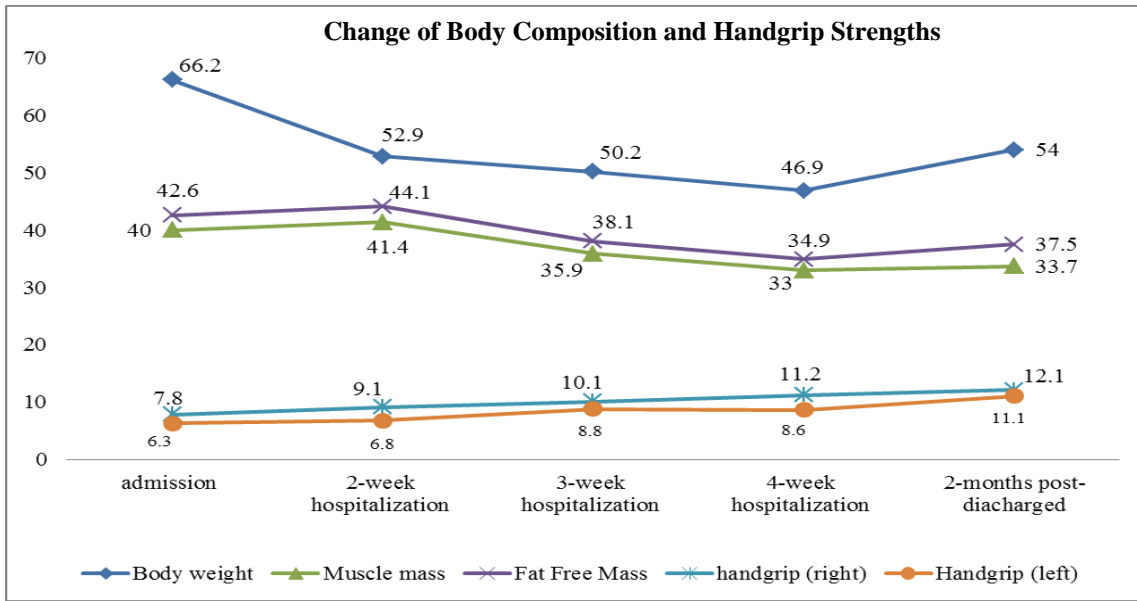


Fig 1. Change of Body Composition and Handgrip Strength

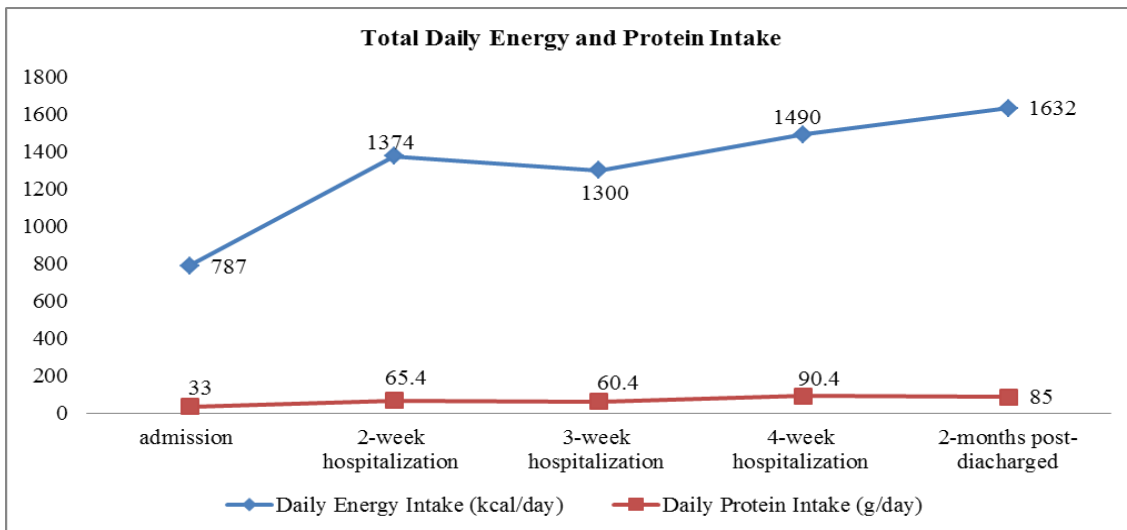


Fig 2. Total Daily Energy and Protein Intake

**DISCUSSION**

Bariatric surgery is proven convincing and successful treatment approach for obesity. A sustainable weight loss, remission of obesity-related comorbidities and well-being are the recognized post-bariatric outcomes. In spite of multiple clinical benefits, a number of nutritional complications can develop especially in the long term, which could cause serious detriment to patients' health (6).

After bariatric surgery, the inadequate oral intake is considered common (7). Those patients who do not adhere to the recommended diets are at a greater risk of developing relevant malnutrition (8). Current PEM after bariatric surgery case was due to non-adherence to nutrition recommendation, food intolerances to good quality protein, small stomach pouch, and

increased protein requirement to maintain muscle mass, food faddism or inability to recognize high quality protein which is in line with the previous study (9). Patients often have postoperative intolerance to protein-rich foods and protein digestion is impaired by reduced mixing with pancreatic enzymes, which results both from mechanical factors (1, 10).

Refeeding syndrome is a severe electrolyte disturbance and metabolic abnormalities when reinstatement of unrestricted enteral or parenteral nutrition in malnourished patients (11). However, obese patients who lose weight after bariatric surgery are also susceptible to the refeeding syndrome (11). PEM in obese patient post-bariatric surgery has high risk of refeeding syndrome upon rapid advancement in nutritional intake (12). Energy supply in enteral feeding

(standard formula and modular protein supplement) in current case was followed as recommendation which aim 25% of energy requirements and stepped up after three days. The protein requirements is 1.2 to 1.5g/kg/day by using the adjusted weight in obese individuals (13).

This case report demonstrated the approaches on the refeeding syndrome of obese patient after bariatric surgery. Concurrent with intravenous electrolyte correction, the nutrition management was initiated with progressively nutrition commencement with full enteral feeding for two weeks and followed by high-protein normal diet with oral supplement support is prescribed to optimize nutrition status during hospitalization (14). Dietitian-led tailored nutrition counseling that establish goal and create individualized dietary plan (7) and motivation to foster responsibility for self-care (15) as well as regular nutrition monitoring are crucial to secure the compliance with the healthy dietary recommendation and promote healthy weight loss post-bariatric period (7). The current case report revealed that regular nutrition monitoring and individualized management by dietitian is crucial to ensure healthy weight loss and prevent PEM post-bariatric surgery (16). This case report intends to strengthen a shift in the conventional post-bariatric unimodal follow up approach to multidisciplinary approaches.

As conclusion, PEM and refeeding syndrome is a potential fatal complications post-bariatric surgery. Hence, dietitian is a mandatory role in the rehabilitation strategy of post-bariatric surgery in outpatient setting in order to monitor nutrition status closely, ensure adequacy of dietary intake and subsequently prevent the risk of PEM and life-threatening complications.

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