TOTAL PARENTERAL NUTRITION SUCCESSFULLY TREATED DYSPHAGIA CAUSED BY ESOPHAGEAL MOTILITY DISORDER: A CASE REPORT

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Abstract

An esophageal motility disorder is any medical disorder causing difficulty in swallowing, food regurgitation, and spasm-type pain. Esophageal achalasia is an esophageal motility disorder involving the smooth muscle layer of the esophagus and lower esophageal sphincter. A 72-year-old male patient with history of dysphagia was admitted to hospital on experiencing progressive dyspnea on exertion. Because of difficulty in eating and weight loss, esophageal myotomy was performed, so total parenteral nutrition support was employed. This study evaluated the benefits and importance of venous support during surgery in a patient with dysphagia. The continual care provided by the nutrition support team enabled satisfactory enteral nutrition and then oral feeding, which led to improved patient outcome.

Key Words: total parenteral nutrition (TPN), enteral nutrition (EN), esophageal achalasia

Introduction

Although the incidence of achalasia is low, the burden it poses is high because it is a chronic incurable disease. Dysphagia is the most fundamental symptom of an esophageal motility disorder. Motility disorders other than achalasia include esophagogastric junction outflow obstruction, major peristalsis disorders (distal esophageal spasm, hypercontractile esophagus, and absent contractility), and minor peristalsis disorders (ineffective esophageal motility and fragmented peristalsis). Clinical manifestations of achalasia may include dysphagia, regurgitation, chest pain, weight loss, and aspiration pneumonia.[1] Weight loss in patients with achalasia is widely variable with an average loss of 20 ± 16 lbs (pounds), and why certain patients with achalasia lose considerably more weight than others is unclear.[2] Body mass index (BMI) is an independent predictor of mortality.[3]

Patients with achalasia are at high risk of malnutrition due to swallowing dysfunction and weight loss. The surgery to treat achalasia, called esophagostomy, involves cutting the esophageal sphincter muscle. The operation's success

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rate is high and the effect usually permanent. Additionally, Heller myotomy helps 90% of patients with achalasia.[4] To maintain adequate nutrition prior to a surgical procedure, parenteral nutrition (PN) may need to be considered. Along with energy supplementation, nutritional intervention can aid rehabilitation of esophageal motility disorder and improve recovery outcomes. In this study, we sought to clarify the benefits and importance of venous support during surgery in a patient with esophageal achalasia.

Case report

The 72-year-old male patient had history of dysphagia (caused by esophageal motility disorder). He experienced progressive dyspnea on exertion and was admitted to hospital with extremely limited oral intake (Chung Shan Medical University Hospital, Taichung, Taiwan). He also reported progressive dysphagia, easy choking, and difficulty swallowing. Because of his difficulty in eating and his weight loss, esophageal myotomy was to be performed and thus total PN (TPN) support was used.

The nutrition support team began the intervention and estimated his nutritional status. Inadequate caloric intake caused malnutrition such that his body weight loss was greater than 3% over 1 month; additionally, the condition had adversely affected his BMI (16.1 kg/m^2), tricep skinfold thickness (TSF) (5.5 mm), arm circumference (AC) (18 cm), arm muscle circumference (AMC) (16.3 cm), Acute Physiology and Chronic Health Evaluation (APACHE II) score (12),[5] and Glasgow Coma Scale (GCS) score (10).[6] His food intake had decreased to a daily average caloric intake of only 500-900 kcal and protein intake of 20-35 g. Test results on admission are displayed in Table 1. Because of difficulty in eating, weight loss, and the forthcoming esophageal myotomy, TPN support was used.

Total calories were determined using the Harris–Benedict equation.[7] The TPN comprised dextrose, amino acids, and lipids as well as supplementary vitamins and minerals and fully met the patient's nutritional requirements. TPN provided 1800 calories and 75 grams of protein per day before surgery. Enteral nutrition (EN) was attempted on the third day after surgery, and the TPN and EN were combined for 4 days. When the EN intake matched 70% of the total energy expenditure (TEE), TPN was successfully removed (Figure 1). For the next 3 days, 100% TEE was obtained through EN. The patient's weight increased from 43 to 48 kg (Figure 2), GCS score improved from 10 to 11, APACHE II score improved from 12 to 11, TSF improved from 5.5 to 7.0 mm, AC improved from 18 to 20 cm, AMC improved from 16.3 to 17.8 cm, prealbumin level improved from 12.2 to 16 mg/dL, and hemoglobin level improved from 9.9 to 13.6 g/dL (Table 2).

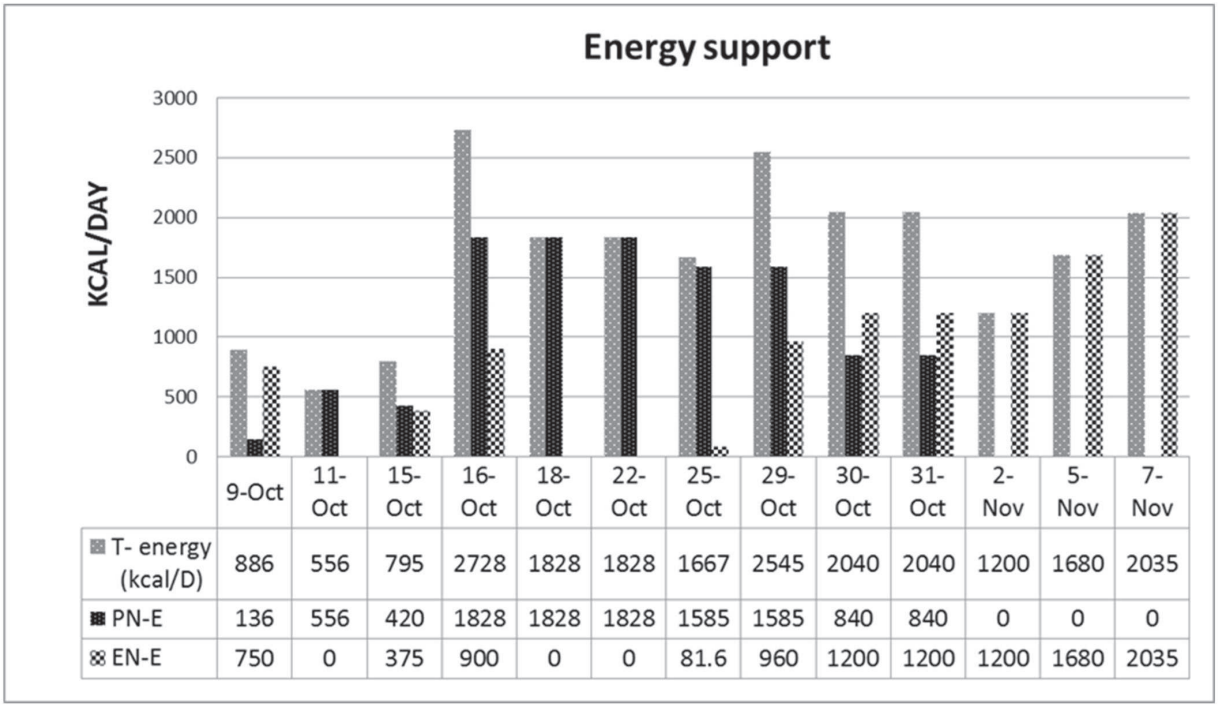
Table 1. Clinical characteristics of the patient at admission

General characteristics	Value
Age (y)	72
Sex	Male
Anthropometric indexes	
Height, cm	163
Body weight, kg	43
Body mass index (BMI), kg/m^2	16.1
TSF, mm	5.5
AC, cm	18
AMC, cm	16.3
APACHE II	12
GCS	10

APACHE II: Acute Physiology and Chronic Health Evaluation; GCS: Glasgow Coma Scale; TSF: tricep skinfold thickness; AC: arm circumference; AMC: arm muscle circumference.

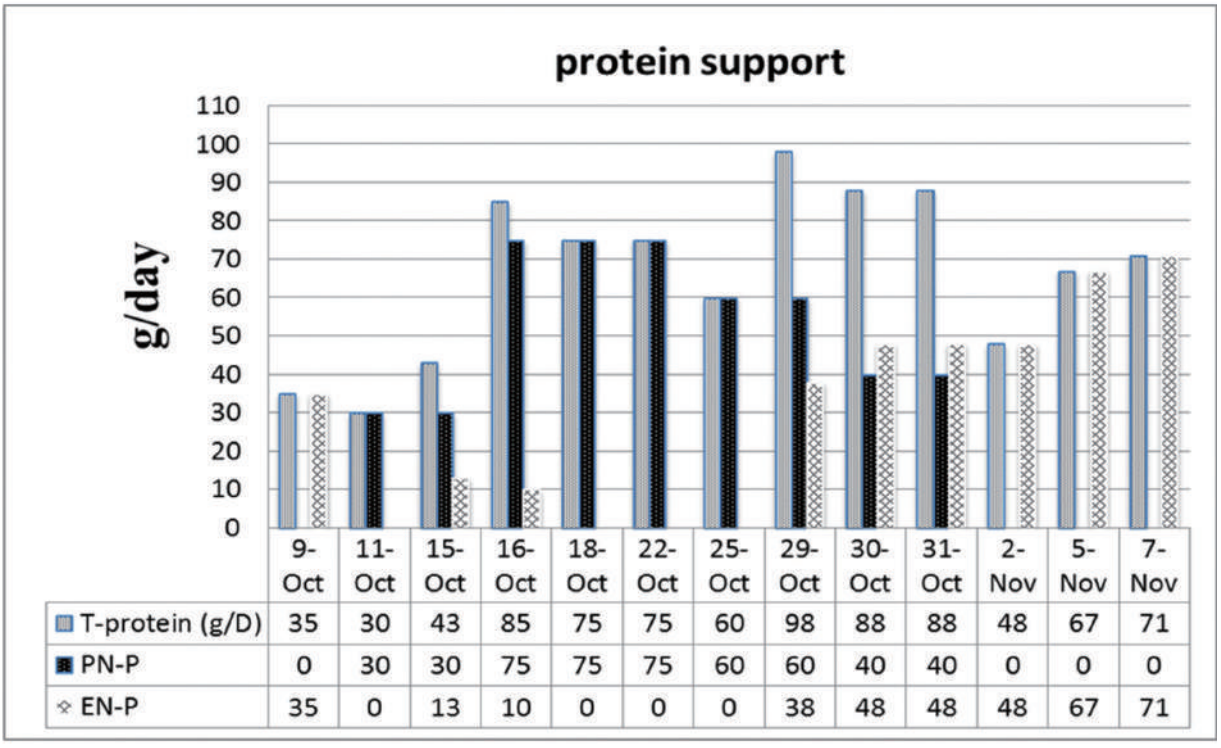
Discussion

The subject of this case report was hospitalized for 30 days. During that period, the patient was under intensive care in the intensive care unit



	9-Oct	11-Oct	15-Oct	16-Oct	18-Oct	22-Oct	25-Oct	29-Oct	30-Oct	31-Oct	2-Nov	5-Nov	7-Nov
T- energy (kcal/D)	886	556	795	2728	1828	1828	1667	2545	2040	2040	1200	1680	2035
PN-E	136	556	420	1828	1828	1828	1585	1585	840	840	0	0	0
EN-E	750	0	375	900	0	0	81.6	960	1200	1200	1200	1680	2035

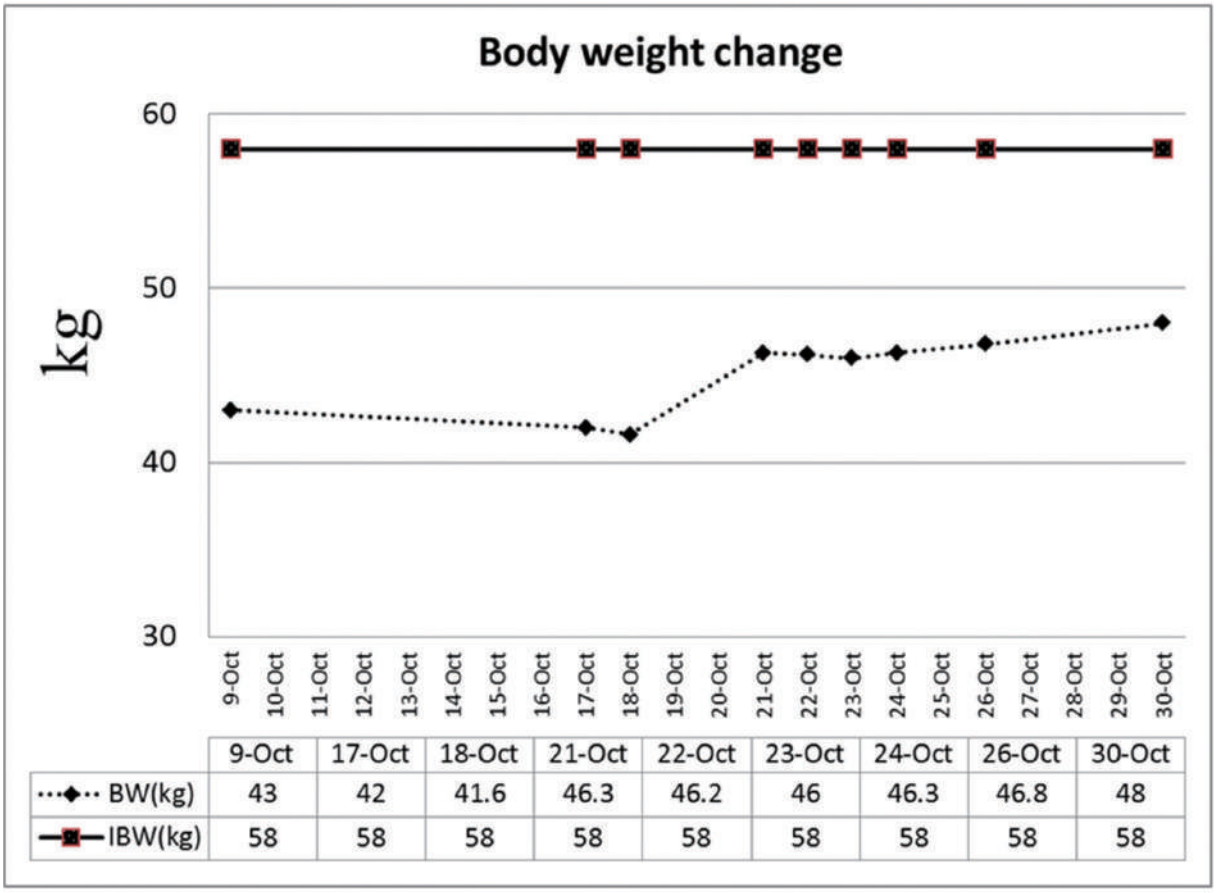
(A) T-energy: total energy; PN-E: parenteral nutrition energy; EN-E: enteral nutrition energy.



	9-Oct	11-Oct	15-Oct	16-Oct	18-Oct	22-Oct	25-Oct	29-Oct	30-Oct	31-Oct	2-Nov	5-Nov	7-Nov
T-protein (g/D)	35	30	43	85	75	75	60	98	88	88	48	67	71
PN-P	0	30	30	75	75	75	60	60	40	40	0	0	0
EN-P	35	0	13	10	0	0	0	38	48	48	48	67	71

(B) T-protein: total protein; PN-P: parenteral nutrition—protein; EN-P: enteral nutrition—protein.

Figure 1. Nutrition therapy, the goals of which were energy intake of 1800 kcal/day and protein intake of 70 g/day: (A) energy intervention and (B) protein intervention.



	9-Oct	17-Oct	18-Oct	21-Oct	22-Oct	23-Oct	24-Oct	26-Oct	30-Oct
BW(kg)	43	42	41.6	46.3	46.2	46	46.3	46.8	48
IBW(kg)	58	58	58	58	58	58	58	58	58

BW: body weight; IBW: ideal body weight

Figure 2. Change in body weight, which increased from 43 to 48 kg during the nutrition intervention.

(ICU) for 16 days. In the early stage, EN was insufficient to meet the elevated nutritional demand induced by disease and surgery. Nevertheless, the continual care of the nutrition support team enabled satisfactory TPN and then oral feeding, which led to outcome improvement. TPN promoted effective service to the patient.

For the majority of the surgical patients in the ICU, nil by mouth is recommended because of intraperitoneal surgery, enteroplegia, inflammation, and gastrointestinal hemorrhage. Additionally, 35%-65% of ICU patients are hypermetabolic.[8] The American Society for Parenteral and Enteral Nutrition guideline advises the delivery of early nutrition support therapy, primarily through the enteral route, and the commencement of PN as early as possible when EN is not feasible in poorly nourished patients.[9] The European Society of Clinical Nutrition and Metabolism also states that patients who are not expected to have returned to normal nutrition within 3 days should receive PN within 24-48 hours if they cannot tolerate EN.[10]

For the patient in this case report, during that period, energy and protein supply was lower than 70% of the requirement and therefore could not meet the high metabolic demand after surgery. TPN was commenced on day 8 of hospitalization and lasted approximately 16 days.

Overall, the evidence suggests that PN support may play a beneficial role in malnourished patients with esophageal achalasia undergoing surgery. We report a patient with achalasia syndrome who was admitted to the ICU, under

Table 2. Plasma levels of prealbumin and hemoglobin, anthropometric indexes, and severity-of-disease classification system score after nutrition intervention

General characteristics	before	after
Prealbumin (mg/dl)	12.2	16
Hb (g/dl)	9.9	13.6
Anthropometric indexes		
Height, cm	163	163
Body weight, kg	43	48
BMI, kg/m^2	16.1	18.1
TSF, mm	5.5	7.0
AC, cm	18	20
AMC, cm	16.3	17.8
APACHE II	12	11
GCS	10	11

Hb: hemoglobin; BMI: Body mass index; TSF: tricep skinfold thickness; AC: arm circumference; AMC: arm muscle circumference; APACHE II: Acute Physiology and Chronic Health Evaluation; GCS: Glasgow Coma Scale.

nutritional management focused on TPN and EN, and then successfully switched to oral feeding. We observed that care from the nutrition support team enabled stabilization of the patient's symptoms and led to his discharge without complications.

Conflicts of interest

The authors have no conflicts of interest relevant to this article.

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全靜脈營養成功治療食道蠕動異常引起的吞嚥困難：個案報告

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摘要

食道蠕動異常（esophageal motility disorder, EMD）是引起吞嚥困難、食物逆流和痙攣型疼痛的任何醫學疾病。食道弛緩不能是一種食道蠕動異常，包括食道平滑肌層和下食道括約肌（lower esophageal sphincter, LES）。這位 72 歲的男性患者有吞嚥困難病史，這一次，他合併患有進行性呼吸困難。由於進食困難，體重減輕和需做食道管肌肉切開術，我們使用了全靜脈營養（total parenteral nutrition, TPN）支持。本研究的目的是評估食道弛緩患者在手術過程中靜脈支持的益處和重要性。最後，在營養支持小組的持續照護下病患順利銜接腸道營養（Enteral nutrition, EN），最後改爲口服餵養 (oral feeding)，成功改善病患生活品質。

關鍵詞：全靜脈營養，腸道營養，食道弛緩不能

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