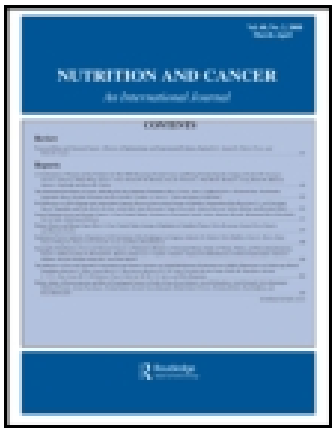

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Appropriateness of Parenteral Nutrition Usage in Cancer Patients

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Appropriateness of Parenteral Nutrition Usage in Cancer Patients

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This study is to investigate the indication appropriateness of parenteral nutrition (PN) administration in cancer patients. Between December 2013 and August 2014, all cancer patients who received PN (including total PN and Kabiven) in a regional hospital of Southern Taiwan were included in this retrospective study. A total of 107 cancer patients received PN. Among them, colorectal cancer was the most common type of cancer ($n = 45$, 42.1%), followed by gastric cancer, head and neck cancer, and esophageal cancer. After evaluation of the appropriateness of PN administration, 88 (82.2%) PN episodes were considered appropriate and unavoidable, 4 (3.7%) as appropriate and avoidable but 15 (14.1%) as inappropriate. In conclusion, PN could be inappropriately used by some oncologic physicians. Physicians and nutrition support team specialists should carefully evaluate the indication of PN administration for cancer patients to obey the generally acknowledged usage rule.

INTRODUCTION

Cancer cachexia is not uncommon among cancer patients, and malnutrition can develop in 40 to 80% of the population (1,2). Moreover, malnutrition status may affect the anti-cancer treatment and can be associated with poor quality of life, higher morbidity and mortality (3–5)]. Therefore, appropriate nutritional support should be taken into account for the patient with cancer-associated weight loss and malnutrition.

Enteral nutrition (EN) is always preferred to parenteral nutrition (PN) for nutritional support, because EN can help maintain gut function and immunity. However, cancer patients may have a lot of causes, such as severe oral mucositis, obstruction of the alimentary tract, loss of appetite, and inability to absorb or ingest nutrients, which may hinder the EN supply. In other words, these patients cannot tolerate the EN route; PN is an essential alternative, but it is associated with several complications, including hyperglycemia, electrolyte imbalance, abnormal liver function, and infection (6). In 2002, the American Society for Parenteral and Enteral Nutrition established the guideline for the appropriate usage of PN (7). Based on this, clinicians can administrate PN support more appropriately and judiciously. However, it is possible that PN was used inappropriately in the hospital setting in the previous studies (8–12). To our knowledge, the appropriateness of PN usage in cancer patients is questionable in clinical practice. Therefore, this study is conducted to investigate the compliance of the generally acknowledged usage rule of PN clinically.

METHODS

Hospital Setting and Patient Selection

This study was retrospectively conducted at a 900-bed regional hospital in southern Taiwan. Between December 2013 and August 2014, all cancer patients who were prescribed with PN administration (including total PN and Kabiven) were included in this retrospective study. Data including patient demographics, underlying diseases, and indication of PN usage were collected. All data was reviewed by a group of dietitians with consensus to assess the appropriateness of PN usage. The data was collected on a routine basis and the analysis was carried out retrospectively. Therefore, no informed consent was required and it was specifically waived

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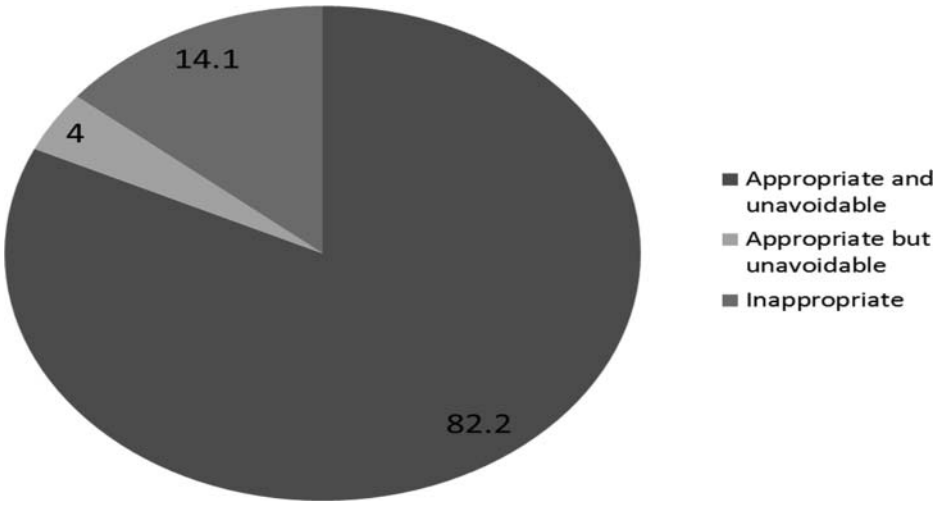

FIG. 1. Distribution of appropriateness of usage of parenteral nutrition.

by Institution Review Board. Ethics approval was obtained from Institution Review Board of Chi Mei Medical Center.

Definition

The indication appropriateness of the PN usage was categorized to appropriate and unavoidable, appropriate but avoidable, and inappropriate, as in the previous study (13). PN was defined as appropriate and unavoidable if nutrition support was indicated by both diagnostic and nutrition criteria and as appropriate but avoidable if nutrition support was indicated but there was a functional gastrointestinal tract (GI) that had not been accessed. PN was identified as inappropriate when none of the diagnostic or nutrition criteria were met but PN was still prescribed. The diagnostic criteria included a diagnosis consistent with indication for PN administration, evidence of GI malfunction and precluded from GI access (7). The nutrition criteria included 3 categories: severely malnourished, well-nourished but at risk, and well-nourished and not at risk (14,15). The administrated PN solution included total PN and Kabiven. The difference between the 2 types of mixtures could be simply explained by the different glucose content and its effect on the osmolarity and the different fatty acid density of the two emulsions. The former is with higher osmolarity and higher fatty acid density than the latter. In other words, Kabiven is considered as a partial parenteral nutrition emulsion.

RESULTS

During the study period, a total of 107 cancer patients were prescribed with PN. Thirty-nine (36.4%) patients received total parenteral nutrition (TPN) and 68 (63.6%) received Kabiven. The mean age was 64.5 years and 57 (53.2%) were $\geq$ 65 yr of age. Among them, colorectal cancer was the most common type of cancer ($n = 45$, 42.1%), followed by gastric cancer ($n = 17$, 15.9%), head and neck cancer ($n = 9$, 8.4%), and esophageal cancer ($n = 8$, 7.5%). The most common indications of PN usage were perioperative status ($n = 37$, 34.6%), followed by persistent vomiting ($n = 12$, 11.2%), ileus ($n = 11$, 10.3%), and abdominal distention/tenderness ($n = 10$, 9.3%). On assessment by the dietitians, 74 ($n = 68.1\%$) patients were considered as well-nourished but at risk, and 17 ($n = 15.9\%$) patients were considered as well-nourished and not at risk. In addition, 16 ($n = 15.0\%$) patients were considered severely malnourished. About the appropriateness of PN (Fig. 1), 88 (82.2%) PN episodes were considered appropriate and unavoidable, 4 (3.7%) as appropriate and avoidable, and 15 (14.1%) as inappropriate.

DISCUSSION

This is the first study to investigate the appropriateness of PN administration in cancer patients in a regional hospital of Taiwan. Inappropriate usage of PN among cancer patient in this study was 14.1% of 107 episodes. Our finding is similar with that by Chan et al. (9) in a local tertiary-care hospital that the rate of inappropriate usage of PN was 15.9% of 138 episodes of PN, but much higher than a recent study in an acute hospital (13) in which only 5% of 1409 episodes of PN usage were considered as inappropriate. In contrast, another study (8) even showed that PN therapy was inappropriately prescribed in 32% of 278 cases at 4 tertiary care hospitals. The differences among our study and previous studies (8,9,13) are presumed to be caused by different study design and population. Although we may not make a solid conclusion based on our limited findings, our study focusing cancer patients still provide useful information about more than 10% of PN usage was inappropriate among cancer patients. It indicates that

TABLE 1
Clinical characteristics of cancer patients receiving parenteral nutrition (PN)

Variable	No. (%) of patients ($n = 107$)
Age (yr), mean ± SD	64.5 ± 14.3
Male (%)	69 (63.9)
Type of cancer	
Colorectal cancer	45 (42.1)
Gastric cancer	17 (15.9)
Head and neck cancer	9 (8.4)
Esophageal cancer	8 (7.5)
Hepatocellular cancer	6 (5.6)
Pancreatic cancer	6 (5.6)
Lymphoma	5 (4.7)
Bladder cancer	4 (3.7)
Prostatic cancer	3 (2.8)
Lung cancer	2 (1.9)
Gynecological cancer	1 (0.9)
Renal cell carcinoma	1 (0.9)
Indication of PN	
Perioperative patients	37 (34.6)
Persistent vomiting	12 (11.2)
Ileus	11 (10.3)
Abdominal distension/tenderness without bowel sounds or bowel movement	10 (9.3)
Severe GI bleeding	5 (4.7)
GI obstruction or pseudo-obstruction	5 (4.7)
Cannot insert tube	4 (3.7)
Intra-abdominal abscess	3 (2.8)
Severe mucositis	3 (2.8)
A prolonged period of minimal oral intake	3 (2.8)
Significant weight loss	3 (2.8)
Access theoretically possible but in clinical judgment could make situation worse	2 (1.9)
Perforated bowel	1 (0.9)
Massive gastric output greater than 1 L/d	1 (0.9)
Excessive diarrhea	1 (0.9)
Enterocutaneous fistula >500 mL/d	1 (0.9)
During combined modality therapy for head and neck cancer	1 (0.9)
Others	4 (3.7)
Nutritional status	
Severely malnourished	16 (15.0)
Well-nourished but at risk	74 (68.1)
Well-nourished and not at risk	17 (15.9)

nutrition support team should pay more efforts to prevent from inappropriate PN use for cancer patients.

In this study, we found that GI cancers, including esophageal cancer, gastric cancer, and colorectal cancer, comprised more than 60% of cases. This subgroup may usually not tolerate enteral feeding because of obstruction of the alimentary tract, inability to absorb or ingest nutrients, or receiving surgery.

In this study, up to 16% of patients were considered "well-nourished and not at risk." This is much higher than a previous study in Ireland (13) in which only 40 (3%) of 1409 episodes were identified as "well-nourished and not at risk." The differences may be because our patients had underlying malignancies that make our oncologist prefer to give them extra nutritional support. In contrast to Western countries, the extra support may make the patient and the caregiver feel more thankful for the physicians' effort and have higher compliance with the clinicians' suggestions in Asia. Although further study is warranted to confirm our hypothesis, our finding underlines the importance of audit and evaluation of nutrition status of patients by nutritional support team specialists.

More than 60% of episodes received Kabiven as PN support in this study, with only 36% receiving TPN. The reason is that TPN should be infused through a central venous catheter (CVC), but Kabiven can be infused via a peripheral line. However, the implementation of CVC carries the risk of infection. Therefore, Kabiven was preferred as PN support by the oncologists in our hospital.

There are several limitations in our study. First, the sample size was limited and the study was performed in a single hospital. Therefore, our finding may not be generalized to other hospitals. Second, we did not investigate the outcome of patients receiving appropriate and inappropriate PN. Therefore, the effect of PN usage on the clinical outcomes of cancer patients remains unclear and further study should be warranted to clarify this issue. However, we still provide the useful information about PN use in this specific group—cancer patients.

In conclusion, we found that about 15% of PN usage in cancer patients is inappropriate. Physicians and nutrition support team specialists should carefully evaluate the indication of PN for cancer patients to avoid the inappropriate usage of PN.

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