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Challenges of Home Parenteral Nutrition for Patients with Advanced Cancer

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Abstract

Context: Advanced cancer is one of the most complicated conditions for both patients and their relatives. This study aimed at investigating the challenges of home parenteral nutrition (HPN) in patients with advanced cancer.

Evidence Acquisition: In this study, all articles published in English from 2000 to 2022 on dietary support for HPN in patients with advanced cancer were collected from several databases, including Medline, Scopus, and Google Scholar, using related keywords such as "advanced cancer" and "home parenteral nutrition".

Results: The different issues of HPN were examined for different dimensions such as HPN during palliative care, deciding HPN, patients' safety, supportive environment, and health literacy. Regarding ethical issues on HPN, 4 principles including charity, autonomy, harmlessness, and justice should be considered in patients with advanced cancer. Considering recent findings on the beneficial effects of nutrients in patients with advanced cancer, there may be a need to revise the guidelines related to parenteral nutrition support in these patients.

Conclusions: Different challenges should be especially considered in adopting appropriate approaches in the field of HPN in patients with advanced cancer. More longitudinal studies in this field are needed.

Keywords: Ethics, Home Parenteral Nutrition, Cancer, Autonomy

1. Context

Cancer is the second leading cause of mortality with about 19.3 million new cases and 10 million deaths annually worldwide (1). An advanced cancer is defined as a tumor that has spread to other sites in the body that usually cannot be cured or controlled (2, 3). Patients with advanced cancer experience several side effects related to radiotherapy or chemotherapy such as nausea, vomiting, loss of appetite, early satiety, diarrhea, constipation, mouth ulcers, dry mouth, loss of sense of smell and taste, difficulty swallowing, fatigue, or pain interfering with eating (4). So, patients with cancer are at risk of malnutrition, because they cannot receive enough food (3). and they suffer from weight loss, nutritional deficiency, dysphagia, loss of appetite, and other feeding-related difficulties (5).

Loss of appetite and reduced dietary intake can increase inflammatory response, muscle catabolism, and inability to process ingested nutrients. This condition also causes impaired anti-tumor immune responses and makes the patients unable to withstand the adverse effects of potent anti-tumor therapies (3). Most cancers at an advanced stage exhibit an aggressive nature and there is a lack of effective anticancer options (6). Patients with advanced cancer need nutritional assessment and the guidelines strongly recommend a nutritional intervention if they are at risk for malnutrition. For example, the European Society for Clinical Nutrition and Metabolism (ESPEN) suggested home parenteral nutrition (HPN) for those who have malignant diseases as a part of palliative care for incurable malignant diseases such as advanced cancer to avoid death from malnutrition in patients, whose life expectancy exceeds 2 months (7). The HPN is an effective nutritional intervention that can increase survival and quality of life in advanced cancer patients that suffer from gastrointestinal obstruction and are unable to consume oral or enteral nutrition or whose compliance is poor (3). The HPN provides macronutrients, micronutrients, electrolytes, and fluid through infusion as an intravenous solution and can be administered to people that are receiving palliative care (3). HPN may shorten the length of hospital stay and improve ambulatory care, and may have social and psychological benefits for cancer patients and their family members (3).

On the other hand, medical ethics is a system of ethical principles that apply values and judgments in the medical field. Attention to ethical issues related to medical care in patients with advanced cancer is considered an important issue in medical ethics (3). Patients with advanced cancer have legal rights to be informed about the nature of the disease and its irreversibility, which should be morally discussed by the medical care team. Palliative care must consider all related physical complications such as pain, anorexia, organ dysfunction, infection, respiratory disorders, and psychological issues such as depression, anxiety, and hopelessness (8).

Nutrition therapy is a medical intervention supported by scientific evidence and ethical principles (9). Making the right decision about the feeding methods for end-stage cancers is possible through reviewing the medical history, involvement of all members of the treatment team, communicating with the patient, and considering the patient's values. However, due to the complexity of implementation and high costs of HPN, recommending HPN to all patients with advanced cancer has been challenging. It is important to review the evidence of current experience and ethical implications in cancer treatment centers to improve cancer care and reduction of unnecessary healthcare costs (3). Ethicists and physicians are skeptical about whether refusing or withholding artificial nutrition and hydration leads to decisions that lead to the patient's death (10). Some countries approved that advanced cancer patients can decide to continue, discontinue, or limit HPN in their palliative care (11). One review study noted that intravenous nutrition should be discontinued if it does not benefit the patient (12). However, there is still no agreement on the different aspects of using HPN in patients with advanced cancer. So, this narrative review aimed at investigating the important challenges of using HPN in patients with advanced cancer.

2. Evidence Acquisition

This narrative review was conducted by searching scientific databases from prestigious databases such as Medline, Google Scholar, ISI, and Scopus for articles reporting on HPN in advanced cancer patients. We included all relevant articles (RCTs, observational studies, guidelines, and reviews) written in English and involving only human subjects.

All published papers on the challenges of HPN in patients with advanced cancer were collected from 2000 to 2022, using the following search strategy: "Home parenteral nutrition" or "home parenteral feeding" or "HPN" or "intravenous feeding" and "cancer" or "tumor" or "neoplasia" or "malignancy" or "malignant neoplasms" and "ethical issues" and "ethical consideration" or "ethics consultants" or "ethics". Additional studies were sought, using references in articles retrieved from searches. Studies were eligible for inclusion if they were published in the English language, published in a peer-reviewed journal, performed on adult patients (over 18 years of age), and included patients with advanced cancers receiving HPN. Irrelevant, inappropriate, and non-English articles were excluded from the review process.

3. Results

3.1. Home Parenteral Nutrition in Palliative Care

Palliative care is an approach aimed at improving the quality of life for patients with advanced cancer and their families by reducing pain and improving their physical, psychological, and spiritual problems (13). Many patients with advanced cancer have malnutrition, caused by reduced food intake related to anorexia. This condition causes a lack of energy, abnormality in carbohydrate metabolism, and negative nitrogen balance (14). Muscle protein depletion is a hallmark of cancer cachexia that negatively influences quality of life and physical function

(3). Thus, in advanced cancer patients, nutrition can essentially improve or maintain health-related quality of life and help improve clinical outcomes (9). In addition, many incurable advanced cancer patients are referred to palliative care professionals for pain relief recommendations (3).

Palliative care should reduce complications in advanced cancer patients (3). ESPEN recommends using enteral nutrition (EN) as first-line support in malnourished anorexic patients with a functional gut. If this route is not accessible, then, parenteral nutrition can be applied (3). The risks of parenteral nutrition (PN) are considered to be more than its benefits for patients with a survival of less than 2 months (3). Torreli et al. reported that parenteral nutrition in advanced cancer patients did not affect the quality of life or outcome. However, some compassionate, ethical, religious, or emotional reasons are available for giving parenteral nutrition to patients with advanced cancer (13). End-of-life parenteral nutrition can worsen the patient's symptoms including increased pain, infection, difficulty breathing, and edema (14). Cotogni et al. in a review study reported that PN should be initiated if the patient receives less than 50% of the nutritional requirement, has no contraindications or risk of aspiration, and has a life expectancy higher than 6 weeks (11).

3.2. Decision-making About Home Parenteral Nutrition

Sharing information about the disease and the effects of HPN by the medical care team can help the patient make decisions about the treatment and reduce the burden of medical duties. In some cases, the patient's family resists this issue and demands not to tell the truth about the disease to the patient (3). Most patients prefer to receive detailed information about their diet and nutritional support to understand and decide about feeding plans (15). Decision-making must be done with special sensitivity and by health staff, who have received proper training in this field (3). Some advanced cancer patients do not have enough knowledge about nutritional support. In this situation, professional medical training can improve the knowledge of patients and their families (16). In addition, the cost of treatments that have no proven beneficial effect should be clearly explained to the patient (17). An advanced cancer patient with decision-making ability should accept or reject medical advice about various treatments after considering the potential benefits and risks. If the patient cannot make a decision, this responsibility is left to his closest relatives (17).

The management of patients with advanced cancer should consider both the patients and their families (5). The medical care team must reduce suffering and protect the patient's interests. In the care of refractory diseases, the doctor's main duty is to help the patient to have the best quality of life by managing the symptom, attention to emotional and psychological needs, and finally experiencing a comfortable death (3). Some studies have reported that advanced cancer patients may begin to change their diet after discussing with their families about feeding (3). The most advanced cancer patients accept nutritional support to save live, relieve symptoms and anxiety, and not give up to fight the disease (5). Some nutrients can help improve the quality of life in people with certain symptoms such as weakness and fatigue (18). Some studies showed that using HPN can prolong the survival of cancer patients. For example, some guidelines suggest the use of HPN for advanced cancer patients, who are unable to use enteral nutrition and whose expected survival exceeds 1 to 3 months (7).

A prevalent challenge in patients with advanced cancer is identifying patients with the possibility of long life to receive HPN. Some prognostic factors like estimating the Glasgow Prognostic Score (GPS), presence and location of metastases, and overall survival are considered for decision-making for HPN in a patient with advanced cancer (19). A clinical trial reported that the group that used HPN for 6 months had an increased quality of life compared to the group that used other nutritional care methods (20). The quality of life and also collaboration with patients and their families are considered important factors in decision-making about recommending HPN in cancer patients (21).

On the other hand, autonomy refers to the right to make decisions concerning healthcare (3). However, autonomy does not mean that people can receive whatever treatment they want. Depending on the individual's overall medical history, treatment may not be appropriate or even harmful (22). The goal of this ethical principle is that the individual is fully informed of healthcare options and the individual's preferences are considered in decision-making. Physicians determine the final decision about the treatment and feeding methods based on the related guidelines and individual preferences (3). Artificial nutrition can be useful for some patients and causes an increase in quality of life. However, in some patients who are at the end of life, many complications may make artificial nutrition useless (3). Furthermore, the decision for nutritional support depends on the cultural background and family members (5). For example, some Taiwanese think that when an individual dies of hunger, the soul becomes hungry and restless after death (16). Jewish culture prioritizes holiness, and Muslims are not in favor of giving up nutritional support (23). Additionally, the Mediterranean culture believes in patient

goodwill and autonomy and emphasizes the need for nutrition and hydration (24). Furthermore, health literacy should be assessed before talking to patients and their families to ensure that information exchange matches the literacy level of patients and their relatives (25). This requires coordination between multiple healthcare professionals and care providers (physicians, nutritionists, nurses, pharmacists) inside and outside the hospital to implement care plans and pre- and post-discharge assessments. Despite awareness, the decision to start parenteral nutrition in patients with advanced cancer is discouraged, and the use of parenteral nutrition can be halved if guidelines are followed (3).

Adequate clinical and metabolic stability of patients can be assessed by clinical factors, protein, energy, fluid and electrolyte balance, and glycemic control. If the patient is stable on her HPN regimen and all clinical parameters are acceptable, a nurse education program should be started to teach appropriate HPN care. The home care environment is needed to be evaluated before initiation of any training program (7). National recommendations are essential to optimizing health literacy and enabling informed choices. Counseling should be based on knowledge-based practice and should include evidence from research, experience, and knowledge about the patient's requirements (11).

In general, a patient's independence in deciding in the final stage of life should be respected. This includes the patient's right to refuse treatment such as nutritional support except for those that would hasten the patient's death. Many factors such as clinical condition and sociocultural background should be considered for decision-making about nutritional support in patients with advanced cancer.

Moreover, for patients that receive PN at home, an important item to monitor regularly is whether the HPN program needs to be changed and whether the feeding schedule needs to be weaned or discontinued. Reassessing the need for HPN or deciding to change the HPN schedule after assessing nutritional status or gastrointestinal function is crucial for all cancer patients undergoing HPN. Improvement in bowel function can be more common in cancer patients with HPN undergoing cancer treatment when side effects of cancer treatments leading to reduced oral intake resolve or regress (3). HPN is discontinued if the patient experiences the development of uncontrolled symptoms or severe organ dysfunction and estimated life expectancy from hours to days. If applicable, discontinuation of HPN should be decided jointly with the patient (26).

3.3. Home Parenteral Nutrition and Patient Safety

Patient safety may have priority over achieving nutritional goals. In a recent study, Amano et al. investigated the clinical benefits of EN and HPN for patients with advanced cancer. The results showed that managing symptoms to improve the quality of life and patient safety is crucial before initiation of HPN and also EN is superior to HPN (27). In a prospective multicentric randomized controlled study by Bouleuc et al., patients with advanced cancer and malnutrition were randomly assigned to optimized nutritional care with or without supplemental PN. The results indicated that PN improved neither quality of life nor survival and induced more serious adverse events than oral feeding among patients with advanced cancer and malnutrition (28). Sowerbutts et al. reported that inconvenience and disruption caused by HPN may increase the burden on patients (29). Bozzetti identified that nutritional support for advanced cancer patients in palliative care is more likely to improve their quality of life when considered as a part of a comprehensive early palliative care approach (30).

Generally, patients with HPN may initially feel apprehensive about HPN (3). Therefore, patients and their caregivers should be trained to independently perform procedures related to HPN bag injection and management of the central venous access device. Preventing HPN-associated complications should be the first consideration. However, pre-discharge or outpatient training for patients and their caregivers is limited. Therefore, a qualified nurse should continue the educational process at home. In addition, training should include self-monitoring procedures (such as edema and body weight) and awareness of potential complications. Finally, home care visits, laboratory monitoring, and hospital follow-up appointments should be scheduled, and written instructions given to the patient/caregiver as to when and whom to contact if complications occur (3).

3.4. Home Parenteral Nutrition and a Supportive Environment

The caregivers should try to identify and consider the patient's psychological needs during HPN. Physicians have to provide the necessary emotional and psychological support for the patients and their families so that they can resist the anxiety, fear, and sadness caused by the final stage of the disease (31). Communication and discussion about the patient's expectations is one of the main tasks of the treatment team (17). The provision of spiritual care requires the presence of gentle and well-mannered nurses, who are committed to professional ethics and perform special duties such as the comfort of the patients and their

families. In addition, a suitable environment, provision of a private room if necessary, and relaxation during the care of the patient in the home are also considered essential (32).

To achieve a safe HPN program, the patient's home environment should be suitable for the safe implementation of the proposed treatment (7). The fixed home infusion pumps may affect the patient's quality of life due to the lack of portability and mobility and confining patients to a room during HPN infusion. Providing a convenient device may improve patients' well-being (33). Therefore, it is necessary to pay attention to the selection of nurses, who provide spiritual care to create a better environment to care for patients with advanced cancer (3).

3.5. Ethical Considerations of Home Parenteral Nutrition

The most common nutritional challenges in HPN have included hydration and providing adequate nutrients (9). A recent study indicated that establishing a proper HPN may lead to low complication and readmission rates and good quality outcomes for advanced cancer patients compared with parenteral nutrition in hospitals (34). However, there have been some debates about the ethical aspects of PN's choices regarding whether cancer patients should be fed or not (35). Ethical dilemmas in the care of patients with advanced cancer are mostly associated with insufficient clarification of the main goals of nutrition therapy. This reflects the difference between nutritional perspectives of "care" and "cure" in the clinical setting and the requirement to respect patient autonomy, which may conflict with the principle of beneficence (9).

Recent studies have frequently reported the benefits of HPN in patients with advanced cancer (34, 36-38). For example, a recent prospective cohort study on the comparison of the use of HPN versus artificial hydration showed significantly longer survival in malnourished patients with advanced cancer receiving HPN. These results support the recommendation of HPN when malnutrition threatens the survival of these patients (37) However, the positive effects of HPN in these patients have not yet been proven (38). The patients and their caregivers should be realistically trained about the possible benefits and side effects of PN. Lack of knowledge may lead to unrealistic expectations of patients and families from PN (11). Some studies showed that enough knowledge can help patients and their relatives in their decision-making about using HPN (3). Four principles are recommended when dealing with ethical dilemmas of HPN, which include autonomy, charity, harmlessness, and justice. Caregivers should emphasize self-determination and respect the autonomy of advanced cancer patients. Also, caregivers should follow ethical considerations in pursuing the patient's best interests and avoiding possible harm (9). Withdrawing and withholding artificial nutrition and hydration should be assessed in each case based on the patient's cultural, spiritual, and regional needs (10).

4. Conclusions

It is important to consider the appropriate criteria for providing HPN to patients with advanced cancer, who are unable to receive oral or enteral nutrition. Some medical and ethical considerations in patients with advanced cancer requiring HPN are crucial including determining the applications of HPN in palliative care, involving the patient and the patient's family in decision-making on HPN, patient autonomy in decision-making, and considering the health literacy of the patient and the patient's relatives. Moreover, it is crucial to pay attention to the patient's safety, to create a supportive environment, and to make the right decision about the need to discontinue HPN. The importance and impact of HPN should be discussed and revised according to the results of new studies on the effects of nutrients in increasing the quality of life and longevity of patients with advanced cancer. However, the present study had some limitations. Due to insufficient studies in the field of HPN in patients with advanced cancer, it is difficult to provide conclusive evidence in this field. In addition, considering the impact of genetic, pathological, nutritional, and psychological differences on the outcomes of HPN, the impact of decisions made in the field of HPN in patients with advanced cancer may be very diverse. More longitudinal studies on the effect of HPN in cancer patients with different genetic, medical, and nutritional backgrounds are warranted.

Footnotes

Authors' Contribution: M. Gh., S. D., S. F., B. A., S. SH., S. M. D., N. H. A., G. KH. M., K. D. and N. F. designed the study and carried out data collection. F. M. N. AND S. D. designed the study, analyzed data and critically reviewed the manuscript. All authors read and approved the manuscript.

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