The Changing Face of Parenteral Nutrition in Oncology

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The impact of disease on the body can be profound. Coupled with treatment, oncology patients will often experience an array of side-effects, including loss of interest in food and decreased appetite, nausea, vomiting, diarrhoea or constipation, and pain.[1] The compounding consequences of disease, treatment and associated side-effects can be weight loss, nutritional deficiencies, malnutrition and cachexia (a multifactorial syndrome defined by an ongoing loss of skeletal muscle mass [with or without loss of fat mass] that cannot be fully reversed by conventional nutritional support).[2] In cancer patients, these issues are frequent, (oncology patients are more likely to be malnourished compared to patients treated in many other specialities), are indicators for poor prognosis and are responsible for excessive morbidity and mortality.[3]

In 2016, the European Society for Clinical Nutrition and Metabolism (ESPEN) published evidence-based guidelines to help translate the best evidence and expert opinion into recommendations for multi-disciplinary teams responsible for the identification, prevention, and treatments of reversible elements of malnutrition in adult cancer patients.[4] These recommendations are further supported by the 2017 *ESPEN expert group recommendations for action against cancer-related malnutrition*.[5] The group identified three keys steps to help update nutritional care for people with cancer, including: 1) screening all patients with cancer for nutritional risk in the early course of their care, regardless of body mass index and weight history; 2) expand nutrition-related assessment practices to include measurement of anorexia, body composition, inflammatory biomarkers, resting energy expenditure and physical function; 3) use multimodal nutritional interventions with individualised plans, including care focused on increasing nutritional intake, lessening inflammation and hypermetabolic stress, and increasing physical activity.

Poor quality of life, lower activity levels, increased treatment-related adverse reactions and reduced tumour response to treatment have all been associated with malnutrition in oncology patients.[4, 6] Weight loss preceding tumour diagnosis has been reported to occur in 31-87% of patients.[7, 8] Understanding the nutritional status and specific issues that influence patient health and treatment is an essential part of a patient's care. Diagnosing and treating malnutrition and metabolic derangements through appropriate nutritional screening, intervention and support, is a key step in helping to counteract and diminish the potential implications associated with disease. Evaluation of nutritional intake, weight change and body mass index (BMI) at the beginning of cancer diagnosis, followed by regular rescreening (regardless of BMI and weight history), and continued review, monitoring and evaluation, can help to ensure that any nutritional disturbances are caught at an early stage. Some recommended screening tools include: Nutrition Risk Screening 2002 (NRS-2002), Malnutrition Universal Screening Tool ('MUST'), Malnutrition Screening Tool (MST), Mini Nutritional Assessment Short Form Revised.[8]

Improving the nutritional status in those cancer patients who are nutritionally depleted (when not extreme) is important for maintenance and prevention of further nutritional deterioration. Adequate clinical nutrition can improve outcomes through improved wound healing, reduced incidence of complications, reduced length of stay in hospitals, quicker recovery, increased survival and better quality of life. The recent *ESPEN guidelines on nutrition in cancer patients* strongly recommends nutritional intervention to increase oral intake in cancer patients who are able to eat but are malnourished or at risk of malnutrition.[5] This includes dietary advice and oral nutritional supplements. Inadequate nutritional intake is confirmed if patients cannot eat for a week or if their energy intake is less than 60% of estimated requirements for 1-2 weeks, at which point artificial nutrition is indicated.[5] If oral nutrition remains inadequate then enteral nutrition (EN) is recommended. Should this not be sufficient or feasible, then parenteral nutrition (PN) will be required. Many of the indicators for EN are the same as those for PN.

The role of PN – palliative care considerations

PN is the provision of nutrition intravenously via a central or peripherally placed line directly into the systemic circulation. It is comprised of water, amino acids, lipids, glucose, vitamins, electrolytes and trace elements, and can be used in the hospital, care-home or home setting. ESPEN recommend that home parenteral nutrition (HPN) is considered for patients with incurable cancer and a non-functioning gastrointestinal tract with a life expectancy longer than three months.[6, 9] PN is typically used when intestinal failure is present and enteral nutrition options have been explored. In advanced malignancy, intestinal failure is often the result of bowel obstruction but can also be a result of dysmotility, surgical resection, oncological treatment or disease-associated loss of absorption, and is characterised by the inability to maintain protein-energy, fluid, electrolyte, or micronutrient balance. PN use in chemotherapy, radiotherapy or combined therapy in not routinely recommended. However, PN is recommended for those patients who are malnourished or face a period of more than one week of starvation, and for whom enteral feeding is not feasible.[4] Short-term PN use is also indicated, and better tolerated, in patients who develop gastrointestinal toxicity from chemotherapy or radiotherapy.[6]

There has been substantial debate surrounding the use of how best to most appropriately support and feed patients undergoing palliative care, with clinical, ethical and legal issues all important considerations. The stage and extent of the cancer will affect the treatment the patient receives. In the advanced disease state, or refractory cachexia, nutritional status may not necessarily be able to improve disease status. Furthermore, the possible exacerbation of symptoms due to nutritional intervention should always be considered, with all benefits and burdens addressed. EN and PN are deemed medical treatments and both do come with their specific considerations (these should be discussed under the framework of Gillon's model of ethical principle).[9] When considering PN use, sleep disruptions, equipment within the home, regular nurse's visits and additional complications should all be taken into account. In palliative care, the main aim is to ensure the patient's needs are met and that all care is in the best interest of the patient.[1] That said, the benefit of appropriate feeding may well be seen in terms of maintenance and symptom management, quality of life (including improved wellbeing and better energy levels), as well as increased life expectancy. In aphagic/obstructed (inability to swallow) palliative cancer patients, undernutrition may have a bigger influence on survival than the tumour itself. Studies evaluating the effectiveness of PN in incurable and aphagic/obstructed cancer patients are difficult to conduct. However, studies have shown that mean survival in patients with malignant obstruction who receive palliative care but no nutritional support is around 48 days.[10] In contrast, 20-50% of patients with advanced cancer and selected for HPN have been shown to be alive at six months.[11] In cases of intestinal failure, long-term PN should be offered, if enteral nutrition is insufficient.[12, 13, 14] By receiving PN, the extra time bestowed could be of notable value to the patient and family. PN may improve survival;[15] the median survival in people with malignant bowel obstruction who receive PN is around 80 days, with improvements of symptoms demonstrated after starting PN.[16, 17]

PN in the home

Within the UK, a steady rise in home parenteral nutrition (HPN) use in patients with malignancy has been observed, with 27% of patients receiving it in 2015, compared to 12% in 2005.[18] Despite this, Europe as a whole has much higher figures (39%) for HPN use in cancer patients.[11] In the USA, people with cancer account for 42% of the patients who receive HPN.[19] The UK is also typically likely to only use PN in cases of intestinal failure, whereas other countries may use it to supplement oral nutrition support or enteral tube feeding.[6, 20] Figures therefore suggest that PN is not being offered to all patients, where indicated, who could potentially benefit from it. For patients in their last year of life, in the community setting, the logistics of establishing PN, and its perceived risks, have previously been the main factors to deter healthcare professionals from recommending it. The varied use of PN observed between countries likely says more about a country's culture and attitudes towards treatment and palliation than medical judgement, and strongly highlights the need for stronger, more extensive research to support consistent recommendations both within the UK and across Europe.

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The evolution of PN

The world of PN has markedly changed over the last few decades; technological advances have seen the evolution of all-in-one bags and new formulas (for both enteral and parenteral), which has allowed for better cost outcomes, new materials for improved access and insertion, as well as improved strategies to reduce risks, i.e. evidence-based interventions, updated policies and improved healthcare professional training. Those patients whom require PN for a short period of time do not need any specific formulation.[4] However, in the long-term, pathophysiological and clinical considerations would necessitate more specific bags. With general improvements in homecare support and safer delivery of PN, it is likely that there are patients with advanced malignancy and intestinal failure, whom have failed with EN, which could benefit from PN – a position recently expressed by the British Intestinal Failure Alliance (BIFA) statement.[21]

Current research

Studies are currently being conducted and developed by several universities and hospitals across the UK, to help improve the amount of high quality evidence available. This is needed to help drive change for equitable access to all necessary nutritional resources which are currently lacking.

Conclusion

The impact of cancer, and necessary treatments, can have a profound and varied physical and psychological effect on the patient. Malnutrition and nutritional deficiencies will often present and have been shown to negatively impact the health and overall outcome of the patient. Nutritional screening and malnutrition identification is therefore a fundamental and primary step in the care pathway of the patient. For this, and in accordance with the National Institute for Health and Care Excellence (NICE), it is essential that a multi-disciplinary team is involved to help minimise risks and complications (although these will vary according to the patient's condition and circumstances).[22]

Choosing the appropriate nutritional intervention can play an important role in the patient's prognosis, wellbeing and overall quality of life, either on the road to recovery or for end of life. PN is an effective form of nutrition support, which can play an important role in patient care. Continued research will help to underpin and strengthen current recommendations to ensure that PN is offered under the correct circumstances, to those who are most likely to require it, and that healthcare professionals have the necessary guidance and support on this decision making process.

Further details of when to consider HPN in malignancy can be found via BIFA (www.bapen.org.uk/about-bapen/bapen special-interest-groups/bifa) and ESPEN (www.espen.org/).

Medical Nutrition International Industry (MNI) has started a project on home parenteral nutrition

MNI is planning a campaign to raise awareness about the do-ability and safety of home parenteral nutrition. Key deliverables will include key messages and patient stories. For further information visit: www.medical nutritionindustry.com or contact: secretariat@medicalnutritionindustry.com

About the British Specialist Nutrition Association

BSNA is the trade association representing the manufacturers of products designed to meet the particular nutritional needs of individuals; these include specialist products for infants and young children (including infant formula, follow-on formula, young child formula and complementary weaning foods), medical nutrition products for diagnosed disorders and medical conditions, including parenteral nutrition and gluten-free foods on prescription. **www.bsna.co.uk @BSNA_UK**

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