

The Proper Nutritional Support for Reducing the Side Effects During Leukemia Treatment

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Introduction

The purpose of this thesis paper is to discuss the nutritional support needed for reducing the side effects of treatment in leukemia patients. When a patient is undergoing radiation or chemotherapy, this can take a toll on the body. With treatment, patients may experience fatigue, nausea, vomiting, eating problems, or dehydration.¹ Therefore, the body has to have specific nutritional support in order to reduce these effects and to improve the patient's overall health. This is why nutritional support is important when dealing with oncology. The patient's normal appetite will be diminished, therefore, the patient will need to indulge in a new diet, one that will be more suitable in fulfilling the patient's nutrient needs. Leukemia is cancer of the early blood-forming cells; however, the most common form of leukemia is cancer in the white blood cells.¹ Leukemia can be either an acute or chronic form of cancer, and there are different types of leukemia.

Some statistics about cancer are as follows: in the United States, 1,688,780 cases of cancer were diagnosed in 2017.¹ In Tennessee there are 37,080 individuals that have been diagnosed with this disease.¹ However, an estimated 62,130 new cases of leukemia will be diagnosed in 2017 in the US.¹ Ninety-two percent of leukemia diagnoses are reported in adults 20 years or older. Leukemia is more prevalent in males than in females, with an estimated new case of 36,290 (4%) in males and 25,840 (3%) in the female population.¹ The estimated deaths are higher in males than females. There has been 14,300 leukemia deaths reported in males and 10,200 deaths in females.¹ All together, there is an estimation of 24,500 deaths of leukemia patients by the end of 2017.¹ The signs and symptoms of leukemia are: fatigue, paleness, weight loss, re

peated infections, fever, bleeding or bruising easily, bone or joint pain, and swelling of the lymph nodes or abdomen.¹ The most common form of treatment in leukemia is chemotherapy; however, the more specific types of leukemia are treated with different drugs, as well. The impact of treatment on an oncology patient can truly affect their body in a negative way. Therefore, receiving the proper nutritional support needed for leukemia patients will be a factor that will influence how their treatment progresses and how their body will react to the side effects.

Academy of Nutrition and Dietetics Guidelines for Proper Nutrition In Oncology

The Academy of Nutrition and Dietetics established guidelines (through the Evidence Analysis Library, which is a dietetic research database that provides evidence based nutrition practice guidelines) discussing the matters of proper nutritional needs specifically in cancer patients. These recommendations were reviewed to see which ones would become an official guideline of the Academy.² The recommendations were finalized into the EAL and include: validated tools for malnutrition screening and nutrition assessment, evaluation of nutrition status, medical nutrition therapy in patients undergoing chemotherapy and radiation therapy.² The EAL recommends the use of Patient Generated-Subjective Global Assessment (PG-SGA) and Subjective Global Assessment tools to depict the data of an oncology patient's nutrition assessment.² This will help the dietitian recognize if the patient is at risk for malnutrition. The dietitian can also communicate with other health professionals to discuss the patient's nutritional status and to describe the importance of nutrition for the patient oncology process.² Another guideline would be for the dietitian to provide medical nutrition therapy for the patient.² Thompson et al looked at the use of medical nutrition therapy during chemotherapy and radiation and found that it was ef-

fective for patients with multiple forms of cancer such as breast, ovary, lung, leukemia, head and neck, etc.² The results also showed improvement in weight gain, the patient increasing in a desirable weight status, enhanced quality of life, patient's appetite improved, and found an increased energy and protein intake all through the use of proper medical nutrition therapy.² In the research, the use of fish oil had a positive impact on leukemia patients, as well. The researchers analyzed the patients who were continuing to lose weight, so the registered dietitian recommended the EPA supplement fish oil and found an increase in weight gain in a leukemia patient.² The Evidence Analysis Library also discusses recommendations based on systematic review such as neutropenic dietary precautions. These precautions are common for oncology patients who are undergoing a bone marrow transplant.² The RDN will counsel the patient on the importance of handling foods safely and educating the patient on the foods that may be linked to microbial infections during the neutropenic period.² Some factors the dietitian should analyze during a patient's nutrition assessment should be: food, beverage, nutrient-intake, changes in food and fluids, actual daily intake from enteral and parenteral nutrition, food intolerances, meal or snack patterns, and prescriptions and medications.² The dietitian can also find physical abnormalities that will result in malnutrition such as: impaired immune response, decreased muscle strength, impaired wound healing, and increased treatment toxicities.² A dietitian should follow-up with the patients to see if any improvement in the biochemical data or nutritional/physical findings have occurred since the last visit from the patient. The recommendations will provide nutrition education in order to decrease the likelihood of an oncology patient developing malnutrition, as well as, recover the patient back to proper nutrient care. Even though a patient's nutritional status

can improve through these guidelines, there are symptoms during treatment that can reduce the status of the individual.

Factors Relating to Nausea and Vomiting During Chemotherapy

There are factors that can cause nausea and vomiting during chemotherapy. These symptoms can be caused by the patient having a history of motion sickness (which will cause the stimuli to appear more often), psychological factors, such as the patient having anxiety, genetics (if the patient is younger and a female), or the intense dosage of chemotherapy.³ All of these factors can cause a greater risk for malnutrition in oncology patients. The dietitian should monitor these symptoms closely in order to prevent malnutrition. A patient's pharmacotherapy will need to be noted when counseling an oncology patient, due to the drug that can affect the patient's appetite.³ There are also modifications a dietitian can provide to reduce nausea and vomiting during chemotherapy. Some meal modifications could include avoiding overly spicy, fatty, or sweet foods.³ The patient could also drink cold clear fluids between meals such as lemonade, ginger ale, or fruit juice.³ Also the patient should be encouraged to consume dry foods such as toast, crackers, or cereal.³ A dietitian can educate the patient to eat slower, consume smaller, more frequent meals, avoid overeating or skipping meals, and eating before feeling hungry since hunger can increase the likelihood of the patient becoming nauseous.³ Environmental factors can also decrease the occurrence of nausea and vomiting through eating in a cool environment with fresh air or partaking in exercise/hobbies to help distract the patient from becoming nauseous.³ The patient should consume a protein-rich meal while undergoing chemotherapy as this too will decrease the symptoms of treatment.³ Therefore, knowing these factors can greatly reduce the

symptoms of nausea and vomiting while undergoing oncology treatment and are important when discussing proper nutritional support.

One of the main side effects of treatment is nausea and vomiting. Frequent vomiting can lead to dehydration, as well as inhaling of foods or liquids, which can result in choking or other problems.⁷ The patient may experience changes in eating habits, foul mouth odor, feeling queasy or having an upset stomach, increased saliva, clamminess, and sweating that may occur before vomiting.⁷ If the patient experiences the symptoms in between meals, the dietitian can encourage the patient to eat frequent, small meals and have a snack at bedtime.⁷ The patient can drink clear liquids served cold and sip the drink slowly, examples include: ginger ale, apple juice, broth, tea, popsicles or gelatin.⁷ The patient may also want to try to suck on hard candy with pleasant smells, such as lemon drops or mints to get rid of the bad tastes, as well as eating bland foods such as dry toast and crackers.⁷ The patient should try to eat food cold or at room temperature to decrease the smell and taste, and avoid fatty, fried, spicy, or very sweet foods.⁷ The patient can also consume foods high in calories that are easy to eat several times a day; use butter, oils, syrups, sauces, and milk in foods to help raise calories.⁷ Many oncology patients develop a dislike for red meat and meat broths during treatment, so the dietitian can recommend other protein sources such as fish, chicken, beans, and nuts.⁷

Taste Impairment During Treatment

Chemotherapy or radiation therapy can impact a patient's taste buds and sense of smell. A registered dietitian can educate the patient on different ways to adjust these new tastes. Patients typically recover the sense of taste within three months after undergoing chemotherapy.⁴ Patients

have reported that the taste buds will come back one at a time.⁴ An oncology patient may experience a lack of taste or have different tastes to foods that were eaten previously, which is normal with chemotherapy.⁴ A patient may also be experiencing weight loss due to the lack of appetite because nothing tastes appealing to the individual during this time.⁴ The dietitian will then analyze what the patient is consuming on a day-to-day basis to understand why those foods are unappetizing. The dietitian will then discuss suggestions such as enhancing taste sensations by adding seasonings, marinades, sauces or consuming hot foods.⁴ The patients may be open to branching out and trying something different to give more variety of food sensations.⁴ Follow-up appointments will still occur even after treatment so the dietitian can still see progress in the patient's condition. This describes how a patient's perception of taste can alter during treatment, and that is important when informing the oncology patient of the proper nutrition needed with treatment.

Medical Nutrition Therapy Study in Oncology Patients

The American Dietetic Association partnered with Morrison Health Care in providing proper medical nutrition therapy for patients with different conditions. What was found was adequate nutritional support during treatment in cancer patients can have a positive impact such as: a reduction in weight loss, a quicker recovery time from treatment, and an all-around better quality of life.⁵ A randomized controlled study was conducted to see how well the nutrition interventions protocol for radiation therapy affected oncology patients compared to the standard practice protocols.⁵ The patients who were participating in the nutrition interventions saw more weight maintenance, an improved nutritional status, and overall better quality of life.⁵ During this study, the

researchers also measured the patients dietary intake, quality of life, and nutritional status to see how those factors would be affected with nutritional support or the standard support.⁵ An interesting result was found in which the researchers saw more malnourished patients in the nutrition intervention group than in the standard practice group.⁵ However, there was not many differences between the two groups in regard to energy, or protein and fiber intakes. In the nutrition intervention group, more patients regularly consumed high-calorie and protein supplements daily.⁵ As well as none of the patients had to endure in tube feedings or parenteral nutrition. In contrast, in the standard practice group, one patient had to use a nasogastric feeding while the other patient received a percutaneous gastrostomy.⁵ Over the 12-week trial, the nutrition intervention group had more energy and protein intakes as compared to the standard practice.⁵ The results indicated that sixty of the seventy-eight participants actually consented to the study, however only fifty-four of the subjects completed the study.⁵ The two patients from the nutrition intervention group decided to discontinue the study because one's health was declining and did not feel well enough to complete the measurements, while the other wished to discontinue radiation treatment.⁵ There was also four deaths during the trial — two of which participated in the interventions, while the other two participated in the standard practice.⁵ The medical nutrition therapy protocols are always changing and evolving, however the information found in this study showed improved dietary intake, body weight, nutritional status and quality of life.⁵ Therefore, the dietitian needs to follow up with the patients to see if those factors are still improving during therapy. This study shows the results of having proper nutrition care in oncology patients and how that can affect the health when undergoing treatment.

Study Found on Nutrition Status and Its Effects Of Quality of Life in Oncology Patients

A patient's quality of life describes the physical capacity, presence of emotion, cognitive, and social functions, as well as the symptoms due to the disease or treatment.⁶ A study conducted in France looked at the patient's quality of life and how that can affect the nutritional statuses of oncology patients.⁶ The study was over a two-week period and the setting was at six different university hospitals. Within those hospitals the study was conducted in twenty-three different departments such as: radiotherapy, oncology, ENT, urology, pneumology, etc.⁶ All of the patients were eighteen years of age or older and are ill with different forms of cancer as well as are in the different stages.⁶ In the beginning of the trial, the trained medical students collected information from each of the patients to indicate nutritional status.⁶ The indicators for the statuses were: weight at the start of the illness, over the last week, month, and six months, body mass index, nutrition risk index, and the patient-generated subjective global assessment (PG-SGA).⁶ The students also asked the patients demographic questions such as age, profession, resident location, and diet.⁶ After collecting this data, the students then analyzed the participant's quality of life measurements through a "European Organization for Research and Treatment of Cancer" questionnaire.⁶ The questionnaire was composed of thirty items relating to the functional areas of: physical activities, emotional status, cognitive development, social skills, and global quality of life.⁶ The participants were also scored on areas of oncology symptoms such as: tiredness, nausea and vomiting, pain, loss of appetite, and constipation to see how those factors related to the patient's weight loss.⁶ The lower the score of the functional areas implies that the patient has an impaired function capacity, while a lower score of the symptoms indicates an absence or small presence of those symptoms in the body.⁶ A total of 907 participants were active in this study;

fifty-one percent were women while forty-nine percent represented the male participants.⁶ The average age of the population was 62.3 years and the average percentage of BMIs under eighteen was 8.6%.⁶ On the other hand, the patients that were seventy-five years or older had an average BMI of twenty-one.⁶ The researchers later concluded that the patients who had lost less than ten percent of body weight during this study showed better signs of quality of life as compared to the patients who did not. The patients who were consuming a modified diet during the study were showing signs of improved quality of life, as well.⁶ The final result showed that the patients who had lost weight had significantly higher scores on the functional areas as well as a lower score for the symptoms due to the nutritional therapy that was being given.⁶ Malnutrition can have a negative impact on an oncology patient's health and that is why the proper nutritional support is needed immediately when consulting a cancer patient. This study supports the thesis topic by describing the impact of nutrition therapy and how it can improve an oncology patient's health during treatment.

The American Cancer Society Guidelines on Nutrition for Cancer

The World Cancer Research Fund estimates that about twenty percent of all cancers diagnosed in the U.S are related to body fatness, physical inactivity, excess alcohol consumption, and/or poor nutrition.⁸ Patients should choose vegetables, whole fruit, and other low-calorie foods instead of calorie-dense foods such as: french fries, potato and other chips, ice cream, donuts, and other sweets.⁸ When eating out, patients should be mindful to choose low-calorie, low-fat, and low-added sugar, and avoid eating large portion sizes.⁸ When consuming meats, patients should consume less processed meats such as bacon, sausage, lunch meats, and hot dogs,

and consuming more fish, poultry, or beans instead of red meat.⁸ Patients when preparing meats should bake, broil or poach instead of frying or charbroiling.⁸ Oncology patients should consume at least two and a half cups of vegetables and fruits a day, including snacks.⁸ If consuming juices, the juice needs to be one-hundred percent fruit or vegetable juice.⁸ Lastly, patients should be eating whole grains instead of refined grain products. Whole grain products consist of: brown rice, barley and oats, while refined grains are: breads, cereals, and pasta.⁸ These guidelines are important for patients post-treatment and even in the future after surviving cancer.

Surviving Cancer and the Continuation of Proper Nutritional Support

Overcoming cancer is known to be something to celebrate, however there are still some health concerns that can trigger in the future from undergoing the oncology treatments. In 2005, the Institute of Medicine conducted a study to look at the health care needs of cancer survivors by increasing the efforts of survivorship through an improvement in nutritional status and lifestyle factors like physical activity and diet.⁹ Some records indicate that cancer survivors have shown an improvement in health once diagnosed, but other records also indicate that no lifestyle changes are made in some survivors compared to the general population.⁹ In 1991, the American Cancer Society first published guidelines of physical activity and nutrition related to decreasing the likelihood of cancer risk in the population.⁹ However, in 2003 the guidelines specifically for cancer survivors were released.⁹ The American Cancer Society encourages maintaining a healthy weight, enduring in physical activity, consuming vegetables, fruit and whole-grains, while limiting meat and alcohol.⁹ The American Cancer Society also promotes more consumption of those types of foods as opposed to supplements for the source of nutrients.⁹ This will result in an im-

provement of health in those individuals as well as prevention of cancer returning in one's body. The guidelines also discuss the importance of managing one's weight and increase physical activity because this can prevent cancer from reoccurring in the body.⁹ A correlation to the diagnosis of cancer is excess body weight; this can lead to an increased low-grade chronic inflammation, elevated levels of hormones and growth factors such as: insulin, insulin-like growth factor-1, estrogen, and androgen.⁹ However, there has never been a clinical trial performed to determine if weight loss and maintenance of that weight loss decreases the risk of cancer or improves the survival rate.⁹ Specifically in breast cancer, studies have shown that a diet high in fat has been correlated with the occurrence of the diagnosis and/or survival.⁹ Other studies have found that a dietary pattern high in fruits, vegetables, whole grains, legumes, and fish was associated with a fifteen percent reduction in overall mortality and deaths when compared with a diet high in refined grains, processed and red meats, desserts, high-fat dairy products, and french fries.⁹ A cohort study for breast cancer survivors showed that a consumption of five servings of fruit and vegetables per day as well as engaging in thirty minutes of walking for six days per week resulted in a fifty percent reduction in mortality over a seven year follow-up.⁹ Alcohol consumption has also been linked to the risk of specific cancers, such as head and neck, however this has only been done by a limited number of studies, so therefore the American Cancer Society suggests looking at other risk factors and conditions.⁹ Between fourteen and thirty-two percent of cancer survivors consume supplements after the diagnosis.⁹ The highest prevalence of consuming dietary supplements is amongst breast cancer survivors, whereas prostate cancer survivors is reported as the lowest.⁹ However, dietary supplements have been proven to not improve overall survival status, but can actually increase the number of deaths.⁹ According to a cohort

study of 77,719 Washington State residents, the use of multivitamins, Vitamin E or C did not protect the residents from cancerous deaths in a ten year follow-up.⁹ The American Cancer Society emphasizes that one's nutrient needs should be consumed from foods first, but if one is not meeting the nutrient needs or has a deficiency then the patient can consume a multivitamin/mineral supplement during and after cancer treatment.⁹ The number of deaths from cancer that end due to a non-cancerous cause is sixty to seventy-five percent.⁹ So therefore, nutrition interventions are important when trying to prevent or manage the causes of cancer and improve the patient's quality of life.⁹ Even though these recommendations are in practice, many cancer survivors are not participating in these studies due to timing.⁹ Patients that are in the treatment stage may be experiencing difficulty coping with the treatment, having treatment-related side effects, and other lifestyle commitments.⁹ So this is why the nutritional interventions that take place during this time need to be individualized and symptom focused for the patients.⁹ When gathering participants, one must consider barriers of the patient's lifestyle such as time and transportation; this is why a traditional face-to-face nutritional intervention like a counseling session has been more successful in receiving dietary behavior change information from cancer survivors.⁹ Cancer survivorship research is still continuing, so the recommendations are limited. However, nutrition interventions are still important when wanting to improve the outcomes, prevent, manage the issues, improve quality of life, and decrease the health care cost of cancer even though further research will needed to be conducted.⁹

Conclusion

When discussing the relationship of nutritional support in leukemia as well as other forms of cancer, nutrition interventions are how researchers analyze the data or health of the patients. In this paper, a lot of studies and data were collected on how important nutritional interventions were for the patients, and how the results can differ if a group of patients did not receive nutritional interventions. A concern for these studies was trying to figure out how to improve the patient's quality of life, how to cope with the strenuous forms of cancerous treatments, and reducing the side effects with nutritional support. A lot of the studies did prove that with the use of nutrition therapy, patients did show signs of improvement such as less nausea, vomiting, tiredness, and overall feeling better. The effects of treatment on the body are important to be knowledgeable about as a dietitian for example, how some patients can develop an impairment to taste, and educating individuals on how to adapt to those lifestyle changes. The proper consumption of foods such as vegetables, fruits, whole grains etc. can really improve a patient's progress while undergoing cancer treatment. There needs to be more clinical and research trials done to test the effects of nutrition amongst cancer survivors, there has been little research done but not enough to provide enough information for the public. This research topic is important for the future because cancer is such a prevalent disease in America today. With the knowledge of proper nutritional support, the causes and risks of this disease can potentially decrease in the near future. This can also help the ones that are diagnosed have a faster time of recovery from the treatment, which essentially will improve the prognosis and develop a positive effect on the body. This topic can potentially open a new discovery of improving the symptoms of cancer, as well as other diseases that will be beneficial for the future of the population. In general, the field of dietetics is

already becoming more known and society is becoming more aware of the importance of consuming a healthier diet due to studies and research being done every single day.