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# Challenging role of dietitian to improve oral food intake in a post bone marrow transplant patient – A case report

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## ABSTRACT

***Bone marrow transplantation (BMT) involves the administration of high doses of chemotherapy, immunosuppressive medications and infusion of marrow cells. During and after treatment, patients may develop a poor appetite, mucositis, anorexia and gastrointestinal failure which severely affect the food intake and leads to malnutrition (1, 2). It is important to follow dietary guidelines for post bone marrow transplant patient to improve or maintain nutritional intake. The dietary approach varies from patient to patient based on their condition. This case report explains the crucial role of a dietitian to improve the nutrient intake and nutritional status of the post bone marrow transplant patient.***

***Keywords***— *BMT, TPN, AML, Nutrition support, ONS*

## 1. INTRODUCTION

Diet plays an important role in coping up with cancer and its treatment. Impaired nutritional status is the commonest problem of patients with Acute Myeloid Leukemia (AML) [3, 4]. AML is cancer characterized by the rapid growth of abnormal cells of the myeloid line of blood cells that build up in the bone marrow and blood and interfere with normal blood cells[5]. One of the treatments for AML is bone marrow transplant. Intensive and personalized nutritional support can have positive effects on weight maintenance, helps to withstand and overcome the side effects of treatment, and improves the overall nutritional status of post-BMT patients[6].

## 2. CASE REPORT

A 55-year-old male, known case of relapsed AML was admitted for management of high-grade fever with giddiness associated with decreased appetite, nausea and vomiting for 3 weeks. **Past medical history:** He had undergone a bone marrow transplant twice. The first bone marrow transplant was in 2016 elsewhere which relapsed within 7 months, hence he underwent a 2nd allogenic transplant in 2017 in our hospital which was successful. He was presently admitted for medical management of fever, nausea and vomiting and was on exclusive Intravenous Fluids for the first 4 days of admission. TPN was initiated on the 5th day by the medical team which continued till 8th day of admission. The treating doctor referred the patient to the dietitian on day 9 to intervene and gradually tapper parenteral nutrition support and to start with oral nutrition.

## 3. NUTRITION SUPPORT THERAPY

### 3.1 Nutritional Evaluation

Nutritional assessment is the interpretation of anthropometric, biochemical, and diet history of the patient to determine the patient's nutritional status. Patient's anthropometric measurements such as height and weight were collected (figure 1). During the assessment, it was found that the patient had poor appetite, nausea and vomiting, which eventually affected the patient's oral intake, which was about 600 calories and 10-grams protein. Along with oral diet, the patient was receiving TPN which provide 1000 calorie 45-gram protein. Twelve Kgs of weight loss was observed over a period of 3 months prior to admission.

 


**Fig. 1: Anthropometric Data**

### 3.2 Nutritional Recommendations

BMT is a treatment which often ends in nutritional complications which commonly affects dietary intake due to mucosal membrane injuries, nausea, vomiting and anorexia. Nutritional support is considered as an integral part of the supportive care of BMT patients.

Nutritional requirements for BMT patients are increased to achieve optimal blood cell reconstitution. The energy requirements of the transplant recipient range between 30-35 kcal/kg of body weight per day. Protein requirements are also high, 1.4-1.5 g/kg of body weight per day [7, 8].

The main goal of nutrition intervention in post-BMT patient focuses on managing nutrition-related symptoms such as nausea, vomiting, constipation, taste changes, poor appetite, fatigue, weakness. Diet plays an important role to maintain strength and energy, to enhance the quality of life, to support the immune system which enables the patient to cope better with treatment and ensures the best outcome of the patient.

### 3.3 Nutritional intervention

On day 1 of hospital admission, the patient was on exclusive Intravenous Fluids for first 4 days due to weakness, hypotension, nausea and vomiting. Later from day 5 – 6 patient was only on TPN at a volume of 85 ml/ hour then reduced to 65 ml/hour from day 7 -8 and gradually reduced to 45 ml/hour from day 9 -11.

Following nutritional assessment on day 9 where patient's intake was only about 600 calories and 10 gram protein, considering the patient's health condition, he was started on 20 calorie/ kg body weight, 1 gram protein / kg body weight which is about 1300 calorie 55 gram protein on $10^{th}$ and $11^{th}$ day along with TPN. However, the patient was able to eat orally only 800 – 900 calorie 40 – 50-gram protein due to nausea for the first two days initiation of oral diet. Since the patient tolerated the oral diet well, TPN was completely stopped on the $11^{th}$ day. On the subsequent days (12th and $13^{th}$ day) calorie and protein was stepped up to 25 calorie/ kg body weight and 1.2 gram protein / kg body weight which is about 1600 calorie 75 gram protein out of which approximately he was able to consume orally 1500 calorie and 75 gram protein which accounts for 90% consumption of the requirement. On day 14 and 15, the nutrient recommendation was stepped up to 30 calorie/ kg body weight and 1.5-gram protein/kg body weight which was around 1900 calorie, 95-gram protein.

Since the patient was unable to consume adequate soft solid, the target for protein requirement of 95 gm could not be achieved through oral diet. Hence it was decided to support with home-based high protein oral nutritional supplement (ONS) along with oral soft solid diet. The dietitian also explained to incorporate commercial protein supplements in some of the food preparations like kitchadi, chapattis, gravies etc to improve the protein intake.

The patient was advised to follow the Neutropenic Diet. Neutropenic diet is nothing but a freshly-cooked food which should be eaten immediately after the preparation. This is to prevent microbial infections as the BMT patients are at a greater risk of developing neutropenia [9]. Basic food safety principles such as avoiding uncooked/undercooked meat, seafood, raw eggs, unwashed fruit and vegetables, as well as hand washing and practising personal hygiene were insisted.

## 4. CHALLENGES

As the treating medical team decided to stop TPN and initiate oral diet for the patient, it was very challenging for the dietitian to feed the patient as the dietary intake had been worsening since admission due to poor appetite, taste changes, nausea and vomiting. To stop TPN the dietitian continued to encourage oral intake and tried to adjust the patient's preference, palatability and food texture. The dietitian daily assessed the patient and promptly intervened the nutritionally related barriers. The patient was initially started with liquids, and then gradually switched over to small frequent soft solid meals consisting of energy-dense foods along with high protein home based ONS. By continuous motivation and explaining the importance of diet in post-BMT, the patient was able to achieve oral intake from 600 calories and 10 gm protein to 1900 calorie and 95 gm protein within 7 days of initiation of oral diet as shown in table 1.

 

**Table 1: Grading up of Nutrients**

| Day | TPN | | Oral Intake | | Total | |
|---|---|---|---|---|---|---|
| | Energy (Kcal) | Protein (gm) | Energy (Kcal) | Protein (gm) | Energy (Kcal) | Protein (gm) |
| 1 - 4 | IV Fluids | - | - | - | - | - |
| 5 | 2000 | 88 | - | - | 2000 | 88 |
| 6 | 2000 | 88 | - | - | 2000 | 88 |
| 7 | 1500 | 66 | - | - | 1500 | 66 |
| 8 | 1500 | 66 | - | - | 1500 | 66 |
| 9 | 1000 | 45 | 600 | 10 | 1600 | 55 |
| 10 | 1000 | 45 | 800 | 40 | 1800 | 95 |
| 11 | - | - | 950 | 50 | 950 | 50 |
| 12 | - | - | 1500 | 73 | 1500 | 73 |
| 13 | - | - | 1606 | 75 | 1606 | 75 |
| 14 | - | - | 1800 | 93 | 1800 | 93 |
| 15 | - | - | 1900 | 95 | 1900 | 95 |

## 5. DISCUSSION AND CONCLUSION

Proper nutrition is an inherent element of treatment after allogenic BMT. Malnutrition can occur rapidly due to inadequate nutrition support and may have a severe and negative impact on morbidity, with persistent serious long term effects which warrant attention. Especially, in this case, the implementation of a personalized diet was effective in preventing malnutrition.

Setting nutrition-related goals in consultation with the patient enabled him to play an active role in his treatment and recovery. Professional care of the dietitian helped the patient to prevent dietary abnormalities during the hospitalization. His initial intake was 800 calorie, 40 gm protein and gradually his intake was improved up to 1900 calorie 95 gm protein. At the time of discharge, he was hemodynamically stable and ambulant with the dietary advice of the 2000 calorie 95-gram protein to follow at home.

Hence intensive and personalized nutritional intervention can have positive effects on weight maintenance, helps to withstand and overcome the side effects of treatment, and improves the overall nutritional status of post-BMT patients.

### 5.1 Conclusion

(a) Intensive nutrition intervention can improve the dietary intake of post-BMT patients
(b) Individual nutritional counselling can positively influence the quality of life of post-BMT patients
(c) Early and timely intervention, a sensible partnership with patients is the key to success.

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