Neutropenic diets in hematopoietic stem cell transplantation

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Hematopoietic stem cell transplantation (HSCT) is an aggressive therapeutic procedure that consists in the administration of high-dose chemotherapy (conditioning regimen) sometimes associated with radiotherapy prior to an infusion of hematopoietic stem cell precursors.[1,2]

The aggressive immunosuppressive therapy puts patients at risk of developing infectious complications and bleeding, which may cause nausea and repeated vomiting within the first two weeks despite of the use of antiemetic drugs. Oropharyngeal mucositis, changes in taste, diarrhea and esophagitis are common complications that may remain for several weeks after HSCT; this results in a low calorie-protein intake and a drop in absorption of nutrients as well as greater nutritional needs. The consequence of this association of factors is a progressive worsening of the nutritional status and with increased morbidity and mortality being related to malnutrition in patients submitted to HSCT.[3,4]

Individualized nutritional therapy should be used for all outpatients and hospitalized patients diagnosed as malnourished or at nutritional risk. After transplantation the goal of this is to maintain or recover the nutritional status, to prevent or minimize nutritional deficiencies arising from chemotherapy and radiotherapy, to protect the functioning of the gastrointestinal tract and improve oral intake by providing a substrate appropriate for hematopoietic and immune system recovery.[5]

Neutropenia, which is associated with increased risk of infection, is a potential side effect of chemotherapy during critical myeloablative conditioning regimens for HSCT.[6] Thus, as opportunistic infections, including those caused by foods, can occur in the period during which patients are immunocompromised, an oral neutropenic diet has been advocated during the conditioning phase until engraftment or bone marrow recovery.[1,7] According to guidelines from the American Society of Parenteral and Enteral Nutrition (ASPEN),[2] there is some evidence that patients should receive dietary advice regarding foods may increase risks of infection and about the safe handling of food during the period of neutropenia. This type of recommendation has also been suggested at a national level by the National Consensus of Oncology Nutrition[8] and the National guidelines of Nutritional Therapy (DITEN).[4]

Neutropenic diets, designed to reduce the ingestion of pathogens through the exclusion of certain foods that can be vectors of bacteria, were originally composed of foodstuffs sterilized by autoclaving or irradiation. Due to the resulting poor intake by patients, this strategy was subsequently modified to a diet of cooked foods prepared using appropriate techniques of hygiene, storage and cooking. Although more acceptable to patients than the sterile diet, the limited choice of food made this practice more difficult as patients need to remain on the diet it for between four and six weeks.[9] Despite the routine use of neutropenic diets, there seems to be little evidence of their benefits. In contrast, there are data showing that, at least some patients, would prefer not to be limited to a neutropenic diet.

DeMille et al.,[10] in a study on the effect of this diet on the infection rate, enrolled 23 outpatients and found that 30% did not adhere to the principles of the diet. Infection rates were similar in adherent and non-compliant patients. Another study,[11] in which 19 4- to 5-year-old children were randomly selected to either receive a diet of foods that was considered safe by the U.S. Food and Drug Administration or the same diet without raw fruits and vegetables and foods prepared away from home including fast food, found no difference in febrile neutropenia rates. In another small randomized trial carried out with 20 patients (15 with acute myelogenous leukemia),[12] no differences were found in the colonization of the gut or infections when a normal hospital diet and a low-bacterial diet were compared.

More recently, in a study by Gardner et al.,[13] 153 patients with acute myeloid leukemia treated in an environment protected from infection (room with laminar air flow) and prophylaxis with antifungal, antiviral and antibacterial agents to receive induction therapy, were randomized to receive a diet without raw fruits and vegetables (cooked food diet) and a diet with raw fruits and vegetables. These authors found that the cooked food diet did not prevent neutropenic infection or mortality. Thus, further studies are needed with a higher number of patients to test the evidence in using this type of diet.

Another important finding is the lack of standardization of foodstuffs included in neutropenic diets. In this issue of the *Revista Brasileira de Hematologia e Hematologia*, there is a study by Vicenski et al.[14] carried out in Brazilian bone marrow transplantation centers. The objective of this study was to collect information regarding the standardization of diets for immunosuppressed patients after HSCT and on the structure of nutrition services in bone marrow transplantation centers listed in the *Sociedade Brasileira de Transplante de Medula Óssea*. Data were collected by the application of a questionnaire containing questions on the profile and structure of nutrition services, the time it took for patients to be released to a normal diet after HSCT and the foods that were allowed in the critical phase of immunosuppression as well as at the stage immediately following HSCT. The results show that there are differences between centers with regards to the types of food permitted and the time after HSCT to release patients to a normal diet.

Based on available literature there is a need of clinical studies with a higher number of patients to evaluate the real need of neutropenic diets during and after HSCT.

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