



Applied nutritional investigation

## Nutritional support practices in hematopoietic stem cell transplantation centers: A nationwide comparison



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### ABSTRACT

**Objective:** In 2009, international nutritional societies published practice guidelines on screening and nutritional support for patients undergoing stem cell transplantation. Little is known about how these guidelines are implemented in clinical practice. We performed a nationwide survey with the aim of understanding current practice patterns, differences between clinical practice, and international recommendations as well as barriers to the use of nutritional therapy.

**Methods:** We performed a qualitative survey including all centers across Switzerland offering allogeneic (n = 3) or autologous (n = 7) stem cell transplantation. We focused on in-house protocols pertaining to malnutrition screening, indications for nutritional support, types of nutritional therapy available and provided, and recommendations regarding neutropenic diets.

**Results:** All centers offering allogeneic, and most of the centers offering autologous transplantation, had a malnutrition screening tool, mainly the nutritional risk score (NRS 2002) method. Only one center does not provide nutritional support. There is wide variation regarding start and stop of nutritional therapy as well as route of delivery, with five centers recommending parenteral nutrition and five centers recommending enteral nutrition as a first step. Although all centers offering allogeneic transplantation, and approximately every other autologous transplant center, used a neutropenic diet, specific recommendations regarding the type of food and food handling showed significant variation.

**Conclusion:** This Swiss survey found wide variation in the use of nutritional therapy in patients undergoing stem cell transplantation, with low adherence overall to current practice guidelines.

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Understanding and reducing barriers to guideline implementation in clinical practice may improve clinical outcomes. Close collaboration of centers will facilitate future research needed to improve current practice and ensure high quality of treatment.

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## Introduction

Allogeneic and autologous hematopoietic stem cell transplantation (allo-HSCT/auto-HSCT) are the only potentially curative treatment options for specific hematological conditions [1,2]. Treatment protocols have undergone major changes over the last 40 y, specifically with improved conditioning regimens. Additionally, reduced-intensity conditioning (RIC) has been evaluated for elderly patients or patients with multiple comorbidities undergoing allo-HSCT [2]. A noteworthy feature of RIC is that it induces fewer toxic side effects such as mucositis and significantly shortens the duration of neutropenia [2,3]. Changes in management of transplant patients have contributed to improved clinical outcomes and lead to an increasing number of patients undergoing HSCT. As a result, there are a growing number of long-term survivors [1]. However, HSCT, above all allo-HSCT, has considerable toxicity and induces an inflammatory response, metabolic changes (cachexia), gastrointestinal symptoms, and general constitutional effects, all of which lead to reduced oral intake and worsening nutritional status. This puts patients at increased risk for malnutrition, which might have a negative influence on clinical outcomes [4].

It is well known that malnutrition in patients undergoing allo-HSCT is associated with an increase in morbidity and mortality and that it puts them at higher risk for failure of the transplant [5–8]. Both the American Society for Parenteral and Enteral Nutrition (ASPEN) [9] and the European Society for Clinical Nutrition and Metabolism (ESPEN) [10] have published consensus guidelines on screening and nutritional support in patients undergoing HSCT. In brief, these guidelines recommend malnutrition screening and nutritional interventions if patients are unable to maintain their nutritional status on their own. It is recommended that enteral nutrition (EN) be used as a first step in all patients with a functioning gastrointestinal tract [9–11], and that parenteral nutrition (PN) be reserved for patients with severe mucositis (grade >3), ileus, or intractable vomiting [9,10]. A few guidelines also give weak recommendations for the use of a neutropenic diet (ND) [9,12], whereas others do not [10]. Currently, there is ongoing discussion on the extent of dietary restrictions needed to prevent food-borne infections [13–15].

Although these recommendations have been available for several years, little is known about the implementation of these international guidelines in routine clinical practice. We performed a nationwide survey that included all transplantation centers across Switzerland that offer either allo-HSCT or auto-HSCT. The aim of the study was to better understand current practice patterns, differences between clinical practice, and international recommendations as well as possible barriers to the use of nutritional therapy in patients undergoing HSCT. We speculate that the knowledge gained through this survey will contribute to the development of national practice guidelines in Switzerland and facilitate further research.

## Methods

### *Selection of study centers and study population*

In 2014, a total of 621 stem cell transplantations were performed in Switzerland (226 allogeneic, 395 autologous). Two centers in Switzerland offer allo-HSCT and auto-HSCT to patients: University Hospital Basel (USB) and University Hospital Zurich (USZ). One center only offers allo-HSCT, University Hospital Geneva (HUG), while five centers offer auto-HSCTs only: Kantonsspital Aarau (KSA); Istituto Oncologico della Svizzera Italiana (IOSI); Inselspital Bern (Insel); Centre Hospitalier Universitaire Vaudois (CHUV); and Kantonsspital St. Gallen (KSSG).

We contacted the heads of the hematological departments or the transplant program directors of these Swiss centers and requested permission to further contact members of the medical team, dietitians, and the person(s) in charge of the nutritional team. No compensation was offered for their participation.

### *Survey*

To evaluate clinical practices at all Swiss centers, we used a questionnaire focusing on general measures, such as the availability of a nutritional risk screening program, implementation of nutritional interventions, use of parenteral glutamine, dietary restrictions in terms of a neutropenic diet, and attitudes toward nutritional support in graft-versus-host disease (GvHD). The full questionnaire is presented in [Appendix A](#) and includes open-ended and close-ended questions. Centers offering allo-HSCT and auto-HSCT were asked to answer the questions for both procedures separately. The results are shown in [Appendices B and C](#). Before sending the final questionnaire, a preliminary version of the questionnaire was developed through rounds of consensus conferences within the research team. Its content validity was established by getting it reviewed by independent physicians and dietitians and by testing it in a small pilot study within the University Hospital of Basel, Switzerland. After revision to incorporate their feedback, the questionnaire was translated into English and sent to all eight Swiss centers in either English or German.

We contacted the person(s) in charge of the center if information was missing from the questionnaires. In addition, we collected individual guidelines and recommendations of the centers that focused on hygiene, food handling, and dietary advice. In case of uncertainty about specific questions, we individually contacted the centers until the issues were resolved.

We decided to present data only qualitatively and did not perform a quantitative (statistical) analysis.

## Results

### *Nutritional support practices in centers offering allogeneic transplantation*

#### *Screening for malnutrition*

General screening for nutritional risk was performed at all centers ([Table 1](#)), mainly using the validated nutritional risk score (NRS 2002) as the preferred tool, which is also recommended by ESPEN [16]. In one center, screening was performed according to an individual hospital-developed guideline that incorporated additional parameters, such as indirect calorimetry and bioelectrical impedance analysis. Nutritionists were directly involved at all centers in the pre-transplant assessment of patients undergoing myeloablative conditioning (MAC) and reduced-intensity conditioning (RIC).

#### *Supplementation and nutritional support*

Screening for vitamin or trace element deficiencies and supplementation ([Table 2](#)) is performed in one center while in the

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