Short- and Long-Term Controls After HSCT

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21.1 Introduction

Patients undergoing HSCT (mainly allo-HSCT) have a risk of developing complications related to pre-, peri-, and post-HSCT. The resulting morbidity of the HSCT process makes it necessary for patients to adopt a healthy lifestyle that promotes health and contemplate preventive measures for the detection and treatment of possible complications.

The short- and long-term controls allow for regular and systematic screening and at the same time are an opportunity to give advice on healthy lifestyle habits. Monitoring should be multidisciplinary with involvement of hematology, other medical specialties, physicians of primary care, nursing, and mental health professionals.

Early and late complications, as well as psychological problems, are discussed in Parts IV, V and VI of the Handbook.

After discharge, it is important that the patient has a summary of the treatment received and a long-term follow-up plan appropriate to the exposure and individual risk factors.

The recommendations related to screening and prevention post-HSCT can be consulted in several web pages (see references).

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21.2 Monitoring Depending on the Type of HSCT

21.2.1 Autologous HSCT

Timing	Monitoring
From discharge to day +100	Until full hematologic recovery, it is recommended to live near the hospital Recommended controls[a]: – Clinical evaluation and transfusions when necessary – Basic hematological and biochemical tests – Specific markers for different diseases
At +3 months	Evaluate the status of the primary disease Recommended controls[a]: – Hematological and biochemical tests, specific tumoral markers – MRD evaluation: Immunophenotype and molecular specific adapted to each disease – BM biopsy in case of NHL, HL, MPS, and solid neoplasms with previous marrow affectation, in the remaining disease BM smears (see specific chapters) – Imaging tests depending on primary disease
Long term	Visits every 6 months up to 2 years and then annually Recommended controls[a]: – Analytical and complementary explorations: See Table 21.1 – Baseline disease: Control of possible progression or relapse during at least 5 years – In patients treated with chemotherapy + radiotherapy, assess the risk of second malignancies or MDS after HSCT

[a]Variable frequency depending on the patient's condition

21.2.2 Allogeneic HSCT

Timing	Monitoring
From discharge to day +100	It is recommended that the patient resides near the transplant center during the first 3–6 months after HSCT Recommended controls[a]: – Weekly clinical evaluation, during the first month, every other week until 2 m, and then monthly up to 6–12 m, unless problems arise. It must include complete physical examination, with special emphasis on data of acute GvHD, infections, and pulmonary complications – Blood samples: Complete blood count, liver and kidney function, Mg, levels of IS agents, quantify CMV by PCR (and EBV if ATG); chimerism evaluation at 1 month – BM aspirate (or biopsy) in diseases with previous marrow affectation (usually within 1 month of HSCT)
At 3 months	Usually, this moment marks the turning point so that, if the patient does not have major problems, he/she can be monitored by the referring doctor. However, the patient should be periodically reevaluated at the transplant center (every 3–4 months during the first year, every 4–6 months during the second year, and annually after the third year) Recommended controls[a]: – Visit and complete physical exploration with special emphasis on the signs of acute and chronic GvHD (assessment by organs as indicated in Chaps. 43 and 44 and paragraph 21.3) – Blood test: Complete blood count, kidney function, liver function, clearance creatinine, IS levels; chimerism and sample for MRD follow-up. In patients aged <17 years, weight and height every 3 months
Long term	It depends on the complications that arise during follow-up. If there are no complications, it is recommended that a patient visits to the center every 6 months up to 3 years and annually thereafter Recommended controls: – Visit and complete physical examination including gynecological evaluation and endocrinological, if appropriate – Analytical and complementary explorations: See Sect. 21.3 – Specific controls: Specific MRD studies on diseases with markers (see corresponding chapters) – In patients treated with chemotherapy + radiotherapy, the risk of secondary neoplasms

[a]Variable frequency depending on the patient's condition

21.3 Organ-Specific Long-Term Monitoring

Table 21.1 analyzes organ by organ the long-term follow-up recommendations.

Table 21.1 Organ-specific monitoring[a]

Recommended screening[b]	6 months	1 year	An.	Comments
Ocular (see Chap. 48)				
– Clinical symptom evaluation	1	1	1	– Immediate exam if visual symptoms
– Visual acuity and fundus exam	+	1	+	– Special attention to *sicca* syndrome
Oral (Chap. 50)				
– Preventive oral health and dental maintenance	1	1	1	– Avoid smoking, sugar beverages, or oral piercing
– Clinical assessment	1	1	1	– If oral cGvHD, high-risk squamous cell cancer; evaluation every 6 months
– Dental assessment (+children)	+	1	1	
Respiratory (Chap. 52)				
– Clinical pulmonary assessment	1	1	1	* Active or passive
– Smoking tobacco avoidance*	1	1	1	– If cGVHD, spirometry test in each control (recommended for many authors)
– PFT (+chest Rx if symptoms)	+	+	+	
Cardiac and vascular[c] (Chap. 55)				
– CV risk factor assessment	+	1	1	– Counseling on heart healthy lifestyle – Active treatment of risk factors
Liver (Chaps. 38 and 49)				
– Liver function testing	1	1	1	– Monitor viral load by PCR if HCV or HBV
– Serum ferritin testing		1	+	– Additional testing if high ferritin levels (MRI/FerriScan®)
Kidney (Chap. 51)				
– Blood pressure screening	1	1	1	– Hypertension should be investigated and treated appropriately – Avoid nephrotoxins
– Urine protein screening	1	1	1	
– BUN/creatinine testing	1	1	1	
Muscle and connective (Chap. 54)				
– Physical activity counseling	1	1	1	– If risk of cGvHD, test joint mobility and touch skin to detect sclerotic changes – Treat cramps symptomatically
– Evaluation muscle weakness	2	2	2	
Skeletal (Chap. 54)				
– Bone density testing[d]		1	+	– Prevent bone loss and fractures with exercise, vitamin D, and calcium
Nervous system (Chap. 53)				
– Neurologic clinical evaluation	+	1	1	* Special attention of cognitive development in pediatric patients
– Cognitive development*		1	1	
Endocrine (Chap. 56)				
– Thyroid function testing		1	1	– Annual gynecological evaluation in women – Hormonal replacement if necessary
– Growth speed in children		1	1	
– Gonadal function assessment[e]	1	1	1	
– Gonadal function assessment[f]		1	+	
– Gonadal function assessment[g]		+	+	

Table 21.1 (continued)

Recommended screening[b]	6 months	1 year	An.	Comments
Mucocutaneous (Chap. 54)				
– Skin self-exam, sun counseling	1	1	1	– Avoid sunlight without adequate protection
– Gynecological exam in women		1	1	
Immunity				
– Encapsulated Microorg. Prophylaxis*	2	2	2	* If chronic GvHD and IS therapy, consider endocarditis prophylaxis in high-risk patients
– PJP prophylaxis (see Chap. 39)	1	2	2	
– Immunizations (see Chap. 29)	1	1	1	
Secondary neoplasia (Chap. 47)				
– Counseling and autoexamination		1	1	– Reduce UV skin exposure
– Same population screening		1	1	– Special attention to high-risk organs – If TBI, increase frequency mammography
Psychosocial and sexual				
– Psychosocial assessment (see Chap. 30)	1	1	1	– Add spousal/caregiver psychological adjustment and family functioning
– QOL assessment (see Chap. 34)	1	1	1	
– Evaluation of Sexual function	1	1	1	

An. annually, *1* recommended for all transplant recipients, *2* recommended for patients with ongoing chronic GvHD or IS, + reassessment recommended for abnormal testing in a previous time period or for new signs/symptoms
[a]Adapted from Majhail et al. (2012). Similar recommendations but focused in children have been elaborated by the Children's Oncology Group http://www.survivorshipguidelines.org
[b]In patients with chronic GVHD, these controls should be tightened, and their frequency increased
[c]Follow the American Heart Association for endocarditis prophylaxis in high-risk HSCT recipients
[d]Adult women, all allo-HSCT, and patients at high risk for bone loss
[e]Prepubertal men and women
[f]Postpubertal women
[g]Postpubertal men

21.4 Fertility (See Chap. 56)

21.5 Quality of Life (See Chap. 34)

Key Points

- Patients auto- and mainly allo-HSCT have a risk of developing complications related to pre-, peri-, and post-HSCT
- The resulting morbidity of the HSCT process makes it necessary for patients to adopt a healthy lifestyle that promotes health and contemplate preventive measures for the detection and treatment of possible complications
- The short- and long-term controls allow for regular and systematic screening and at the same time are an opportunity to give advice on healthy lifestyle habits
- Monitoring should be multidisciplinary with involvement of hematology, other medical specialties, physicians of primary care, nursing, and mental health professionals

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