
ACUTE COMPLICATIONS OF STEM CELL TRANSPLANT

CHRIS RIMKUS

OBJECTIVES: *To provide a comprehensive review of the acute complications that occur during the first 100 days post stem cell transplant (SCT).*

DATA SOURCES: *Research studies, book chapters, websites, and articles.*

CONCLUSION: *Even though the outcomes for SCT continue to improve, the complications seen in the first 100 days post transplant are a significant cause of mortality. Astute nursing assessment with resultant early intervention improves treatment-related mortality.*

IMPLICATIONS FOR NURSING PRACTICE: *Because SCT patients are seen in every oncology care setting, knowledge of these acute complications is essential to helping the nurse care for and educate SCT recipients.*

KEY WORDS: *Stem cell transplant, pulmonary fibrosis, thrombotic microangiopathic syndrome, sinusoidal obstructive syndrome, engraftment syndrome.*

STEM CELL transplantation (SCT) has been a treatment modality utilized for over 230,000 patients worldwide since 1991, according to the Center for International Blood and Marrow Research.¹ The actual transplant process has evolved since its inception more than 40 years ago, being performed for blood related cancers, solid tumors, and an increasing number of non malignant disorders. Approximately 450 transplant centers worldwide are members of the Center for International Blood and Marrow

Research, each contributing to this growing field through clinical trials.¹ During the acute phase, patients typically are treated at a transplant center. Because the number of transplants continues to rise, as do the indications, SCT is touching all areas of oncology nursing, particularly in the pre and post care of the SCT recipient. For this reason, it is important for all nurses to have some understanding of the complications of SCT.

Acute complications may occur at any phase of the SCT process, from the conditioning regimen through day 100 post transplant. If not recognized and treated immediately, these complications can lead to significant morbidity and mortality. Patients are given higher than normal doses of chemotherapy and/or total body irradiation (TBI) for the purpose of eradicating their cancer and/or making space for a new immune system to engraft. The treatments often result in damage to healthy organs. Validated comorbidity scales are reliable at predicting transplant related mortality.² Factors placing the patient at risk for developing complications include renal failure and other organ disease, older age, obesity, donor type, and disease risk.³

Chris Rimkus RN, MSN, AOCN®: *Clinical Nurse Specialist, Blood and Marrow Transplant Program, Barnes-Jewish Hospital, Siteman Cancer Center, St. Louis, MO.*

Address correspondence to Chris Rimkus RN, MSN, AOCN®, Clinical Nurse Specialist, Blood and Marrow Transplant Program, 216 S. Kingshighway, Barnes-Jewish Hospital, Siteman Cancer Center, St. Louis, MO 63110; e-mail: cfr2614@bjc.org

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Given the expansive information on this subject, this article will place emphasis on the complications that may occur during conditioning, SCT, engraftment, and the immediate post engraftment period. Table 1 provides a summary of complications resulting from conditioning regimens.

THE CONDITIONING PHASE

The conditioning regimen is the treatment given prior to transplantation of stem cells. This treatment may include chemotherapy, radiation therapy, and/or immunotherapy. The goal of

TABLE 1.
Complications Based on Treatment

Treatment	Associated Toxicity(s)	Treatment	Testing
Busulfan	Seizures	Prophylactic antiseizure drugs	PFT CT chest
	Pulmonary fibrosis	Steroids	
CI	Seizures/encephalopathy	Discontinue the drug or change to another CI	MRI BUN Cr CI levels Peripheral smear CBC LDH Cr PFTs CT chest LVEF evaluation
	Renal impairment	Keep blood levels within normal limits	
	TMA	Discontinue the drug or change to another CI Steroids Plasma exchange Rituximab Steroids	
Carmustine	Pulmonary fibrosis		
Cyclophosphamide	Cardiomyopathy	Diuresis Inotropic agents	PFTs CT chest
	Pulmonary fibrosis	Steroids	
DMSO	Pulmonary	Monitor pulse oximetry during infusion Pulmonary support as needed	Urine dipstick for blood
	Hemolysis Seizures	Hydration Usually improves when DMSO is excreted	
Fludarabine	Cardiomyopathy	Diuresis Inotropic agents	LVEF
Ifosfamide	Encephalopathy	Methylene blue	MRI
Melphalan	Mucositis	Oral cryotherapy	LVEF
	Cardiomyopathy	Diuresis Inotropic agents	
	Neutropenic enterocolitis Pulmonary fibrosis	Antibiotics Steroids	
Thiotepa	Skin rash	Frequent showering No occlusive dressings 36 hours post infusion	CT neck
TBI	Parotiditis	Lemon drops Warm saline	ECHO
	Mucositis	Oral cryotherapy Palifermin Caphosol Pain medication	
	Pericarditis	Steroids Pericardial window	
	Cardiomyopathy	Diuresis Inotropic agents	

Abbreviations: PFT, pulmonary function test; CT, computed tomography; CI, calcineurin inhibitors; MRI, magnetic resonance imaging; BUN, blood urea nitrogen; Cr, creatinine; TMA, thrombotic microangiopathy; CBC, complete blood count; LDH, lactate dehydrogenase; LVEF, left ventricular ejection fraction; DMSO, dimethylsulfoxide; TBI, total body irradiation; ECHO, echocardiogram.

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