

Complications from Hematopoietic Stem Cell Transplantation that is not Infectious to the Lungs

Department of Medicine, UCL College of Medicine, London, United Kingdom

Respiratory distress syndrome during peri-engraftment

Respiratory distress syndrome during peri-engraftment is a common complication of hematopoietic stem cell transplantation. It is characterized by acute respiratory failure, hypoxemia, and bilateral infiltrates on chest radiograph. The pathogenesis is multifactorial, involving direct lung injury from conditioning regimens, indirect injury from systemic inflammation, and infection.

The clinical presentation is typically within the first week after transplantation. Symptoms include tachypnea, dyspnea, and hypoxemia. Physical examination may reveal crackles and rales. Chest radiograph shows bilateral infiltrates, and pulmonary function tests show decreased lung volumes and impaired gas exchange.

Respiratory distress syndrome during peri-engraftment

The pathogenesis of respiratory distress syndrome during peri-engraftment is multifactorial. Direct lung injury from conditioning regimens, particularly total body irradiation and high-dose chemotherapy, is a major contributor. Indirect injury from systemic inflammation and oxidative stress also plays a role.

Management is primarily supportive, including oxygenation, mechanical ventilation, and fluid management. Early identification and treatment of infection is crucial. In severe cases, extracorporeal membrane oxygenation (ECMO) may be required. Prevention strategies include minimizing conditioning regimen toxicity and using prophylactic antibiotics.

Prognosis is generally poor, with high mortality rates. However, early recognition and aggressive supportive care can improve outcomes. Research is ongoing to identify novel therapeutic targets and preventive strategies.

Syndrome of Bronchiolitis Obliterans

Syndrome of bronchiolitis obliterans (SBO) is a late complication of hematopoietic stem cell transplantation. It is characterized by progressive, irreversible airflow obstruction and hyperinflation. The pathogenesis is multifactorial, involving direct lung injury from conditioning regimens, indirect injury from systemic inflammation, and infection.

The clinical presentation is typically within the first year after transplantation. Symptoms include progressive dyspnea, cough, and hyperinflation. Physical examination may reveal hyperinflation and decreased breath sounds. Chest radiograph shows hyperinflation and decreased lung volumes.

1. Niederwieser D, Baldomero H, Szer J (2016) Hematopoietic stem cell transplantation activity worldwide in 2012 and a SWOT analysis of the Worldwide Network for Blood and Marrow Transplantation Group including the global survey. *Bone Marrow Transplant* 51: 778-785.
2. Gooley TA, Chien JW, Pergam SA (2010) Reduced mortality after allogeneic hematopoietic-cell transplantation. *N Engl J Med* 363: 2091-2101.
3. Kassim AA, Savani BN (2017) Hematopoietic stem cell transplantation for acute myeloid leukemia: a review. *Hematol Oncol Stem Cell Ther* 10: 245-251.
4. Sahin U, Toprak SK, Atilla PA (2016) An overview of infectious complications after allogeneic hematopoietic stem cell transplantation. *J Infect Chemother* 22: 505-514.
5. Chi AK, Soubani AO, White AC (2013) An update on pulmonary complications of hematopoietic stem cell transplantation. *Chest* 144: 1913-1922.
6. Cheng GS (2016) Pulmonary function and pretransplant evaluation of the hematopoietic cell transplant candidate. *Clin Chest Med* 38: 307-316.
7. Wasilewska E, Kuziemski K, Niekoszko M (2019) Impairment of lung diffusion capacity-a new consequence in the long-term childhood leukaemia survivors. *Ann Hematol* 98: 2103-2110.
8. Chien JW, Madtes DK, Clark JG (2005) Pulmonary function testing prior to hematopoietic stem cell transplantation. *Bone Marrow Transplant* 35: 429-435.
9. Scheidl S, Zinke-Cerwenka W, Flick H (2019) Whole-body lung function test-derived outcome predictors in allogeneic stem cell transplantation. *Biol Blood Marrow Transplant* 25: 129-136.
10. Varadarajan R, Licht AS, Hyland AJ (2012) Smoking adversely affects survival in acute myeloid leukemia patients. *Int J Cancer* 130: 1451-1458.