The use of allogeneic stem cell transplantation in CML

By 5 years, 40% of patients with chronic myeloid leukemia (CML) will require a therapy change due to failure to respond to tyrosine kinase inhibitors (TKIs) which in turn leads to lower survival.

Allogeneic stem cell transplantation (ASCT) was developed to replace the blood-forming cells destroyed during high-dose chemotherapy.

Originally considered a frontline treatment, it is now preceded by TKIs.

Criteria to be eligible for ASCT

In order to qualify for ASCT, patients need to meet certain criteria:

- Low European Group for Blood and Bone Marrow Transplantation (EBMT) score
  - This includes factors such as age, disease stage, time interval from diagnosis to transplant, donor type, donor recipient sex combination

- Failure to respond to TKIs according to guidelines
  - EuropeanLeukemia.net (ELN), National Comprehensive Cancer Network (NCCN), European Society for Medical Oncology (ESMO)

According to the disease phase

- Patients in chronic phase (CP) with poor response to TKIs
- Patients with advanced disease or in blast crisis (BC)

Low European Group for Blood and Bone Marrow Transplantation (EBMT) score

- This includes factors such as age, disease stage, time interval from diagnosis to transplant, donor type, donor recipient sex combination

ASCT protocol

Bone marrow

Peripheral blood

Cord blood cells

Stem cells

Administration of stem cells to patient pre-treated with a conditioning regimen

Administration of post-transplant regimen

Donor

Pre-transplant EBMT risk score

Comorbidities (such as organ dysfunction)

Stem cell source

Pre-transplant conditioning regimen

Transplant

Graft versus host disease (GvHD)

Transplant toxicity/infection

Relapse

Optimisation of graft-versus-leukemia (GVL) effect

Post-transplant regime (cyclophosphamide)

Complications

These include relapse, infection and most importantly GvHD. GvHD can be acute or chronic and can manifest in many different organs/sites.

Covariates that may affect outcomes

EBMT risk score

Comorbidities (such as organ dysfunction)

Stem cell source

Pre-transplant conditioning regimen

Post-transplant regime (cyclophosphamide)

Graft versus host disease (GvHD)

Transplant toxicity/infection

Relapse

Optimisation of graft-versus-leukemia (GVL) effect

Population-based data

Overall survival (OS) depending on disease stage