Reduced Intensity Haploidentical Bone Marrow Transplantation in Adults with Severe Sickle Cell Disease: BMT CTN 1507

WHAT?

The Blood and Marrow Transplant Clinical Trials Network (BMT CTN) 1507 study was a multi-center phase II prospective clinical trial of patients with severe sickle cell disease (SCD) who had an allogeneic blood or marrow transplant (BMT) using a haploidentical (half-matched) related donor. Patients received a reduced dose conditioning regimen to get the body ready for transplant and an immune-suppressing drug called post-transplant cyclophosphamide (PTCy).

The investigators wanted to understand the impact on event-free survival (EFS) at 2 years after transplant. EFS means the patient did not have graft failure, severe chronic graft-versus-host disease (GVHD), or death.

WHY?

- Complications like stroke, heart, lung, and kidney damage can cause serious—even life-threatening—health issues for people with severe SCD. Allogeneic BMT offers a potential cure.
- Allogeneic BMT uses cells from a donor. Historically, a full human leukocyte antigen (HLA) donor match offered the best chance for a good outcome.
- Less than 15% of patients with SCD have a matched sibling donor, and most do not have a full unrelated donor match on the NMDP Registry℠.
- The full-intensity (myeloablative) conditioning regimen that's used in children with SCD before BMT can be too toxic to use for adults.
- These issues can keep people with severe SCD from accessing BMT.
- Smaller studies that used reduced-intensity haploidentical transplant with PTCy had encouraging results, but concerns remained about graft failure and GVHD when using a haploidentical donor.

WHEN?

- Investigators enrolled patients on the BMT CTN 1507 clinical trial from Oct. 5, 2017 through Jan. 6, 2021.

WHO?

- The study included patients aged 15 to 45 years old with severe SCD who had an HLA-haploidentical first-degree relative (parent, child or sibling) willing and able to donate bone marrow. The average age at enrollment was about 23 years old.
- 42 of 54 eligible patients enrolled on the trial proceeded to transplant.
- Most participants are male (59%); 93% of participants are Black and 4% are Hispanic.

RESULTS

- The clinical trial showed positive results. The 2-year EFS (88%) and overall post-transplant survival (95%) were similar to those reported for children with SCD who receive a matched sibling donor transplant and full-intensity conditioning.

Read the study abstract published in Blood: https://doi.org/10.1182/blood-2023-192022

IMPACT

- These results support reduced intensity haploidentical transplant with PTCy as an appropriate and tolerable curative therapy for adults with severe SCD.
- This is a positive step forward and reduces a major barrier to transplant—access to a suitable donor.

FROM THE EXPERTS

"This study is an important evolution in optimizing the application of post-transplant cyclophosphamide for post-grafting immunosuppression in HLA-haploidentical BMT for adults with severe sickle cell disease. Extending a curative therapy across the life-span."

Adetola A Kassim, MBBS, MS
Hematology/Stem Cell Transplant
Vanderbilt University Medical Center
Vanderbilt-Meharry Center for Excellence in Sickle Disease

Citation: Kassim AA, Walters MC, Eapen M, et al. Reduced Intensity Haploidentical Bone Marrow Transplantation in Adults with Severe Sickle Cell Disease: BMT CTN 1507. Blood. 2023;142(Supplement 2):LBA-4. doi: 10.1182/blood-2023-192022.