

Customer Success Story

Hospital Significantly Increases the Mean Hematopoietic Stem Cell and CD34+ Collection Efficiency for Sickle Cell Disease Patient Procedures

The customer: Boston Children’s Hospital and Harvard Medical School

The problem: Cell collections via apheresis on patients with sickle cell disease (SCD) present many challenges. The blood of SCD patients has unique characteristics, making it difficult to separate compared to the blood of non-SCD patients.^{1,2}

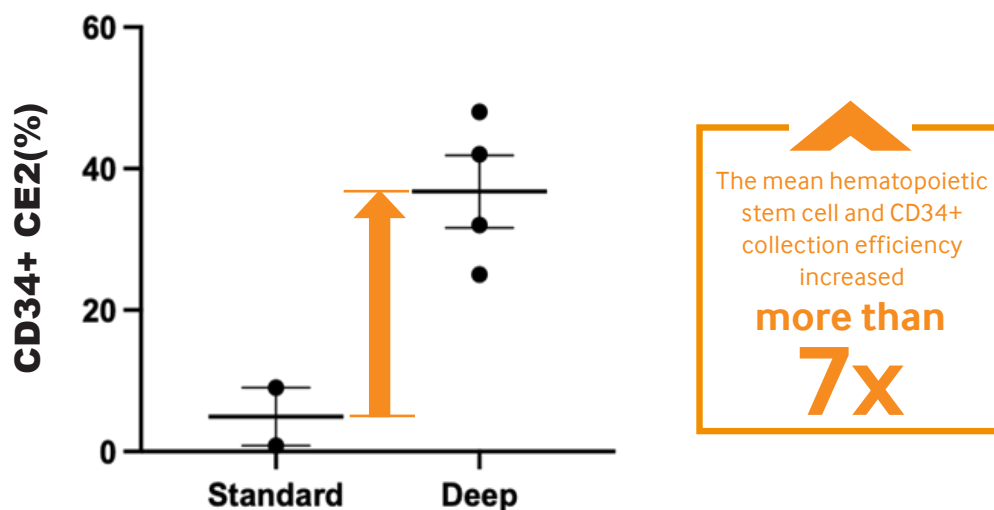
Cell collections for transplantation and novel genetic therapies emerging for SCD may require multiple days and cycles of collection to meet target yields.² In some cases, the challenges with hematopoietic stem cell (HSC) collections for SCD patients resulted in inadequate yields, preventing patients from receiving their cellular therapy.

How Veda Solutions helped: Cell collection is an inherently variable process that becomes even more unpredictable when working with an SCD patient. Terumo Blood and Cell Technologies conducted a retrospective analysis of 20 collections on SCD patients to identify opportunities for optimization in future collections. All 20 collections were performed on the Spectra Optia® Apheresis System. Implementing the suggestions for optimization increased mean CD34+ collection efficiency (CE2) from 4.9% to 36.8% for subsequent SCD patient collections.

Methods: Our company analyzed Spectra Optia Apheresis System procedural data and linked it to patient complete blood count (CBC) data, blood separation efficiency, and interface stability parameters. Procedural issues, including alarms, related pauses, and inlet flow rate adjustments, were also reviewed. The insights gathered by the analytics experts were translated into optimization recommendations.

Results: Terumo Blood and Cell Technologies recommended collecting cells from a deeper layer within the buffy coat than was typical for HSC collections. This, along with managing procedural events in subsequent procedures, significantly increased the mean CD34+ CE2 ($P = 0.0169$).

The mean CD34+ CE2 increased from 4.9% (range: 0.8%-9.0%) for the standard collections to 36.8% (range: 25.0%-48.0%) for the collections where the optimization suggestions were implemented.



Performing data analytics on patient, apheresis collection, and collected product data can help optimize collection procedures on SCD patients. It’s critical to ensure collection targets are achieved for these high-stakes procedures and patients. Data analytics can guide operator behavior during cell collection procedures and may increase collection efficiency, increasing the chance of success for HSC collections and related gene therapies.

Ready to optimize your cell collection process?

Let’s Connect!

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References:

1. Esrick EB, Manis JP, Daley H, et al. Successful hematopoietic stem cell mobilization and apheresis collection using plerixafor alone in sickle cell patients. *Blood Adv.* 2018;2(19): 2505-2512.
2. Sharma A, Leonard A, West K, et al. Optimizing haematopoietic stem and progenitor cell apheresis collections from plerixafor-mobilized patients with sickle cell disease. *Br J Haem.* 2022;198(4):740-744.



Terumo Blood and Cell Technologies is a medical technology company. Our products, software, and services enable customers to collect and prepare blood and cells to help treat challenging diseases and conditions. Our employees around the world believe in the potential of blood and cells to do even more for patients than they do today. [TerumoBCT.com](https://www.terumobct.com)

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