Rapid Engraftment, Immune Recovery, and Resolution of Transfusion Dependence in Treatment-Refractory Severe Aplastic Anemia Following Transplantation with Ex Vivo Expanded Umbilical Cord Blood (Omidubicel)

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Disclosures

No Disclosures
Severe Aplastic Anemia (SAA)

- SAA is a life-threatening bone marrow failure disorder.
- Long term survival for SAA patients can be achieved with immunosuppressive therapy (IST), but refractory disease and relapses are common.
- Allogeneic stem cell transplantation is a viable option for refractory patients, but many patients lack an HLA-matched donor.
- Umbilical cord blood transplantation is associated with delayed engraftment and high rejection rates.
Study Design: Schema

Cohort 1

- Umbilical Cord Blood
  - CD133 enriched cells
  - CD133 negative cells

Cohort 2

- Apheresis following 5 days of GCSF
  - CD34 selection (T-cell depletion)
  - Cryopreserve
  - 2Gy TBI

- Thaw
- hATG
- Cyclophosphamide
- Fludarabine

- Cryopreserve and ship to NIH

- Thaw
Study Design: Eligibility

- Patients 4 to 55 years of age with a diagnosis of transfusion dependent SAA or hypoplastic MDS
- Failure or intolerance to IST
- Lack of an HLA-matched donor
- Patients must have a ≥ 4/8 HLA matched UCB unit with a minimum of \(1.8 \times 10^9\) and at least \(1.8 \times 10^7 /kg\) TNCs and at least \(8 \times 10^6\) CD34+ cells
- Absence of donor specific antibodies to mismatched alleles on the UCB unit
## Results

<table>
<thead>
<tr>
<th>ID</th>
<th>Age</th>
<th>Sex</th>
<th>Prior Therapy</th>
<th>CMV/EBV Status (IgG)</th>
<th>ABO Mismatch</th>
<th>aGVHD (≥grade 2)</th>
<th>cGVHD</th>
<th>CMV Reactivation</th>
<th>Transfusion Independence</th>
<th>Time From Transplant</th>
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<td>1</td>
<td>22</td>
<td>M</td>
<td>IST + EPAG</td>
<td>+/-</td>
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<td>Yes</td>
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<td>3.2 y</td>
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<td>No</td>
<td>N/E</td>
<td>1 m</td>
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</tbody>
</table>

**Cohort 1**

**Cohort 2**

*EPAG: Eltrombopag, N/E: not evaluable*
Results: Summary

- No acute grade ≥2 GVHD (except patient #7)
- No chronic GVHD
- CMV reactivation seen in 3 patients (42.8% of patients at risk)
- 1 death related to disseminated adenovirus infection
- 1 rejection in cohort 2 followed by a successful haploidentical transplant
Results: Summary

- A total of 7 of 8 (88%) patients achieved early and sustained cord engraftment.
- Brisk neutrophil and platelet recovery occurring at a median of 10 days (range 6-14) and 31 days (15-40) respectively.
- Chimerism data shows 6 patients had > 95% myeloid by D+14 and >95% T-cell by D+26.
Results

**Median cell number**

![Graph showing median cell number over days post-transplant.](image)

**Mean IgG level**

![Graph showing mean IgG level over days post-transplant.](image)