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The Use of Plerixafor in Hematopoietic Progenitor Cell Collection in Pediatric and Adult Patients: A Single Center Experience

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Introduction

- Hematopoietic stem cell transplantation:
 - Potential curative therapy
 - Dose of CD34+ cells transplanted is an important predictor of outcome

Plerixafor

- FDA indication:
 - Autologous HPC collection in adults with multiple myeloma or non-Hodgkin's lymphoma in combination with G-CSF
- Off-label:
 - Autologous HPC collection in pediatric patients
- Goal:
 - Review the use of plerixafor for autologous HPC collection in both adult and pediatric patients

Study design

- Retrospective, observational study
- Study period: 12/2006 – 12/2010
- Inclusions:
 - Patients mobilized by plerixafor in addition to G-CSF
- Exclusions: None

Outcomes

- Primary outcome:
 - Collection yield
 - Collection minimum target: 2×10^6 CD34+ cells/kg
 - Collection goal: 5×10^6 CD34+ cells/kg
- Secondary outcomes:
 - Ability to undergo auto-HSCT
 - Engraftment status

Results

- Demographics:
 - 19 HPC collections completed on 16 patients
 - 5 children/adolescents
 - 7 collections
 - 3 males and 2 females
 - Median age: 14 years (range: 10 – 20 years)
 - 2 had prior radiation; 4 failed previous mobilization
 - 11 adults
 - 12 collections
 - 7 males and 4 females
 - Median age: 56 years (range: 25 – 77 years)
 - 4 had prior radiation; 10 failed previous mobilization

Diagnoses

- **Pediatrics (N = 5)**

- 2 Burkitt's lymphoma
- 1 Medulloblastoma
- 1 Neuroblastoma
- 1 CNS PNET

- **Adults (N = 11)**

- 3 Non-Hodgkin's lymphoma
- 1 Burkitt's lymphoma
- 1 Hodgkin's lymphoma
- 4 Multiple myeloma
- 1 POEMS syndrome
- 1 Waldenstrom's
macroglobinemia

Mobilization regimen

- G-CSF for 5 days.
- Plerixafor on the night of Day+4 for collection on Day+5.
- Plerixafor and G-CSF were continued every night until collection target was achieved or up to a maximum of 4 doses.

HPC collection

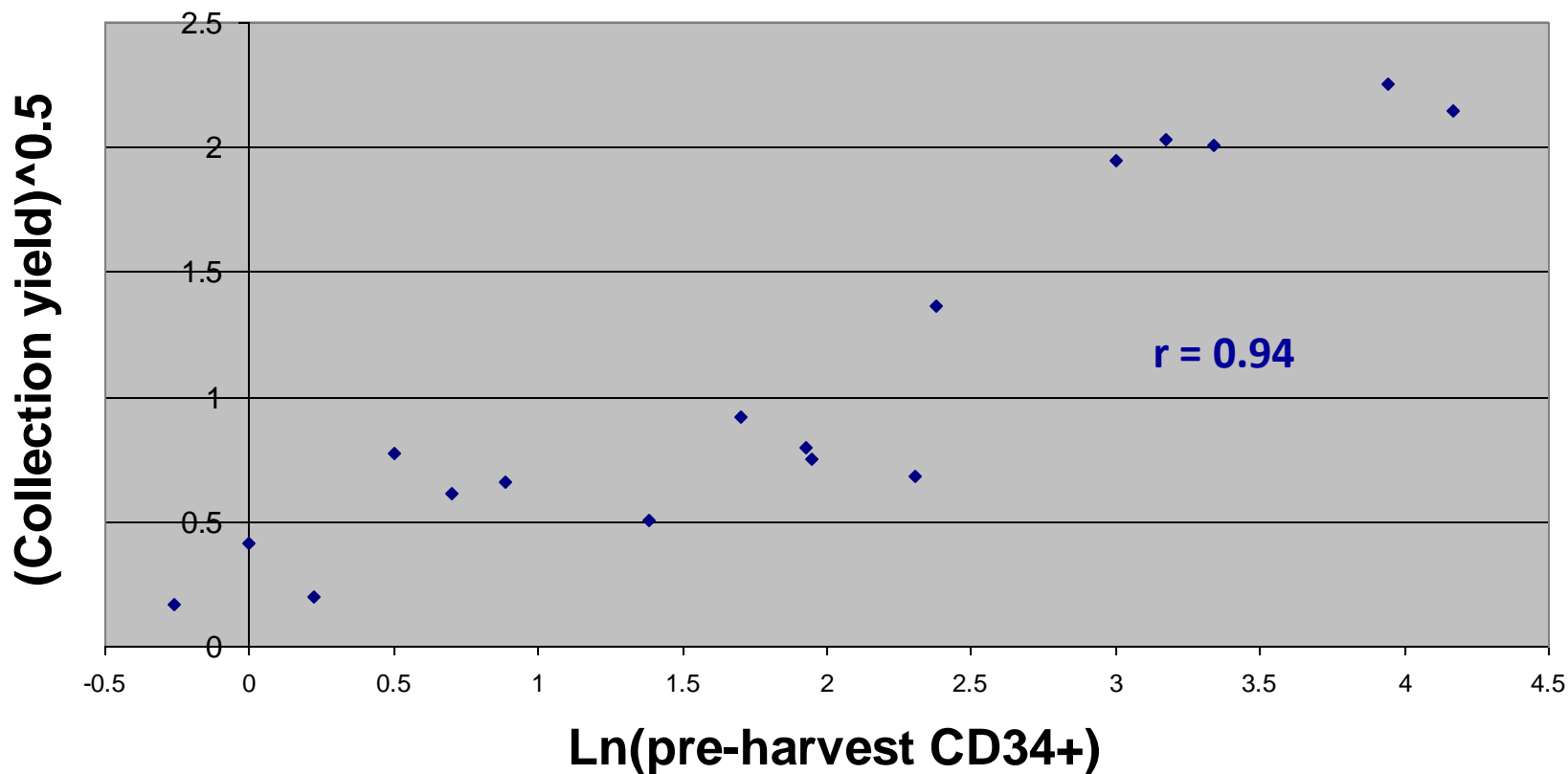
- Apheresis procedures performed with Cobe Spectra.
 - 4 BV or 20L maximum processed for all patients
- Procedure started ~10 – 12 hours after plerixafor was given.
- Number of collections: 2 – 4 procedures.
 - Pediatrics: 2.6 procedures
 - Adults: 2.8 procedures

Pediatrics – collection outcomes

- WBC increased after first dose of plerixafor:
 - Median: 29.8 (post) vs. 22.3 (pre)
- Median pre-harvest CD34+:
 - 6.88/ μ L (range: 0.77 – 64.76)
- Median total collection:
 - 2.26×10^6 CD34+ cells/kg (range: 0.07×10^6 – 9.69×10^6)
- Achieved minimum target: 4 of 7 collections
- Achieved goal: 3 of 7 collections

Pediatrics – collection outcomes

Correlation between pre-harvest CD34+ and collection yield



Adults – collection outcomes

- WBC increased after first dose of plerixafor:
 - Median: 48.3 (post) vs. 28.1 (pre)
- Median pre-harvest CD34+:
 - 13.4/ μ L (range: 3.52 – 60.05)
- Median total collection:
 - 2.82×10^6 CD34+ cells/kg (range: 1.1×10^6 – 14.9×10^6)
- Correlation:
 - Pre-harvest CD34+ vs. CD34+/kg collection yield
 - $r = 0.61$
- Achieved minimum target: 8 of 12 collections
- Achieved goal: 3 of 12 collections

Engraftment outcomes

	Pediatrics N = 5	Adults N = 11
Auto-HSCT (patients)	3	5
Median time to neutrophil engraftment (days)	12	13
Median time to platelet engraftment (days)	34	14

Non-auto-HSCT patients

- **Pediatrics:**
 - 1 underwent allo-HSCT
 - 1 died
- **Adults:**
 - 2 in complete remission
 - 1 on chemotherapy
 - 1 died
 - 1 lost in follow-up
 - 1 recent collection

Adverse events

- No major adverse event reported.
- All patients were able to undergo collection procedure without any major complication.

Conclusions

- Plerixafor is safe for both pediatric and adult patients.
- Addition of plerixafor to the mobilization regimen in patients who failed previous mobilization(s) is potentially helpful.

Limitations & future directions

- Retrospective review
- Small sample sizes
- Future study is warranted in pediatrics
 - Randomized, controlled, multicenter
 - G-CSF vs. G-CSF + Plerixafor
 - Issues to consider:
 - Subpopulations with potential benefit
 - Dosage and timing of dosage with respect to initiation of collection
 - Predictability of collection yield from pre-harvest CD34+
 - Adverse effects