

**HARVESTING STEM CELLS FROM A
CHALLENGING PATIENT WITH BETA
THALASSEMIA MOBILIZED WITH
PLERIXAFOR (MOZOBIL)**

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Usual Collection of Autologous Peripheral Blood Stem Cells (PBSC)

- For reinfusion and recovery of bone marrow function after intensive chemotherapy
- Based on different buoyant densities of RBCs and nucleated cells under centrifugation
- Settings on apheresis instrument guided by visual inspection of RBC-WBC-plasma interface
- Overlap of cell layers results in some RBC contamination of WBC-PBSC product.

Case Report

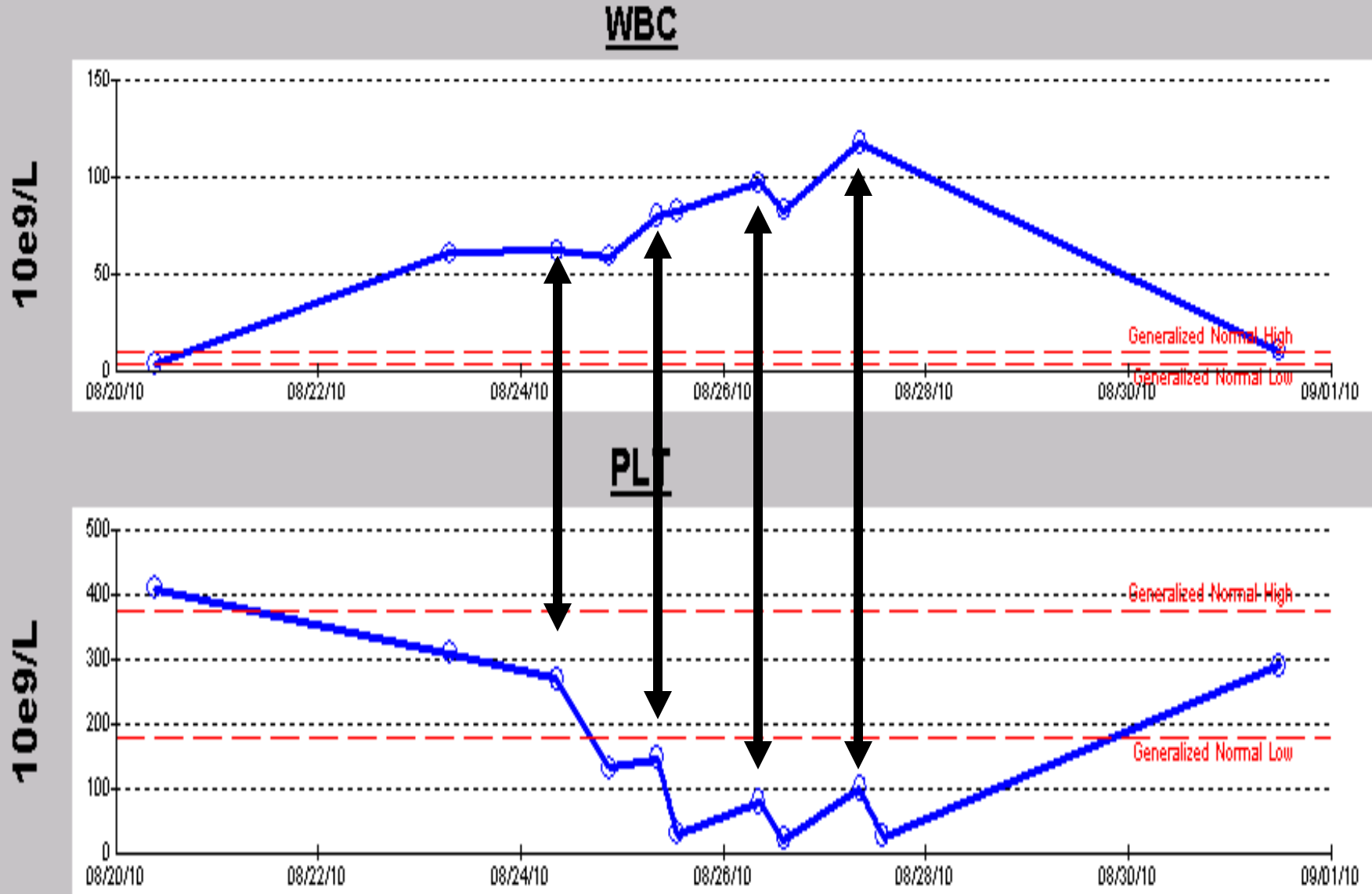
- 52 yo man with beta thalassemia intermedia and hereditary persistence of fetal hemoglobin
- Splenectomy 1 year earlier; eliminated dependence on RBC transfusions
- IgG-kappa myeloma (two bands, 0.4 and 0.6 g/dL)
- Plan: peripheral blood stem cell (PBSC) collection for autologous transplant

Peripheral Blood Stem Cell Collection

- Mobilized with plerixafor (Mozobil)
- Collections failed to meet collection criteria with filgrastim alone
- Done with COBE Spectra Apheresis System (CaridianBCT, Denver)
- Processed 24 L (5.5x blood volume) each day.



Apheresis Collections

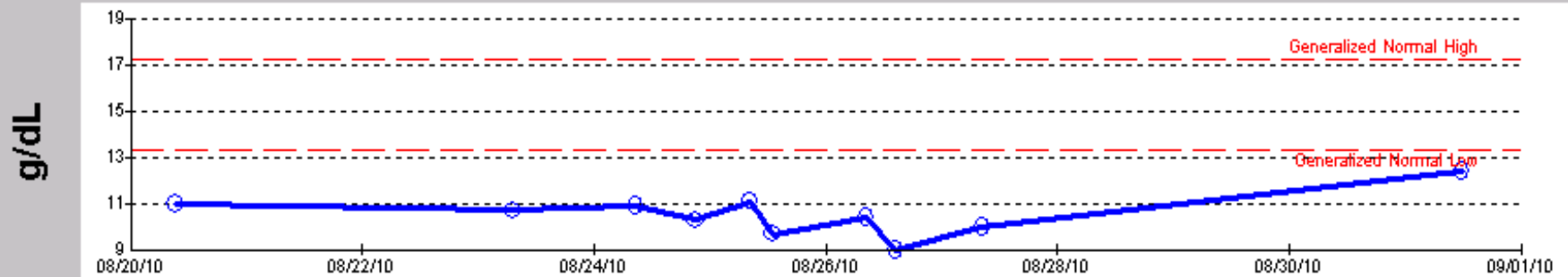


Day 1 Collection Results

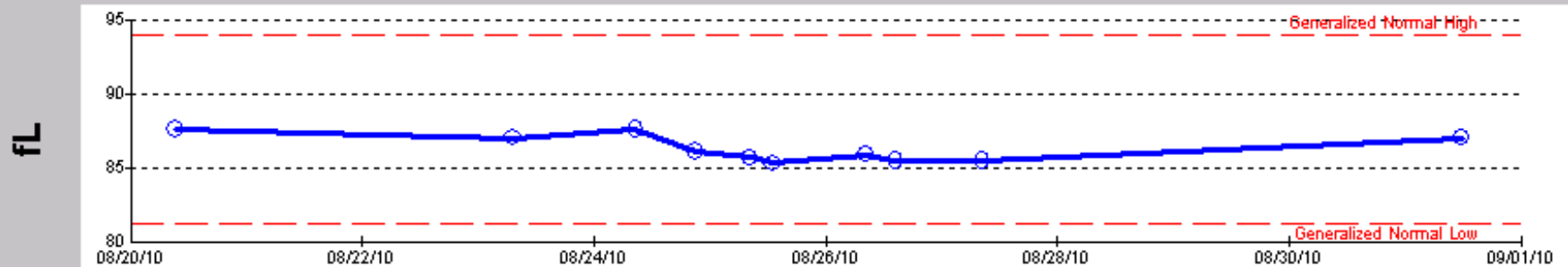
- Peripheral CD34 = 0.05%
- Product CD34 = 0.04%
- Product yield = 0.04×10^6 CD34 cells/kg
- Goal = 10×10^6 /kg
- *Severely inadequate* collection on day 1

Erythrocyte Parameters: Size Variation

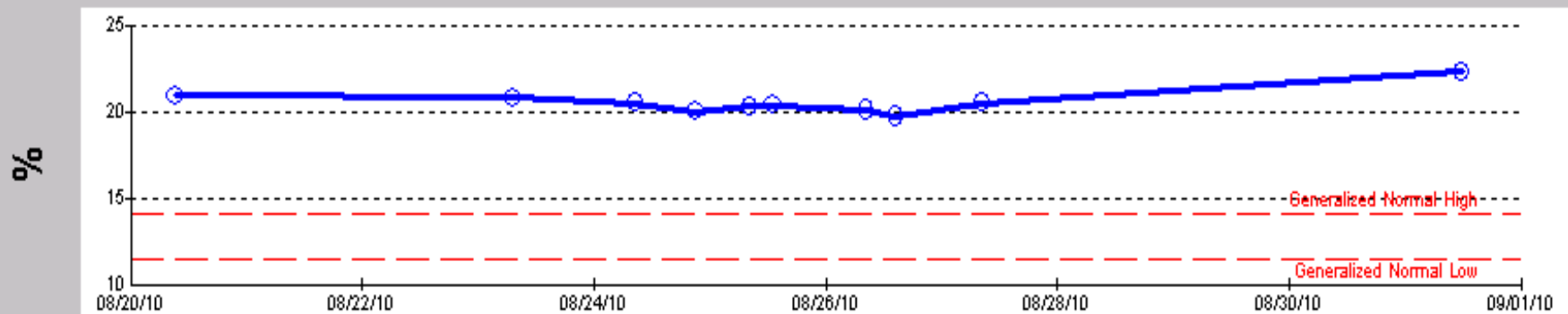
Hemoglobin



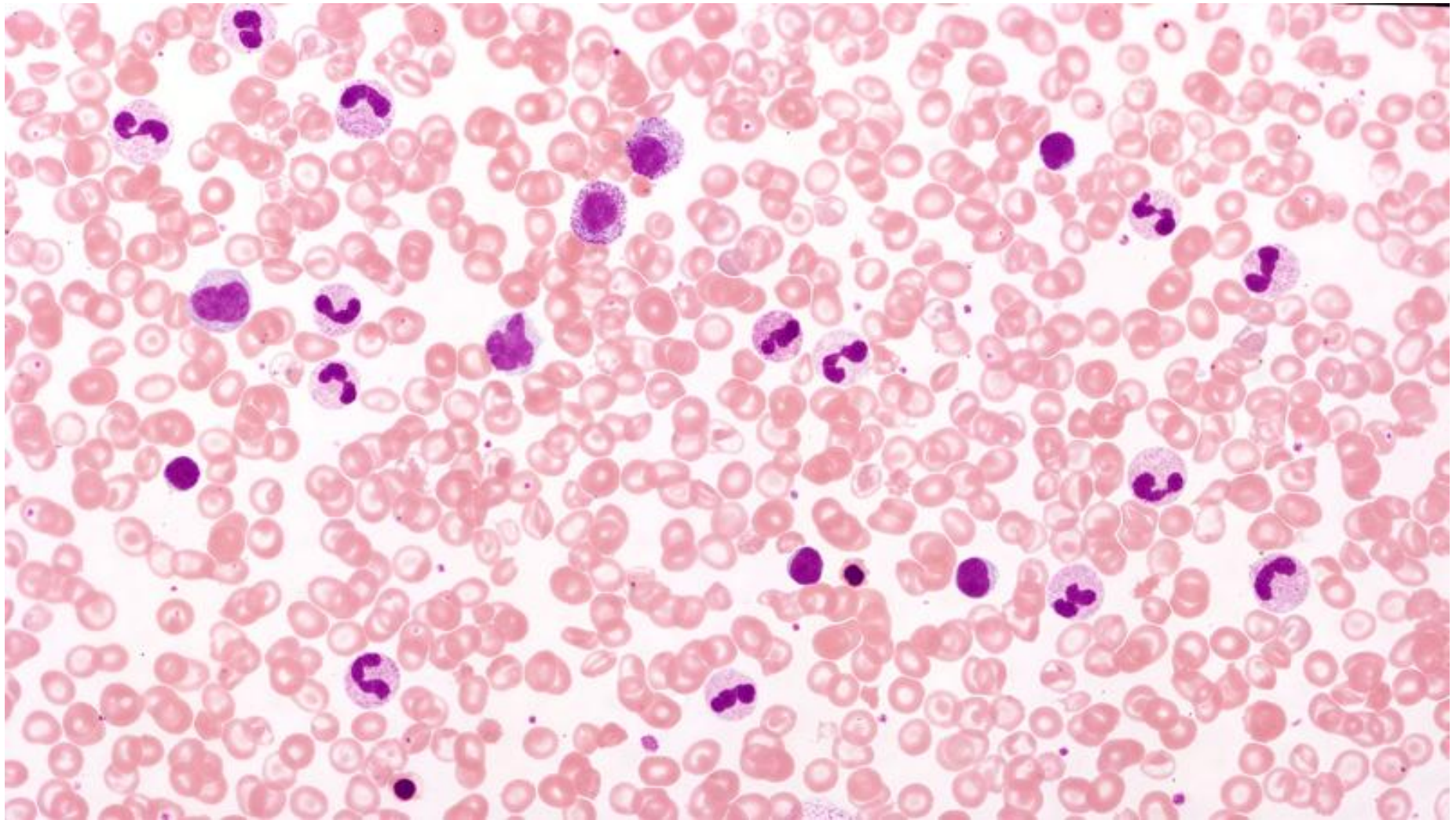
MCV



RDW



Peripheral Blood Smear



RBC Morphologies

- Nucleated RBCs present
- Polychromasia
- Moderate target cells
- Howell-Jolly bodies present
- Pappenheimer bodies present
- Large variation in RBC sizes:
anisocytosis

Adjustments to Collection

COBE Spectra Apheresis System

1. Spin Factor increased from 500 to 850
2. Product hematocrit changed from 4% to 7% by colorgram

Strategy was to collect PBSC from deeper in RBC layer below position of aberrant RBCs where nucleated cells peaked.

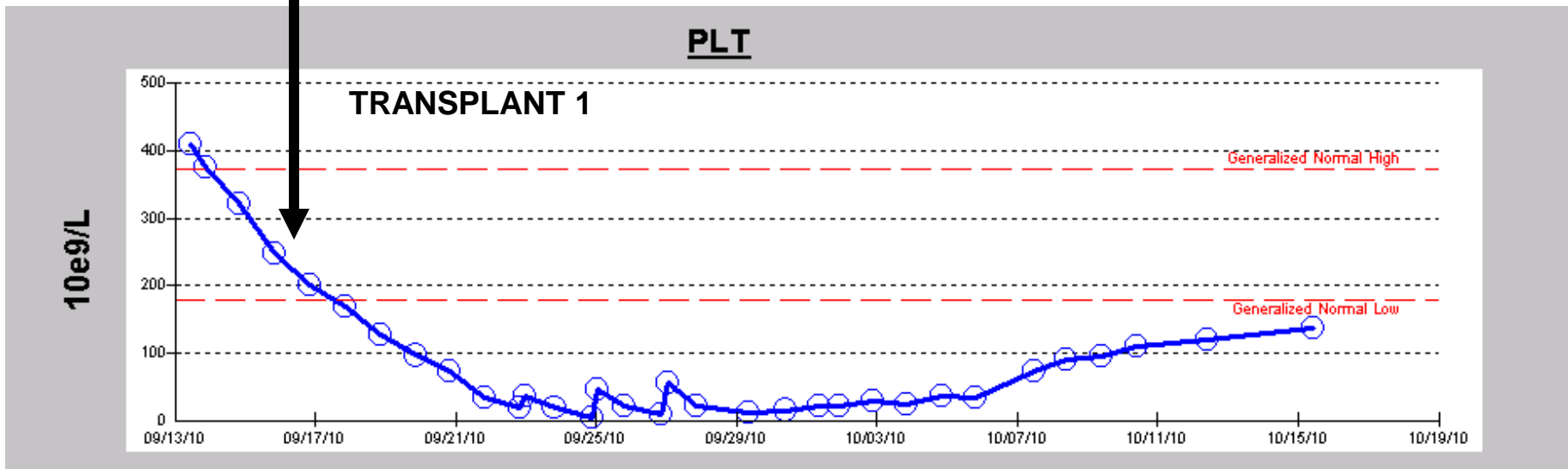
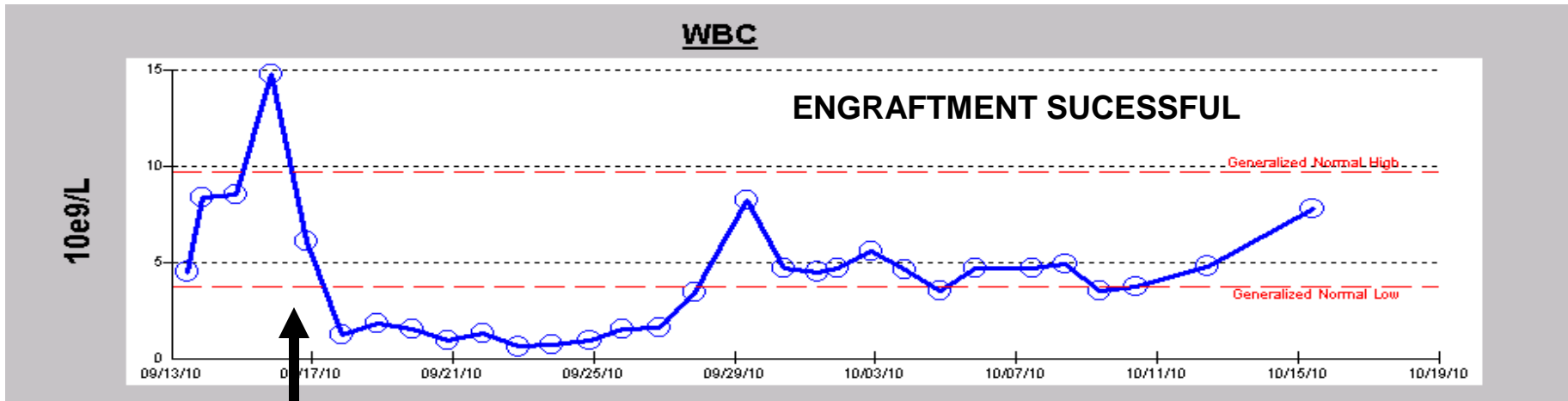
Product: (L) β -Thal vs (R) Usual



Collection Data by Day

Day	WBC X10 ⁹ / L	HCT (%)	PLT X10 ⁹ / L	PB CD34 (%)	Produ ct CD34 (%)	Produ ct HCT (%)	Daily CD34 X10 ⁶ / kg
1	62.0	34.2	269	0.05	0.04	3.9	0.04 poor
2	79.6	34.8	146	0.04	0.09	17	0.95
3	96.9	31.8	79	0.02	0.10	16	1.08
4	117	30.9	100	0.03	0.19	17	2.23

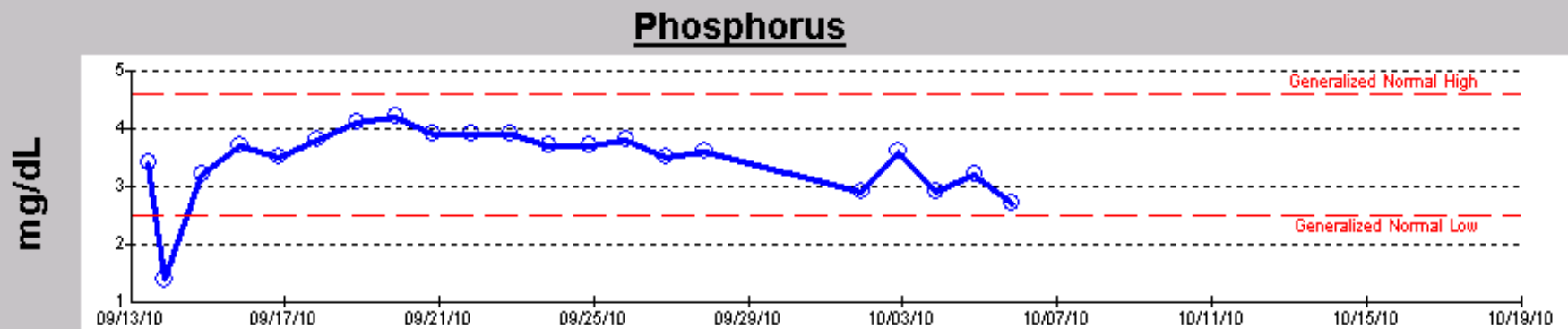
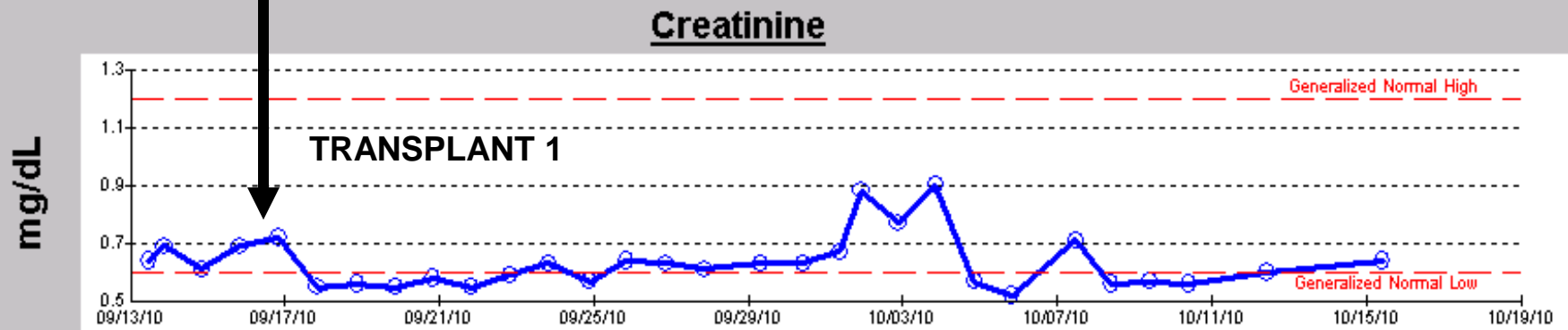
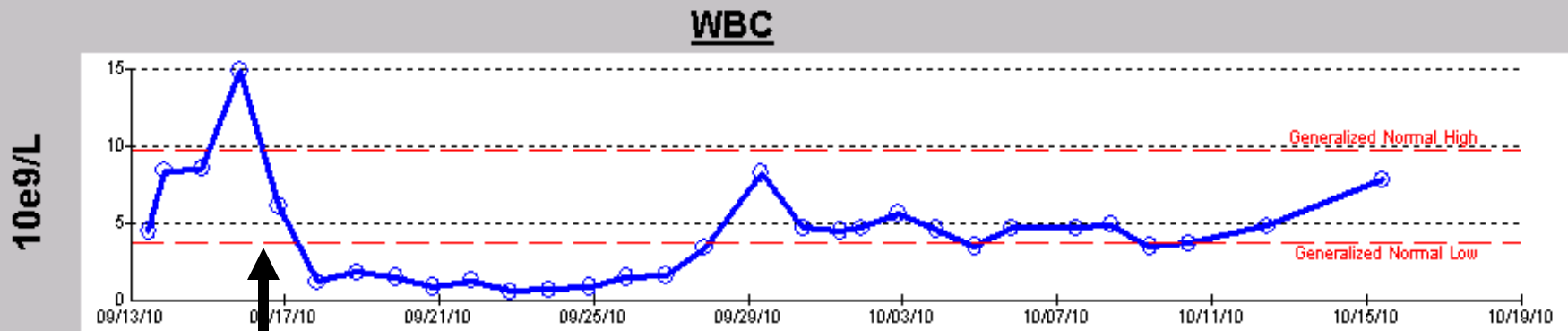
Course of Engraftment



Strategy to Reduce Risk to Kidneys

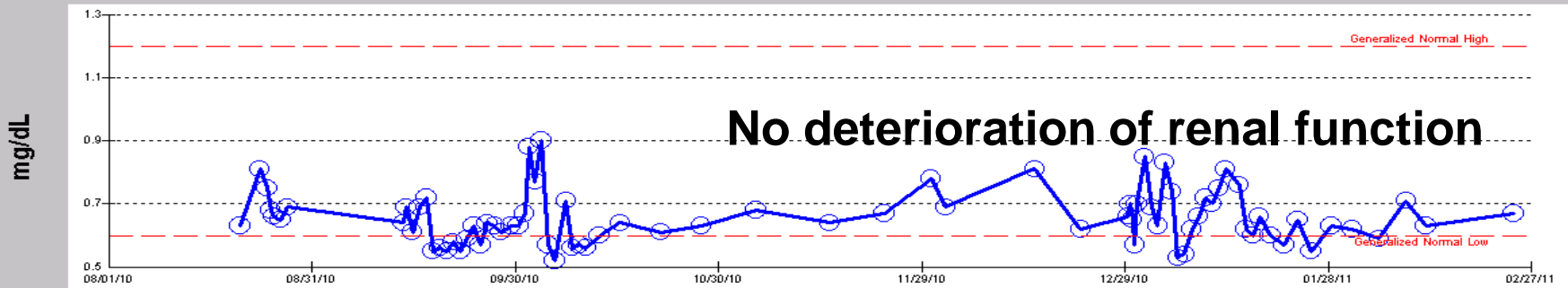
- Renal clearance of free hemoglobin from frozen PBSC product was enhanced.
- Day prior to transplant:
 - Hydration with 1 L saline + 20 mg Lasix x3
- Day of transplant:
 - Saline drip 40 cc/hr + 20 mg Lasix

Renal Function during/after Infusion

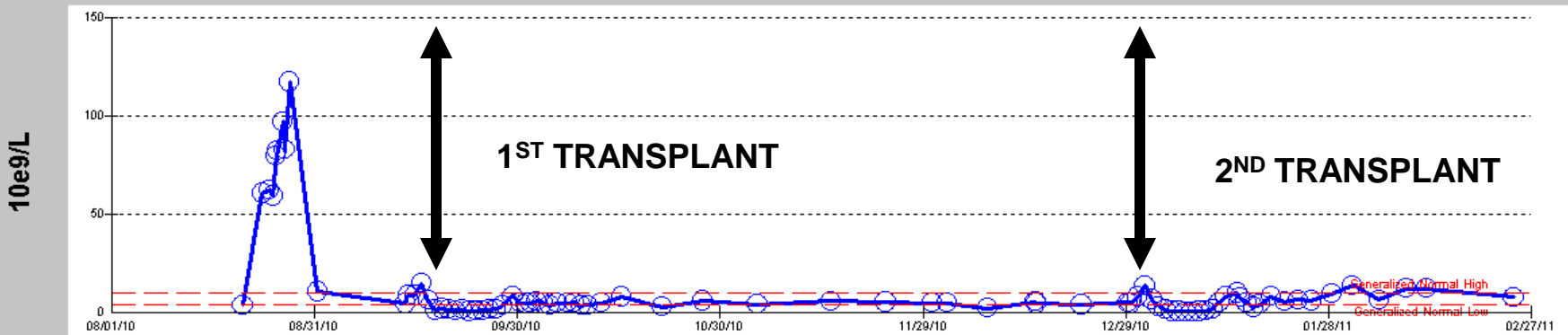


Course of Both Transplants

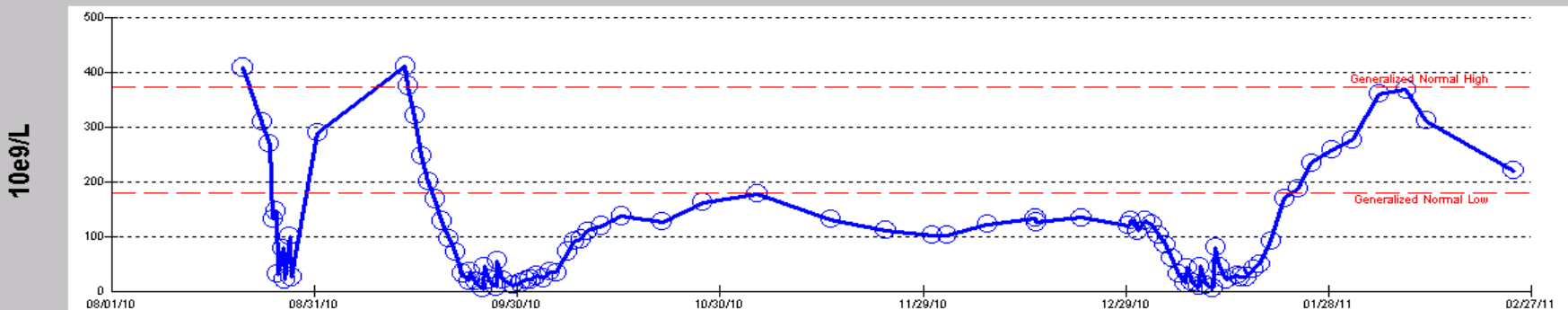
Creatinine



WBC



PLT



Case Summary

- Autologous PBSC donor for multiple myeloma
- *Problem:* Inefficient collection by standard interface due to altered buoyant densities of aberrant RBCs in β -thal intermedia
- *Solution:* Collection deeper in erythrocyte layer yielded efficient PBSC recovery, but
- *Complication:* Product hematocrit high; risk of renal injury from excess hemoglobin infusion
- *Outcome:* Patient infused with attention to hydration; no renal impact
- Patient successfully engrafted

Conclusion

- Adjustments in apheresis parameters allowed successful collection of PBSC from a patient with erythrocyte anomalies of β -thalassemia intermedia that interfered with usual apheresis procedures.

THANK YOU!

QUESTIONS?