National Neutropenia Network
Family Conference
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Jim Connelly, MD
Assistant Professor of Pediatrics
and Communicable Diseases
Blood and Marrow Transplant Program
University of Michigan
Transplant Definition

• Hematopoietic Stem Cell Transplant (HSCT)
  – Infusion of blood “stem cells” into a recipient patient

[Diagram showing Stem Cell leading to Red Cell, Platelet, and White Cell]
Donor Source of Hematopoietic Stem Cells

• Autologous: Use patient’s own cells
  • Typically given in patients receiving high dose chemotherapy to “rescue” patients from toxic side effects

• Allogeneic: Use donor’s cells
  • Used in a variety of diseases (cancer, red cell disorders, bone marrow failure, metabolic disorders, NEUTROPHIL DISORDERS, immune deficiencies)

• Donor sources include collection of stem cells from the bone marrow, peripheral blood, or umbilical cord
Stem Cell Transplant Process

Recipient

Immune System

Bone Marrow

Neutrophil
Stem Cell Transplant Process

Recipient

Bone Marrow

Immune System

Donor

Stem cells + Immune System

Neutrophil
Stem Cell Transplant Process

Recipient

Donor

Stem cells + Immune System

Bone Marrow

Immune System

Neutrophil
Stem Cell Transplant Process

Recipient

Donor

Stem cells + Immune System

Immune System

Bone Marrow

Neutrophil
Transplant Requirements: Conditioning

• Eliminates/weakens recipient bone marrow and immune system

• Myeloablative
  – Irradicates marrow and immune system
  – Increased toxicity to the patient

• Reduced Intensity
  – Less organ toxicity and therefore expands the use of transplant to sicker patients
  – Less conditioning therapy can result in increased risk of donor cells not growing in the patient recipient
Stem Cell Transplant Process

Recipient

Immune System

Bone Marrow

Neutrophil
Stem Cell Transplant Process

Recipient

Immune System

Bone Marrow

Conditioning Therapy

Neutrophil
Stem Cell Transplant Process

Recipient

Immune System

Bone Marrow

Neutrophil
Stem Cell Transplant Process

Recipient

Donor

Bone Marrow

Immune System

Stem cells + Immune System

Neutrophil
Stem Cell Transplant Process

Recipient

Donor

Immune System

Stem cells + Immune System

Bone Marrow

Neutrophil
Stem Cell Transplant Process

Recipient

Immune System

Fight Infection

Prevent Cancer

Attack normal tissue?

Donor

Bone Marrow

Neutrophil

Stem cells + Immune System
Finding an immune system match
Finding an immune system match
Finding an immune system match
Finding an immune system match
Finding an immune system match
Finding an immune system match

Graft-versus-host-disease (GVHD)

Donor Immune Cell  
Recipient Skin Cell
Finding an immune system match

Immune Suppression

Donor Immune Cell

Recipient Skin Cell
GVHD prevention and treatment

• Patients are started on immune suppression shortly before stem cell infusion
  – Goal is to wean off immune suppression starting around 6 months after cells infused if no evidence of GVHD

• GVHD can occur early (in first couple months) and/or late (several months after transplant)
  – Treatment is additional immune suppression (typically steroid based)
Indications for Transplant in SCN

• **Absolute Indications**
  – No response to GCSF
  – Malignant transformation to AML/MDS

• **Indications to consider transplant if a good match is available**
  – Poor response to GCSF (high doses with ANC < 2000)
  – Mutation causing SCN associated with poor outcomes
Transplant in SCN without AML/MDS

• The outcome of HCT in patients who have not developed MDS or leukemia is excellent

<table>
<thead>
<tr>
<th>Donor Source</th>
<th>Total Patients</th>
<th>Overall Survival</th>
<th>Event Free Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matched Related Donor (MRD)</td>
<td>21</td>
<td>20/21 (95%)</td>
<td>18/21 (86%)</td>
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<tr>
<td>Matched Unrelated Donor (MUD)</td>
<td>8</td>
<td>7/8 (88%)</td>
<td>6/8 (75%)</td>
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<td>Umbilical Cord</td>
<td>30</td>
<td>28/30 (93%)</td>
<td>13/17 (76%)</td>
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<tr>
<td>Total</td>
<td>59</td>
<td>55/59 (93%)</td>
<td>37/46 (80%)</td>
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Transplant in SCN with AML/MDS

• Patients who progress to MDS or leukemia do poorly
  – Patients with AML develop significant toxicity during induction chemotherapy
  – Currently recommended to avoid chemotherapy before conditioning therapy
  – Survival following HCT is historically poor

Summary of published HCT in SCN with MDS or leukemia

<table>
<thead>
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<th>Disease at transplant</th>
<th>Total Patients</th>
<th>Overall Survival</th>
<th>Event Free Survival</th>
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<tbody>
<tr>
<td>MDS</td>
<td>7</td>
<td>4/7 (57%)</td>
<td>4/7 (57%)</td>
</tr>
<tr>
<td>Leukemia</td>
<td>11</td>
<td>4/11 (36%)</td>
<td>3/11 (27%)</td>
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