Novel Clinical Care Practices

Council Meeting 2016

Disclosures

The following faculty and planning committee staff have no financial disclosures:

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courtney Byam, CHTC</td>
<td>Memorial Sloan Kettering Cancer Center</td>
</tr>
<tr>
<td>Martha Lassiter, RN, MSN, AOCNS, BMTCTN</td>
<td>Duke University Medical Center</td>
</tr>
<tr>
<td>Elisa Malek, RN, OCN, CHTC</td>
<td>University of Pittsburgh Medical Center</td>
</tr>
<tr>
<td>Andrea Selleck, CHTC</td>
<td>NMDP / Be The Match</td>
</tr>
<tr>
<td>Trish Demko, CHTC</td>
<td>NMDP / Be The Match</td>
</tr>
</tbody>
</table>
Session Speakers

• Courtney Byam, CHTC  
  Memorial Sloan Kettering Cancer Center
• Elisa Malek, RN, OCN, CHTC  
  University of Pittsburgh Medical Center
• Martha Lassiter, RN, MSN, AOCNS, BMTCTN  
  Duke University Medical Center
• YOU!

Learning objectives

At the conclusion of this session, attendees will be able to:

• Compare unique care models that can impact patient satisfaction.
• Describe the care delivery value of methods presented.
• Evaluate the feasibility of incorporating novel processes or unique care methods at your program.
• Assess mechanisms to evaluate the impact of care model changes.
Learning objectives

• Learn from each other
  – Share BMT clinical care models, unique processes & innovative ideas to improve patient care and patient satisfaction.

• Add to your personal network
  – Audience members: share your experiences and make connections with others.

Improving Efficiency in the URD Search Process

Courtney Byam, MPH, CHTC, Program Manager
Bone Marrow Transplant Service | URD Program
Memorial Sloan Kettering Cancer Center
New York, NY
byamc@mskcc.org

Memorial Sloan Kettering Cancer Center
MSKCC Adult BMT Program

Search & Transplant Volume*
- 400 Preliminary Search Submissions
- 262 URD Formal Searches (+/- cords)
- 166 Transplants
  - 114 URD transplants
  - 52 Cord transplants

Team
- 23 Transplant Physicians
- 6 Search Coordinators

*Projected volume based on year to date numbers

URD Searches at MSKCC

- Only ~ 50% of patients without a matched related donor will have an available 8/8 URD.
- Searches are on spectrum from easy to difficult
  - ~35% of searches: can predict with certainty the best donor.
  - ~65% of searches: cannot be predicted with certainty.
- Incorporate HapLogicSM predictions to guide CT.
Goals for Revamping the MSKCC Search Process

- Improve Speed & Efficiency
- Reduce Costs
- Reduce Coordinator Anxiety

Standard Stem Cell Source Algorithm: Adult Patients

≤ 60 years old
- 8/8 Related Donors
- 8/8 Unrelated Donors
- Cord Blood
- Haplo Donors
- 7/8 Unrelated Donors

> 60 years old
- 8/8 Related Donors
- 8/8 Unrelated Donors
- Haplo Donors
- Cord Blood
- 7/8 Unrelated Donors
• **Very Good**
  – ≥ 20 8/8 potential donors with a ≥ 85% chance likelihood of matching at 8 alleles

• **Good**
  – 5 – 19 8/8 potential donors with a ≥ 85% chance likelihood of matching at 8 alleles
  – ≥ 20 8/8 potential donors with a ≥ 70% chance likelihood of matching at 8 alleles

• **Fair**
  – 1–4 8/8 potential donors with ≥ 85% chance likelihood of matching at 8 alleles
  – 1–19 8/8 potential donors with ≥ 70% chance likelihood of matching at 8 alleles
  – ≥ 5 8/8 potential donors with a 40 – 69% chance likelihood of matching at 8 alleles

• **Poor**
  – 1–8 8/8 potential donors with 40 – 69% chance likelihood of matching at 8 alleles
  – 1–17 8/8 potential donors with ≥ 70% chance likelihood of matching at 7 alleles
  – ≥ 1 8/8 potential donors with ≥ 70% chance likelihood of matching at 7 alleles

• **Very Poor**
  – ≥ 1 8/8 potential donor with ≤ 24% chance likelihood of matching at 8 alleles

• **Futile**
  – 0 8/8 & 7/8 donor options

**The Good, The Bad & The Ugly**

**Validation of Search Prognosis Categorization by Patient Ancestry**

<table>
<thead>
<tr>
<th>SPC Category by Pt Ancestry</th>
<th>N Pts</th>
<th>N (%) with Identif 8/8 URD</th>
<th>SPC Category p-value</th>
<th>Pt Ancestry p-value</th>
<th>Median # 8/8 URDs Identified</th>
<th>N who Underwent Allograft</th>
<th>N (%) BMRT with 8/8 URD</th>
<th>SPC Category p-value</th>
<th>Pt Ancestry p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>830</td>
<td>499 (60%)</td>
<td></td>
<td></td>
<td>443</td>
<td>206 (47%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Very Good</strong></td>
<td>217</td>
<td>217 (100%)</td>
<td>≤ 0.001</td>
<td>--</td>
<td>4</td>
<td>137</td>
<td>135 (99%)</td>
<td>&lt; 0.001</td>
<td>--</td>
</tr>
<tr>
<td>European</td>
<td>188</td>
<td>188 (100%)</td>
<td></td>
<td>--</td>
<td>4</td>
<td>119</td>
<td>118 (99%)</td>
<td>--</td>
<td>0.235</td>
</tr>
<tr>
<td>Non-European</td>
<td>28</td>
<td>28 (100%)</td>
<td></td>
<td>--</td>
<td>3</td>
<td>17</td>
<td>16 (94%)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td><strong>Good</strong></td>
<td>104</td>
<td>104 (100%)</td>
<td>≤ 0.001</td>
<td>--</td>
<td>4</td>
<td>67</td>
<td>64 (96%)</td>
<td>&lt; 0.001</td>
<td>--</td>
</tr>
<tr>
<td>European</td>
<td>86</td>
<td>86 (100%)</td>
<td></td>
<td>--</td>
<td>4</td>
<td>55</td>
<td>53 (98%)</td>
<td>--</td>
<td>0.452</td>
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<tr>
<td>Non-European</td>
<td>18</td>
<td>18 (100%)</td>
<td></td>
<td>--</td>
<td>3</td>
<td>12</td>
<td>11 (92%)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td><strong>Fair</strong></td>
<td>178</td>
<td>136 (76%)</td>
<td>≤ 0.001</td>
<td>--</td>
<td>2</td>
<td>87</td>
<td>69 (75%)</td>
<td>&lt; 0.001</td>
<td>--</td>
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<tr>
<td>European</td>
<td>119</td>
<td>97 (82%)</td>
<td></td>
<td>0.024</td>
<td>2</td>
<td>60</td>
<td>53 (88%)</td>
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<td>0.018</td>
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<tr>
<td>Non-European</td>
<td>58</td>
<td>38 (66%)</td>
<td></td>
<td>--</td>
<td>1</td>
<td>26</td>
<td>21 (43%)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td><strong>Poor</strong></td>
<td>33</td>
<td>16 (48%)</td>
<td>≤ 0.001</td>
<td>--</td>
<td>0</td>
<td>17</td>
<td>16 (55%)</td>
<td>&lt; 0.001</td>
<td>--</td>
</tr>
<tr>
<td>European</td>
<td>19</td>
<td>14 (74%)</td>
<td></td>
<td>0.001</td>
<td>1</td>
<td>12</td>
<td>10 (83%)</td>
<td>--</td>
<td>0.003</td>
</tr>
<tr>
<td>Non-European</td>
<td>14</td>
<td>2 (14%)</td>
<td></td>
<td>0.001</td>
<td>0</td>
<td>5</td>
<td>0 (100%)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td><strong>Very Poor</strong></td>
<td>153</td>
<td>18 (12%)</td>
<td>≤ 0.001</td>
<td>--</td>
<td>0</td>
<td>71</td>
<td>7 (10%)</td>
<td>&lt; 0.001</td>
<td>--</td>
</tr>
<tr>
<td>European</td>
<td>89</td>
<td>13 (15%)</td>
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<td>0</td>
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<td>7 (14%)</td>
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<td>0.180</td>
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<tr>
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<td>63</td>
<td>3 (5%)</td>
<td></td>
<td>--</td>
<td>0</td>
<td>20</td>
<td>0 (100%)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td><strong>Futile</strong></td>
<td>145</td>
<td>8 (6%)</td>
<td>≤ 0.001</td>
<td>--</td>
<td>0</td>
<td>64</td>
<td>1 (2%)</td>
<td>&lt; 0.001</td>
<td>--</td>
</tr>
<tr>
<td>European</td>
<td>57</td>
<td>6 (11%)</td>
<td></td>
<td>0.058</td>
<td>0</td>
<td>30</td>
<td>1 (3%)</td>
<td>--</td>
<td>0.476</td>
</tr>
<tr>
<td>Non-European</td>
<td>87</td>
<td>2 (2%)</td>
<td></td>
<td>--</td>
<td>2</td>
<td>33</td>
<td>0 (10%)</td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>

Overall, 60% of pts had ≥ 1 8/8 URD identified. All pts in Very Good & Good SPC categories had an 8/8 URD identified, & of those who went to transplant almost all received an 8/8 URD

*Davis et al, ASBMT submitted*
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Good</td>
<td>247</td>
<td>247 (100%)</td>
<td>&lt; 0.001</td>
<td></td>
<td>4</td>
<td>119</td>
<td>118 (99%)</td>
<td>&lt; 0.001</td>
<td></td>
</tr>
<tr>
<td>European</td>
<td>188</td>
<td>188 (100%)</td>
<td></td>
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<td>16 (48%)</td>
<td>&lt; 0.001</td>
<td></td>
<td>0</td>
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<td>17 (51%)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Very Poor</td>
<td>153</td>
<td>78 (51%)</td>
<td>&lt; 0.001</td>
<td></td>
<td>0</td>
<td>71</td>
<td>7 (4.8%)</td>
<td>&lt; 0.001</td>
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<td>89</td>
<td>15 (17%)</td>
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<td>1 (2.5%)</td>
<td>&lt; 0.001</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 76% of Fair & 48% of Poor category pts had an 8/8 URD identified but % significantly worse in non-European than European pts.
- Very Poor & Futile categories were highly predictive of no 8/8 URD.
- For the 58 non-European pts in the Poor, Very Poor, & Futile categories who proceeded to transplant, none received a BMT with an 8/8 URD.

Davis et al, ASBMT submitted

Tailoring Donor Priority with Transplant Urgency

<table>
<thead>
<tr>
<th>Transplant Urgency</th>
<th>Very Good / Good</th>
<th>URD SEARCH PROGNOSIS</th>
<th>Poor</th>
<th>Very Poor</th>
<th>Futile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Urgent: Admission &lt; 4 weeks</td>
<td>1st: 8/8 URDs &amp; CBs 2nd: 7/8 URDs</td>
<td>1st: 8/8 URDs &amp; CBs 2nd: 7/8 URDs</td>
<td>1st: CBs 2nd: 8/8 &amp; 7/8 URDs</td>
<td>1st: CBs</td>
<td></td>
</tr>
<tr>
<td>Urgent: Admission 4 – 6 weeks</td>
<td>1st: 8/8 URDs 2nd: CBs</td>
<td>1st: 8/8 URDs &amp; CBs 2nd: 7/8 URDs</td>
<td>1st: CBs 2nd: 8/8 &amp; 7/8 URDs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard: Admission &gt; 6 weeks</td>
<td>1st: 8/8 URDs</td>
<td>1st: 8/8 URDs &amp; CBs 2nd: 7/8 URDs</td>
<td>1st: CBs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Insurance coverage available for typing is also considered with evaluating the likelihood of securing 8/8 MUD. Urgency influences triage of MUD vs CBU typing.

COUNCIL MEETING: Sharing Our Passion for Life
### Preliminary Search Electronic Order

#### Example Patient Jane Doe

<table>
<thead>
<tr>
<th>Patient Name / MRN</th>
<th>Doe, Jane / 01234567</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>50</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>AML</td>
</tr>
<tr>
<td>Prelim Requested By</td>
<td>Dr. Heme</td>
</tr>
<tr>
<td>Ancestry*</td>
<td>Caribbean Hispanic</td>
</tr>
<tr>
<td>URD Search Results Category</td>
<td>Fair</td>
</tr>
<tr>
<td>Prediction of Search Result – URD</td>
<td>8/8</td>
</tr>
<tr>
<td></td>
<td>1 likely 8/8 donor (99%) and 1 potential 8/8 with ~45% likelihood of matching</td>
</tr>
<tr>
<td></td>
<td>7/8  Multiple 7/8 donors.</td>
</tr>
<tr>
<td></td>
<td>≤ 6/8 n/a</td>
</tr>
<tr>
<td></td>
<td>International 1 potential 8/8 donor at low resolution.</td>
</tr>
<tr>
<td>Prediction of Search Result – Cords</td>
<td>Multiple units of suitable match &amp; size.</td>
</tr>
<tr>
<td>Additional Comments</td>
<td>Need HLA antibodies drawn</td>
</tr>
</tbody>
</table>

*Ancestry details may impact match predictions*
### Formal Search Request Confirmation Email

<table>
<thead>
<tr>
<th><strong>Patient Name / MRN</strong></th>
<th>Doe, Jane / 01234567</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>50</td>
</tr>
<tr>
<td><strong>Diagnosis</strong></td>
<td>AML</td>
</tr>
<tr>
<td><strong>BMT Admission Timeframe (in weeks)</strong></td>
<td>&lt;4 weeks</td>
</tr>
<tr>
<td><strong>Candidate for 7/8 URD transplant (yes/no)</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Candidate for Cord transplant (yes/no)</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Candidate for Haplo (yes/no)</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Candidate for Auto (yes/no)</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Priority HSC if no 8/8 URD in required timeframe</strong></td>
<td>1. Cords 2. 3.</td>
</tr>
</tbody>
</table>

#### Preliminary Search Result – URD

| 8/8 | 1 likely 8/8 donor and 1 potential 8/8 with ~45% likelihood of matching |
| 7/8 | Multiple 7/8 donors. |
| ≤ 6/8 | n/a |

#### Preliminary Search Results – Cords

Multiple units of suitable match & size.

#### Search Strategy

Type potential 8/8 donors. Type cords.

#### Coordinator Concern

Given patient non-European ancestry, fair search & transplant urgency, pursuing cords as primary option.

#### Clinical Team Follow-up

Need HLA antibody drawn
# Search Committee Meeting

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>MRN</th>
<th>Referring Physician</th>
<th>Age</th>
<th>Diagnosis</th>
<th>MSK Search Prognosis</th>
<th>Search Stage</th>
<th>Additional Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doe, Jane</td>
<td>01234567</td>
<td>Dr. Heme/Leuko</td>
<td>50</td>
<td>AML</td>
<td>Fair</td>
<td>Prelim</td>
<td>Creatinine: 0.9, Known haplos: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>donor: 1 likely 8/8. 1 potential 8/8 (45%) &amp; 1 8/8 internationally. Several 7/8s.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>cord: Multiple units of suitable match &amp; size. Search Strategy: Type 8/8 donors. Type cords. Do not type 7/8s.</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Coordinator Concern: Non-Europe ancestry together with search results &amp; urgency indicate pursue cords as primary option.</td>
</tr>
<tr>
<td>Cyotgenetic, Sam</td>
<td>12345678</td>
<td>Dr. Hodgkins/Marrow</td>
<td>62</td>
<td>NHL</td>
<td>Poor</td>
<td>Prelim</td>
<td>Creatinine: 0.8, Known haplos: 2 sibling haplos, has kids</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>donor: 3 donors ~42% likelihood of matching at 8/8, several 7/8 donors.</td>
</tr>
<tr>
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<td>cord: Several units of suitable match &amp; size. Search Strategy: Type 8/8s, type 7/8s, do not type cords.</td>
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<td>Coordinator Concern: Dr. Marrow indicated 7/8 is priority after 8/8. Given patient age, haplo should be priority after 8/8. Does not follow algorithm.</td>
</tr>
</tbody>
</table>

## Conclusions

- **Improve Speed & Efficiency**
  - Moves patients to allo graft in timely fashion.
  - Avoids URD searches that will not deliver donor in required time period.

- **Reduce Costs**
  - Not wasting funds typing unnecessary donors/cords.
  - Less damage control with patients on search result expectations – what MD heard vs. what we said.

- **Reduce Coordinator Anxiety**
  - Formal Confirmation Email clearly outlines the search plan – eliminates fear that MD will want a stem cell source that was not typed.
  - More transparency in search.
  - More efficient use of time.
Acknowledgements

**MSKCC**
- Dr. Juliet Barker
- Search Coordinators
  - Eric Davis
  - Jennifer Paulson
  - Melissa Sideroff
  - Debbie Wells
  - Candice Cooper

**NMDP**
- Jason Dehn
Patient-Centered Care: Why it matters and what you can do

Elisa Malek, RN, BSN, OCN
Quality Manager, Stem Cell Transplant Service at UPMC

THE LEMIEUX MISSION

• Gift from the Mario Lemieux Foundation (2011)
  – Goal: Build an innovative space focused on patient comfort and convenience in the outpatient setting
  – Goal: Create a calm and healing environment
THE LEMIEUX MISSION

“Because of my own experience with Hodgkin’s disease, I know first-hand what many of these patients are going through and how important it is to feel comfortable and relaxed when there is so much uncertainty and worry. It means a great deal to me and my family that my foundation is able to be a part of something that affects patient care in such a positive way.”

- Mario Lemieux

The Lemieux Center for Blood Cancers

• Opened in January 2013
• 24,000 square foot outpatient treatment center
  – Clinic and treatment suites
  – Patient and Family Lounge
  – Laboratory
  – Pharmacy
DESIGNING PATIENT-CENTERED CARE

ARCHITECTURE

- Therapeutic power of art and nature
  - Earth tones for a calming effect
  - Large glass windows for natural light
  - Visual installations of nature scenes with sound
  - Illuminated stone-like tiles
  - Plants

- Patient-centered design
TECHNOLOGY

• RTLS (Real Time Locating Services)
• Touchless, timed soap-scrubbing faucets
• Privacy glass
• Touch Screens
• GetWellNetwork
• Electronic Medical Record
• Workstations on Wheels

VALUES

• Everything in one place
  – Addition of new role: Patient Service Coordinator
  – Vitals, phlebotomy, physical exam, appt scheduling

• Treating the whole person
  – Integrative Oncology
Integrative Oncology

Helping patients fight cancer
From the Inside Out.

Works in concert with traditional cancer care to help patients address symptoms of their disease and treatment and improve their quality-of-life.

Integrative Oncology

- Yoga
- Pilates
- Exercise
- Diet evaluation
- Herbal and supplemental assessment
- Food shopping
- Weight Management Counseling
- Massage therapy
- Acupuncture
- Reiki
- Meditation
- Music therapy
- Art therapy
- Aromatherapy
The Wellness Suite

- Opened September 2016
- Program opened 3 years ago
- 250 patients treated
The Wellness Suite

Metrics of Success – Press Ganey

• 2012 (prior to Lemieux Center opening)
  – Overall ranking near 30th percentile
• 2013
  – Overall ranking near 90th percentile
• 2014, 2015, 2016
  – Scores consistently >90th percentile
One Step At A Time…

- Ideas to consider for your center:
  - Add simple nature elements for “spa-like” feel
  - Incorporate calming color schemes
  - Create open spaces
  - Consider infrastructure changes to improve patient flow
Medical Home HSCT Care

Martha Lassiter, RN, MSN, AOCNS, BMTCN
Duke ABMT Clinical Nurse Specialist

Current Care Model since 1992

- Traditional Inpatient Unit-16 beds
  - Allogeneic Myeloablative HSCT
    - Until engraftment
  - Autologous HSCT
    - BEAM regimen
    - CBV regimen
      - Until prep regimen completed
      - Daily follow up in day hospital and reside locally

- Outpatient Day Hospital- 7 day access
  - Autologous HSCT
    - Melphalan
  - Allogeneic Nonmyeloablative HSCT
  - Allogeneic Reduced Intensity HSCT
  - Autologous following preparative regimen given inpatient
    - Apheresis
    - Photopheresis
    - Hematologic malignancy patients
Current Care Model since 1992

- Inpatient unit main hospital
- Outpatient day hospital is 3 blocks from main hospital
- Pharmacy on site - not dispensing
- Shuttle service between buildings
  - Routine chest x-rays
  - Procedures
- Courier service
- Local corporate apartment housing options

Off hours coverage

- Inpatient HSCT unit is the back up at night
- Throughfare via Duke ED
  - Safest route into the hospital
  - Easy parking
  - Communication with inpatient unit
- Directly admitted to HSCT unit
2011

- Dr. Ringden visited Duke ABMT Program to lecture at grand rounds
- February over dinner at 2011 Tandem……..
- May 2011- 48 hours spent with the staff at Karolinska to observe home care
- Champion Krista Rowe, RN, MSN, AOCNS
- July 2011- first draft of protocol out to team for review

Implementation

- IRB approval
- Risk management approval
  - Use of technology
  - Blood transfusions in the home
  - EHR security
- Insurance approval
  - Upfront communication with key payers
- Research funding
  - Gateway
  - NIH
- Transfusion service collaboration
- Pharmacy collaboration
- EPIC implementation summer 2013
- Buy in from the ABMT Team
Home care during the pancytopenic phase after allogeneic hematopoietic stem cell transplantation is advantageous compared with hospital care

Brit-Maree Svanh, Mats Remberger, Karl-Erik Myrback, Katana Holmgren, Brita Eriksson, Patrik Hentschke, Johan Aschan, Louise Bankefrid, and Ulf Ringblom

After myeloablative treatment and allogeneic stem cell transplantation (SCT), patients are kept in isolation rooms in the hospital to prevent neutropenic infections. During a 3-year period, patients were given the option of treatment at home. Daily visits by an experienced nurse and daily phone calls from a physician from the unit were included in the protocol. We compared 36 patients who wished to be treated at home with 18 patients who chose hospital care (control group 1). A matched control group of 36 patients treated in the hospital served as control group 2. All home care patients had hematologic malignancies and 19 were in first remission or first chronic phase. Of the donors, 23 were unrelated. The patients spent a median of 18 days at home (range, 5–38 days). Before discharge to the outpatient clinic after SCT, patients spent a median of 4 days (range, 0–24 days) in the hospital. In the multivariate analysis, the home care patients were discharged earlier (relative risk [RR] 0.53, P = .03), had fewer days on total parenteral nutrition (RR 0.24, P = .05), and lower rates of acute graft-versus-host disease (GVHD) grades IV (RR 2.4, P = .01), lower transplantation-related mortality rates (RR 0.22, P = .34), and lower costs (RR 0.27, P = .05), compared with the controls treated in the hospital. The 3-year survival rates were 71% in the home care group versus 51% and 67% (not significant) in the 2 control groups, respectively (P = .03). To conclude, home care after SCT is a novel and safe approach. This study found it to be advantageous, compared with hospital care. (Blood. 2002:109:4117–4124)

COUNCIL MEETING: Sharing Our Passion for Life

Clinical Observations, Interventions, and Therapeutic Trials

Biology of Blood and Marrow Transplantation

Clinical Research:
Improved Survival after Allogeneic Hematopoietic Stem Cell Transplantation in Racial Years. A Single-Center Study

Mats Remberger, 1*, Brit-Maree Svanh, 1 Anna Backlund, 1 Nina Bergvall, 1 Jan-Erik Myrback, 1 Katana Holmgren, 1 Brita Eriksson, 1 Patrik Hentschke, 1 Johan Aschan, 1 Louise Bankefrid, 1 and Ulf Ringblom 1

We analyzed the outcome of allogeneic hematopoietic stem cell transplantation (HSCT) over the past 2 decades. Between 1992 and 2000, 963 patients were treated with HSCT, mainly for hematologic malignancies. They were divided according to 4 different time periods of treatment: 1992 to 1995, 1996 to 2000, 2001 to 2005, and 2006 to 2009. Over the years, many factors have changed considerably regarding patient age, diagnosis, disease status, type of donor, stem cell source, and GvHD prophylaxis, cell dose, type of conditioning, treatment of infections, use of granulocyte-colony stimulating factor (G-CSF), use of mesenchymal stem cells, use of cytokine T cells, and home care. When we compared the last period (2006–2009) with earlier periods, we found slower neutrophil engraftment, a higher incidence of acute GvHD versus chronic disease (ATGMD3), and a higher risk for infection. We found that transplantation-related mortality (TRM) was lower in the last period, with the best results during the last period (2006–2009) and a 160-day TRM of 6.1%. This improvement was also observed in a multivariate analysis. When comparing for differences between the 4 groups, the hazard ratio for mortality in the last period was 0.59 (95% confidence interval [CI]: 0.44–0.79), P = .001, and for TRM it was 0.43 (CI: 0.33–0.52), P < .001. This study shows that the combined efforts to improve outcome after HSCT have been very effective. Even though we now find that older patients with more advanced disease and use more alternative HLA-matched donors, OS and TRM have
Objectives

- **Primary**
  - Compare bowel microbiota before and during the first 100 days between home treatment and clinic treatment (living at home)

- **Secondary**
  - Assess infection rates
  - Assess nutritional status (PG-SGA)
  - GvHD incidence
  - Morbidity/mortality
  - QOL (FACT-BMT)
  - Cost comparison
Candidates

- Within 90 minute driving distance to Duke
  - 3 counties
  - All subjects have been within 40 minutes to Duke
- HSCT from any source
- Options
  - Live at home/Treat at home
  - Live at home/Treat at clinic daily
- No active infections

Organization

- Staff caring for HSCT patients should be experts
  - Declined to use home care nurses
  - Team from inpatient unit and outpatient day hospital
  - Did use home care expertise for training of HSCT nurses
  - Same standard of care as provided in traditional setting
Is every local patient a candidate?

- Safety first
  - Fall risks
  - Infection risk
  - Caregiver 24/7
  - Children in the home
  - Food safety
- Pets allowed in the home but not during treatment times
  - Assess the pet living arrangements
Reimbursement Issues

- Only private payers eligible
  - No medicare/medicaid
    - Advanced practice providers are billed as home visits
    - Attending physician “remote visit” is unbillable encounter
  - Most private payers pay on a case rate
    - Language
      - Transplant nurses as opposed to home health nurses

Care at home model

- Conditioning regimen administered in traditional setting
- HSCT administered in traditional setting
- Discharge for home care on DOT +1
- If naïve to transfusions, first transfusion administered in ABMT day hospital
- Methotrexate for GvHD prophylaxis administered in ABMT day hospital
Care at home model

• Advanced practice provider
  – Early am visit
    • Assessment
    • Vital signs and draw labs
    • Return to ABMT day hospital to run labs and discuss assessment with ABMT team
• RN visit
  – Administer therapy based on lab results/assessment
    • Blood products
    • Electrolyte supplementation
    • IV fluids
    • Symptom management
    • Education
• Supplies
  – Set up a treatment station in the home
    • Scale
    • CVC supplies
Embracing technology

- Daily Facetime with attending physician
- Ability to Facetime with consultants
  - Registered dietitian
  - Social worker
  - Financial counselors
  - Clinical Nurse Specialist
Results

• First treat at home transplant September, 2011
• Ability to treat 1 at home patient at a time
• Treated 19 home based transplant patients
  – Short hiatus 2012 due to staffing issues
  – Hiatus 2013 during EPIC implementation
  – Last half of 2014- 8 maternity leaves

Yes there are challenges

• Safety first
  – Environmental issues
  – Staffing issues
  – Not everyone is a candidate
  – Not all staff members are enthusiastic
• Resource allocation
  – Physician
  – APP’s
  – RN’s
• Cost unknown
Patient/Staff feedback

- Overall positive
- Unexpected feedback
  - Feeling of isolation
    - Began visits to the clinic daily
    - Palliative care
- A realistic view of home environments that we send ALL our HSCT patients home to
- A certain intimacy providing care in the patient’s living room

Caregiver Comments

- Having the nurse here in the house allowed me to work from home staying in contact with work saving a good amount of vacation days.
- The only negative that I experienced was feeling that at times ______ might have been more cooperative at the clinic with the nurses than home with me (when the PAs and nurses had gone home). I was frustrated a few times that he wouldn’t always follow “doctor’s orders.” However, I truly believe that _________ ultimate recovery was due in part to being able to remain in his own home.
- While going through an extremely difficult situation where so many things are out of your control and can be very scary, to have the comfort of being in your own space, sleeping in the comfort of your own bed, and having your own things certainly helped ease some of the stress of a very stressful situation.
Early data

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average # home visits (APP)</td>
<td>12.7</td>
</tr>
<tr>
<td>Average # home visits (RN)</td>
<td>10.1</td>
</tr>
<tr>
<td>Average # days of IV antibiotics in home</td>
<td>4.1 (7.1 total)</td>
</tr>
<tr>
<td>Overall # ED visits</td>
<td>1</td>
</tr>
<tr>
<td>Average # days of transfusions in the home (9 additional done in traditional setting for some patients)</td>
<td>2.2</td>
</tr>
</tbody>
</table>

****Based on 15 autologous transplant patients 4 allogeneic transplant patients

Live at home/Come to clinic

- Collecting same data
- Increased the range for patients to live at home
  - Traditionally Durham proper
  - Expanded to 3 county area
Duke Performs First At-home Bone Marrow Transplant  

By Marty Fisher

When Nelson Chao, MD, visited his bone marrow transplant patient, David Lenat, one recent morning, the scene was not what you'd expect. No needs hospital room, nor a ward gown or face mask. Instead, Lenat sat in his own Raleigh living room in a comfortable leather recliner by a crackling fire, steaming mug of coffee in one hand and a copy of The News & Observer open on his lap. His wife, Georgia, returning from her morning run, leaned down to kiss his forehead.

Lenat is one of the first patients in the world to benefit from a new clinical trial of at-home bone marrow transplant led by Chao, chief of the Division of Cellular Therapy and professor of immunology.

Normally, the Lenats would have had to rent an apartment close by Duke University Hospital during the one- to two-month transplant and recovery. Instead, he received outpatient chemotherapy at Duke to treat multiple myeloma, then went home, where nurses and other practitioners came several times a day.

The actual transplant was performed at Duke in the outpatient setting. Lenat’s stem cells were harvested from his bone marrow. Next, he received an injection to wipe out his remaining stem cells, leaving him with no immune system. Finally, the harvested stem cells were returned, and he went home to endure the month-long process of waiting for his immune system to regenerate.

“I spent a lot of time reclining in a fancy leather chair my wife bought me,” says Lenat. “We didn’t have any real disruptions, no daily trips back and forth to Durham. (Renting an apartment) doesn’t sound so bad, but there are a bazillion little things that you would miss.”

Chao, who holds the Donald D. and Elizabeth G. Cooke Cancer Research Professorship, says trying the risky and challenging at-home transplant was motivated in part by listening to patients, who craved the security and comfort of home while undergoing a frightening, difficult procedure and recovery. He also was intrigued by

Continued on page 5

David Lenat was able to stay in his own home with

"The microbe is nothing, the terrain is everything."

-Claude Bernard

Father of “blind experiments” and homeostasis