Transplant Center Survey

Navneet Majhail, MD, MS
Director, Blood & Marrow Transplant Program
Cleveland Clinic
CIBMTR Health Services Research Program
Conducted in Partnership with Be The Match® Patient and Health Professional Services

Background

- National survey of US transplant centers conducted in 2012
  - To understand and describe center capacity, infrastructure, personnel and models of care delivery
  - To investigate the association of center characteristics with 1-year survival for allogeneic HCT recipients
Survey

Survey Instrument

• 42 item web-based instrument
• Directed towards center medical directors
• Piloted at 5 sites
• Administered in summer 2012
### Survey Domains

**Healthcare Provider Characteristics**
- Transplant physicians
- Midlevel providers (e.g., nurse practitioner, physician assistant)
- HCT/physician and HCT/mid-level provider ratios
- Nurse staffing ratio on inpatient unit
- Availability of other personnel (e.g., social workers, pharmacists)

**Transplant Program Resources**
- Center volume
- Availability of dedicated inpatient unit for HCT
- Number of beds for HCT
- Outpatient clinic facilities
- Presence of stem cell processing facilities
- FACT accreditation
- Participation in national cooperative clinical trial groups

**Care Team Structure and Processes**
- Structure of inpatient and outpatient medical team
- Role of mid-level providers and trainees on transplant team
- Role of other providers (e.g., pharmacists)
- Models of care
- Models of care for patients needing critical care support
- Transition of care

**Medical Center Characteristics**
- Location of center (rural vs. urban)
- Teaching status
- Ownership status (Govt. vs. private)
- Inpatient hospital beds
- NCI cancer center designation
- Patient population (pediatric vs. adult)

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### Center Assignment

US centers that reported allogeneic HCT to CIBMTR, 2011: N = 172

- Adult only centers: N = 69
- Pediatric only centers: N = 42
- Combined centers*: N = 41

- Separate Medical Directors for adult and pediatric programs
- One Medical Director for the whole program

- Considered as separate adult and pediatric programs: N = 26
- "True" combined programs: N = 15

* Reported both adult and pediatric HCT to the CIBMTR

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Response Rate

• 188 centers included in analysis
  – 10 centers ineligible (inactive or no allogeneic HCT b/w 2008-2010)
• Response rate 81% (152/188 centers)
  – 79% response rate for adult centers
  – 82% response rate for pediatric centers

Adult Transplant Center Characteristics
Center Size Categories

- Based on 2010 total HCT volume (N=84 centers)

Hospital Size
Dedicated Inpatient Beds for HCT

Number of Inpatient Beds

* N=78 centers with dedicated inpatient beds for HCT
Dedicated Outpatient Clinic for HCT

Outpatient Transplants
Outpatient Mid-level Care Model

Center Characteristics and Allogeneic HCT Survival
Objective and Methods

• Evaluate association of center characteristics with 1-year survival for adult allogeneic HCT recipients
  – 2008-2010 Center Specific Outcomes dataset
  – Center size categories based on 2010 allogeneic HCT volume (≤ 40 vs. >40)
  – Patients alive and with <11 mos followup excluded
  – Final population included 11,537 patients from 83 adult transplant centers

Multivariate Analysis

<table>
<thead>
<tr>
<th>Patient Variables</th>
<th>1-year model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recipient age</td>
<td>x</td>
</tr>
<tr>
<td>Recipient race</td>
<td>x</td>
</tr>
<tr>
<td>Karnofsky performance score</td>
<td>x</td>
</tr>
<tr>
<td>Disease group</td>
<td>x</td>
</tr>
<tr>
<td>Resistant disease (NHL and HL only)</td>
<td>x</td>
</tr>
<tr>
<td>Recipient CMV</td>
<td>x</td>
</tr>
<tr>
<td>Time from diagnosis to transplant</td>
<td>x</td>
</tr>
<tr>
<td>Donor type</td>
<td>x</td>
</tr>
<tr>
<td>Graft type</td>
<td>x</td>
</tr>
<tr>
<td>HLA match</td>
<td>x</td>
</tr>
<tr>
<td>Donor age (unrelated donor only)</td>
<td>x</td>
</tr>
<tr>
<td>Conditioning regimen intensity (by disease)</td>
<td>x</td>
</tr>
<tr>
<td>Donor recipient sex match</td>
<td>x</td>
</tr>
<tr>
<td>Prior auto transplant</td>
<td>x</td>
</tr>
<tr>
<td>Sorror score</td>
<td>x</td>
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</table>
## Patient Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>≤ 40 Allo HCT</th>
<th>&gt;40 Allo HCT</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centers/Patients</td>
<td>42/1900</td>
<td>41/9637</td>
<td></td>
</tr>
<tr>
<td>Median allo HCT volume (IQR)</td>
<td>21 (7-29)</td>
<td>72 (57-108)</td>
<td></td>
</tr>
<tr>
<td>Median age</td>
<td>52 years</td>
<td>52 years</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>KPS score ≥ 90</td>
<td>59%</td>
<td>62%</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Acute leukemia</td>
<td>53%</td>
<td>49%</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>HLA identical sibling donor</td>
<td>39%</td>
<td>35%</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>HCT CI score 0</td>
<td>44%</td>
<td>38%</td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>

## Center Characteristics

**Bed Size**

<table>
<thead>
<tr>
<th>≤ 40 Allo HCT</th>
<th>&gt; 40 Allo HCT</th>
<th>P&lt;0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.9</td>
<td>14.6</td>
<td></td>
</tr>
<tr>
<td>45.2</td>
<td>56.1</td>
<td></td>
</tr>
<tr>
<td>42.9</td>
<td>29.3</td>
<td></td>
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</tbody>
</table>

**Affiliated with Teaching Hospital**

<table>
<thead>
<tr>
<th>≤ 40 Allo HCT</th>
<th>&gt; 40 Allo HCT</th>
<th>P&lt;0.05</th>
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</thead>
<tbody>
<tr>
<td>≥ 1000</td>
<td>≥ 1000</td>
<td></td>
</tr>
<tr>
<td>71.4</td>
<td>92.7</td>
<td></td>
</tr>
<tr>
<td>28.6</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
## Follow-up/Survivorship & GVHD Program

![Graph showing Follow-up/Survivorship Program and GVHD Program](image)

*Follow-up/Survivorship Program*
- ≤ 40 Allo HCT: 71.4% Yes, 28.6% No
- > 40 Allo HCT: 61.0% Yes, 39.0% No
  - p-value: 0.36

*GVHD Program*
- ≤ 40 Allo HCT: 90.5% Yes, 9.5% No
- > 40 Allo HCT: 73.2% Yes, 26.8% No
  - p-value: 0.05

## Center Characteristics

<table>
<thead>
<tr>
<th>Personnel</th>
<th>≤ 40 Allo HCT</th>
<th>&gt;40 Allo HCT</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median BMT MD’s (IQR)</td>
<td>4 (3-5)</td>
<td>8 (6-12)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Median mid-levels (IQR)</td>
<td>2 (1-5)</td>
<td>8 (5-14)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>≥ 4 FTEs HCT coordinators</td>
<td>14%</td>
<td>78%</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>≥ 4 FTEs pharmacists</td>
<td>2%</td>
<td>20%</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>≥ 2 FTEs social workers</td>
<td>38%</td>
<td>88%</td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>
## Center Characteristics Associated with 1-year Overall Survival

<table>
<thead>
<tr>
<th>Center Characteristics</th>
<th>Level</th>
<th>Patient No.</th>
<th>No. of Centers</th>
<th>OR</th>
<th>95% CI</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allo HCT volume in 2010</td>
<td>≤ 40</td>
<td>1900</td>
<td>42</td>
<td>1</td>
<td>1.32</td>
<td>1.12-1.55</td>
</tr>
<tr>
<td></td>
<td>&gt; 40</td>
<td>9637</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Long-term follow-up/survivorship program</td>
<td>No</td>
<td>5941</td>
<td>55</td>
<td>1</td>
<td>1.23</td>
<td>1.05-1.43</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>5596</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OR=Odds Ratio; CI: Confidence Interval
Note: Adjusted for patient characteristics and disease status.

### Summary
Center Characteristics

- Substantial variation in transplant center characteristics
- Larger centers (not surprisingly) have more resources to perform more transplants
- Centers have different models of care to optimize use of available resources
- Data will help centers understand resource needs and capacity

Center Characteristics and Survival

- Centers reporting adult allo HCT to CIBMTR
  - >40 allo annual HCT in 2010 associated with better 1-year survival
  - Most center factors not associated with survival
  - Total allo volume likely represents a complex construct that is highly associated with center structural characteristics and care processes
- Limitations and challenges
  - Survey limitations
  - Centers change over time
Center Characteristics and Survival

• Analysis lays foundation for more research
  – Comprehensive investigation of center characteristics and care models
  – More research on care coordination
  – Reconcile findings with Center Outcomes Analysis

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Survey Respondents