Matching Recipient and Donor Risk – Do Two “Bads” Ever Equal a “Good”

Shelley Hall, MD, FACC, FHFSA, FAST
Chief, Transplant Cardiology, MCS and Advanced Heart Failure
Baylor University Medical Center
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Disclosure

• Speaker’s Bureau – Novartis, CareDx
• Consultant – Abbott, Abiomed, CareDx, Evaheart, Syncardia

Learning Objectives

• Understand behaviors vs facts associated with donor risks
  • Review most common recipient risks
  • Discuss matching strategies
The Myth of Predicting Good

“Perfect Donor”+ “Perfect Recipient” ≠ Perfect Outcome
Donor “Bads”

- Age
- Female
- Large BMI
- HTN/LVH
- Increased risk

- Alcohol
- Drug Use
- Infections
- CAD
Adult Heart Transplants
Kaplan-Meier Survival by Donor Age Group (Years)

(Transplants: January 1992 – June 2017)

Median survival (years):
0-10=11.8; 11-39=12.2; 40-59=10.4; 60+=7.6

All pairwise comparisons were significant at $p < 0.05$ except 0-10 vs. 11-39 and 0-10 vs. 40-59.
Adult Heart Transplants
Kaplan-Meier Survival by Donor/Recipient Sex
(Transplants: January 1992 – June 2017)

Median survival (years): Male/Male=11.7; Male/Female=12.0; Female/Male=10.5; Female/Female=12.4

All pairwise comparisons were significant at p < 0.05 except Male/Female vs. Female/Female and Male/Male.
Recipient "Bads"

- Age
- Prior sternotomies
- VAD
- Diabetes
- PVR
- Sensitization
- Dual Organs
- BMI
Adult Heart Transplants
Kaplan-Meier Survival by Pre-Transplant MCS

(Transplants: January 2010 – June 2017)

No pairwise comparisons were significant at p < 0.05 except ECMO vs. LVAD Continuous and ECMO vs. No LVAD.

- LVAD Pulsatile (N=77)
- LVAD Continuous (N=7,072)
- LVAD+RVAD Pulsatile (N=141)
- ECMO (N=144)
- No LVAD/No Inotropes (N=4,221)
- No LVAD/Inotropes (N=5,878)

Survival (%)

Years

0 1 2 3 4 5 6 7
Adult Heart Transplants

Number and % of Combined Organ Transplants Reported by Year and Type of Transplant

# of Transplants
Decision Time

“Of course we can make fast decisions ... once we have considered the 4872 factors.”
The Birth of DonorNet

- 2007
- Conceived as a way to get offers out more rapidly
- "Level playing field" by giving information to all centers identically
- Included Donor Sequence # in the offers
- Unconscious "pressure" that if those above turned it down, must not be a good donor

Figure 3. Post-transplant survival across DSN groups 1-10.
Rules Have Changed

• Everyone adopting higher risks
• Time Limits and data criteria
• Behavior changes
• For those in lower statuses, the supply / demand equation is now different
• UNOS and CMS standards didn’t change Oct 18, 2018
New Way to Approach This Heart Transplant Edition
Gambling on Transplant Success

Choose the low hanging but hidden fruit

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[Chart showing donor era distribution]

Donor Era:
- Era 1987-1996
- Era 1997-2006
- Era 2007-2018

Txp or Not recovered or other:
- Transplanted
- Other
- Not Recovered
• Increasing use of anoxic donors (though higher turndowns as well)
• Less use of CVA donors
• High use of head trauma donors
• More coronary angios
Adult Heart Transplants
Kaplan-Meier Survival by Donor/Recipient Sex Conditional on Survival to 1 Year

(Transplants: January 1992 – June 2017)

Median survival (years):
Male/Male = 13.8; Male/Female = 14.6;
Female/Male = 13.2; Female/Female = 14.9

All pairwise comparisons were significant at p < 0.05 except Male/Female vs. Female/Female.
Measured Tox Score and Usage for Transplant

Baran et al, presented at ATC 2019
Risk Factors to Define an Extended Criteria Donor Heart Do Not Appear to Have Cumulative Adverse Effects after Heart Transplantation

M. Olymbios, S. Dimbil, R. J. Levine, F. Esmailian, J. Patel, J. A. Kobashigawa

<table>
<thead>
<tr>
<th>Endpoints</th>
<th>0 Extended Criteria (n=350)</th>
<th>1 Extended Criterion (n=220)</th>
<th>2 Extended Criteria (n=76)</th>
<th>3 Extended Criteria (n=15)</th>
<th>P-Value</th>
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<tbody>
<tr>
<td>3-Year Survival</td>
<td>82.4</td>
<td>86.0</td>
<td>94.5</td>
<td>78.6</td>
<td>0.136</td>
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<td>3-Year Freedom from NF-MACE</td>
<td>82.5</td>
<td>74.8</td>
<td>59.3</td>
<td>54.6</td>
<td>0.035</td>
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<td>3-Year Freedom from CAV</td>
<td>93.8</td>
<td>85.1</td>
<td>83.5</td>
<td>92.9</td>
<td>0.081</td>
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<td>3-Year Freedom from Any-Treated Rejection</td>
<td>83.0</td>
<td>77.0</td>
<td>75.1</td>
<td>75.7</td>
<td>0.583</td>
</tr>
</tbody>
</table>

- Risk of NF-MACE incrementally increased with the number of criteria
- Donors with one or more extended criteria are acceptable for us
Gambling on Transplant Success

Be Prepared

- Choose the low hanging but hidden fruit
- Be prepared to lose, and win anyway
Be Prepared to Lose, and Win Anyway

• Have a PGD go-to plan
• Modify immunosuppression when patients are sick
  – Too sick to tolerate rejection or too sick to reject?
• Most of the time the heart will come back
Gambling on Transplant Success

- Choose the low hanging but hidden fruit
- Be prepared to lose, and win anyway
- Know your recipients and your donors
Know Your Recipients and Your Donors

• Critically important to review every aspect of the donor history and make a match between donor and recipient
• Look at the echo and cath, not just the report
• Talk to the OPO Coordinator
• Recipient ability to “weather a storm”
• Age (on both sides) trumps most things
Gambling on Transplant Success

– Choose the low hanging but hidden fruit
– Be prepared to lose, and win anyway
– Know your recipients and your donors
– Be willing to spend some to make a donor usable (trip to donor site to look)—Fixer Upper
The Fixer-Upper

- Donor with LV dysfunction
- Donor without repeat echo
- Donor not hormonally resuscitated
- Donor where you just aren’t sure
- **GO LOOK AT IT!**
- Importance of Donor Call
Gambling on Transplant Success

The only Real Mistake is the one from which we Learn Nothing

- Choose the low hanging but hidden fruit
- Be prepared to lose, and win anyway
- Know your recipients and your donors
- Be willing to spend some to make some (trip to donor site to look) – Fixer Upper
- Have a team culture which allows mistakes and learns from them
Conclusions

- Our donors are less “good”
- We need to control how less “good” our recipients are … but the allocation system has taken some of that control away
- When evaluating a donor offer, we need to say “why not” take it
- Our less bad recipients will be getting less good offers now so summation of risk is new paradigm
The Myth of Stability: 2 % per Month

Continuously Updated Estimation of Heart Transplant Waitlist Mortality

Eugene H. Blackstone, MD, a,b,c Jeevanshu Rajeswari, PhD,b,c Vincent B. Cruz, MD,d Eileen M. Hsieh, MD,d,e Marian Koprivanac, MD,f Nicholas G. Smedira, MD,f,g Katherine J. Hoercher, RN,h Lucy Thuita, MS,h Randall C. Starling, MD, MPHh
The Ultimate Good

Alive with issues rather than dead on the waiting list
Thank You!

Questions?