Who and When to Refer for a Heart Transplant

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BSH 24th November 2017
BSH Annual Autumn Meeting 2017

Presentation title: Who and when to refer for a heart transplant

Speaker: Jayan Parameshwar

Conflicts of interest: NIL

Presentation slide distribution:
These presentation slides will be added to www.bsh.org.uk after the meeting
Adult Heart Transplants
Kaplan-Meier Survival by Era
(Transplants: January 1982 – June 2014)

Survival (%)

Years

1982-1991 (N=21,391)
1992-2001 (N=39,913)
2002-2008 (N=24,485)
2009-6/2014 (N=20,577)

Median survival (years):

All pair-wise comparisons were significant at p < 0.05.
Papworth Heart Transplant Survival
Adult Heart Transplants
Rehospitalization Post Transplant of Surviving Recipients
(Follow-ups: January 2004 – June 2015)
Figure 5.1 Number of adult heart transplants in the UK, 1 April 2006 to 31 March 2016, by financial year

Source: Annual Report on Cardiothoracic Transplantation 2015/16, NHS Blood and Transplant
Deceased donor heart programme in the UK, 1 April 2007 - 31 March 2017, Number of donors, transplants and patients on the active transplant list at 31 March

<table>
<thead>
<tr>
<th>Year</th>
<th>Donors</th>
<th>Transplants</th>
<th>Transplant list</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2008</td>
<td>127</td>
<td>128</td>
<td>130</td>
</tr>
<tr>
<td>2008-2009</td>
<td>132</td>
<td>130</td>
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<tr>
<td>2009-2010</td>
<td>130</td>
<td>126</td>
<td>130</td>
</tr>
<tr>
<td>2010-2011</td>
<td>169</td>
<td>136</td>
<td>138</td>
</tr>
<tr>
<td>2011-2012</td>
<td>144</td>
<td>138</td>
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<tr>
<td>2012-2013</td>
<td>200</td>
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<tr>
<td>2013-2014</td>
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<td>2014-2015</td>
<td>175</td>
<td>181</td>
<td>198</td>
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<tr>
<td>2015-2016</td>
<td>210</td>
<td>195</td>
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</tr>
<tr>
<td>2016-2017</td>
<td>199</td>
<td>198</td>
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</tr>
</tbody>
</table>

Source: Transplant activity in the UK, 2016-2017, NHS Blood and Transplant
Figure 5.4 Number of adult heart transplants in the UK, 1 April 2006 to 31 March 2016, by financial year and urgency status

Source: Annual Report on Cardiothoracic Transplantation 2015/16, NHS Blood and Transplant
UK DATA

• www.odt.nhs.uk/statistics-and-reports
Patient Selection

• Relative risk and benefit for patient
• Benefit relative to the population of potential heart transplant candidates (i.e. patients capacity to benefit)
• Likelihood of receiving a transplant

Patients listing done in a MDT and as transparent as possible but is not an exact science. Second opinion is always available.
GUIDELINES

• UK Guidelines for referral and assessment of adults for heart transplantation
Heart 2011;97:1520-1527

• Listing Criteria for Heart Transplantation
J Heart Lung Transplantation 20016;35:1-23
INDICATIONS

• History
  – Recurrent admissions to hospital despite adequate medical therapy (2 in 12 months)
  – Persistent symptoms attributable to heart failure despite optimal medical therapy
  – Recurrent ventricular arrhythmia in the presence of severe ventricular dysfunction
PATIENT SELECTION CPEX

Peak VO2 < 14 ml/kg/min or 50% predicted.
If on beta blockers <12 ml/kg/min
Peak VO2 is affected by age, pre-morbid fitness
INDICATIONS

• Laboratory
  – Deteriorating renal function (eGFR<50), inability to tolerate diuretic dose sufficient to clear congestion, need to decrease or discontinue prognostic medication
  – Hyponatraemia
  – Rising or persistent elevation of natriuretic peptide
  – ECHO: worsening RV function or rise in PASP (>50 mm Hg)
Figure 1. Event-free survival by NTproBNP quartiles.
Urgent inpatient referral

- Inotrope or iv diuretic dependent
- Need for IABP to prevent secondary organ failure
- Intractable ventricular arrhythmia with severe ventricular dysfunction.
- Ventilation for pulmonary oedema
  (Absence of Contraindication to Transplantation)
Urgent In-Patient Referral

- 65 year old man in ICU BP 80/60 on 2/3 inotropes
- 3 week h/o dyspnoea and fluid retention
- Ventilated for pulmonary oedema
- CTPA: multiple bilateral PE
- ECHO: poor LV and RV, clot in both
- Lactate 10, anuric, creatinine 400
- ALT 5000, INR 2.8 (auto anticoagulated)
Re-Testing

• Serial testing important for pts on waiting list and those deemed too well on initial listing
• Interval: 3-6 monthly recommended
• Pts with borderline PVR may need RHC more frequently
Relative Contraindications

• Active acute infection
• Symptomatic peripheral or cerebrovascular disease
• Diabetes mellitus with end-organ damage (nephropathy, neuropathy, proliferative retinopathy), poor diabetic control
Relative Contraindications

- Severe lung disease (FEV1 and FVC less than 50% predicted, CT lung disease)
- Recent pulmonary thromboembolism (6 weeks)
- Pulmonary hypertension: pulmonary artery systolic pressure > 65 mm Hg, transpulmonary gradient ≥ 15 mmHg and/or pulmonary vascular resistance > 5 Wood units.
Patient Selection-RHC

- RA pressure (volume status)
- TPG: PA mean – PCWP
- PVR: TPG ÷ Cardiac Output
- (Low filling pressure with CI > 2 l/min/m²: good prognosis)
<table>
<thead>
<tr>
<th>DATE</th>
<th>18/10/2011</th>
<th>15/02/2012</th>
<th>12/07/2012</th>
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<tbody>
<tr>
<td>RA</td>
<td>19</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>RV</td>
<td>78/27</td>
<td>81/15</td>
<td>43/12</td>
</tr>
<tr>
<td>PA</td>
<td>84/36 53 53%</td>
<td>82/32 49 55.4%</td>
<td>39/23 29 65.3%</td>
</tr>
<tr>
<td>PCWP</td>
<td>36 v=43</td>
<td>32 v=41</td>
<td>20 v=27</td>
</tr>
<tr>
<td>CO</td>
<td>2.0</td>
<td>2.8</td>
<td>4.0</td>
</tr>
<tr>
<td>CI</td>
<td>1.1</td>
<td>1.5</td>
<td>2.1</td>
</tr>
<tr>
<td>TPG</td>
<td>17</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>PVR</td>
<td>8.5</td>
<td>6.1</td>
<td>2.3</td>
</tr>
</tbody>
</table>
Relative Contraindications

• Age: not absolute bar to transplant evaluation
• Pts over 60 probably have a worse long-term outcome (most patients < 65)
• Higher risk of malignancy and renal dysfunction, (but less rejection)
• Careful attention to co-morbidity in older patients
Relative Contraindications

• Malignancy: recent history \(< 5\) years, less for haematological malignancy

• Depends on the prognosis of the individual malignancy (consult oncologist)

• Possible effect of immunosuppression on tumour recurrence
Relative Contraindications

• Renal Dysfunction: common in patients with advanced heart failure
• Impacts on outcome after TP
  – Normal renal size & no proteinuria and eGFR > 40 ml/min/1.73 m²
• Response to trial of inotrophic therapy may help in some patients
• Duration of abnormal function
Relative Contraindications

• Obesity: BMI $\geq 35$ affects outcome; advise weight loss first (consider body habitus). BMI 30-35, may help to lose weight before listing

• Chronic Viral infection:
  – HIV: if CD4 count $>200$ for 3 months, RNA –ve and no opportunistic infection or malignancy
  – Hep B and Hep C: if negative PCR and no cirrhosis/liver dysfunction, Hep C genotype
Relative Contraindications

- Smoking: affects medium term outcome; recommend 3-6 month smoking free
- Active/recent drug abuse
- Alcohol abuse (at least 6 months abstinence)
- Inability to give informed consent
- History of non-adherence
TIMING

- Probable duration on waiting list
  - Size
  - Blood group
  - Allo-sensitization (presence of anti-HLA antibodies)
CONCLUSION

- Refer “too early” rather than “too late”
- If in doubt discuss with transplant cardiologist
- MINIMUM INFORMATION:
  - History (operations, transfusion, co-morbidities), symptoms
  - Diabetes: complications, PVD
  - Medication
  - Height, weight, FBC, U+E, LFT, other
  - Imaging: Coronary angiogram, CT, MRI