Experience in heart transplant as salvage treatment for infective endocarditis

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AEPEI: Association pour l’Etude et la Prévention des Endocardites Infectieuses
Menu

- **Background**
  - Heart transplant (HT) in 2017
  - HT as salvage treatment for IE: is it reasonable?
  - Literature review

- **International Collaboration on Endocarditis (ICE) study**

- **Conclusions**
Special article


- 250-300 heart transplant/year
- Mean age: 45 –> 50 years

Progress in survival despite
- Recipients & donors older
- Increasing proportion of HT performed as ‘emergency’ (50% in 2015)
- 5 year-survival = 66% (improving)

Gonzalez-Vilchez F et al. Rev Esp Cardiol 2016
Who can receive heart transplant?

1. Age limit (70 years ?)
2. No comorbidity with life expectancy < 5 years
3. No disease at risk of rapid evolution with immunosuppressive drug (e.g. cancer < 5 years)
4. Predictable good adherence to medications and follow-up visits
5. No uncontrolled systemic infection
### Table 1: Patient survival rates in the main cohorts of kidney, liver, heart, and LVAD recipients

<table>
<thead>
<tr>
<th>Type of SOT/Country</th>
<th>Period</th>
<th>Number of patients</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>10</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidney/USA (1)*</td>
<td>2002–2011</td>
<td>HIV+ (n = 362)</td>
<td>96</td>
<td>-</td>
<td>92</td>
<td>-</td>
<td>89</td>
<td>-</td>
<td>63%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HIV− (n = 3620)</td>
<td>97</td>
<td>-</td>
<td>94</td>
<td>-</td>
<td>89</td>
<td>-</td>
<td>78%</td>
</tr>
<tr>
<td>Liver/Spain (2)</td>
<td>2002–2006</td>
<td>HIV+/HCV+ (n = 84)</td>
<td>88</td>
<td>71</td>
<td>62</td>
<td>60</td>
<td>54</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HIV−/HCV+ (n = 252)</td>
<td>90</td>
<td>81</td>
<td>76</td>
<td>73</td>
<td>71</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Liver/USA (3)</td>
<td>2003–2010</td>
<td>HIV+/HCV+ (n = 89)</td>
<td>76</td>
<td>-</td>
<td>60</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HIV−/HCV− (n = 235)</td>
<td>92</td>
<td>-</td>
<td>79</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Liver/USA (4)</td>
<td>2001–2007</td>
<td>HIV+/HBV+ (n = 22)</td>
<td>85</td>
<td>-</td>
<td>85</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HIV−/HBV− (n = 20)</td>
<td>100</td>
<td>-</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Heart/USA (5)</td>
<td>1999–2004</td>
<td>HIV+ (n = 20)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HIV− (n = 9174)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Heart/USA (6)</td>
<td>NR</td>
<td>HIV+ (n = 18)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>63%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HIV− (unknown)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>72%</td>
</tr>
</tbody>
</table>

RESEARCH NOTE

Heart transplantation as salvage treatment of intractable infective endocarditis

- 6 HT for IE in Rennes (France), 2005-2014
  - Severe IE, but otherwise long life expectancy
  - Mean age, 45 years (range, 24-64)
  - Sepsis controlled by time of HT (per-transplant cultures sterile)
  - <2% of all HT in this site; 3.6% of patients with surgical treatment for IE

- 100% success (median follow-up, 2 years)
  
  But highly selected patients…

<table>
<thead>
<tr>
<th></th>
<th>Patient 1</th>
<th>Patient 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex, age (y)</td>
<td>Male, 24</td>
<td>Male, 55</td>
</tr>
<tr>
<td>Comorbidity</td>
<td>None</td>
<td>Smoker</td>
</tr>
<tr>
<td>Infected valve(s)</td>
<td>Aortic (native)</td>
<td>Aortic and tricuspid (native)</td>
</tr>
<tr>
<td>Microbiology</td>
<td>Methicillin-susceptible Staphylococcus aureus</td>
<td>Streptococcus pneumoniae</td>
</tr>
<tr>
<td>Antibacterial treatment for</td>
<td>Cloxacillin/gentamicin</td>
<td>Amoxicillin/gentamicin</td>
</tr>
<tr>
<td>infective endocarditis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time (d) from initiation of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IE treatment to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd cardiac surgery</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td>3rd cardiac surgery</td>
<td>Not performed</td>
<td>Not performed</td>
</tr>
<tr>
<td>HT</td>
<td>55</td>
<td>75</td>
</tr>
<tr>
<td>Explanted heart</td>
<td>Sterile</td>
<td>Sterile</td>
</tr>
<tr>
<td>Microbiology</td>
<td>Acute necrotic myocarditis</td>
<td>Multiple abscesses: interventricular septum,</td>
</tr>
<tr>
<td>Lesions</td>
<td>(multiple abscesses in left ventricle)</td>
<td>aorta, right ventricle, right atrium</td>
</tr>
<tr>
<td>Duration of IE antibacterial</td>
<td>Suppurative pericarditis</td>
<td>6 weeks after HT (mediastinitis)</td>
</tr>
<tr>
<td>treatment</td>
<td>6 weeks from admission</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2 weeks after HT)</td>
<td></td>
</tr>
<tr>
<td>Post-HT immunosuppression</td>
<td>Basiliximab</td>
<td>Thymoglobulin</td>
</tr>
<tr>
<td></td>
<td>Prednisolone</td>
<td>Prednisolone</td>
</tr>
<tr>
<td></td>
<td>Ciclosporine</td>
<td>Ciclosporine</td>
</tr>
<tr>
<td></td>
<td>Mycophenolic acid</td>
<td>Mycophenolic acid</td>
</tr>
<tr>
<td>Duration of follow-up after</td>
<td>9 years</td>
<td>3 years</td>
</tr>
<tr>
<td>HT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
HT for untractable IE: literature review (2014)

<table>
<thead>
<tr>
<th>Patient</th>
<th>Sex, age (y)</th>
<th>Cardiac lesions</th>
<th>Microbiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female, 25</td>
<td>Mitral and aortic valves, prosthetic</td>
<td>Mycoplasma hominis</td>
</tr>
<tr>
<td>2</td>
<td>Male, 31</td>
<td>Marfan syndrome, prosthetic aortic valve</td>
<td>Staphylococcus, group D, Streptococcus, group D</td>
</tr>
<tr>
<td>3</td>
<td>Male, 28</td>
<td>Aortic valve, native</td>
<td>Methicillin-resistant Staphylococcus epidermidis</td>
</tr>
<tr>
<td>4</td>
<td>Male, 58</td>
<td>Mitral valve, prosthetic, pacemaker, Bentall</td>
<td>Propionibacterium acnes</td>
</tr>
<tr>
<td>5</td>
<td>Male, 17</td>
<td>Aortic valve, prosthetic</td>
<td>Brucella melitensis</td>
</tr>
<tr>
<td>6</td>
<td>Female, 44</td>
<td>Intracardiac granuloma (vegetations), Previous HT for hypertrophic cardiomyopathy</td>
<td>Culture-negative endocarditis</td>
</tr>
<tr>
<td>7</td>
<td>Male, 31</td>
<td>Aortic valve, prosthetic</td>
<td>MRSA</td>
</tr>
</tbody>
</table>

100% survival
- Median F-U, 27.5 months
- Range 3 months - 18 years

International, multicenter, retrospective study

- Inclusion: heart transplant performed as ‘salvage’ during the acute phase of IE
- Follow-up > 3 months

Methods

- Rio, ISCVID meeting, 2015
- ICE participating sites (Mailing list)
- Standardized questionnaire derived from the ICE CRF
Results: 19 cases (1991-2017)

- 6 women, 13 men
- Median age 52 years (IQR, 41-61)

Comorbidities (n=11):
- Previous IE (n=4)
- Cardiopathy (n=4)
- Coronary Heart Disease (n=4)
- Diabetes (n=3)
- HIV, IVDU, COPD, Left ventricular assist device, Rheumatic Heart Disease (n=1)

ICE site | HT Date
--- | ---
MEDELLÍN | 12/04/1991
MADRID | 16/11/1997
CHARLESTON | 23/02/2004
BARCELONA | 03/09/2004
LYON | 03/11/2004
MADRID | 02/09/2005
PARIS | 29/04/2006
LYON | 22/07/2008
BARCELONA | 29/05/2010
MADRID | 17/07/2011

Spain, n=9
France, n=6
IE characteristics

- Mostly acute (symptoms <1 month, n=16)
- Native valve IE, n=9
- Prosthetic valve, n=10
Microbiology

- *Streptococcus oralis*, n=4
- MSSA, n=3
- MRSA, n=2
- *Enterococcus faecalis*, n=2
- *S. viridans, S. constellatus, S. mutans, Mycoplasma hominis, Haemophilus para-influenzae, Candida albicans*

NB. Two cases remained undocumented
Complications

- Heart Failure: 17
- Stroke: 5
- Systemic Emboli: 8
- Persistent Positive BC: 3
- Septic Metastasis: 4
- Perforation: 1
- Fistula: 1
- Prosthetic Valve Desinsertion: 4
- Perivalvular Abscess: 9
- Severe Regurgitation: 15
- Vegetation: 17
Cardiac surgery before HT

- 17 patients (including 2 with 2 surgeries)
- Valvular replacement

• Delay between admission and first surgery
  - Median 3 days (IQR 0-8)

• Indication(s) for HT
  - Heart failure, n=17 => 4 assistance (2 LVAD, 2 ECMO)
  - Life-threatening paravalvular lesions, n=9
Heart transplant

- Delay between 1st surgery and heart transplant
  - Median 28 days (IQR 18-71)

- Complications
  - Rejection (n=5), CMV infection (n=2),
  - Other (n=1): 2nd HT, CAD, kidney transplant, thrombotic microangiopathy
  - Death, n=6 (first month post HT, n=4; 2 and 11 years post HT)
  - 13 patients survived (68%), median F-U post HT 44 months (IQR 13-88)
Heart transplant as salvage treatment for IE: conclusions

- HT not contra-indicated, but still rarely performed
  - Rennes: IE = 3% of all indications for HT; HT = 5% of all cardiac surgery for IE
  - Barcelona: IE = 2% of HT (6/334), and HT = 1% of surgery for IE (6/478)

- Selected patients
  - Young (median, 52 years), limited comorbidities

- Usual scenario
  - Sepsis controlled
  - Life-threatening cardiac lesions, can’t be fixed by cardiac surgeons anymore

- Outcome similar to other indications for HT (65% survival 5 years ?)
Gracias!

Heart transplant for IE Project investigators

Co-coordination: J. Miro, P. Munoz, A. Moreno, C. Mestres

- Barcelona
  MT Castel
- Madrid
  P. Munoz, and ?
- Paris (Pitié, Bichat)
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- Lyon
  F. Delahaye
- Zurich
  B. Hasse
- Medelin
  N. Jamarillo
- Zagreb
  J. Vincelj
- USA
  D. Wray