Surgery for Infective Endocarditis

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Practice guidelines

Role of the surgeon

- 35-60% of IE patients eventually require surgery (early or late)
- BCS, RCP: *In haemodynamically stable patients, early consultation with a cardiac surgeon is recommended in case surgery is suddenly required*

Middlemost JACC 1991
Moon Prog Cardiovasc Dis 1997
Jubair JTCVS 1992
Vlessis Ann Thorac Surg 1996
Castillo Heart 2000
Indications

- Hemodynamic
- Infectious
- Prevention of complications

Always a patient-centered decision making process
Indication for EMERGENCY surgery

- Acute heart failure requires IMMEDIATE surgery!!!
- Mainly:
  - Acute Aortic Valve Regurgitation
  - PVE (valve dehiscence)
  - Intracardiac fistulae
  - Pre-existing severe cardiac lesions
- Class I, level B
Indications for EARLY surgery

- Fungal endocarditis (difficult to treat, high risk of embolisation)
- Macro-embolisation under adequate AB with residual vegetation present (cerebral emboli no contra-indication if IC bleeding excluded by CT immediately preop and <48-72 hrs after embolus)
Indications for EARLY surgery

• Destruction of the cardiac skeleton
  – Abscess, VSD, fistulae (Ao-RA)
  – New 3°AVB

• Persistent septic-infectious symptoms or increase in vegetation size after 7 d of adequate AB (especially for PVE)

• PVE S. aureus (?)
Relative surgical indications

=Surgery should be seriously considered

- Vegetation >1 cm esp. fragile, AML
- Early (<2 m) PVE
- New AVBlock (1°, 2°, LBBB) persisting >7d under adequate AB
- Renal failure
Relative surgical indications

- « Kissing lesions »
- Serious hemodynamic lesion, which might lead to heart failure (increase in LV diameters, wall stress, pulmonary hypertension)
Surgical principles

- Ubi pus, ibi evacua.
- Debridement+++ 
  - Culture
  - Pathology
- Extensive reconstructions
- Homografts, pericardial patches, valve reconstructions, valve replacements
Aortic valve allograft

Anterior mitral leaflet
Postoperative AB, NVE

- Perop culture - : total period of AB should be 4 or 6 weeks including preoperative adequate treatment period
- Perop culture + : 4 or 6 weeks after surgery
- Monitoring therapeutic effect
Postoperative AB, PVE

- Always 4 or 6 weeks postoperative AB
- Sometimes prolonged AB (only after multidisciplinary consult)
Outcome

GHB 2000-2004,
Hill et al, Eur Heart J 2007
Survival abscess surgery

David et al, JTCVS 2007
Reoperation free after abscess surgery

SBIMC-BVIKM 10/05/2007  David et al, JTCVS 2007
Recurrence free after abscess surgery

- 5 yr = 88 ± 3%
- 10 yr = 82 ± 4%
- 15 yr = 82 ± 4%

David et al, JTCVS 2007
Outcome – multivariable analysis

KUL 2000-2004 (n=203)
Predictors 6 month mortality

- Age
- Causative micro-organism (staphylococcal and enterococcal IE worse)
- Treatment group (perforce conservative worse)

Hill et al, Eur Heart J 2007
Outcome – multivariable analysis

New Haven 1990-2000 (n=513)
Predictors 6 month mortality

• Valve surgery adjusted HR 0.35 [0.23-0.54]
• Adjusted for:
  – Hospital site, comorbidity, congestive heart failure, microbial etiology, immunocompromised state, abnormal mental status, refractory infection.

Vikram et al, JAMA2003
Propensity scores analysis

- Propensity that a specific patient receives the specific treatment under study
- 3 ways of integration into multivariable analysis
  - Individual matching
  - Quintiles-stratification
  - Score = independent parameter
Propensity scores adjusted

HR 0.40 [0.18-0.53]

Vikram et al, JAMA2003
N=218/513 matched patients
Propensity scores adjusted

HR 0.22 [0.09-0.53]

Vikram et al, JAMA2003
N=218/513 matched patients
Table 5. Multivariate analysis of survival of the 102 patients with infective endocarditis (IE) within the matched cohort.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>$\chi^2$ test score</th>
<th>Hazard ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery</td>
<td>13.01</td>
<td>0.27 (0.13–0.55)</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>19.80</td>
<td>4.81 (2.41–9.62)</td>
</tr>
<tr>
<td>Chronic indwelling central catheter</td>
<td>7.43</td>
<td>2.65 (1.31–5.33)</td>
</tr>
<tr>
<td>Paravalvular complications</td>
<td>4.43</td>
<td>2.16 (1.06–4.44)</td>
</tr>
</tbody>
</table>

Aksoy et al, CID 2007
N=102/426 matched patients
Propensity scores adjusted

The Impact of Valve Surgery on 6-Month Mortality in Left-Sided Infective Endocarditis
Imad M. Tleyjeh, et al

Conclusions—The results of our study suggest that valve surgery in left-sided infective endocarditis is not associated with a survival benefit and could be associated with increased 6-month mortality, even after adjustment for selection and survivor biases as well as confounders. Given the disparity between the results of our study and those of other observational studies, well-designed prospective studies are needed to further evaluate the role of valve surgery in endocarditis management. (Circulation. 2007;115:1721-1728.)
Comments:
- N=186/546
- 1980-1998
- Very high operative mortality (27% in entire group, half within 7d) is the reason for worse survival. After removal of early mortality effect by partitioning, HR 0.92 [0.48-1.76]
Propensity scores adjusted

Cabell et al, Am Heart J 2005
N=1516, quintiles
Propensity scores adjusted

Table IV. Important characteristics of patients with native valve IE by propensity group

<table>
<thead>
<tr>
<th>Propensity group</th>
<th>1 (n = 299)</th>
<th>2 (n = 300)</th>
<th>3 (n = 299)</th>
<th>4 (n = 300)</th>
<th>5 (n = 299)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>47.5</td>
<td>33.7</td>
<td>35.5</td>
<td>25.0</td>
<td>20.1</td>
</tr>
<tr>
<td>S. aureus</td>
<td>31.4</td>
<td>20.0</td>
<td>27.1</td>
<td>24.3</td>
<td>16.1</td>
</tr>
<tr>
<td>Coagulase-negative staphylococci</td>
<td>2.7</td>
<td>5.0</td>
<td>5.0</td>
<td>9.0</td>
<td>12.4</td>
</tr>
<tr>
<td>Viridans group streptococci</td>
<td>39.1</td>
<td>34.3</td>
<td>23.1</td>
<td>21.0</td>
<td>23.4</td>
</tr>
<tr>
<td>AV vegetation</td>
<td>10.0</td>
<td>20.0</td>
<td>26.8</td>
<td>31.7</td>
<td>52.2</td>
</tr>
<tr>
<td>MV vegetation</td>
<td>32.4</td>
<td>33.0</td>
<td>38.5</td>
<td>37.0</td>
<td>26.8</td>
</tr>
<tr>
<td>TV vegetation</td>
<td>10.4</td>
<td>5.0</td>
<td>5.7</td>
<td>4.3</td>
<td>1.7</td>
</tr>
<tr>
<td>CHF</td>
<td>0.7</td>
<td>12.0</td>
<td>36.5</td>
<td>68.0</td>
<td>73.6</td>
</tr>
<tr>
<td>Abscess</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>6.0</td>
<td>43.1</td>
</tr>
<tr>
<td>Embolization, systemic</td>
<td>31.8</td>
<td>31.3</td>
<td>37.5</td>
<td>36.3</td>
<td>30.1</td>
</tr>
</tbody>
</table>

Values are presented as percentages. AV, Aortic valve; MV, mitral valve; TV, tricuspid valve; CNS, central nervous system.
ICU endocarditis

- Surgical intervention better
- multivariate sign
  - Surgery OR 0.465
  - Shock
  - Cerebral embolism
  - Immunosuppressive therapy

Mourvillier Intensive Care Med 2004
N=228 consecutive patients
Thanks

• Multidisciplinary working group on endocarditis
  – E. Hill
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