Indications and optimal timing for surgery in infective endocarditis

F Delahaye, M Célard, O Roth, G de Gevigney


More and more patients are operated on during the active phase of infective endocarditis (IE).1 Between 1991 and 1999, in France, the rate of cardiac surgery has increased from 31% to 50%. This may, at least in part, explain the concomitant decrease of in hospital mortality, from 22% to 17%.2 Nonetheless, the indications for cardiac surgery and its optimal timing remain difficult decisions.

The principal indications for cardiac surgery are heart failure, no control of infection, embolisms, large size of vegetations, severe valvar and perivalvar lesions, and infection caused by some microorganisms.

INDICATIONS FOR CARDIAC SURGERY

Heart failure

If heart failure is present, the mortality rate of native valve infective endocarditis is 55–85% in the case of medical treatment only and 10–35% in operated patients.2

The first indication for cardiac surgery in infective endocarditis is heart failure: it represents more than half of the indications. Heart failure caused by aortic regurgitation is particularly poorly tolerated (heart failure is better tolerated in the case of mitral regurgitation because the left atrium and the pulmonary vascular bed adapt better than the left ventricle to the regurgitant volume), and it progresses faster, thus needing rapid surgery.

Not only does heart failure increase the mortality rate if there is no surgery, but it also increases the perioperative mortality rate: from 5–10% in patients without heart failure to 15–35% in patients with heart failure. Moreover, delaying surgery increases the risk of perivalvar infection.

No control of infection

The first step is to make sure that there is no extracardiac infectious location. If there is no such extracardiac location, cardiac surgery should be performed if the course of fever and inflammatory syndrome is unfavourable after one week of appropriate antibiotic treatment.

Vegetations and embolic risk

The literature on this topic contrasts greatly. The embolism rate varies from 10–50% in different series.3 Three quarters of embolisms occur before the beginning of antibiotic treatment.4 The embolic risk decreases greatly and regularly over time, from 15% after one week of treatment to 1% after four weeks of treatment.5 In mitral infective endocarditis, embolisms look to be more frequent if vegetations are located on the anterior leaflet than on the posterior leaflet.6 Embolisms should always be looked for not only by clinical means but also by systematic scanners (for example, cerebral, thoraco-abdominal), searching for clinically silent embolisms, especially in spleen and kidneys.

Rapid surgery must be performed when there has been an embolic episode and when large and mobile vegetations remain. When there are large and/or mobile vegetations but no embolic event, the medical community is divided. The decision is easier in the case of mitral infective endocarditis when valve repair looks possible, or when there are other arguments for surgery (heart failure, no control of infection, severe valvar and perivalvar lesions, etc).

Perivalvar infection

Infective endocarditis on the aortic valve and prosthetic infective endocarditis are those most commonly associated with perivalvar infection, such as abscesses and intracardiac fistula: 10–40% of aortic valve infective endocarditis and 45–100% of prosthetic infective endocarditis.6 Occurrence and persistence of conduction disturbances are not very sensitive indicators of perivalvar infection, but they look very specific (85%–90%).4

Rapid surgery is recommended in most cases since the perioperative risk increases with the delay to surgery.4,6 However, in large aortic abscesses, a large resection exposes the patient to the risk of postoperative complete atrioventricular block.

Valvar obstruction

Valvar obstruction is an obvious indication for urgent surgery.

Unstable prosthesis

Dehiscence of an infected prosthesis means that there is perivalvar infection, and haemodynamic deterioration usually occurs quickly. Thus rapid surgery is recommended.2

Prosthetic infective endocarditis

In early prosthetic infective endocarditis (<12 months after valve replacement), most often the microorganism is a Staphylococcus and lesions are severe (abscess, prosthesis dehiscence).7,8 Redo surgery is associated with a lower mortality rate than medical treatment alone, and it is most often necessary, although it may be technically difficult.10

The mortality rate of prosthetic infective endocarditis caused by Staphylococcus aureus is about 75% in the case of medical treatment and 25% in the case of medical + surgical treatment.9 In a multivariate analysis in a study including 33 patients, the risk of death was 14 times higher if there was an intracardiac complication, and it was 20 times lower in operated patients than in non-operated patients.11 Surgery is thus recommended in prosthetic infective endocarditis caused by S aureus when there is an intracardiac complication.

Medical treatment only may be sufficient in cases of late infective endocarditis caused by some microorganisms (oral streptococci, organisms from the HACEK group—Haemophilus species, Actinobacillus actinomycetemcomitans, Actinomyces...)
Cardiobacterium hominis, Eikenella corrodens, and Kingella kingae), if there are no signs of perivalvar infection.13

Fungal infective endocarditis
Infective endocarditis caused by Candida or Aspergillus is often complicated with very large vegetations, infectious metastases, perivalvar infection, and embolisms.14 Amphotericin B poorly penetrates into vegetations. Rapid surgery is thus most often needed.

Difficult-to-treat microorganisms
Surgery is almost always needed in infective endocarditis caused by certain Gram negative bacilli (for example, Pseudomonas aeruginosa, Achromobacter xylotoxans), by Brucella, or by highly resistant enterococci.

Neurological complications
The rate of neurological complications varies from 15% to 45% in different series.3,4 They mostly are ischaemic cerebral vascular accidents, but also cerebral haemorrhages, ruptured mycotic aneurysms, meningitis, and encephalopathy.

A cerebral scan must always be performed in infective endocarditis, to look for silent cerebral vascular accidents. In the case of cerebral haemorrhage, an arteriography or an angio-magnetic resonance image must be performed, to look for silent cerebral vascular accidents. In this case, there must be close collaboration between the physician, the cardiac surgeon, and the microbiologist.

Timing of cardiac surgery
Classically, early surgery was considered to be a greater risk than delayed surgery because of tissue inflammation and the surgery was technically more difficult. In fact, the duration of antibiotic treatment before surgery does not appear to influence the perioperative mortality, nor the rate of recurrent infective endocarditis.2,10,16

Surgery should be rapid in the case of haemodynamic deterioration, where there is no control of infection, or there are large and mobile vegetations. Decision as to the timing of surgery is particularly difficult when there is a neurological complication.

**CONCLUSION**
Table 1 presents a summary of the indications for surgery and its timing, as proposed recently by Olaison and Pettersson.2

Indications for surgery and its timing are difficult decisions to reach. The patient must be followed up closely (clinical examinations once or twice a day, regular scans, and transthoracic and transoesophageal echocardiography). There must be close collaboration between the physician, the cardiac surgeon, and the microbiologist.

**Authors’ affiliations**
F Delahaye, M Célard, O Roth, G de Grevigné, Hôpital cardiovasculaire et pneumologique, Lyon, France
Correspondence to: Professor Francois Delahaye, Hôpital cardiovasculaire et pneumologique, BP Lyon Montchat, 69394—Lyon Cedex 03, France; francois.delahaye @ chu-lyon.fr

**REFERENCES**
Mitral and tricuspid valve thrombus in antiphospholipid syndrome

A 58 year old woman with a one year history of antiphospholipid syndrome and ineffective anticoagulant treatment (international normalised ratio 1.2) was admitted with pain in the left hypochondrium. Abdominal ultrasound revealed a 5 cm wide splenic infarction. Transoesophageal echocardiography showed mobile masses resembling bunches of grapes on both the mitral and the tricuspid valves (panels A and B, and video 1—to view video footage go to http://www.heartjnl.com/supplemental). On control transoesophageal echocardiography after six weeks of effective anticoagulation, these masses almost entirely disappeared from both valves (panel C and video 2). The patient showed no signs or symptoms of embolism during the same period.

Video footage appears on the Heart website—http://www.heartjnl.com/supplemental

J Tomcsányi, A Zsoldos, M Szabó
tomcsanyi.janos@axelero.hu

 doi: 10.1136/hrt.2003.017434
Indications and optimal timing for surgery in infective endocarditis

F Delahaye, M Célard, O Roth and G de Gevigney

*Heart* 2004 90: 618-620
doi: 10.1136/hrt.2003.029967

Updated information and services can be found at:
http://heart.bmj.com/content/90/6/618

These include:

**References**
This article cites 14 articles, 1 of which you can access for free at:
http://heart.bmj.com/content/90/6/618#BIBL

**Email alerting service**
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

**Topic Collections**
Articles on similar topics can be found in the following collections

- Drugs: cardiovascular system (8839)
- Interventionsal cardiology (2932)
- Epidemiology (3768)
- Aortic valve disease (414)
- Mitral valve disease (229)

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/