Convegno Internazionale

GIORNATE INFETTIVOLOGICHE "LUIGI SACCO" 2019

MILANO, 28-29 MAGGIO 2019

OSPEDALE LUIGI SACCO POLO UNIVERSITARIO – ASST FATEBENEFRATELLI SACCO

AULA MAGNA POLO LITA

ENDOCARDITE INFETTIVA
Terapia chirurgica

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The primary objectives of surgery are :

- TOTAL removal of infected tissues, foreign materials
- clear and debride paravalvular infection and cavities
- to completely restore cardiac integrity (reconstruction of cardiac morphology, including repair or replacement of the affected valve(s))
- removal of sources of embolism

What does the surgeon need to know?

-The patient should be on an effective antimicrobial therapy (or be broadly covered if organism and sensitivity are unknown)

- for better surgery planning, advanced imaging techniques are usually required (i.e. TEE)

- other imaging modalities may be appropriate in selected cases

Preoperative and perioperative management

- Echocardiography (TTE w/o TEE)

-Coronary angiography (?)

- Detection of extracardiac infective sites (CT-scan, MR...)

European Heart Journal Advance Access published August 29, 2015

European Heart Journal
doi:10.1093/eurheartj/ehv319

ESC GUIDELINES

2015 ESC Guidelines for the management of infective endocarditis

The Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC)

Endorsed by: European Association for Cardio-Thoracic Surgery (EACTS), the European Association of Nuclear Medicine (EANM)

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Table 22 Indications and timing of surgery in left-sided valve infective endocarditis (native valve endocarditis and prosthetic valve endocarditis)

Indications for surgery	Timing[a]	Class[b]	Level[c]	Ref.[d]
1. Heart failure				
Aortic or mitral NVE or PVE with severe acute regurgitation, obstruction or fistula causing refractory pulmonary oedema or cardiogenic shock	Emergency	I	B	111,115, 213,216
Aortic or mitral NVE or PVE with severe regurgitation or obstruction causing symptoms of HF or echocardiographic signs of poor haemodynamic tolerance	Urgent	I	B	37,115, 209,216, 220,221
2. Uncontrolled infection				
Locally uncontrolled infection (abscess, false aneurysm, fistula, enlarging vegetation)	Urgent	I	B	37,209, 216
Infection caused by fungi or multiresistant organisms	Urgent/ elective	I	C	
Persisting positive blood cultures despite appropriate antibiotic therapy and adequate control of septic metastatic foci	Urgent	IIa	B	123
PVE caused by staphylococci or non-HACEK gram-negative bacteria	Urgent/ elective	IIa	C	
3. Prevention of embolism				
Aortic or mitral NVE or PVE with persistent vegetations >10 mm after one or more embolic episode despite appropriate antibiotic therapy	Urgent	I	B	9,58,72, 113,222
Aortic or mitral NVE with vegetations >10 mm, associated with severe valve stenosis or regurgitation, and low operative risk	Urgent	IIa	B	9
Aortic or mitral NVE or PVE with isolated very large vegetations (>30 mm)	Urgent	IIa	B	113
Aortic or mitral NVE or PVE with isolated large vegetations (>15 mm) and no other indication for surgery[e]	Urgent	IIb	C	

HACEK = *Haemophilus parainfluenzae, Haemophilus aphrophilus, Haemophilus paraphrophilus, Haemophilus influenzae, Actinobacillus actinomycetemcomitans, Cardiobacterium hominis, Eikenella corrodens, Kingella kingae* and *Kingella denitrificans*; HF = heart failure; IE = infective endocarditis; NVE = native valve endocarditis; PVE = prosthetic valve endocarditis.
[a]Emergency surgery: surgery performed within 24 h; urgent surgery: within a few days; elective surgery: after at least 1–2 weeks of antibiotic therapy.

Table 26 Indications for surgical treatment of right-sided infective endocarditis

Recommendation	Class[a]	Level[b]
Surgical treatment should be considered in the following scenarios: • Microorganisms difficult to eradicate (e.g. persistent fungi) or bacteraemia for > 7 days (e.g. *S. aureus*, *P. aeruginosa*) despite adequate antimicrobial therapy or • Persistent tricuspid valve vegetations > 20 mm after recurrent pulmonary emboli with or without concomitant right heart failure or • Right HF secondary to severe tricuspid regurgitation with poor response to diuretic therapy	IIa	C

HF = heart failure.
[a]Class of recommendation.
[b]Level of evidence.

AHA/ACC GUIDELINE

2017 AHA/ACC Focused Update of the 2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease

A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

Circulation. 2017;135:e1159–e1195. DOI: 10.1161/CIR.0000000000000503

Class I

1. Decisions about timing of surgical intervention should be made by a multispecialty Heart Valve Team of cardiology, cardiothoracic surgery, and infectious disease specialists. *(Level of Evidence: B)*

2. Early surgery (during initial hospitalization before completion of a full therapeutic course of antibiotics) is indicated in patients with IE who present with valve dysfunction resulting in symptoms of HF. *(Level of Evidence: B)*

3. Early surgery (during initial hospitalization before completion of a full therapeutic course of antibiotics) is indicated in patients with left-sided IE caused by S. aureus, fungal, or other highly resistant organisms. *(Level of Evidence: B)*

4. Early surgery (during initial hospitalization before completion of a full therapeutic course of antibiotics) is indicated in patients with IE complicated by heart block, annular or aortic abscess, or destructive penetrating lesions. *(Level of Evidence: B)*

5. Early surgery (during initial hospitalization before completion of a full therapeutic course of antibiotics) for IE is indicated in patients with evidence of persistent infection as manifested by persistent bacteremia or fevers lasting longer than 5 to 7 days after onset of appropriate antimicrobial therapy. *(Level of Evidence: B)*

6. Surgery is recommended for patients with PVE and relapsing infection (defined as recurrence of bacteremia after a complete course of appropriate antibiotics and subsequently negative blood cultures) without other identifiable source for portal of infection. *(Level of Evidence: C)*

7. Complete removal of pacemaker or defibrillator systems, including all leads and the generator, is indicated as part of the early management plan in patients with IE with documented infection of the device or leads. *(Level of Evidence: B)*

Class IIa

1. Complete removal of pacemaker or defibrillator systems, including all leads and the generator, is reasonable in patients with valvular IE caused by S. aureus or fungi, even without evidence of device or lead infection. *(Level of Evidence: B)*

2. Complete removal of pacemaker or defibrillator systems, including all leads and the generator, is reasonable in patients undergoing valve surgery for valvular IE. *(Level of Evidence: C)*

3. Early surgery (during initial hospitalization before completion of a full therapeutic course of antibiotics) is reasonable in patients with IE who present with recurrent emboli and persistent vegetations despite appropriate antibiotic therapy. *(Level of Evidence: B)*

Class IIb

1. Early surgery (during initial hospitalization before completion of a full therapeutic course of antibiotics) may be considered in patients with NVE who exhibit mobile vegetations greater than 10 mm in length (with or without clinical evidence of embolic phenomenon). *(Level of Evidence: B)*

AHA/ACC guidelines: what is NEW?

Recommendations for IE Intervention (Continued)

COR	LOE	Recommendations	Comment/Rationale
IIb	B-NR	Operation without delay may be considered in patients with IE and an indication for surgery who have suffered a stroke but have no evidence of intracranial hemorrhage or extensive neurological damage.[284,285]	**NEW:** The risk of postoperative neurological deterioration is low after a cerebral event that has not resulted in extensive neurological damage or intracranial hemorrhage. If surgery is required after a neurological event, recent data favor early surgery for better overall outcomes.
See Online Data Supplement 24 (Updated From 2014 VHD Guideline)			
Stroke is an independent risk factor for postoperative death in IE patients. Recommendations about the timing of operative intervention after a stroke in the setting of IE are hindered by the lack of RCTs and reliance on single-center experiences. In early observational data, there was a significantly decreased risk of in-hospital death when surgery was performed >4 weeks after stroke.[284] These data were not risk adjusted. In an observational study that did adjust for factors such as age, paravalvular abscess, and HF, the risk of in-hospital death was not significantly higher in the group who underwent surgery within 1 week of a stroke than in patients who underwent surgery ≥8 days after a stroke.[285]			
IIb	B-NR	Delaying valve surgery for at least 4 weeks may be considered for patients with IE and major ischemic stroke or intracranial hemorrhage if the patient is hemodynamically stable.[286]	**NEW:** In patients with extensive neurological damage or intracranial hemorrhage, cardiac surgery carries a high risk of death if performed within 4 weeks of a hemorrhagic stroke.
See Online Data Supplement 24 (Updated From 2014 VHD Guideline)			
Patients with hemorrhagic stroke and IE have a prohibitively high surgical risk for at least 4 weeks after the hemorrhagic event. One multicenter observational study[286] showed wide variation in patient deaths when those who underwent surgery within 4 weeks of a hemorrhagic stroke were compared with those whose surgery was delayed until after 4 weeks (75% versus 40%, respectively). The percentage of new bleeds postoperatively was 50% in patients whose surgery was performed in the first 2 weeks, 33% in patients whose surgery was performed in the third week, and 20% in patients whose surgery was performed at least 21 days after the neurological event.[286]			

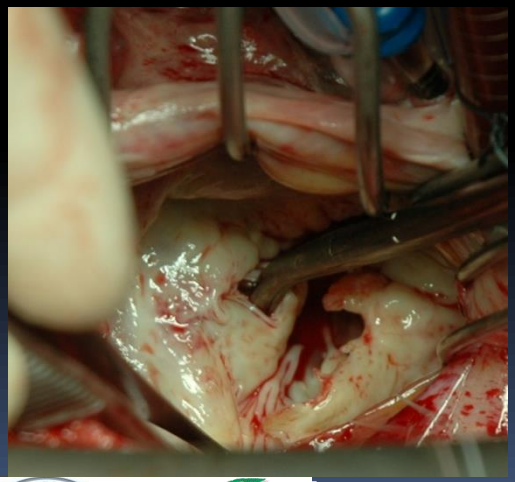
AATS guidelines 2016

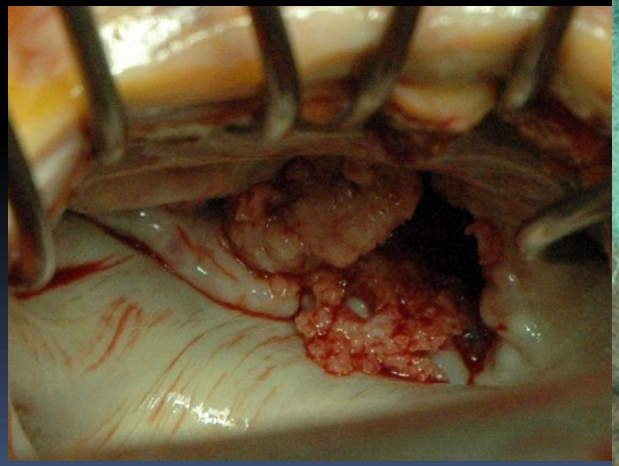
1. What are the indications for surgery in patients with IE?		
Surgery during initial hospitalization independently of the completion of a full therapeutic course of antibiotics is indicated in patients with IE who present with valve dysfunction resulting in symptoms of heart failure	I	B
Surgery during initial hospitalization independently of the completion of a full therapeutic course of antibiotics is indicated in patients with left-sided IE caused by *S. aureus*, fungal, or other highly resistant microorganisms	I	B
Surgery during initial hospitalization independently of completion of a full therapeutic course of antibiotics is indicated in patients with IE complicated by heart block, annular or aortic abscess, or destructive penetrating lesions	I	B
Surgery during initial hospitalization independently of the completion of a full therapeutic course of antibiotics for IE is indicated in patients with evidence of persistent infection as manifested by persistent bacteremia or fever lasting longer than 5 to 7 days after initiation of appropriate antimicrobial therapy	I	B
Surgery is recommended for patients with PVE and relapsing infection (defined as recurrence of bacteremia after a complete course of appropriate antibiotics and subsequently negative blood cultures) without other identifiable source for portal of infection	IIa	C
Surgery during initial hospitalization independently of the completion of a full therapeutic course of antibiotics is reasonable in patients with IE who present with recurrent emboli and persistent vegetations despite appropriate antibiotic therapy	IIa	B
Urgent or even emergency surgery may be considered in patients with NVE or PVE who exhibit mobile vegetations greater than 10 mm in length with clinical evidence of embolic phenomena despite appropriate antimicrobial treatment	IIb	B
In patients with right-sided IE in addition to symptomatic severe valve dysfunction, surgery should be considered for NVE or PVE when large vegetations are present and there is evidence of persistent infection manifested by persistent bacteremia or fevers lasting longer than 5 to 7 days after initiation of appropriate antimicrobial therapy, or in those with evidence of septic pulmonary embolism	IIb	B

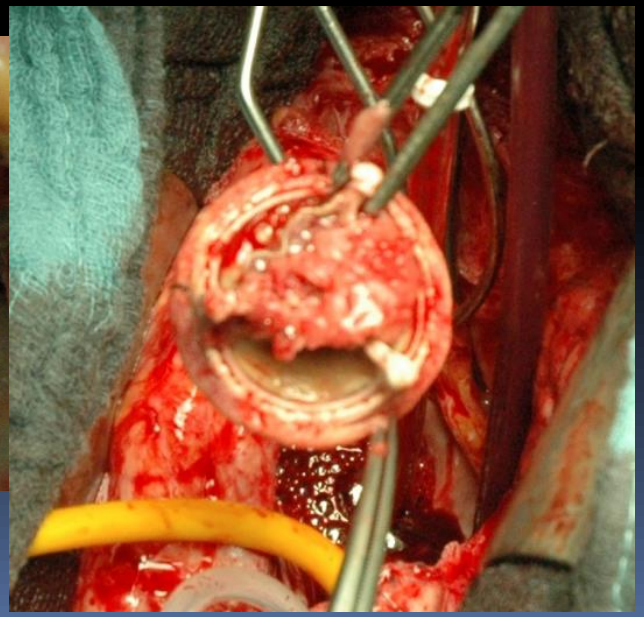
ENDOCARDITIS

Native valve

Prosthetic valve







Aortic valve

- infection limited to valvular cusps:
  -> valvular repair, if possible
  -> complete valvulectomy + replacement with biological or
  mechanical prosthesis or
  homograft or
  pulmonary autograft

- aortic annulus involvement
  -> complete valvulectomy + necrotic/inflamed area resection
  -> closure of the substance defect with patch: fresh autologous pericardium
  (for smaller defects)
  treated bovine pericardium
  (for larger defects)
  dacron
  homograft
  pulmonary autograft
  -> prosthesis implantation

- abscesses/fistulas
  -> total eradication of infected tissues
  -> aortic root replacement in toto
  -> patch reconstruction of the surrounding cardiac structures: interventricular septum, left atrial roof, central fibrosous body, right atrium, pulmonary artery
  -> coronary ostia repair
  -> prosthesis implantation

Caso clinico: ri-riparazione valvolare aortica

ascesso dentale -> EB da Streptococco Milleri e Escherichia Coli
-> IAo severa, IM moderata

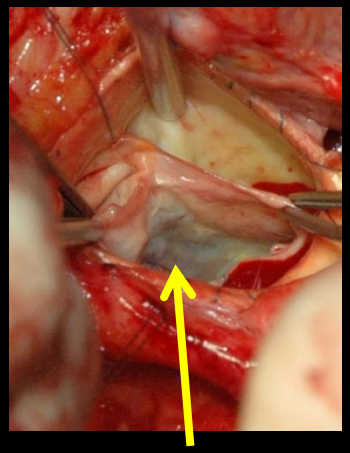
Antibiotico-terapia + CCH:

- asportazione tessuto endocarditico da LNC e LCD -> riparazione con patch di pericardio autologo;
- shaving e plicatura del margine libero del LCD;
- anuloplastica parziale sub-commissurale;
- riparazione valvolare mitralica (accorciamento cordale su A2+ anuloplastica)

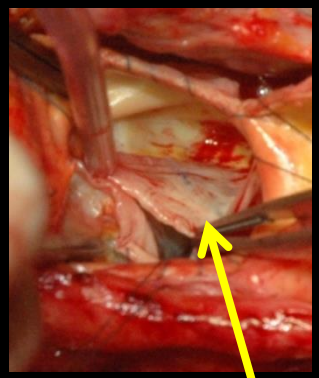
Assenza di rigurgito mitralico residuo; IAo moderata eccentrica –>
risultato accettato in considerazione della patologia di base
e della complessità del caso

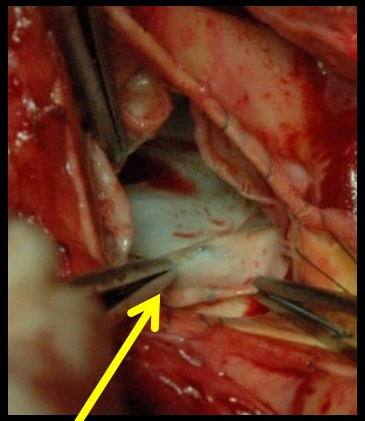
Stabilità al follow-up fino al 7° anno; dopo 8 anni comparsa di
IAo severa eccentrica, CL=0.38 -> re-intervento

...dopo 7 anni

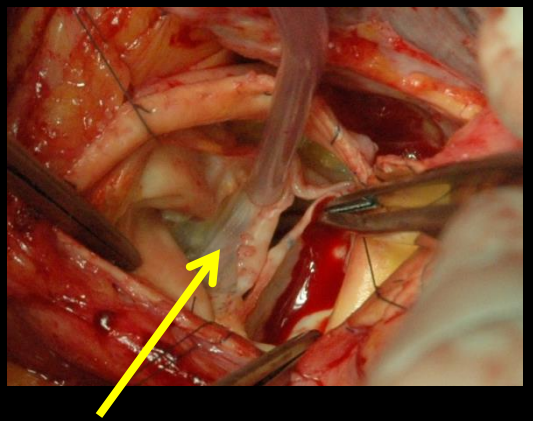


Anuloplastica subcommissurale



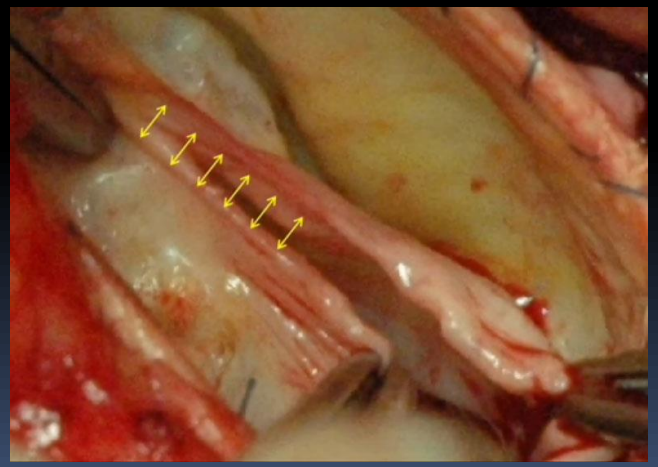


Patch in pericardio



Shaving e plicatura del margine libero

Coaptazione asimmetrica tra LNC e LCD, determinata dal posizionamento del punto per l'anuloplastica non parallelo alla base del triangolo subcommissurale



Buona qualità dei tessuti,
non calcificazioni né retrazioni

Ri-riparazione valvolare aortica:
• shaving del margine libero del LCD
• anuloplastica subcommissurale tra LNC e LCD
• rinforzo del margine libero
• plicatura della giunzione sino-tubulare (SNC)

CL=0.78, IAo residua trivial

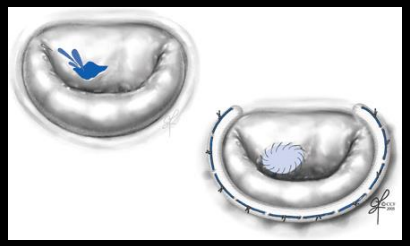
Mitral valve

Sistematic approach:

- minimize cardiac manipulation before aortic cross-clamp
- accurate valve analysis to detect and verify the extension of the infective lesions
- radical excision of the necrotic/infected tissue
- aortic valve inspection also, to rule out an eventual aortic involvement of the endocarditic process (secondary lesions)
- Mitral valve repair is preferred,if possible; the role of the ring implantation is yet controversial

Mitral Anterior Leaflet

- infected tissue excission and repair with fresh autologous pericardium

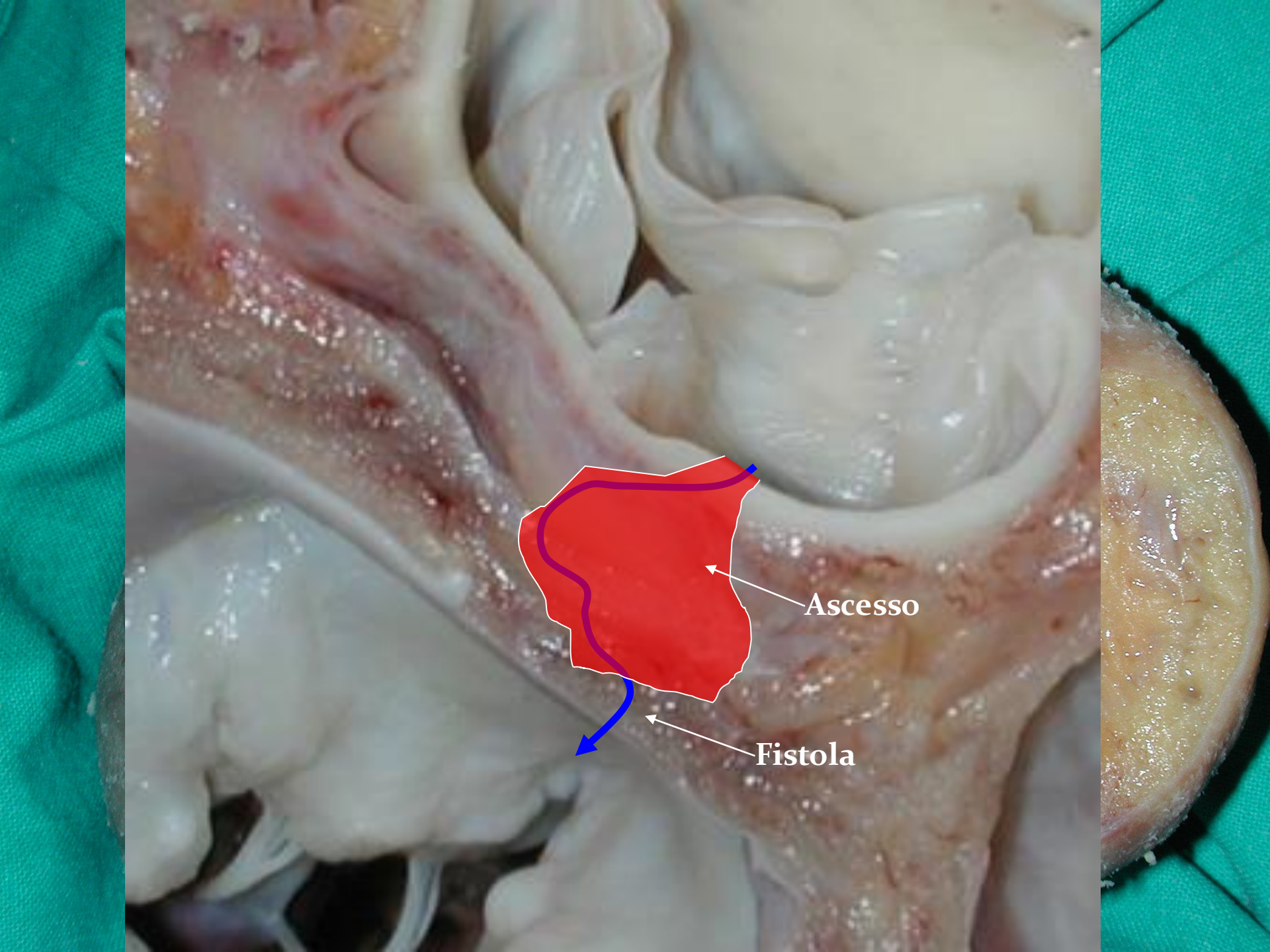


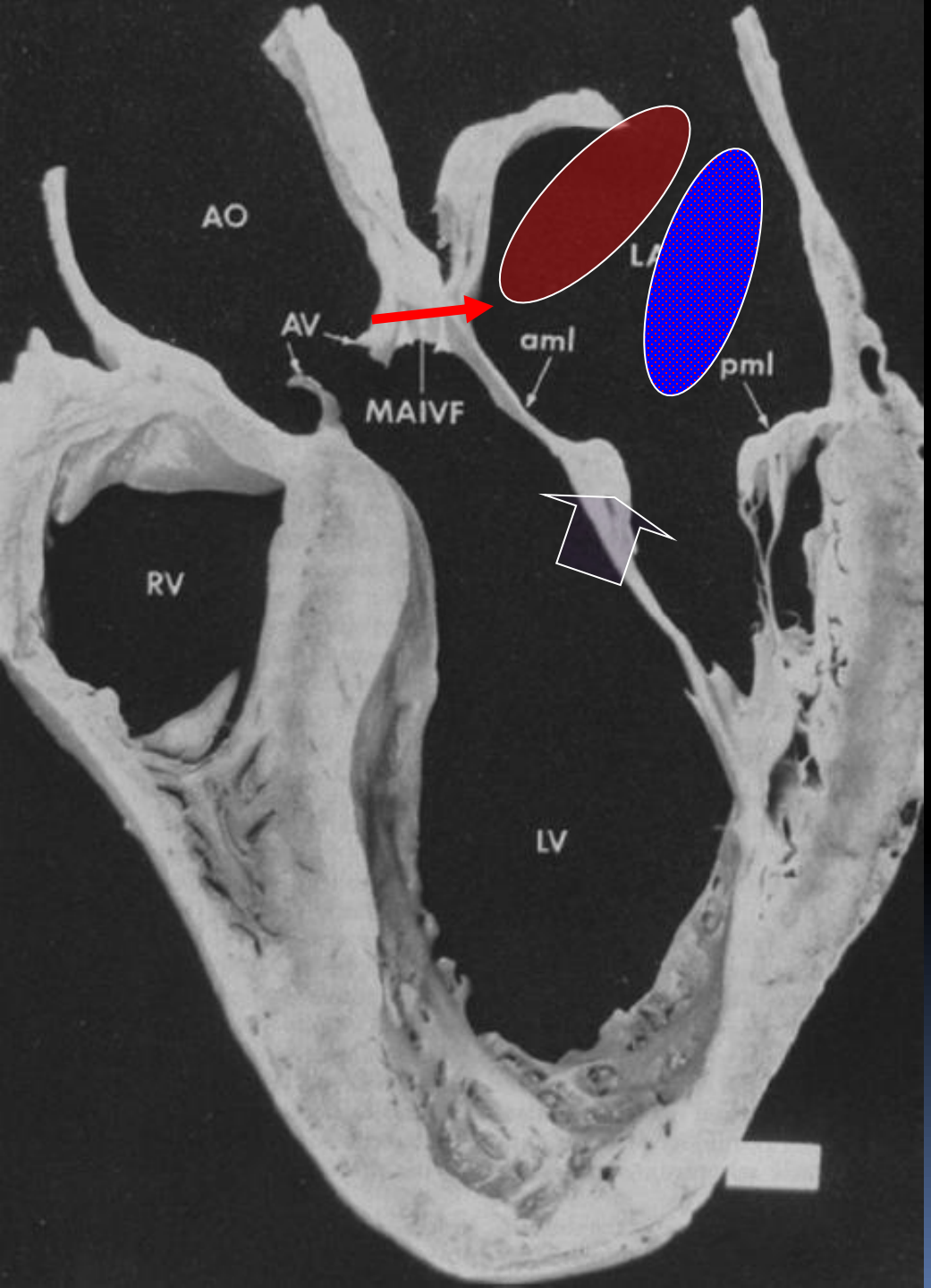
- if aortic valve and LAM involvement -> aortic root homograft (mitro-aortic curtain for LAM reconstruction)

- Mitral valve detachment from the fibrous skeleton -> valve resuspension to the mitral apparatus through detached stitches

- LAM free margin involvement -> triangular resection and detached stitches suture

- cordal rupture-> cordal transposition from LPM, II-order cordal translocation, artificial chordae implantation

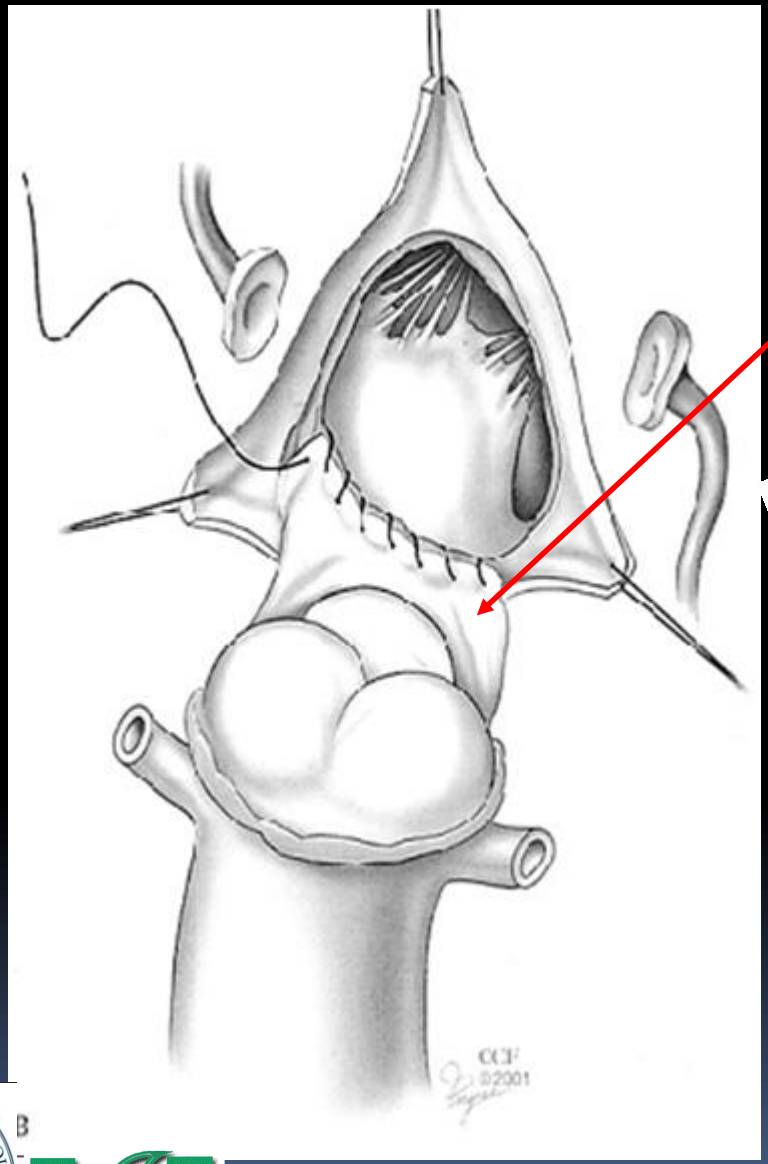

Ascesso
Fistola



ANESTHESIA & ANALGESIA

Il Jet di rigurgito della fistola Aorto-atriale può essere confuso con un jet da IM

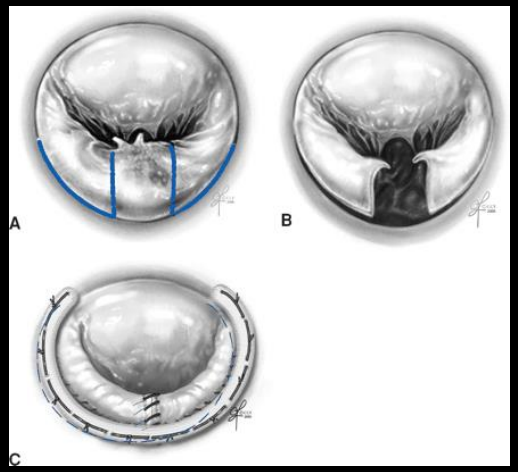
If there was an abscess at the mitral-aortic intervalvular fibrosa, the anterior leaflet of the allograft mitral valve was sutured to the native anterior leaflet to exclude the abscess cavity. Antibiotics were used from the time of diagnosis for at least 8 weeks postoperative. Patients with fungal infections were placed on lifelong oral antifungals.



Lembo Anteriore Mitralico

Mitral Posterior Lealflet

• Chordal rupture of P2 -> quadrangular resection
+ P1-P3 sliding plasty eventually



•If necessary, posterior annulus plication or positioning ofcompressive suture
• Large posterior anulus involvement -> reconstruction with fresh autologous pericardium

Commissures

• Prolapsing area resection and reconstruction with a sliding plasty

Surgery Today (2018) 48:899–908
https://doi.org/10.1007/s00595-018-1637-8

Controversial use of artificial materials

- to some authors ALL artificial and prosthetic materials should be avoided to prevent recurrence of IE:
  - chordal transfer must be preferred over artificial chordae
  -autologous rather than treated pericardium;
  - "NO RING POLICY": annuloplasty performed via stitch or autologous pericardial strip.

- Ring annuloplasty in 80% of cases:
  - complete ring (32%), often a semi-rigid to preserve the mitral physiological shaddle-shape
  - posterior band (23%)

NO STATISTICALLY DIFFERENCE IN THE IE RECURRENCE RATE!

Tricuspid valve

- **Valvulectomy wht**
- **replacement**:

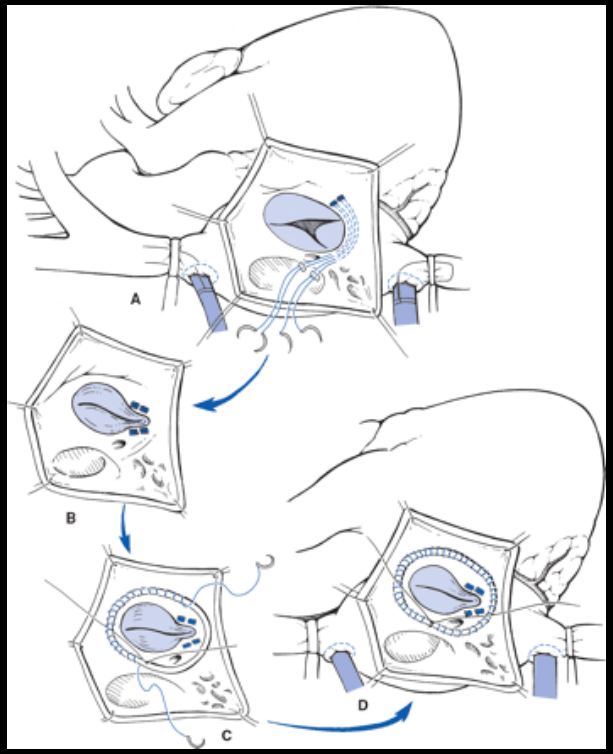
➢Rapid procedure
➢Freedom from reinfection

➢ Tricuspid valve regurgitation
➢ right chambers dilation
➢ Pulmonary hypertension, right heart failure

Now an abandoned technique, or used in a "staged-procedure":
Valvulectomy -> valvular replacement after some time passed

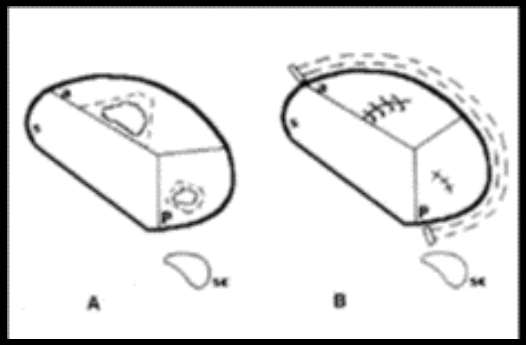
- **Valvular replacement**

- **Valvular repair:** asportation of infective vegetations
leaflet resection-> "bicuspidalization"
leaflet reconstruction

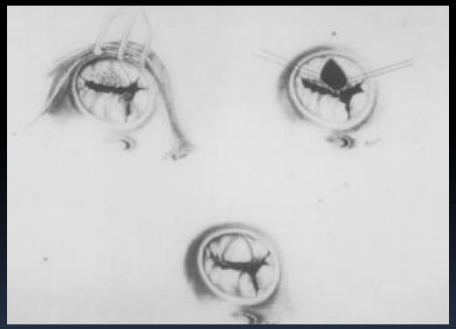


Bicuspidalization of the tricuspid valve
Through a plication of the anulus at the level of the posterior leaflet tramit

Direct suture



Autologous pericardial patch



PVE: some numbers

1-6% pts after cardiac valve replacement

Incidence : 0.3-1.2% pts/year

Incidence of mechanical and biological prosthesis is quite the same in 5 years: 5.6%

but

Higher risk in mechanical prosthesis in the first three months after surgery

Changes in time

Heart ONLINE

VALVE DISEASE: Prosthetic valve endocarditis

C Piper, R Körfer and D Horstkotte

Heart 2001;85;590-593
doi:10.1136/heart.85.5.590

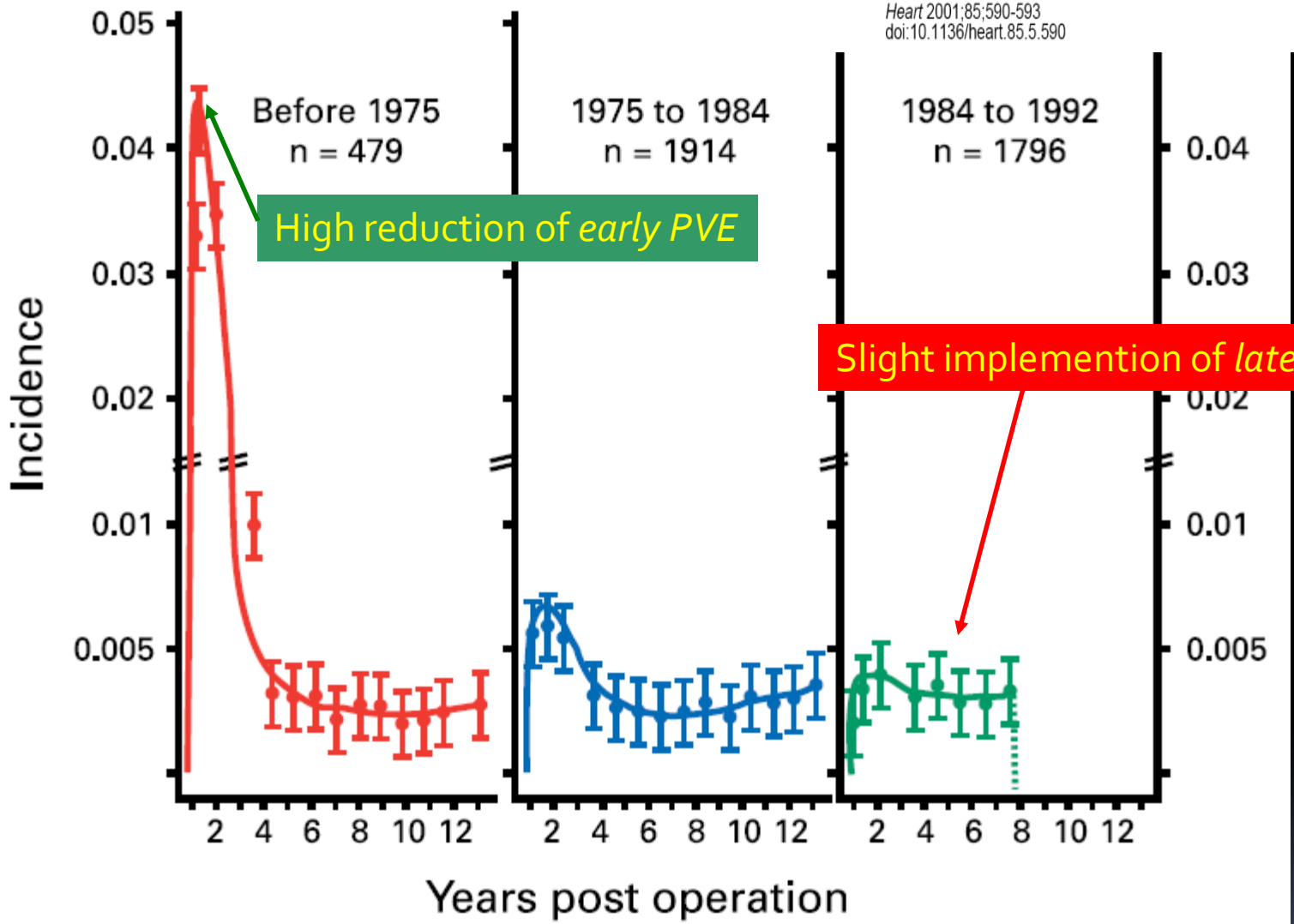


Figure 1. Hazard functions for prosthetic valve endocarditis in 4189 consecutive patients during three successive follow up periods.

Definition, pathogenesis, and microbiology of prosthetic valve endocarditis (PVE)

- Microbial infection of parts of a prosthetic valve or reconstructed native heart valve
- Early PVE is usually acquired perioperatively (nosocomial)
- Late PVE is mostly community acquired
- Time cut off point between early and late PVE should be one year (notable differences in microbiology)
- The risk of early PVE is higher (approximately 5%) in patients with replacement surgery during active infective endocarditis
- Mechanical prosthesis infections originate from the sewing cuff or from nearby located thrombi → periprosthetic leaks, ring abscesses, invasion of adjacent tissue
- Bioprosthesis infections mostly are restricted to the cusps → secondary bioprosthetic failure
- Staphylococci (especially novobiocin susceptible, coagulase negative staphylococci), bacteria of the HACEK group, and fungi occur more frequently in PVE
- Streptococci and enterococci are found more frequently in native valve endocarditis

Heart ONLINE

VALVE DISEASE: Prosthetic valve endocarditis

C Piper, R Körfer and D Horstkotte

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→ Definition

→ 2 different entity with different etio-pathogenesis, different mortality and different surgical approach

→ < 1 year : early PVE
> 1 year: late PVE

→ 5% early PVE risk if NVE

→ Difference between biological and mechanical prosthesis

Locus of Higher bacterial adesivity

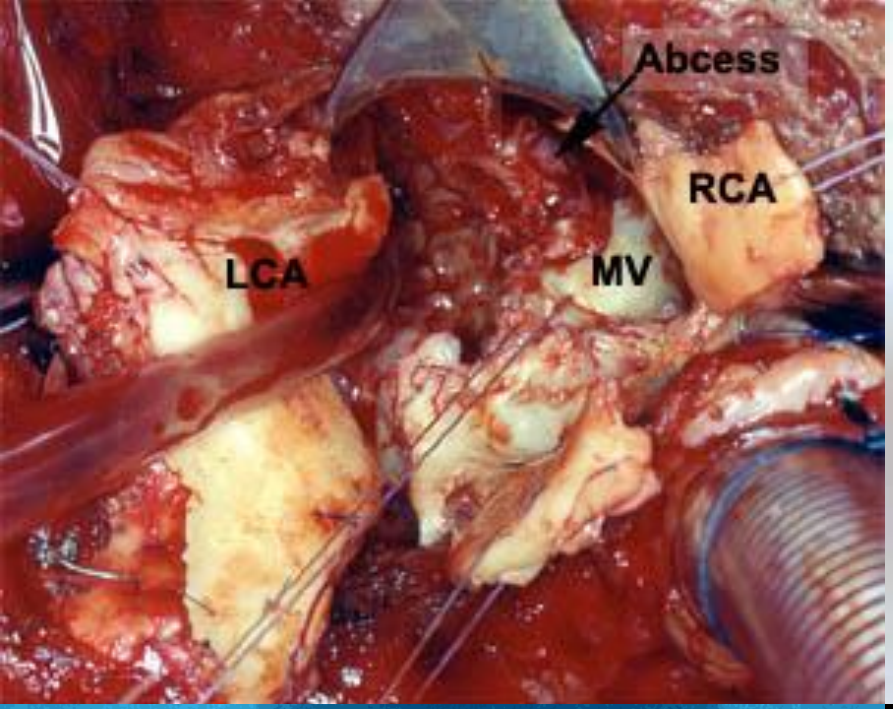
- the infection involves the junction between the prosthetic ring and the tissutal anulus
- Perivalvular abscesses
- prosthesis detachment
- Rare infective vegetations (unless thrombi are also present)

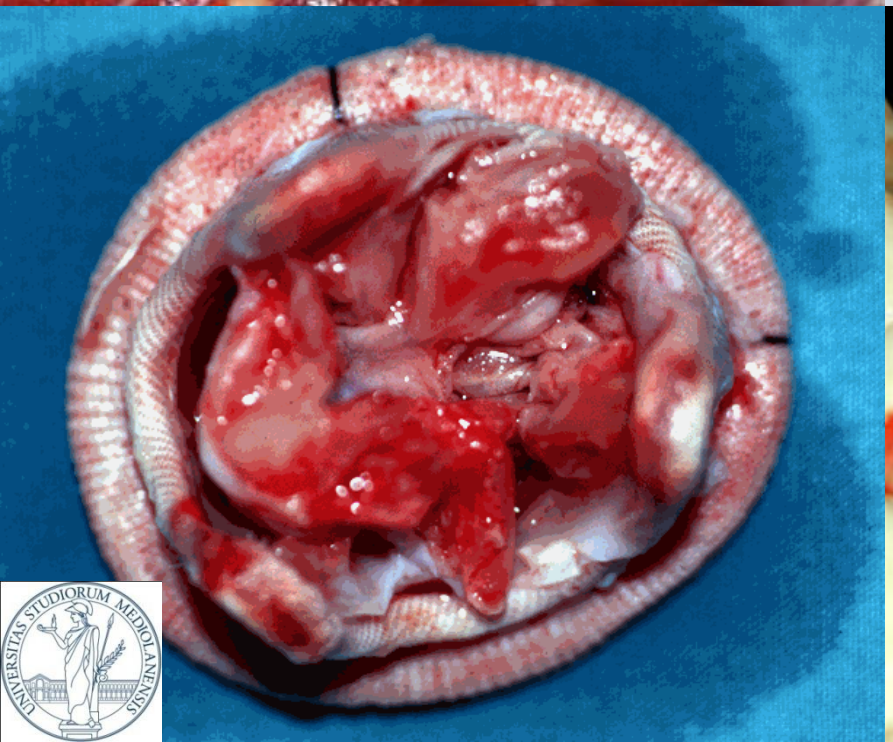
- *similar to early PVE*

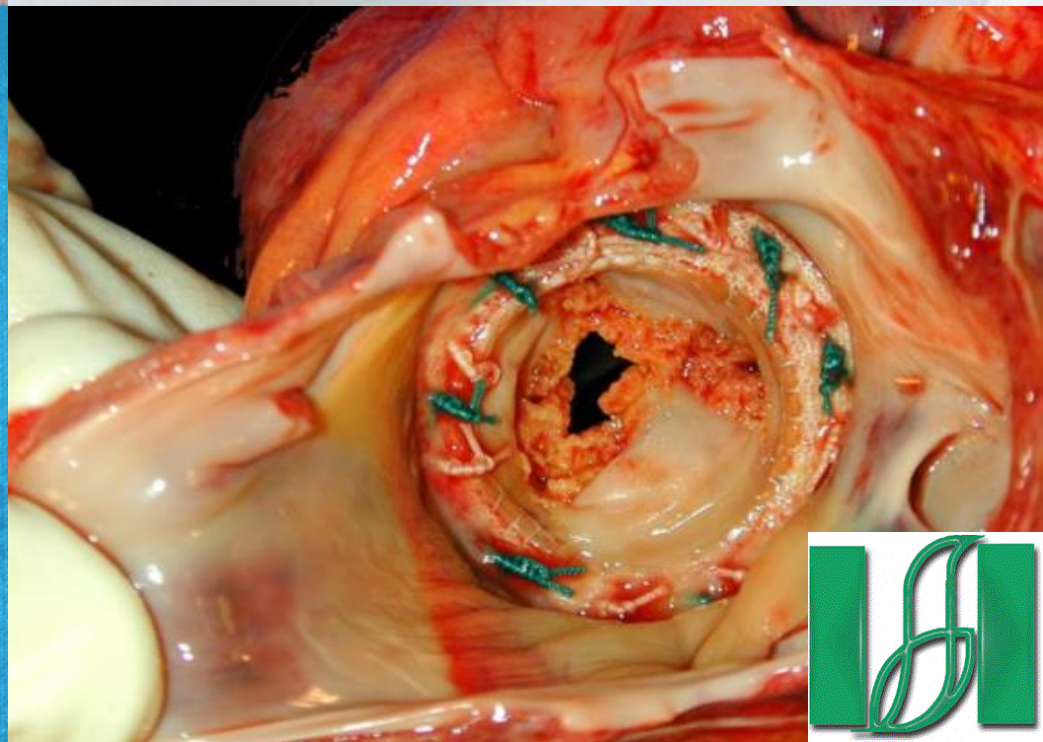
- the infection involves the valvular leaflets primarily
- infective Vegetations are present
- cusps rupture

- *Conservative treatment causes faster degeneration*

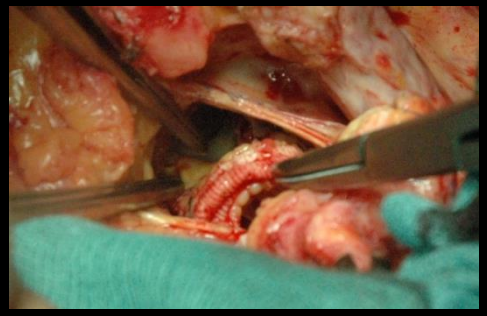
Prosthesis Detachment
Malfunctioning
Abscess

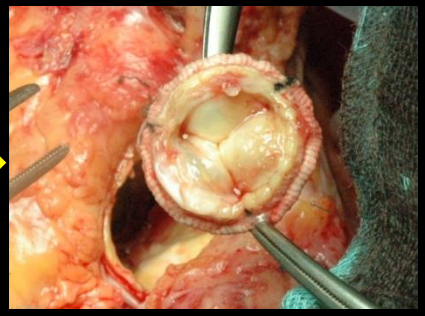

Abcess
RCA
LCA
MV



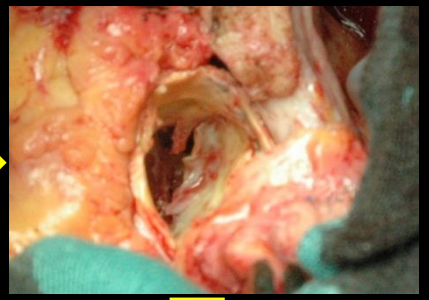


Caso clinico: sostituzione bioprotesi aortica infetta

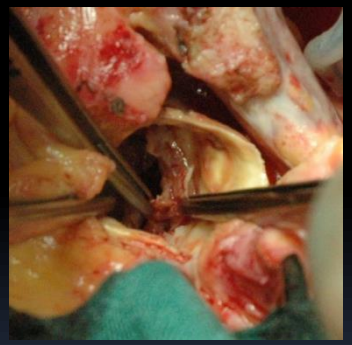


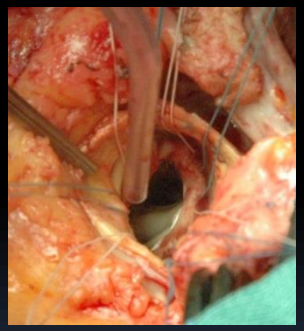


Asportazione bioprotesi aortica infetta



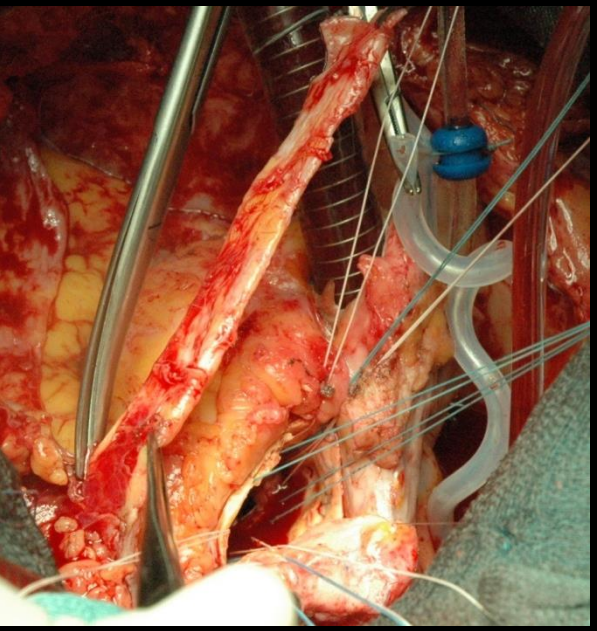
Rimozione tessuto infetto dall'anulus aortico

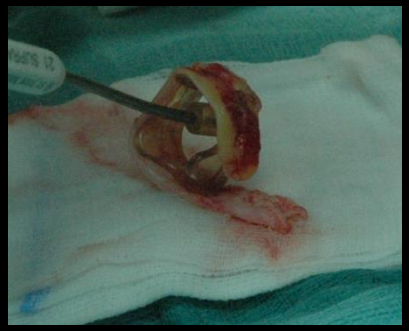


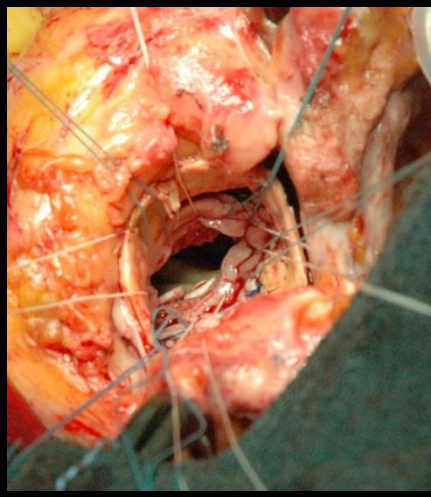


Posizionamento punti su anulus aortico

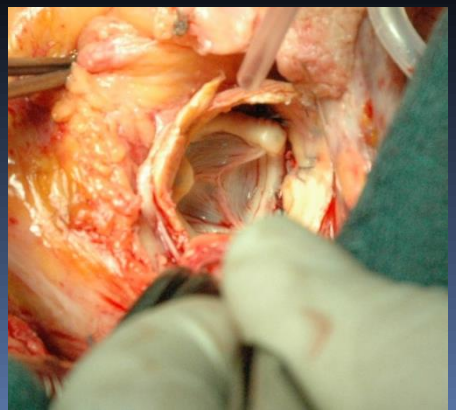
Preparazione e posizionamento patch in pericardio autologo





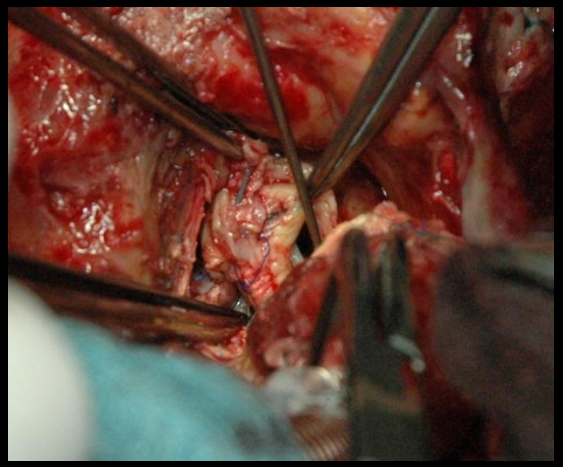


Patch posizionato

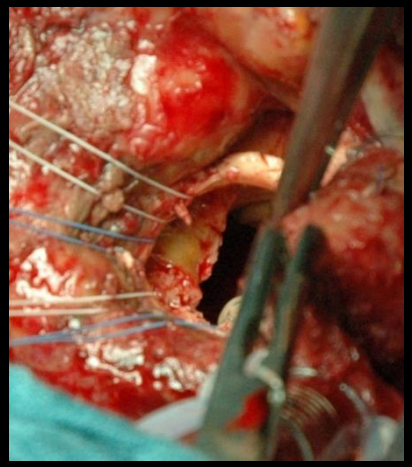


Risultato finale
protesi posizionata
su patch

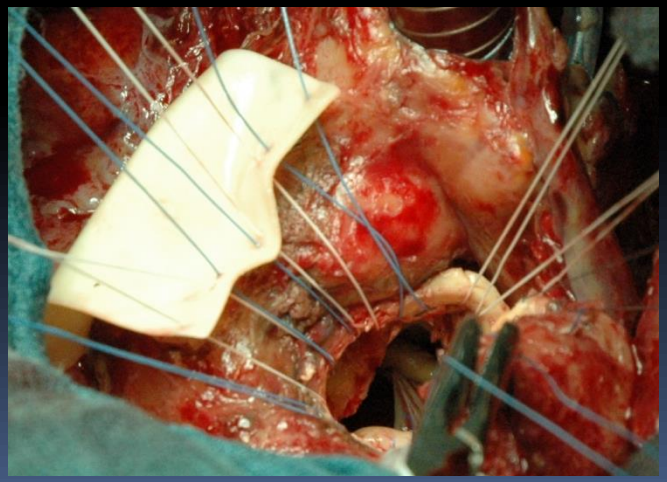
Caso clinico: sostituzione bioprotesi aortica in pz con EB



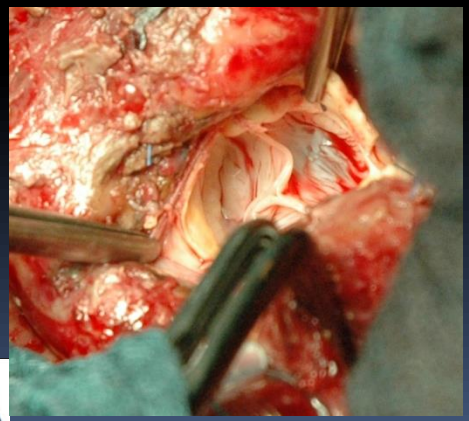
Asportazione bioprotesi aortica e patch recentemente impiantati in pz con endocardite batterica



Recesso anulare aortico



Posizionamento patch in pericardio bovino



Risultato finale

Surgical Timing

- In general, if surgical indication is confirmed, the intervention must not be postponed
- In **PVE caused by S. Aureus** or fungi, even in the absence of perianular abscesses, the intervention must be done as soon as possible to prevent the aggressive infective progression

2. When should the patient undergo operation?		
Once an indication for surgery is established, the patient should be operated on within days	I	B
Earlier surgery (emergency or within 48 hours) is reasonable for patients with large mobile vegetations at imminent risk of embolism	IIa	B
In patients with stroke and neurologic deficits, timing is decided by weighing the need for cardiac surgery against the risk of expanding the stroke or provoking intracranial bleeding during the operation (see specific question about neurologic complications)	IIa	B

presents with refractory heart failure, septic/cardiogenic shock, very large abscess

- If possible, postpone the operation in presence of neurological complication (4 weeks in case of haemorragic stroke, 2-4 weeks in case of ischemic *stroke*)

Surgical Dilemma

Should we operate **early** to reduce the risk of thrombosis and progressive deterioration of cardiac function

OR

should we perform the surgery **after** the effective control of infection to reduce the surgical risks and complications.

Early surgery RISKs

- Operation at the Acute fase of EI: uncontrolled sepsis, heart and other organs failure, shock, higher mortality
- higher risk of deterioration
- poor patient condition

Delaying- surgery RISKs

- higher risk of embolism
- widespread of the cardiac tissues damage
- more challenging surgical technique
- cardiogenic shock and organ failure

Interactive CardioVascular and Thoracic Surgery 22 (2016) 336–345
doi:10.1093/icvts/ivv368 Advance Access publication 17 December 2015

Cite this article as: Liang F, Song B, Liu R, Yang L, Tang H, Li Y. Optimal timing for early surgery in infective endocarditis: a meta-analysis. Interact CardioVasc Thorac Surg 2016;22:336–45.

Optimal timing for early surgery in infective endocarditis: a meta-analysis†

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Early surgery (within 2 weeks) is associated with lower in-hospital and long-term mortality compared with non-early surgical treatment for IE, especialli in NVE.

Sum

To sys n and
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Sixteen cohort studies, including 6141 participants were finally included. The results of the meta-analysis revealed that, compared with non-early surgery, early surgery in IE lowers the incidence of in-hospital mortality [odds ratio (OR) = 0.57, 95% confidence interval (CI) (0.42, 0.77); $P = 0.000$, $I^2 = 73.1\%$] and long-term mortality [OR = 0.57, 95% CI (0.43, 0.77); $P = 0.001$, $I^2 = 67.4\%$]. Further, performing operation within 2 weeks had a more favourable effect on long-term mortality [OR = 0.63, 95% CI (0.41, 0.97); $P = 0.192$, $I^2 = 39.4\%$] than non-early surgery. In different kinds of IE, we found that early surgery for native valve endocarditis (NVE) had a lower in-hospital [OR = 0.46, 95% CI (0.31, 0.69); $P = 0.001$, $I^2 = 73.0\%$] and long-term [OR = 0.57, 95% CI (0.40, 0.81); $P = 0.001$, $I^2 = 68.9\%$] mortality than the non-early surgery group. However, for prosthetic valve endocarditis (PVE), in-hospital mortality did not differ significantly [OR = 0.83, 95% CI (0.65, 1.06); $P = 0.413$, $I^2 = 0.0\%$] between early and non-early surgery. We concluded that early surgery was associated with lower in-hospital and long-term mortality compared with non-early surgical treatment for IE, especially in NVE. However, the optimal timing of surgery remains unclear. Additional larger prospective clinical trials will be required to clarify the optimal timing for surgical intervention and determine its efficacy in PVE.

Keywords: Early surgery • Infective endocarditis • Systematic review • Meta-analysis • Cohort study

Asian Cardiovasc Thorac Ann. 2016 Jun;24(5):435-40. doi: 10.1177/0218492316646903. Epub 2016 Apr 27.

Early or late surgery for endocarditis with neurological complications.

Oh TH[1], Wang TK[2], Pemberton JA[1], Raudkivi PJ[1].

Author information

Abstract

BACKGROUND: The European Society of Cardiology 2015 guidelines advise urgent surgery for endocarditis complicated by cerebral embolism or transient ischemic events (1B evidence). Nevertheless, the timing of surgery remains contentious. This study aimed to review our experience of early versus delayed surgery in a selected cohort.

METHODS: Our surgical database was examined for patients with a discharge diagnosis of endocarditis from 2005 to 2011. Selection was limited to patients who fulfilled the Duke criteria and underwent brain imaging for a clinically diagnosed preoperative neurological event. Patients were categorized as early surgery (≤7 days of clinical or cerebral imaging diagnosis of stroke) or delayed surgery (>7 days after diagnosis).

RESULTS: Thirty-nine patients were identified: 20 in the early group (mean age 52 ± 15 years, diagnosis-to-surgery time 4 ± 2 days) and 19 in the delayed group (mean age 45 ± 15 years, diagnosis-to-surgery time 17 ± 11 days). There were no statistical differences in preoperative risks, operative data (cardiopulmonary bypass and crossclamp times) or postoperative neurological and mortality outcomes between the 2 groups. The size of the cerebral lesion was not a significant predictor of postoperative hemorrhagic or neurological outcome. Multivariate analysis did not show any independent predictor of mortality during follow-up (mean 51 ± 27 months). There was no difference in long-term survival, freedom from reoperation, or recurrent endocarditis between the 2 groups.

CONCLUSIONS: This study showed no statistical excess of mortality or neurological outcomes after early surgical intervention, regardless of the preoperative cerebral lesion size.

KEYWORDS: Embolism; Endocarditis; Intracranial hemorrhages; Stroke; Time factors; bacterial

PMID: 27122616 DOI: 10.1177/0218492316646903

WILEY JOURNAL OF Cardiac Surgery

The AHA, European Society of Cardiology (ESC), and Society of ThoracicSurgeons (STS) guidelines recommend delaying surgery for at least four weeks in the setting of major ischemic stroke or intracranial Hemorrhage.

On the other hand the AHA and ECS guidelines state that valve surgery may be considered without delay when intracranial hemorrhage has been excluded and the neurological deficit is not severe (including coma).
The STS guidelines state that a delay of less than four weeks may be reasonable in the setting of compelling operative indications, particularly in patients with small areas of brain infarction.

The decision to pursue early or delayed surgery ought to be made by a multidisciplinary team after careful consideration of the patient's hemodynamic status, risk of new embolization, and risk of hemorrhagic transformation perioperatively.

TABLE 5 Studies of IE After TAVR

First Author, Year (Ref. #)	No. of TAVR-IE Patients	1-Yr Incidence of TAVR-IE	Microbiology	In-Hospital Mortality	1-Yr Mortality
Aung et al., 2013 (150)	4 (cohort of 132)	3.0%	Enterococci (75%), oral	0%	0%
Puls et al., 2013 (154)	5 (cohort of 180)	2.78%	Enterococcus (40%), oral streptococci (20%),	40%	40%
Regueiro et al., 2016 (119)	250 (			36%	66.7% (2-yr mortality)
Thomas et al., 2011 (155)	99.0% free of IE at 1 yr (cohort of 1,038)	0.1%	Not reported	Not reported	3 deaths reported

*Calculated/estimated.

CoNS = coagulase-negative staphylococci; IE = infective endocarditis; PARTNER = Placement of Aortic Transcatheter Valve; TAVR = transcatheter valve replacement.

JAMA. 2016 Sep 13;316(10):1083-92. doi: 10.1001/jama.2016.12347.

250 cases from the IE after TAVR International Registry

Association Between Transcatheter Aortic Valve Replacement and Subsequent Infective Endocarditis and In-Hospital Death.

Regueiro A[1], Linke A[2], Latib A[3], Ihlemann N[4], Urena M[5], Walther T[6], Husser O[7], Herrmann HC[8], Nombela-Franco L[9], Cheema AN[10], Le Breton H[11], Stortecky S[12], Kapadia S[13], Bartorelli AL[14], Sinning JM[15], Amat-Santos I[16], Munoz-Garcia A[17], Lerakis S[18], Gutiérrez-Ibanes E[19], Abdel-Wahab M[20], Tchetche D[21], Testa L[22], Eltchaninoff H[23], Livi U[24], Castillo JC[25], Jilaihawi H[26], Webb JG[27], Barbanti M[28], Kodali S[29], de Brito FS Jr[30], Ribeiro HB[31], Miceli A[32], Fiorina C[33], Dato GM[34], Rosato F[35], Serra V[36], Masson JB[37], Wijeysundera HC[38], Mangione JA[39], Ferreira MC[40], Lima VC[41], Carvalho LA[42], Abizaid A[43], Marino MA[44], Esteves V[45], Andrea JC[46], Giannini F[3], Messika-Zeitoun D[5], Himbert D[5], Kim WK[6], Pellegrini C[7], Auffret V[11], Nietlispach F[47], Pilgrim T[12], Durand E[23], Lisko J[18], Makkar RR[26], Lemos PA[31], Leon MB[29], Puri R[1], San Roman A[16], Vahanian A[5], Søndergaard L[4], Mangner N[2], Rodés-Cabau J[1].

INCIDENCE: 1.1 % per person-year

Conclusions

- Management of patients with IE is both a clinical and logistical challenge
- Importance of a multidisciplinary team approach
- Surgical techniques are many, but a clear long-term advantage of one has yet to be proven
- The optimal timing for surgery is contentious (even guidelines are not clear on the definition of “early” and “late”)
- “new” challenges in TAVR-era

THANK YOU