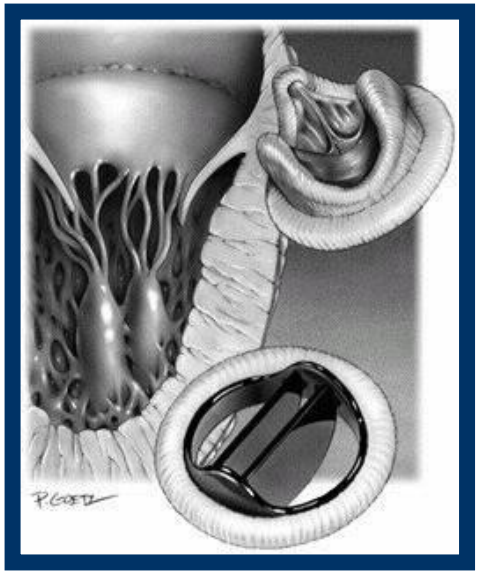
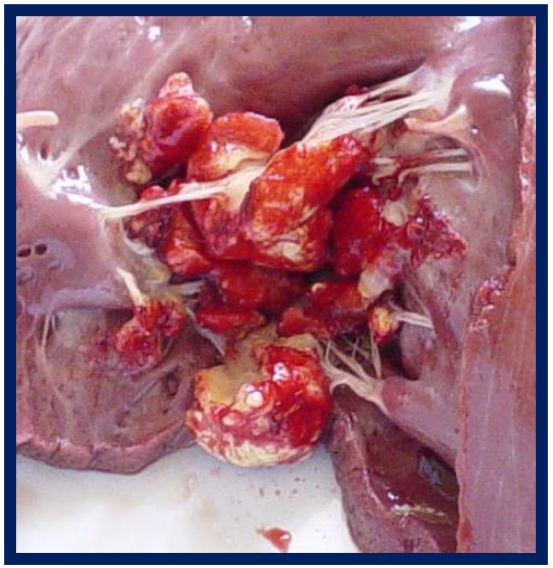
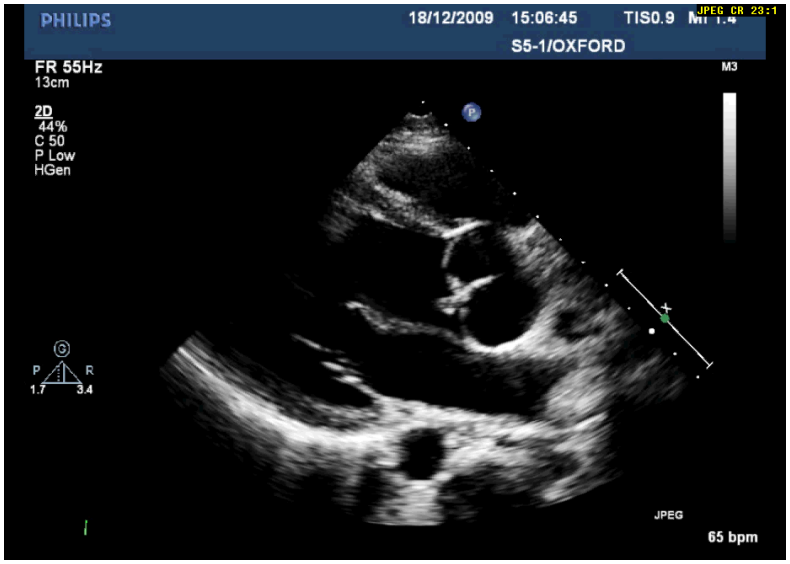






PROSTHETIC VALVE ENDOCARDITIS

Dr Bernard Prendergast DM FRCP

EUROVALVE CONGRESS
MADRID NOVEMBER 2013

Prosthetic Valve Endocarditis – A Dangerous Disease

- Affects 1-6% of prosthetic valves
- Mechanical and biological valves equally prone
- Difficult to diagnose and treat
- In-hospital mortality 20-30%
- One year mortality >50%
- Non-fatal complications
  - Acute stroke 15%
  - CHF 30%
  - Thromboembolic events >20%
- Redo surgery 65%

Chu VH et al. Circulation 2004;109:1745-1749.
Tleyjeh IM et al. JAMA 2005;293:3022-3028.
Tornos P et al. Heart 2005;91:571-575.
Tornos MP et al. Ann Intern Med 1992;117:567-572.

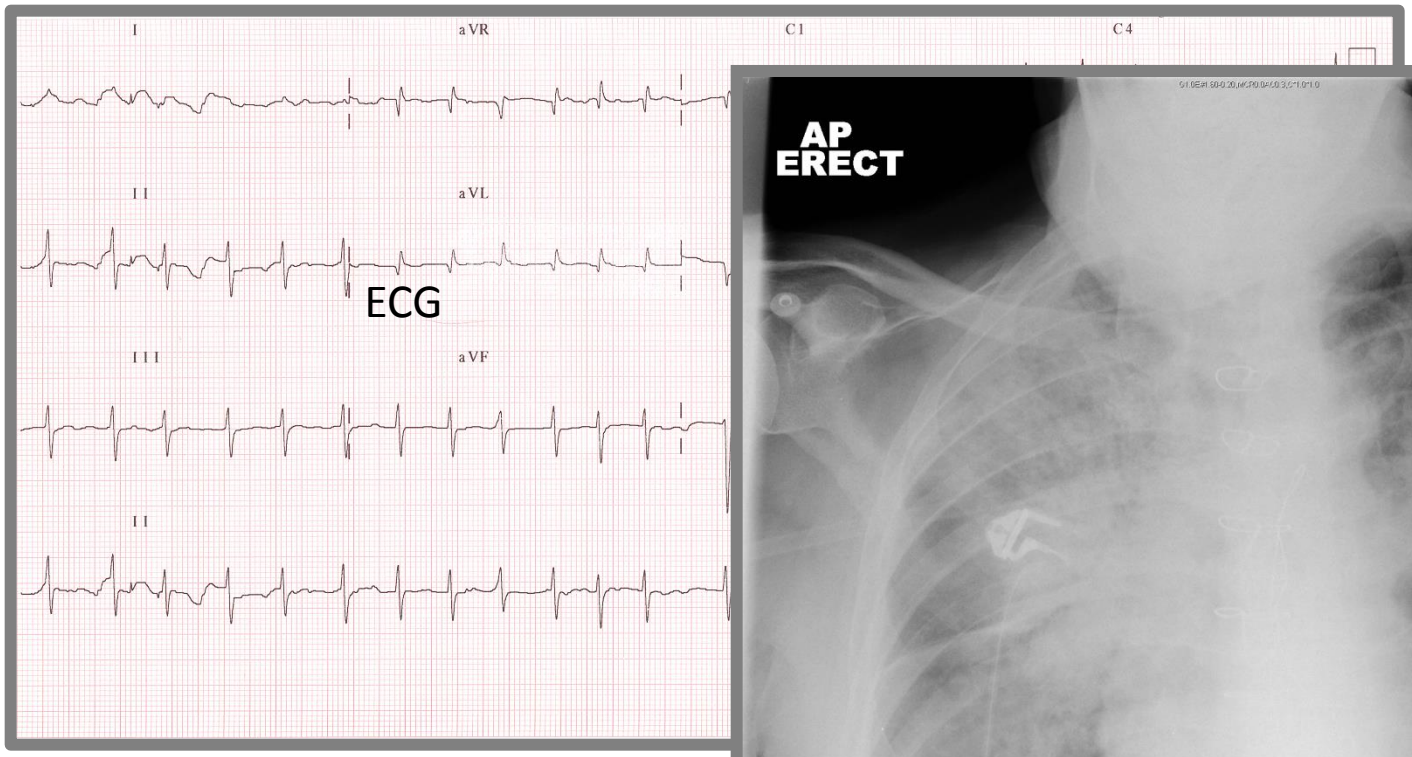
History (1)

- 73 yr old male – smoker, Type II DM, hyperlipidaemia, COPD
- 1995: CHF 2º to IHD with significant MR (annular dilatation)
  - #29 bileaflet MVR with CABG x1 (vein graft to RCA)
  - Post-op cerebral infarct with grand mal seizures
  - Complete recovery – NYHA I
- March 2008: Enterococcal IE on mitral prosthesis
  - Malaise, weight loss and fever
  - 6/6 positive BCs – sens. benpen, vancomicin, ampicillin, amoxycillin
  - TOE – vegetations on prosthesis, no MR
  - No haemodynamic compromise – good response to antibiotic therapy
  - CT colon – diverticular disease & 3 polyps – excision via colonoscopy
- October 2008: Full recovery – normal inflammatory markers

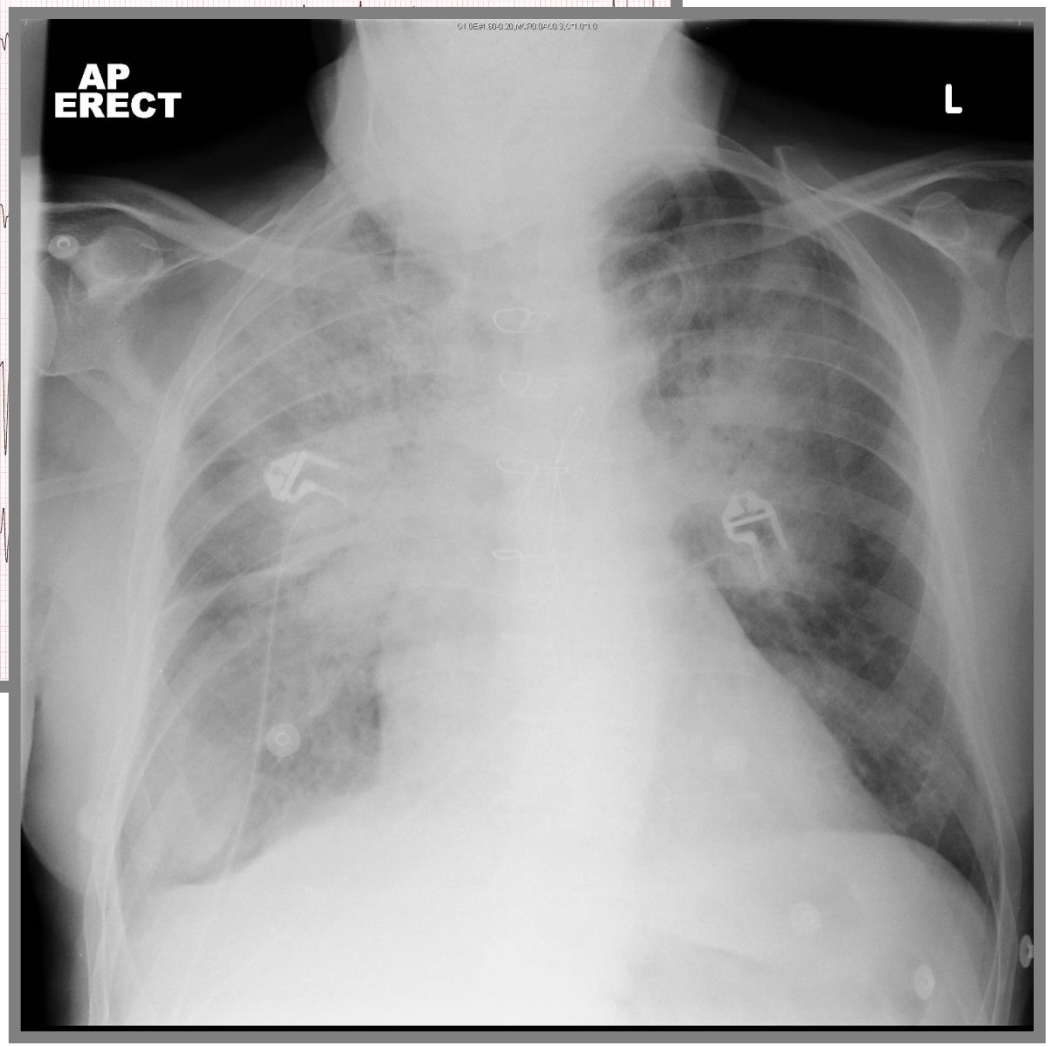
History (2)

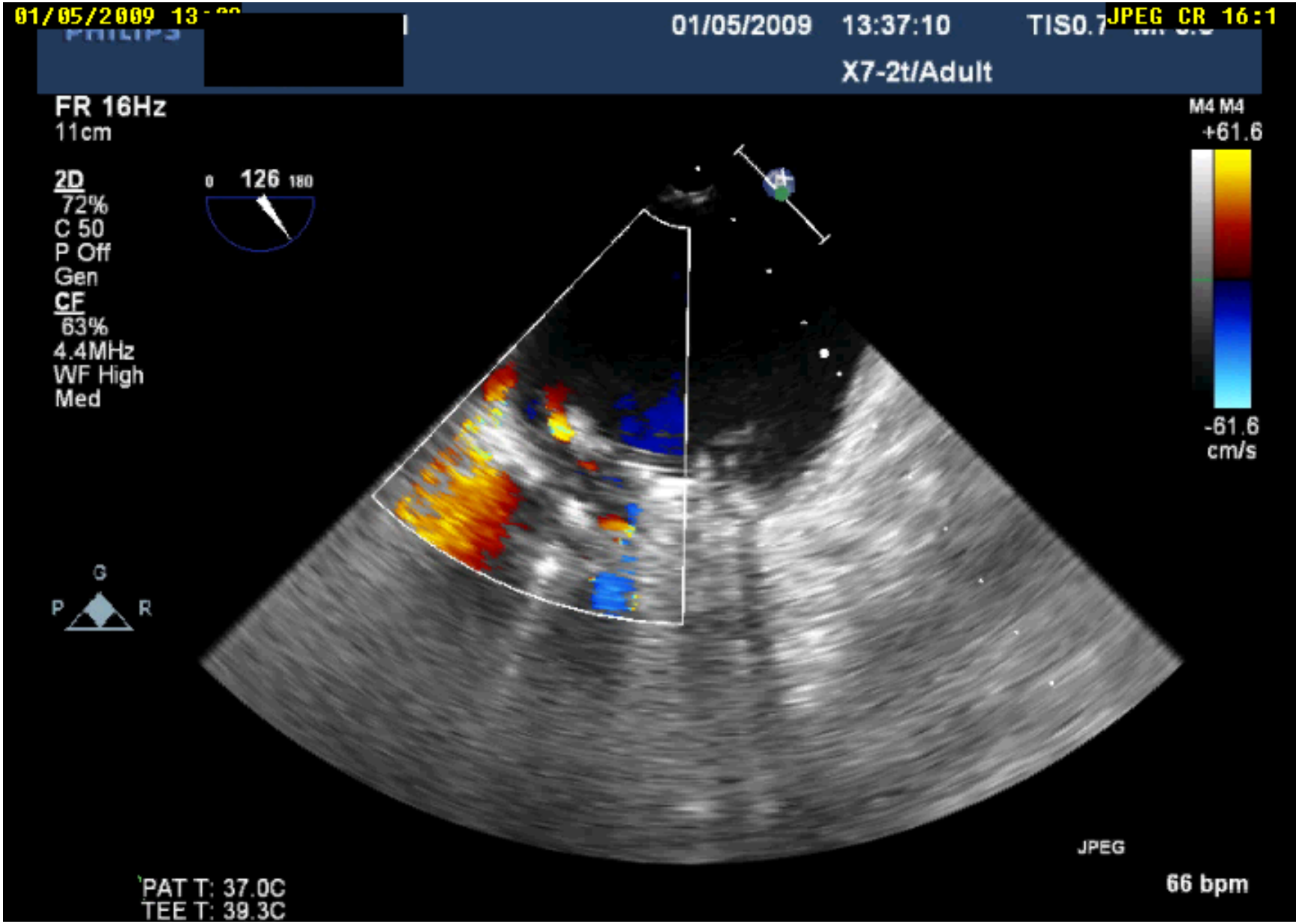
- April 2009 – emergency admission
  - 3/12 weight loss, malaise
  - 1/12 intermittent fever, dyspnoea, haemoptysis
  - Unwell, AF 140 min-1, BP 120/70, continuous mitral murmur
- Initial investigations
  - Hb 10.7g/dl, WCC 19.1x10^9/L, Platelets 380 x10^9/L
  - Creatinine 150mmol/L, CRP 89 IU/L, INR 3.4
  - BCs – 6/8 positive for enterococcus (sensitivities as previously)
  - Unable to compare with previous organism
- Progressive deterioration
  - Type I respiratory failure requiring CPAP
  - Deteriorating renal and liver function
  - Surgeons reluctant to operate
  - Haemodynamic compromise requiring IABP
  - Angiography – minor left coronary disease, occluded RCA and RCA vein graft

Further investigations



ECG

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TEE T: 39.3C
66 bpm

Audience Question

Surgery is the treatment of choice for this patient:

1: Yes – and my surgeon would be ready and willing

2: Yes – but it would be difficult to persuade my surgeon

3: Too late – medical therapy only with dire prognosis

Prosthetic valve endocarditis (PVE)

- The most severe form of IE: mortality can approach 50%
- 16-26% of all IE in contemporary series
- Affects 1-6% of patients with prosthetic valves: 0.3-1.2% per pt year
- Frequent in out-patients with regular healthcare contact
- Mechanical and bioprosthetic valves equally susceptible
- Diagnosis difficult: echocardiography and blood cultures often negative

EARLY

- <12 months after surgery
- Staphylococci predominate
- Risk high (5%) in patients with valve replacement for active IE
- Lesions severe: associated with abscesses, prosthesis dehiscence
- Redo surgery reduces mortality but is often difficult

LATE

- >12 months after surgery
- Organisms mirror those in native valve IE
- Complications are less frequent
- Medical therapy may be sufficient in the absence of perivalvular infection

Hoen B et al. JAMA 2002;288:75-81, Tornos P et al. Heart 2005;91:571-5, Wang A et al. JAMA 2007;297:1354-61.

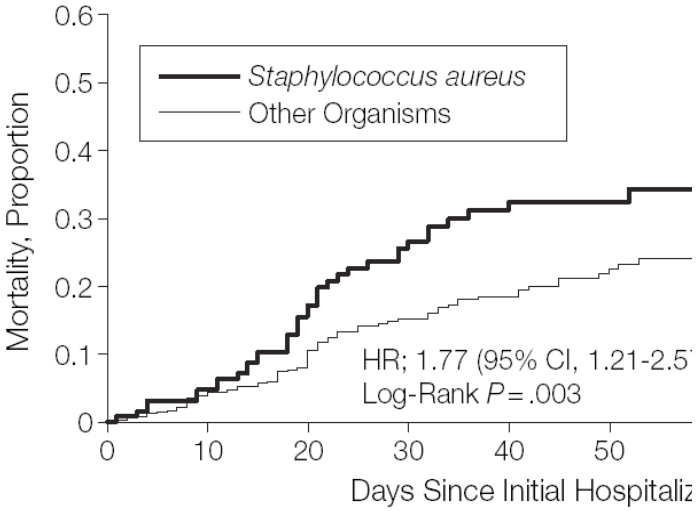
Contemporary Clinical Profile and Outcome of Prosthetic Valve Endocarditis

Prospective cohort study 2670 adults with definite IE

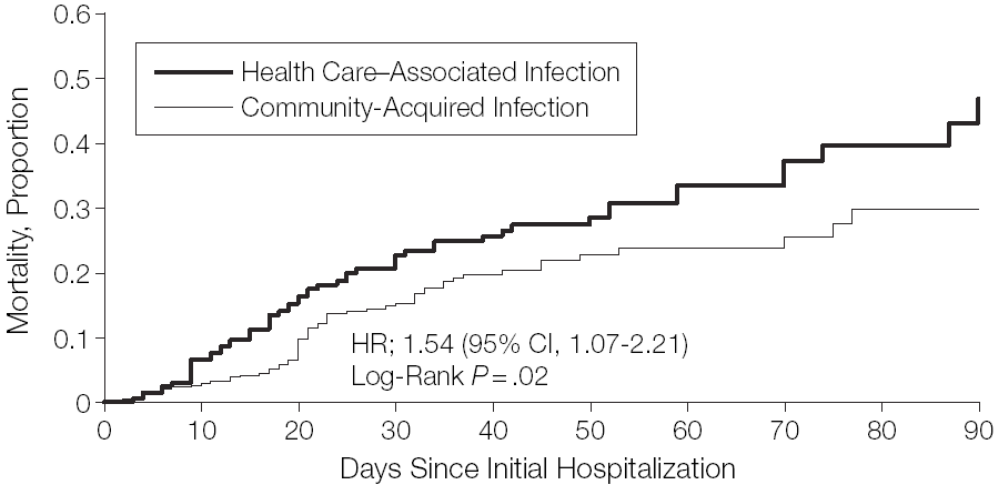
58 hospitals in 25 countries worldwide

556 (20%) with prosthetic valve IE

PVE Caused by *Staphylococcus aureus* or Other Organisms



Health Care–Associated or Community-Acquired PVE

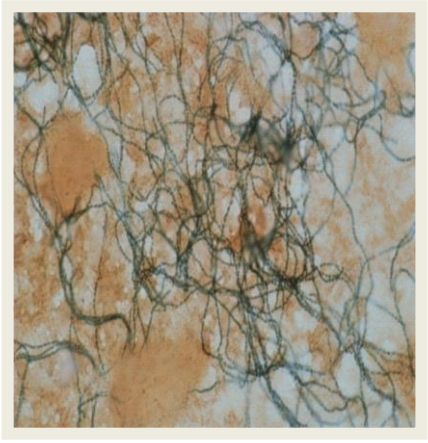


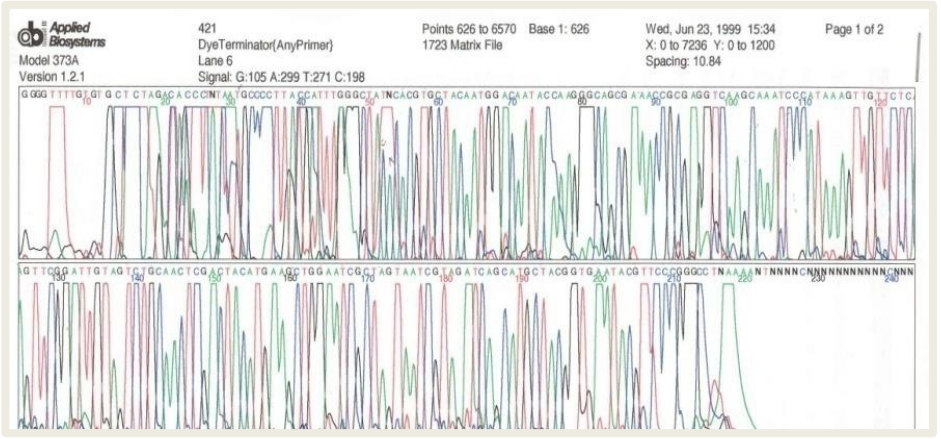
JAMA®

Wang A et al. JAMA 2007;297:1354-1361.

Diagnosis

- Difficult!
- Atypical presentation frequent in early cases
- Often ascribed to post-operative recovery with inappropriate antibiotic use
- Blood cultures frequently negative
- Duke criteria insensitive
- Specialist assessment, fresh blood cultures
- TOE mandatory

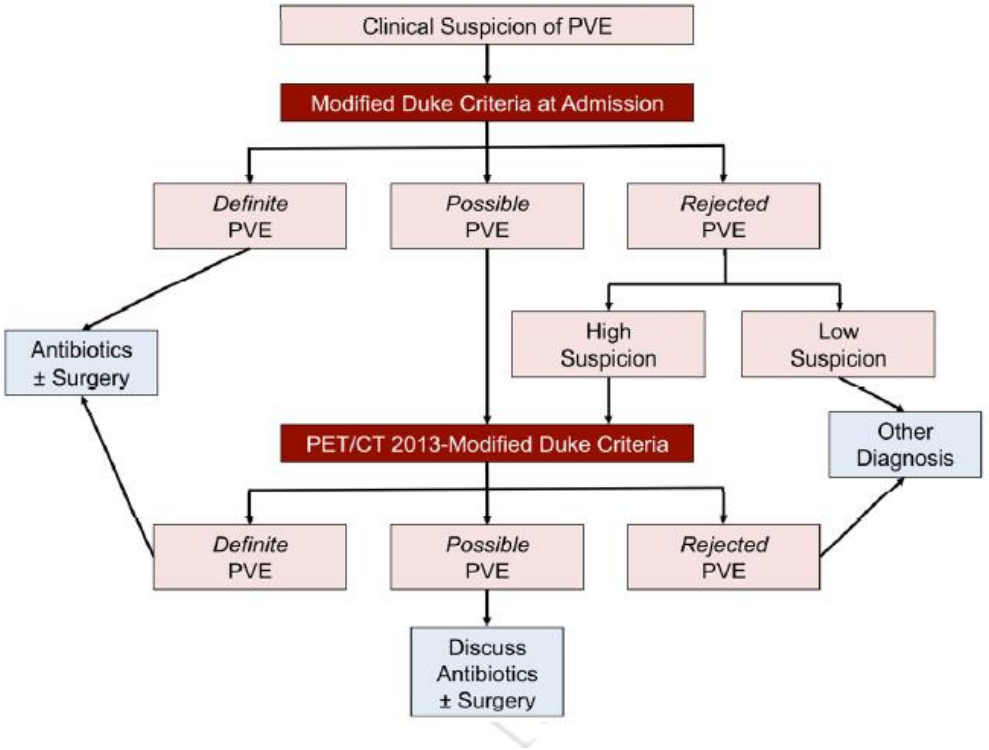




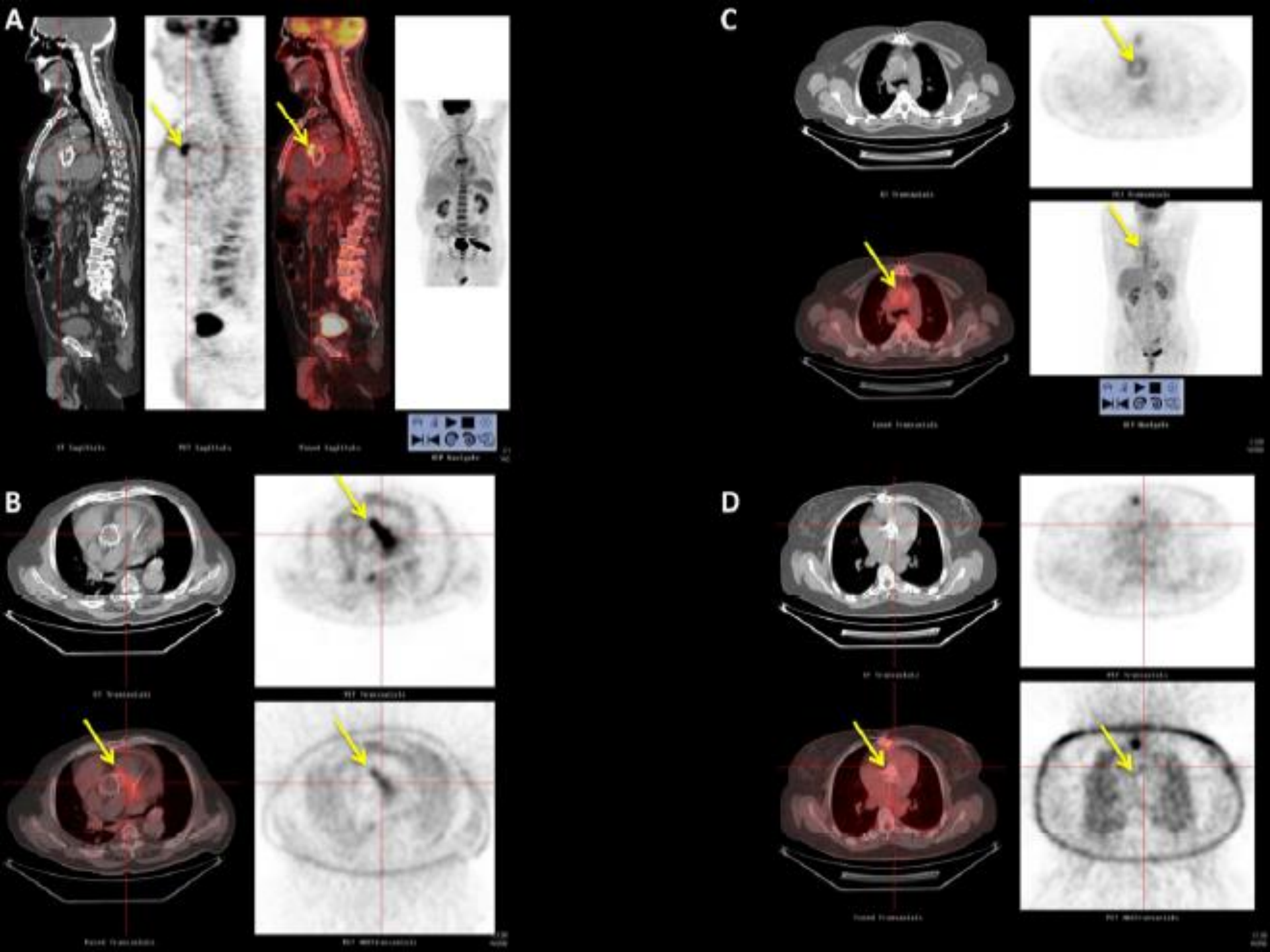
Positron Emission Tomography/Computed Tomography for Diagnosis of Prosthetic Valve Endocarditis: Increased Valvular ^{18}F-Fluorodeoxyglucose Uptake as a Novel Major Criterion

Ludivine Saby, MD,[1] Olivia Laas, MD,[2] Gilbert Habib, MD,[1] Serge Cammilleri, MD, PhD,[2] Julien Mancini, MD, PhD,[3] Laetitia Tessonnier, MD,[2] Jean-Paul Casalta, MD,[4] Frederique Gouriet, MD, PhD,[4] Alberto Riberi, MD,[5] Jean-Francois Avierinos, MD,[1] Frederic Collart, MD,[5] Olivier Mundler, MD, PhD,[2] Didier Raoult, MD, PhD,[4] Franck Thuny, MD, PhD[1,4]

- 72 consecutive pts with suspected PVE
- Systematic CT/PET plus usual diagnostic assessment
- Classification according to mod. Duke criteria over 3/12 FU
- Abnormal FDG uptake in 50%
- Increased sensitivity of Duke criteria (70% vs. 97%, p=0.008)
- Principally due to reduced number of *possible* cases



J Am Coll Cardiol 2013 (In Press)


A
B
C
D

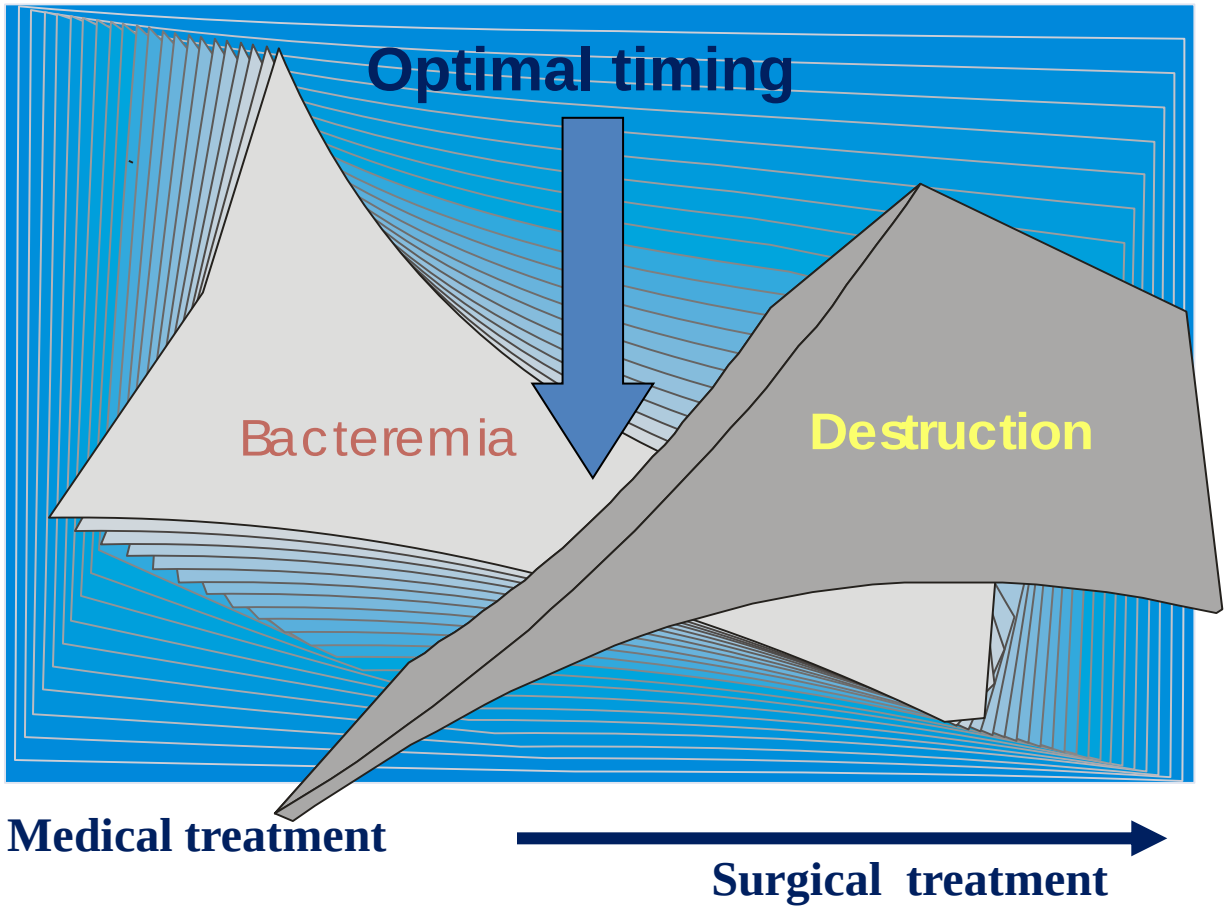
Prosthetic valve endocarditis: treatment

- Some studies suggest improved outcome with surgery in comparison with antibiotic therapy alone
- Studies are small with inherent selection bias
- Benefits of surgery are most prominent in staphylococcal infection and when perivalvular infection is apparent

	Era	n	Surgery (%)	Mortality (%)	Surgical mortality (%)	Medical mortality (%)
Barcelona[1]	1980/1990s	59	30	25	29	24
Gottingen[2]	1990s	24	58	17	21	17
Zurich[3]	1980/1990s	49	80	16	14	18
Sheffield[4]	1990s	66	58	33	24	46
Cleveland[5]	1990s	77	70	24	8	35

1. Tornos P et al. Clin Infect Dis 1997;24:381-6.
2. Schulz R et al. Eur Heart J 1996;17:281-8.
3. Truninger K et al. Heart 1999;82:714-20.
4. Akowuah EF et al. Heart 2003;89:269-72.
5. Gordon S et al. Ann Thorac Surg 2000;69:1388-1392.

Optimal Timing of Surgery: Destructive IE



Emergency: <24 hours

Urgent: within a few days

Elective: >1-2 weeks of antibiotic therapy

European Heart Journal
doi:10.1093/eurheartj/ehp285

ESC GUIDELINES

Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009)

The Task Force on the Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC)

Endorsed by the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) and by the International Society of Chemotherapy (ISC) for Infection and Cancer

Authors/Task Force Members: Gilbert Habib (Chairperson) (France)*, Bruno Hoen (France), Pilar Tornos (Spain), Franck Thuny (France), Bernard Prendergast (UK), Isidre Vilacosta (Spain), Philippe Moreillon (Switzerland), Manuel de Jesus Antunes (Portugal), Ulf Thilen (Sweden), John Lekakis (Greece), Maria Lengyel (Hungary), Ludwig Müller (Austria), Christoph K. Naber (Germany), Petros Nihoyannopoulos (UK), Anton Moritz (Germany), Jose Luis Zamorano (Spain)

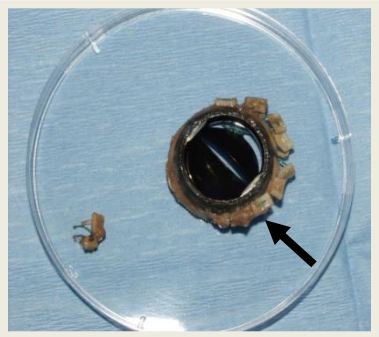
Guidelines of the ESC Task Force on IE

Indications for surgery in PVE	Timing*	Class[a]	Level[b]
A - HEART FAILURE			
PVE with severe prosthetic dysfunction (dehiscence or obstruction) causing refractory pulmonary oedema or cardiogenic shock	Emergency	I	B
PVE with fistula into a cardiac chamber or pericardium causing refractory pulmonary oedema or shock	Emergency	I	B
PVE with severe prosthetic dysfunction and persisting heart failure	Urgent	I	B
Severe prosthetic dehiscence without HF	Elective	I	B
B - UNCONTROLLED INFECTION			
Locally uncontrolled infection (abscess, false aneurysm, fistula, enlarging vegetation)	Urgent	I	B
PVE caused by fungi or multiresistant organisms	Urgent/elective	I	B
PVE with persisting fever and positive blood cultures > 7–10 days	Urgent	I	B
PVE caused by staphylococci or gram negative bacteria (most cases of early PVE)	Urgent/elective	IIa	C
C - PREVENTION OF EMBOLISM			
PVE with recurrent emboli despite appropriate antibiotic treatment	Urgent	I	B
PVE with large vegetations (> 10 mm) and other predictors of complicated course (heart failure, persistent infection, abscess)	Urgent	I	C
PVE with isolated very large vegetations (> 15 mm)	Urgent	IIb	C

Habib G et al. Eur Heart J 2009 ;30:2369-2413.

Clinical Progress and Outcome

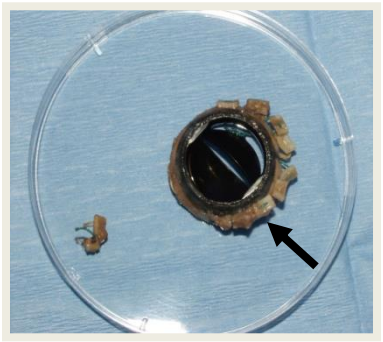
- Inevitable mortality without surgery



- Redo MVR with #29 Mira valve
  - Extensive adhesions
  - Large vegetations impeding discs
  - Severe valve dehiscence – enterococcus on culture

Clinical Progress and Outcome

- Inevitable mortality without surgery



- Redo MVR with #29 Mira valve
  - Extensive adhesions
  - Large vegetations impeding discs
  - Severe valve dehiscence – enterococcus on culture

- Difficult post-operative course (39 days ITU)
  - Antibiotic regime: 6/52 benzylpenicillin, 2/52 gentamicin
  - Prolonged inotropic & respiratory support (tracheostomy)
  - Persistent atrial fibrillation/flutter
  - Loculated pleural effusions (VATS) – Pseudomonas – 1/52 Tazocin
  - Acute renal failure (dialysis)
  - Pressure sore

- Discharged to community hospital day 72
  - Fit and well – normal inflammatory markers

Take-home messages

- PVE remains an infrequent yet challenging condition
- Evidence is scarce but international guidelines (ESC) provide clear advice on management
- Antibiotic treatment is difficult; specialist advice is required
- Prevention is better than cure
- Medical therapy is reasonable in patients with early diagnosis, sensitive organisms, good antibiotic response and reassuring echo findings
- Early surgery is recommended for aggressive organisms (especially *S. aureus*), antibiotic failure, abscess formation, major prosthetic leak and fistula formation
- Cardiologists need the help of brave surgeons!
- Close communication and an IE team (cardiologist, surgeon, microbiologist) underlie successful management