Le best of des… infections cardiovasculaires

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Programme

- Infections sue prothèse vasculaire
- Endocardites infectieuses
  - Épidémiologie
  - Antibiothérapie
  - Chirurgie
  - Prophylaxie

Coxiella burnetii vascular graft infection

First case diagnosed by PCR

- Case report
  - 63-year-old man with a diffuse abdominal pain and no fever.
  - Dacron aorto-bifemoral graft implanted 6 years earlier.
  - CT scan of the abdomen: para-prosthetic fluid collection.
  - Blood cultures sterile in the absence of prior antibiotic therapy.
  - Empirical ciprofloxacin and metronidazole therapy for 2 months. Partial improvement.
  - Laparotomy, extensive adhesions and a right para-iliac purulent mass.
  - Culture of multiple intra-operative specimens negative.
  - 16S rRNA PCR amplification plus sequencing performed on a fragment of the para-iliac mass positive for *Coxiella burnetii.*
  - Diagnosis of *C. burnetii* chronic infection was confirmed by serology.
  - Antibiotic therapy with doxycycline (100 mg bid orally). Cure.

- **Broad-range PCR should be considered in all cases of culture-negative vascular graft infections.**

Senn L., BMC Infect Dis 2005;5:109

Efficacy of rifampicin-soaked graft in combination with systemic vancomycin in the prevention of prosthetic vascular graft infection: an experimental study

- 120 adult male Wistar rats
- Implantation of 1-cm^2 Dacron or ePTFE prosthesis followed by local inoculation with 2 10^7 CFU of a clinical isolate of MRSE.
- Each of the series (Dacron & PTFE) included 6 groups of 10 rats:
  1. no contamination / no antibiotic prophylaxis (uncontaminated control),
  2. Contamination / no antibiotic prophylaxis (untreated control),
  3. Contamination / perioperative IP prophylaxis with vancomycin,
  4. Contamination / rifampicin-soaked (5 mg/1 ml) grafts,
  5. Contamination / vancomycin-soaked (1 mg/1 ml) grafts,
  6. Contamination / combination of rifampicin-soaked (5 mg/1 ml) graft + perioperative IP vancomycin prophylaxis.
- The grafts were removed sterilely 7 days after implantation and evaluated by using sonication and quantitative blood agar culture.

Sacar M, J Surg Res 2005;129**:**329

Efficacy of rifampicin-soaked graft in combination with systemic vancomycin in the prevention of prosthetic vascular graft infection: an experimental study

Group[a]	Graft-bonded drug[b]	Intraperitoneal preoperative drug[c]	Quantitative graft culture (CFU/ml)
D1	—	—	0.0
D2	—	—	$3.7 \times 10^7 \pm 1.1 \times 10^7$
D3	Rifampicin	—	$4.7 \times 10^3 \pm 1.2 \times 10^3$
D4	—	Vancomycin	$5.7 \times 10^2 \pm 1.9 \times 10^2$
D5	Vancomycin	—	$5.1 \times 10^3 \pm 3.6 \times 10^2$
D6	Rifampicin	Vancomycin	0.0
P1	—	—	0.0
P2	—	—	$5.3 \times 10^6 \pm 2.4 \times 10^6$
P3	Rifampicin	—	$4.2 \times 10^3 \pm 8.6 \times 10^2$
P4	—	Vancomycin	$5.3 \times 10^2 \pm 1.6 \times 10^2$
P5	Vancomycin	—	$4.8 \times 10^3 \pm 2.2 \times 10^2$
P6	Rifampicin	Vancomycin	0.0

Sacar M, J Surg Res 2005;129:329

Diabetes mellitus and IE: the insulin factor in patient morbidity and mortality

	Insulin-DM patients ($n = 22$)	Oral-DM patients ($n = 53$)	Non-DM patients ($n = 484$)	*P*-value
Age, years	66 ± 13	66 ± 10	58 ± 17	**0.004**
Microorganisms				
Oral streptococci	0 (0)	4 (8)	87 (18)	**0.016**
Group D streptococci[a]	5 (23)	16 (30)	118 (24)	0.631
Pyogenic streptococci	0 (0)	3 (6)	25 (5)	0.540
Enterococci	3 (14)	7 (13)	36 (7)	0.224
Staphylococci	64%	27%	29%	0.002
S. aureus	9 (41)	10 (19)	101 (21)	0.072
Coagulase-negative staphylococci	5 (23)	4 (8)	37 (8)	**0.041**
Other microorganisms or >1	0 (0)	5 (9)	55 (11)	0.230
No microorganism identified	0 (0)	4 (8)	25 (5)	0.406
Location of IE				
Pacemaker	2 (9)	8 (15)	19 (4)	**0.002**
Clinical and biological events				
Fever duration (days)	25 ± 27	7 ± 41	18 ± 54	0.410
NYHA Class III/IV heart failure	9 (41)	16 (30)	140 (29)	0.470
Septic shock	5 (23)	4 (8)	42 (9)	0.198
Stroke	5 (23)	13 (25)	78 (16)	0.238
Other emboli	7 (32)	19 (30)	141 (29)	0.596
Serum creatinine >180 μmol/L	5 (23)	12 (23)	116 (24)	0.922
Cardiac surgery	7 (32)	25 (47)	232 (48)	0.334
In-hospital death	11 (50)	10 (19)	74 (15)	**<0.001**

Duval X, Eur Heart J, Advance Access published October 13, 2006

Autoimmunohistochemistry: a new method for the histologic diagnosis of IE

- 70 resected native valves
  - 25 IE due to Gram+ cocci , blood cultures +
  - 15 IE with negative blood cultures (*C. burnetii, Bartonella, T. whipplei*)
  - 30 degenerative valve diseases (controls)
- Sample processing
  - Conventional bacteriological and histological methods
  - Immunohistochemical peroxidase-based method, using the patients' own serum as the source of antibodies
  - PCR amplification of the 16S rRNA gene, and sequencing.
- Results: nb. of positive AIHC
  - GPC IE: 20/25 (> culture, = PCR)
  - CN IE: 15/15
  - Controls: 0/30

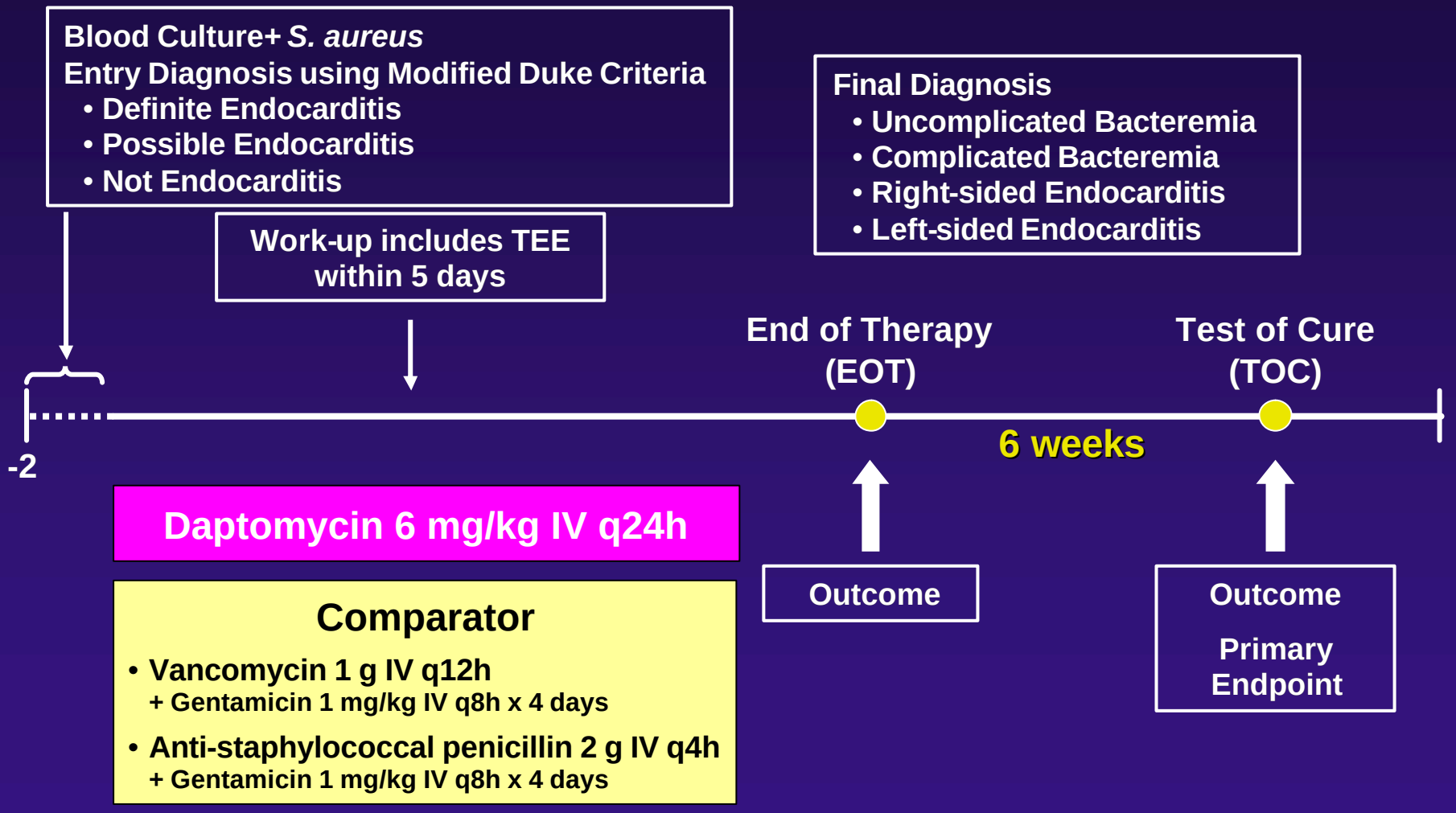
Lepidi H, J Infect Dis 2006; 193:1711–7

Autoimmunohistochemistry: a new method for the histologic diagnosis of IE

Organism	Isolates, total no.	Positive PCR, no.	Positive autoimmunohistochemical detection, no.
Staphylococci			
Staphylococcus aureus	5	4	5
S. epidermidis	3	2	2
Streptococci			
Streptococcus bovis	6	5	5
S. mutans	2	…	1
S. mitis	2	1	1
S. sanguis	1	1	1
S. oralis	1	1	1
S. anginosus	1	…	1
Other *Streptococcus* species	2	2	1
Other bacteria			
Enterococcus faecalis	1	1	1
Abiotrophia defectiva	1	1	1

Lepidi H, J Infect Dis 2006; 193:1711–7

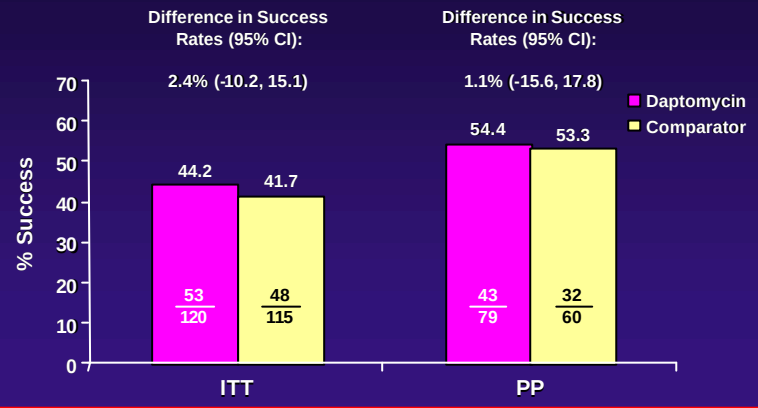
Daptomycin vs. standard therapy for bacteremia and endocarditis caused by *Staphylococcus aureus*



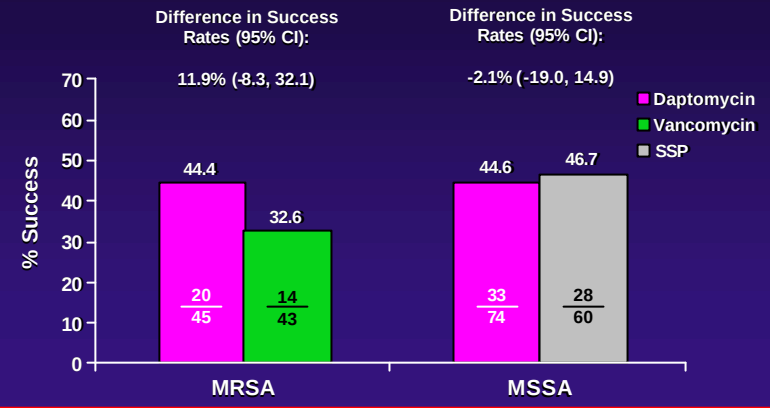
Fowler VG Jr. Et al. N Engl J Med 2006;355:653-65.

Daptomycin vs. standard therapy for bacteremia and endocarditis caused by *Staphylococcus aureus*

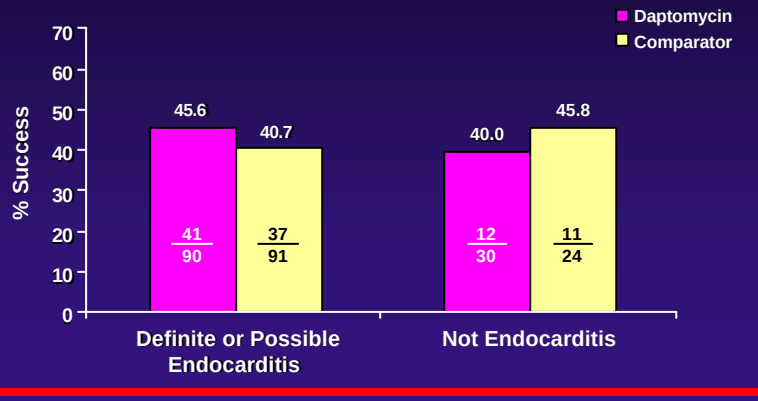
Primary Endpoint: Success at Test of Cure per Adjudication Committee (ITT/PP)



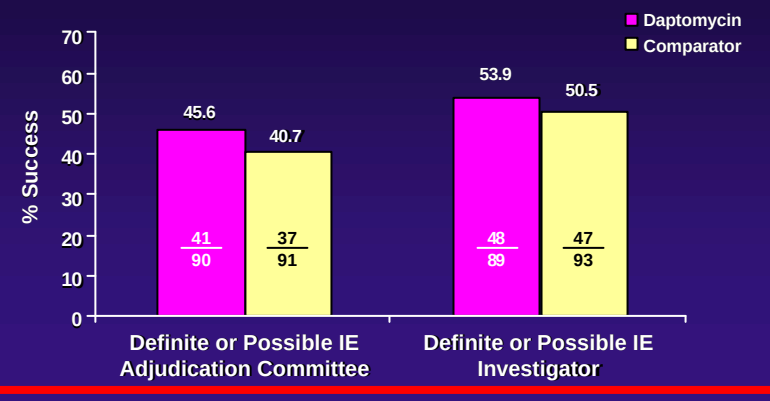
MRSA and MSSA Success at Test of Cure: Pathogen Specific Therapy per Adjudication Committee (ITT)



Entry Diagnosis: Success at Test of Cure per Adjudication Committee (ITT)



Known or Suspected Endocarditis: Success at Test of Cure (ITT)



Fowler VG Jr. Et al. N Engl J Med 2006;355:653-65.

Daptomycin in the treatment of experimental IE due to susceptible and MDR enterococci

- 3 strains
  - ampicillin-S, vancomycin-S *E. faecalis* JH2-2,
  - vancomycin-R (VanA type) JH2-2 mutant (JH2-2/pIP819),
  - ampicillin-R, vancomycin-R (VanB type) *E. faecium* D366.
- Daptomycin 6 mg/kg/d OD

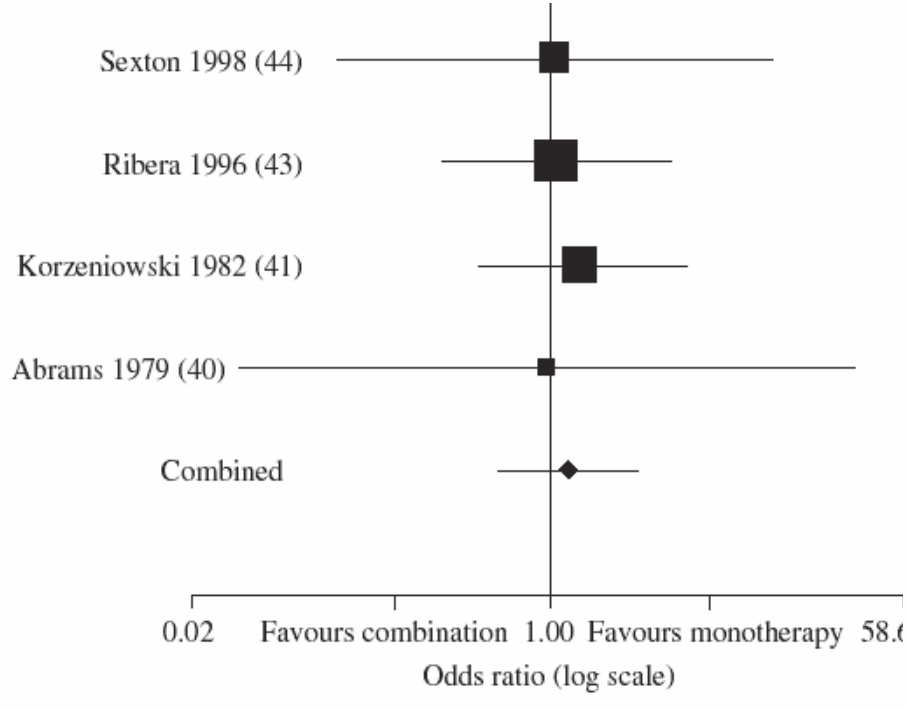
	Dapto MIC
	1
	1
	2

	Infected vegetation/total (mean ± SD $\log_{10}$ cfu/g)		
Regimen	*E. faecalis* JH2-2	*E. faecalis* JH2-2/pIP819	*E. faecium* D366
Controls	11/11 (7.48 ± 0.73)	9/9 (7.57 ± 0.79)	12/12 (7.29 ± 0.83)
Daptomycin	2/12* (2.32 ± 0.56)*,†	2/11*,‡ (2.47 ± 0.53)*,‡	1/12*,‡,# (2.11 ± 0.38)*,†,‡,#
Amoxicillin	1/9* (2.49 ± 1.16)*,†	2/11*,‡ (2.28 ± 0.55)*,‡	9/9 (5.21 ± 1.04)*,‡
Vancomycin	4/9* (3.25 ± 1.16)*	6/6 (8.27 ± 0.51)	6/6 (7.90 ± 0.29)
Teicoplanin	5/9* (4.41 ± 2.52)*	ND	4/9*,#,‡ (3.61 ± 1.77)*,‡,#

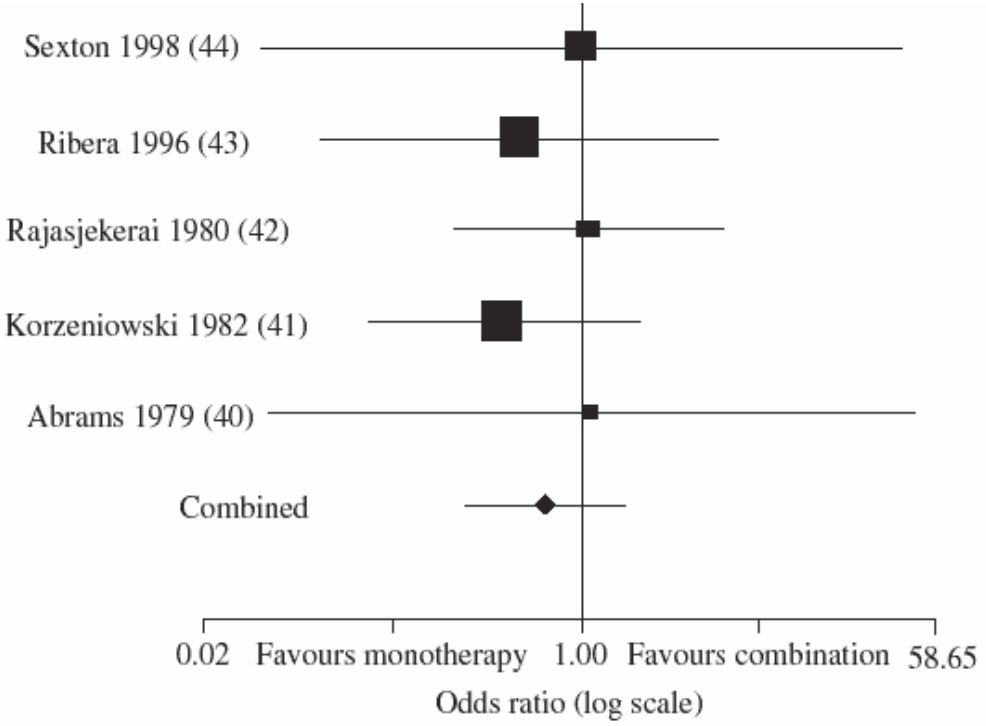
*P < 0.05 vs.controls – P < 0.05 vs. Teicoplanin – P < 0.05 vs. Vancomycin – #P < 0.05 vs.Amoxicillin

Vouillamoz J, J Antimicrobial Chemother 2006

The role of aminoglycosides in combination with a ß-lactam for the treatment of IE: a meta-analysis of comparative trials



Succès du traitement



Mortalité toute cause

Falagas ME et al, J Antimicrob Chemother 2006;57:639–647

Clinical and prognostic profile of patients with IE who need urgent surgery

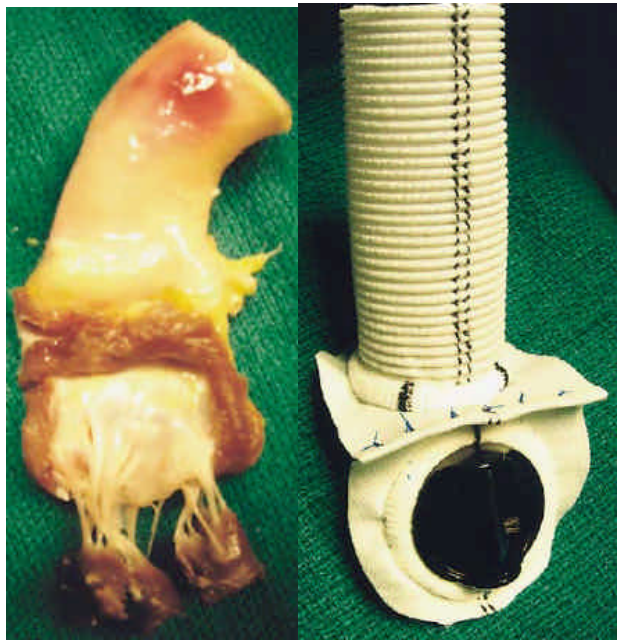
- 508 consecutive episodes of IE
  - 391 were left-sided and 89 required urgent surgery (before completion of Ab Rx)
  - Main reasons for urgent surgery
    - heart failure that did not respond to medication (60%)
    - persistent infection despite appropriate antibiotic treatment (19%)
    - both causes (12%).
  - Thirty-two patients (36%) died during their hospital stay.
- Univariate analysis: renal failure, septic shock, Gram-negative bacteria, persistent infection, and surgery for persistent infection are associated with mortality.
- Multivariate analysis

	OR (95% CI)	p
Heart failure	0.9 (0.3 – 2.6)	0.8
Renal failure	2.9 (1.05 – 8.07)	0.04
Persistent infection	3.5 (1.2 – 9.9)	0.02

Revila A, Eur Heart J 2006; Advance Access published October 10, 2006

Monobloc aorto-mitral homograft or mechanical valve replacement: a new surgical option for extensive bivalvular endocarditis

- Cases
  - 5 patients reoperated for the 3rd to 5th time for extensive IE on aortic and mitral prostheses.
  - All had severely altered hemodynamics and sepsis, and 3 of them had been considered to be inoperable.
  - Microorganism: *S. aureus* (2), *C. glabrata* (1), *K. dentrificans* (1), *S. sanguis* (1).
- Results
  - Cure of IE in all 5 cases
  - 3 deaths, unrelated to IE (pulmonary infection at M4, prolonged coma at M6, and sudden death at M18).
  - 2 patients alive (follow-up 2 and 5.5 years)



Obadia JF, J Thor Cardiovasc Surg 2006;131:243

Estimated risk of IE in adults with predisposing cardiac conditions undergoing dental procedures with or without antibiotic prophylaxis

- Data used for estimations
  - survey performed on a sample of 2805 subjects aged 25–84 years.
    - number of French persons with predisposing cardiac conditions PCCs
    - annual number of dental procedures for which antibiotic prophylaxis would be indicated,
    - number of procedures that were unprotected
  - 1-year epidemiological survey of IE conducted in France in 1999.
    - annual number of IE cases possibly due to an unprotected procedure
- Results
  - 1,287,296 adults (95% CI, 999,196–1,575,396) subjects had PCC,
  - 2,746,384 at-risk dental procedures (95%CI, 2,304,094–3,188,384) were performed in these adults, unprotected in 62% of cases
  - 37 (95% CI, 18–68; 2.7%) of the 1370 annual IE cases in France were possibly related to unprotected procedures.
  - Thus, the risks of developing IE were estimated to be
    - 1 in 46,000 unprotected procedures
      - 1 in 10,700 for subjects with prosthetic valve
      - 1 in 54,300 and native valve
    - 1 in 150,000 protected procedures.

Duval X, Clin Infect Dis 2006; 42:e102–7

Guidelines for the prevention of IE: report of the Working Party of the BSAC

- The Working Party agreed that ideally a prospective double-blind trial to evaluate the risk/benefit of prophylactic antibiotics should be carried out, but this is unlikely to take place because of the numbers of patients required and while current guidelines recommend prophylaxis.
- Indeed, a recent Cochrane review concluded that there was no evidence to support the use of prophylactic penicillin to prevent IE in invasive dental procedures.
- Despite the lack of evidence of the benefit for prophylactic antibiotics to prevent endocarditis associated with dental procedures, the Working Party considered that many clinicians would be reluctant to accept the radical, but logical, step of withholding antibiotic prophylaxis for dental procedures.
- It was therefore agreed to compromise and recommend prophylaxis only for those patients in whom the risk of developing endocarditis is high and, if infected, would carry a particularly high mortality.

Gould FK, J Antimicrob Chemother 2006;57:1035