

10:00–10:20

Duración del tratamiento antimicrobiano después de la cirugía

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Postoperative therapy of IE

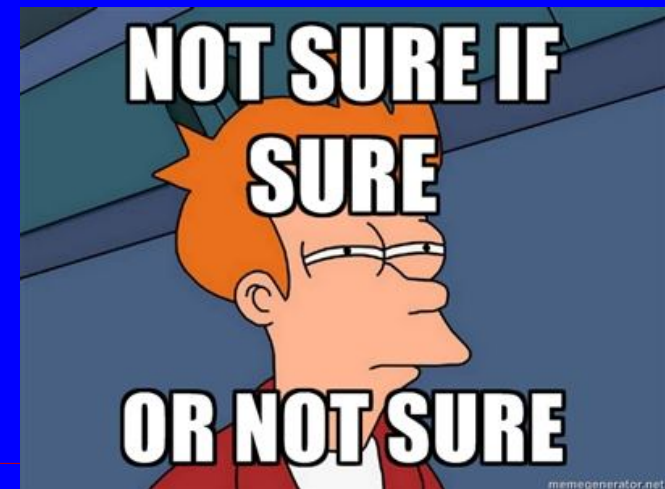
■ Recommendations

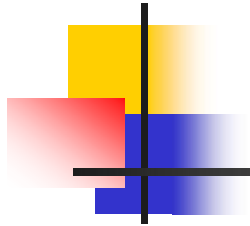
Introduction
Guidelines

■ What is a relapse?

■ Short or long therapy?

■ Could we do better?





Introduction

- Shorter treatment durations for very severe infectious diseases
 - Ventilator associated pneumonia
 - Meningococcal meningitis
 - Typhoid fever

- At least 30-50% IE are operated on
 - Infected tissue removed

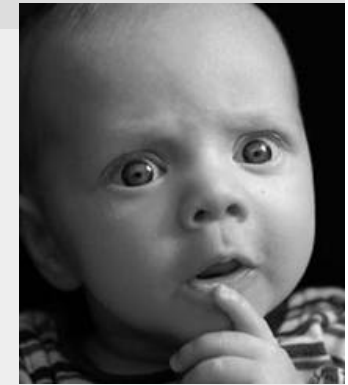


We treat IE long because ...

- IE long treatment objectives
 - Cure the episode
 - Treat detected/undetected septic lesions
 - Avoid recurrences
- We are influenced by
 - Microorganism
 - Perivalvular complications and surgical findings
 - Culture of the valve, Gram stain, histology



What to do?



	AHA	European	Mandell	Uptodate
NVE requiring valve replacement	As PVE	As NVE	-	-
Culture negative	Complete scheduled duration	Complete scheduled duration – at least 7-14 d postop	Complete scheduled duration	Complete scheduled duration
Culture positive	New full course of PVE	New full course of NVE	Complete scheduled duration	Longer than 4-6 weeks

Evaluation of antibiotic therapy following valve replacement for native valve endocarditis

H. J. Fadel • I. M. Tleyjeh • J. M. Steckelberg •
W. R. Wilson • L. M. Baddour

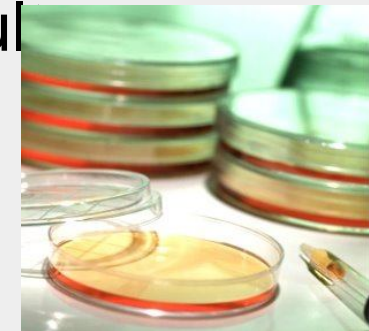
Eur J Clin Microbiol Infect Dis (2009) 28:1395–1398

- NVE operated 1970-2006
 - 52 streptococcal and 53 staphylococcal
- Different outcome if **NVE** or **PVE** regimen?
 - Postoperative monotherapy vs combination
 - Retrospective study
- **Cure rates were similar regardless of the regimen administered (NV vs PV)**

Heart Valves Should Not Be Routinely Cultured[▽]

Patricia Muñoz,^{1*} Emilio Bouza,¹ Mercedes Marín,¹ Luis Alcalá,¹ Marta Rodríguez Créixems,¹
Maricela Valerio,¹ and Angel Pinto² on behalf of the Group for the Management of
Infective Endocarditis of the Gregorio Marañón Hospital

- Careful with the interpretations of heart valves culture
 - Many false positive and negative results
- **Feeble base to make a decision**
- **True positive** valve culture
 - Match blood cultures
 - Match PCR 16S rRNA in negative BC IE



Postoperative therapy of IE

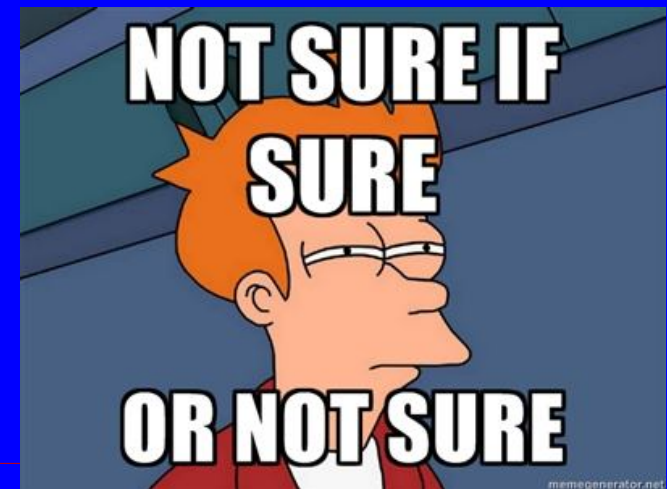
- Recommendations

- What is a relapse?

Incidence
Definition
Risk factors

- Short or long therapy?

- Could we do better?



What experience tells us ..

- Relapse of operated endocarditis is very uncommon
 - even if new valve implanted during active infection

Long-term Outcome of Infective Endocarditis in Non-Intravenous Drug Users

MANUEL MARTÍNEZ-SELLÉS, MD, PhD; PATRICIA MUÑOZ, MD, PhD; ALVARO ESTEVEZ, MD;
ROBERTO DEL CASTILLO, MD; MIGUEL ANGEL GARCÍA-FERNÁNDEZ, MD, PhD; MARTA RODRÍGUEZ-CRÉIXEMS, MD, PhD;
MAR MORENO, MD; AND EMILIO BOUZA, MD, PhD; FOR THE GAME STUDY GROUP

Mayo Clin Proc. 2008;83(11):1213-1217

6 pts (4%)
had 8
recurrences
1.3%/pt-yr

TABLE 3. Clinical Profiles of 6 Patients With Recurrent IE^{a,b}

Characteristic	Patient					
	1	2	3	4	5	6
Age (y)	61	33	79	56	70	72
Prosthetic valve	No	Yes	No	No	Yes	No
First IE						
Cardiac device-related	Yes	No	No	No	No	No
Etiology	MRSA	CNS	Enterococcus spp	CNS	CNS	Streptococcus mitans
Pharmaceutical treatment	Adequate	Adequate	Inadequate	Inadequate	Adequate	Adequate
Surgical treatment	Incomplete lead extraction	AVR	No	No	No	AVR
First recurrence						
Time after discharge (mo)	18.0	3.4	3.5	14.8	7.8	4.4
Cardiac device-related	Yes	Yes	No	No	No	No
Etiology	MSSA	CNS	Enterococcus spp	CNS	Negative BC	Enterococcus spp
Surgical treatment	Complete lead extraction	AVR ^c	No	No	No	No
Death	No	No	Yes	No	Yes	Yes
Second recurrence						
Cardiac device-related	No	Yes	NA	NA ^d	NA	NA
Etiology	MSSA	CNS	NA	NA ^d	NA	NA
Surgical treatment	No	Complete lead extraction	NA	NA ^d	NA	NA
Death	No	No	NA	NA ^d	NA	NA

Second episodes ~ 9% (0% - 23%)

Relapse vs reinfection

■ RELAPSE 1% (0% - 25%)

- Same species within 6-12 m? - 81% < 3 months
 - Incomplete therapy of primary episode

■ REINFECTION

- Other species or beyond first year

Is timing a good enough criterion?

Is relapse really a relapse?

■ DUKE data base

- Prospective cohort (Apr 1996 – Jan 1999)
 - 428 pat - 20 (4.7%) repeated IE
- Retrospective (Jan 1986 – Apr 1999)
 - Other 5 pts identified

**Legal
importance**

■ 25 pts— 13 (52%) hemodialysis

- Median time - 9.1 months (2.1 – 64 months)
- 12 pts reinfection (other species)
- Confirmed relapse (PFGE): 9/13 (69%) with same species

Relapse / Reinfection

Table 1. Comparison of clinical and molecular definitions for 13 patients who had repeat episodes of infective endocarditis (IE) due to the same species as the initial episode.

Patient	Microorganism	Predisposing comorbidity	Time between episodes, months	Clinical definition ^a	Molecular definition ^b	Surgical treatment of initial episode of IE	Outcome ^c
A	MSSA	Hemodialysis	5.0	Relapse	Confirmed relapse	No	Survived
B	MSSA	Hemodialysis	9.1	Reinfection ^d	Confirmed relapse ^d	No	Survived
C	MSSA	Hemodialysis	17	Reinfection	Confirmed reinfection	No	Survived
D	MRSA	None	2.1	Relapse	Confirmed relapse	No	Died
E	MRSA	None	2.4	Relapse	Confirmed relapse	Yes	Died
F	MRSA	Hemodialysis	2.8	Relapse	Confirmed relapse	No	Survived
G	MRSA	Hemodialysis	4.0	Relapse	Confirmed relapse	No	Survived
H	MRSA	Hemodialysis	31	Reinfection	Confirmed reinfection	Yes	Survived
I	<i>Staphylococcus epidermidis</i>	None	2.5	Relapse ^d	Confirmed reinfection ^d	No	Survived
J	<i>Enterococcus faecalis</i>	None	2.7	Relapse	Confirmed relapse	No	Survived
K	<i>E. faecalis</i>	None	2.9	Relapse	Confirmed relapse	No	Survived
L	<i>Propionibacterium acnes</i>	Congenital heart disease	24	Reinfection ^d	Confirmed relapse ^d	No	Survived
M	<i>Streptococcus sanguis</i>	Congenital heart disease	64	Reinfection	Confirmed reinfection	No	Survived

Proposed definitions

- **Confirmed relapse:** molecular analysis
- **Possible relapse:** Same species but molecular analysis *not performed*
- **Confirmed reinfection:** different species or different strain (molecular analysis)

Postoperative therapy of IE

- Recommendations

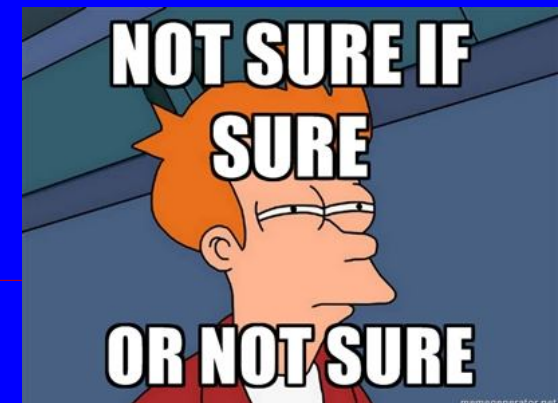
- What is a relapse?

- **Short or long therapy?**

Morris breaking the ice

Our data

- Could we do better?



Bacteriological Outcome after Valve Surgery for Active Infective Endocarditis: Implications for Duration of Treatment after Surgery

Arthur J. Morris,¹ Dragana Drinković,¹ Sudha Pottumathy,¹ Donald MacCulloch,¹ Alan R. Kerr,² and Teena West³

Departments of ¹Microbiology, ²Cardiothoracic Surgery, and ³Biostatistics, Green Lane Hospital, Auckland, New Zealand

■ Green Lane Hospital, Auckland, New Zealand

- Retrospective chart review
- 36-year period: 1963-1999
- 419 pts active IE – surgery

■ 32 second episodes (9%)

- **3 (0.8%)** relapses (95% CI, 0.2%–2.0%)
 - NOT related with
 - antibiotic treatment before or after surgery
 - positive valve culture or Gram stain
 - perivalvular infection



“Since 1994, we have reduced Ab treatment by ~ 7 days for those with **positive** valve culture results and by ~ 14 days for those with **negative** valve culture results, without any increase in the number of relapses”

Table 5. Reduction in duration of antibiotic treatment after surgery for endocarditis at Green Lake Hospital, Auckland, New Zealand, 1963– 1999.

Valve culture result, perivalvular infection	1963–1993		1994–1999		<i>P</i>
	No. of cases	Duration of antibiotic treatment after surgery, median days (interquartile range)	No. of cases	Duration of antibiotic treatment after surgery, median days (interquartile range)	
Positive					
Present	31	36 (28–42)	22	28 (21–28)	<.001
Absent	39	29 (28–41)	25 ^a	28 (21–30)	.017
Negative					
Present	63	28 (25–42)	13	14 (14–28)	<.001
Absent	112 ^b	27 (17–28)	36	14 (9–20)	<.001

NOTE. Data exclude the 17 patients for whom valve culture was not performed. There was 1 relapse in this group (in patient 2, described in table 3).

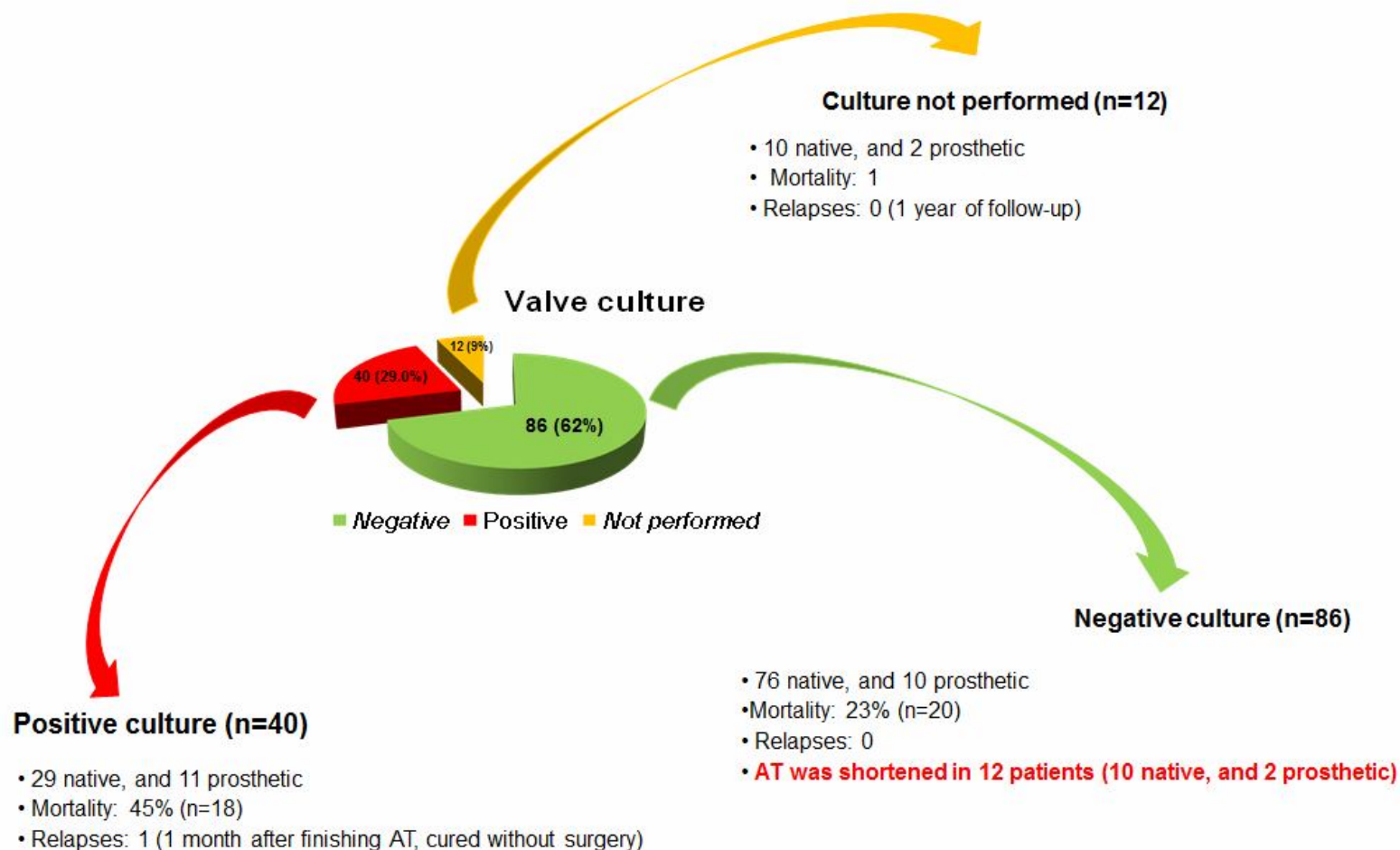
^a Includes 1 relapse (in patient 1, described in table 3).

^b Includes 1 relapse (in patient 3, described in table 3).

LENGTH OF ANTIMICROBIAL TREATMENT (AT) AFTER SURGERY FOR INFECTIVE ENDOCARDITIS (IE). A PROSPECTIVE COHORT STUDY.

N. FERNÁNDEZ-HIDALGO¹, P. TORNOS², B. ALMIRANTE¹, J. FRANCISCO-PASCUAL², M. GALIÑANES³, J.M. GRACIA³, M.T. GONZÁLEZ-ALUJAS², A.M. PLANES⁴

¹Infectious Diseases, ²Cardiology, ³Cardiac Surgery, and ⁴Microbiology Departments. Unitat d'endocarditis. Hospital Universitari Vall d'Hebron. Barcelona, Spain.



Two weeks of postsurgical therapy may be enough for high-risk cases of endocarditis caused by *Streptococcus viridans* or *Streptococcus bovis*

P. Muñoz^{1,2,3}, M. Giannella^{1,2}, F. Scoti⁴, M. Predomingo¹, D. Puga¹, A. Pinto⁵, J. Roda⁵, M. Marin¹ and E. Bouza^{1,2,3} on behalf of the Group for the Management of Infective Endocarditis of the Gregorio Marañón Hospital (GAME)

1) Department of Clinical Microbiology and Infectious Diseases, Hospital General Universitario Gregorio Marañón, 2) Universidad Complutense, Madrid, 3) CIBER de Enfermedades Respiratorias (CIBERES), Palma de Mallorca, Spain, 4) Department of Infectious Diseases, S. Martino Hospital and University of Genova, Genova, Italy and 5) Cardiovascular Surgery, Hospital General Universitario Gregorio Marañón, Madrid, Spain

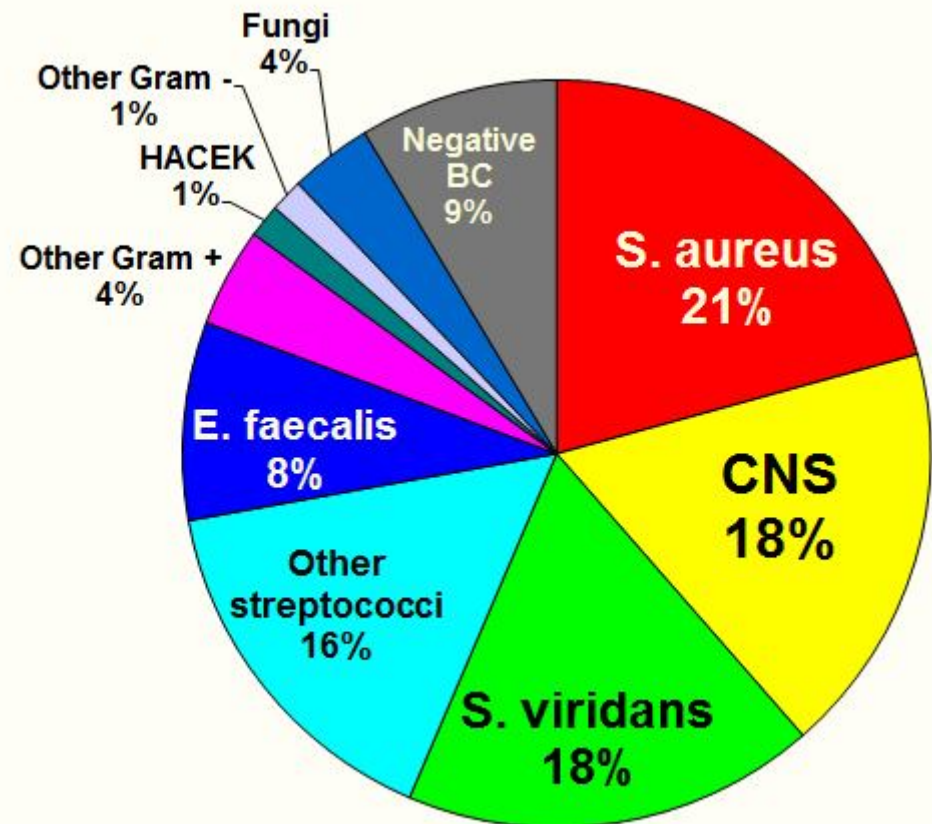
- Episodes of IE were identified prospectively
 - Operated on 1994-2008
- Goal
 - Outcome and postop therapy in patients with **high risk of relapse**
 - Short AT (≤ 20 d) vs Long AT (> 20 d)
- **High risk patients:** any of ...
 - < 2 wks AT before surgery
 - Embolism
 - Perivalvular extension (abscesses, pseudoaneurysm, perforation and dehiscence of a prosthetic valve)
 - Positive culture of valve tissue

Methods

- Therapy decided by attending physician with GAME advice
 - site, aetiology, complications of IE, valve culture and tolerance to treatment
- If repeated IE: pulsed-field gel electrophoresis
- 1 year follow-up

Results

■ Surgery: 140 patients



Overall population

123 (87.9%) valve replacement

Muñoz P. CMI 2012; 18:293-9

Variable	N = 140 (%)
Age (mean \pm SD)	59.1 \pm 15.6
Sex	
Male	90 (64.3)
Female	50 (35.7)
IE type	
Left-sided NVE	88 (62.9)
Left-sided PVE	46 (32.9)
Early < 1 year	22/46 (48)
Right-sided IE	6 (4.3)
Community-acquired	106 (75.7)
Health care-associated	34 (24.3)
Nosocomial	28/34 (82.3)
Aortic valve	82 (58.6)
Mitral valve	75 (53.6)
Both	29 (20.7)
Type of surgery	
Valve replacement	123 (87.9)
Homograft insertion	9 (6.4)
Mitral annuloplasty	4 (2.9)
Valve repair	3 (2.1)
Tricuspid annuloplasty	1 (0.7)
Mortality	
In hospital	42 (30)
After discharge	4 (2.8)
Repeated IE	
Relapse	1 (0.7)
Reinfection	4 (2.9)

Results

- High risk criteria: 133
 - <2 weeks of treatment before surgery: 107
 - Perivalvular invasion: 75
 - One or more embolic events: 58
 - Positive valve culture: 37

+

- Survive till complete programmed therapy:
92

➤ **37 SHORT treatment / 55 LONG**

Who did we choose for SAT?

	SAT group N = 37	LAT group N = 55	p
Aetiology, no. (%)			
<i>Staphylococcus aureus</i>	3 (8.1)	12 (21.8)	0.09
MRSA	0	3 (5.5)	0.27
Coagulase-negative staphylococci	4 (10.8)	13 (23.6)	0.17
<i>Streptococcus viridans</i>	16 (43.2)	3 (5.5)	<0.001
<i>Streptococcus bovis</i>	5 (13.5)	2 (3.6)	0.11
<i>Enterococcus faecalis</i>	3 (8.1)	5 (9.1)	1
<i>Candida</i> spp.	0	2 (3.6)	0.51
Antibiotic treatment			
Days of ABT after surgery (median (IQR))	15 (14–15)	32 (24–42)	<0.001
Use of aminoglycoside, no. (%)	28 (75.7)	34 (61.8)	0.18

81% SAT
received < 2
wks of Abs

before surgery

Who did we choose for SAT in real life?

	SAT group N = 37	LAT group N = 55	p
Demographic data			
Age (years) (mean \pm SD)	56.8 \pm 17.9	57.8 \pm 16.2	0.76
Male, no. (%)	21 (56.8)	41 (74.5)	0.11
Female, no. (%)	16 (43.2)	14 (25.5)	
Underlying conditions			
None, no. (%)	9 (24.3)	6 (10.9)	0.15
Diabetes mellitus, no. (%)	6 (16.7)	7 (12.7)	0.76
Cancer, no. (%)	0	6 (10.9)	0.08
HIV infection, no. (%)	3 (8.1)	3 (5.5)	0.68
Haemodialysis, no. (%)	0	5 (9.1)	0.08
Charlson comorbidity index (median (IQR))	3 (1–4)	3 (2–5)	0.09
Predisposing conditions, no. (%)			
Previous valve disease	18 (48.6)	30 (54.5)	0.67
Endocavitary device	1 (2.7)	12 (21.8)	0.01
Current IV drug use	1 (2.7)	6 (10.9)	0.23
Congenital heart disease	5 (13.5)	0	0.009
Previous IE	2 (5.4)	4 (7.3)	1

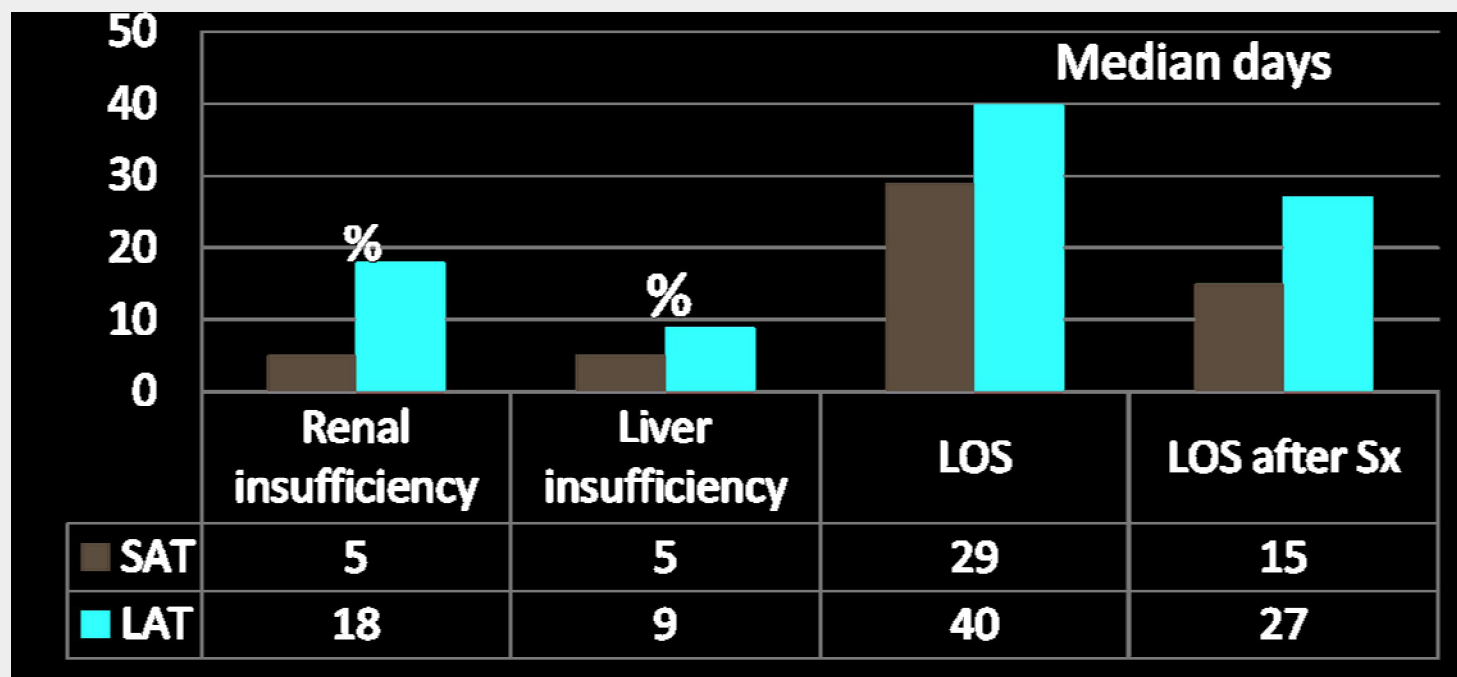
Who did we choose for SAT?

	SAT group N = 37	LAT group N = 55	p
Left-sided NVE	29 (78.4)	31 (56.4)	0.04
Left-sided PVE	8 (21.6)	19 (34.5)	0.24
Early, <1 year	3 (37.5)	6 (31.6)	1
Right-sided IE	0	5 (9.1)	0.08
Community-acquired	35 (94.6)	44 (80)	0.06
Healthcare-associated	2 (5.4)	11 (20)	0.06
Nosocomial	2 (5.4)	8 (14.5)	0.31
Aortic valve	19 (51.4)	35 (63.6)	0.28
Mitral valve	21 (56.8)	23 (41.8)	0.2
Both	4 (10.8)	12 (21.8)	0.26
High-risk variables, no. (%)			
Positive valve culture	5 (13.5)	19 (38.8)	0.01
≤2 weeks of ABT	30 (81.1)	45 (81.8)	1
before surgery			
Embolic events	14 (37.8)	25 (45.5)	0.83
CNS	8 (21.6)	15 (27.3)	0.63
Skin	6 (16.2)	13 (23.6)	0.44
Liver	1 (2.7)	5 (9.1)	0.39
Bone	3 (8.1)	5 (9.1)	1
Ocular	0	4 (7.3)	0.14
Perivalvular extension	20 (54.1)	28 (50.9)	0.83
Abscess	11 (29.7)	20 (36.4)	0.65
Valve perforation	11 (29.7)	6 (10.9)	0.03
Pseudoaneurysm	2 (5.4)	0	0.16
Dehiscence of prosthetic valve	4 (10.8)	9 (16.4)	0.55

Independent differences of S vs L therapy

	Adjusted OR (95% CI)	p
IE caused by <i>Streptococcus viridans</i>	16.06 (3.80–67.92)	<0.001
IE caused by <i>Streptococcus bovis</i>	6.21 (1.02–37.62)	0.047
Positive result of valve culture	0.22 (0.06–0.83)	0.025
Positive result of valve culture	0.55 (0.09–0.83)	0.052

Outcome



Similar mortality and relapse rates

	SAT group N = 37	LAT group N = 55	p
Mortality after discharge	2 (5.4)	2 (3.6)	1
Relapse	0	1 (1.8)	1
Reinfection	2 (5.4)	2 (3.6)	1

- Active IVDU 1 year after 1st episode
- Both *MSSA*, different fingerprinting

- 1st episode: Mitral IE by *A. urinae* (operated + 2 wks ceftriaxone). Persistent prostatic hypertrophy
- +10 mm dehiscence of the prosthetic valve, *S. agalactiae* BSI +obstructive renal failure
- Second VR and transurethral prostatic resection. Cured

Similar mortality and relapse rates

	SAT group N = 37	LAT group N = 55	p
Mortality after discharge	2 (5.4)	2 (3.6)	1
Relapse	0	1 (1.8)	1
Reinfection	2 (5.4)	2 (3.6)	1

- **1 relapse**
 - Prosthetic AV aortic valve IE (*S. epidermidis*) – Surgery and 4-week therapy
 - + 3 months possible relapse
 - Isolates were not available

- **Two re-infections** within 6 months
 - *S. viridans* -> *E. gallinarum*
 - *S. epidermidis* -> *S. bovis*

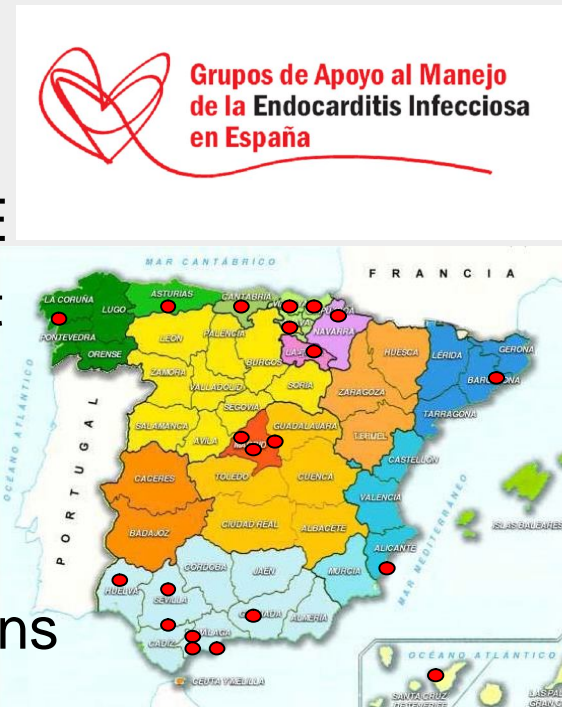
Short therapy in culture positive patients

Sex/age	U. disease	Type of IE	Etiology	Days of therapy before	Embolism	Perivalv extension	Outcome
M/57	No	Ao Nat	<i>S. viridans</i>	0	No	No	MVR - cure
M/41	IVDU	M	<i>E.</i>	2	No	Yes	MVR - cure
F/19	Bicuspid valve	Ao Nat	<i>S. viridans</i>	0	No	Yes	MVR- cure
M/28	IVDU	M Nat	<i>MSSA</i>	14	Skin lesion	Yes	MVR– cure reinfection after 1yr
F/35	No	M Nat	<i>S. mitis</i>	1	No	No	Cure

GAMES study group

Spanish Collaboration on Endocarditis

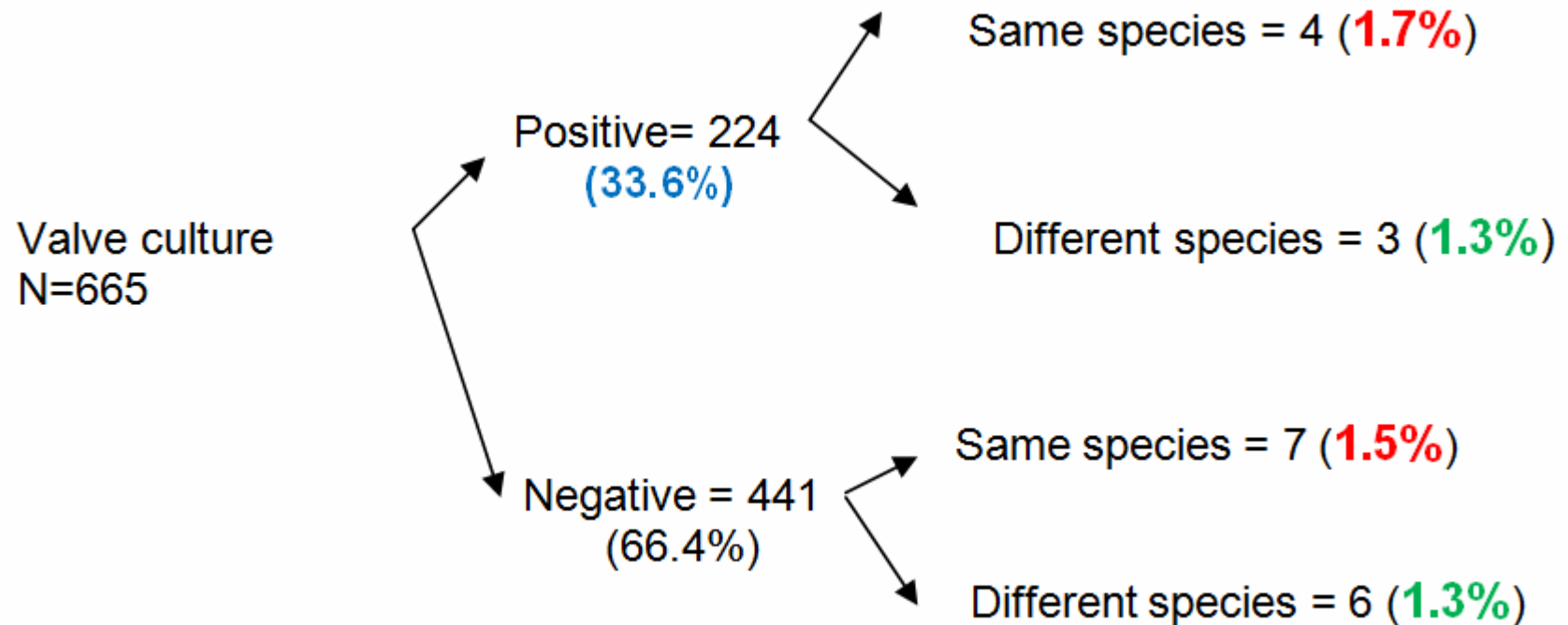
- **21 hospitals of different sizes**
 - multidisciplinary teams
 - prospective consecutive episodes of IE
 - 150 healthcare providers from different specialties
 - Ethics committee approval
- **Pre-established protocol**
- **Standard diagnostic criteria** and definitions
- Data collection started in **Jan 2008**
- Reports centralized in the **coordinating center** (HGUGM)



GAMES series

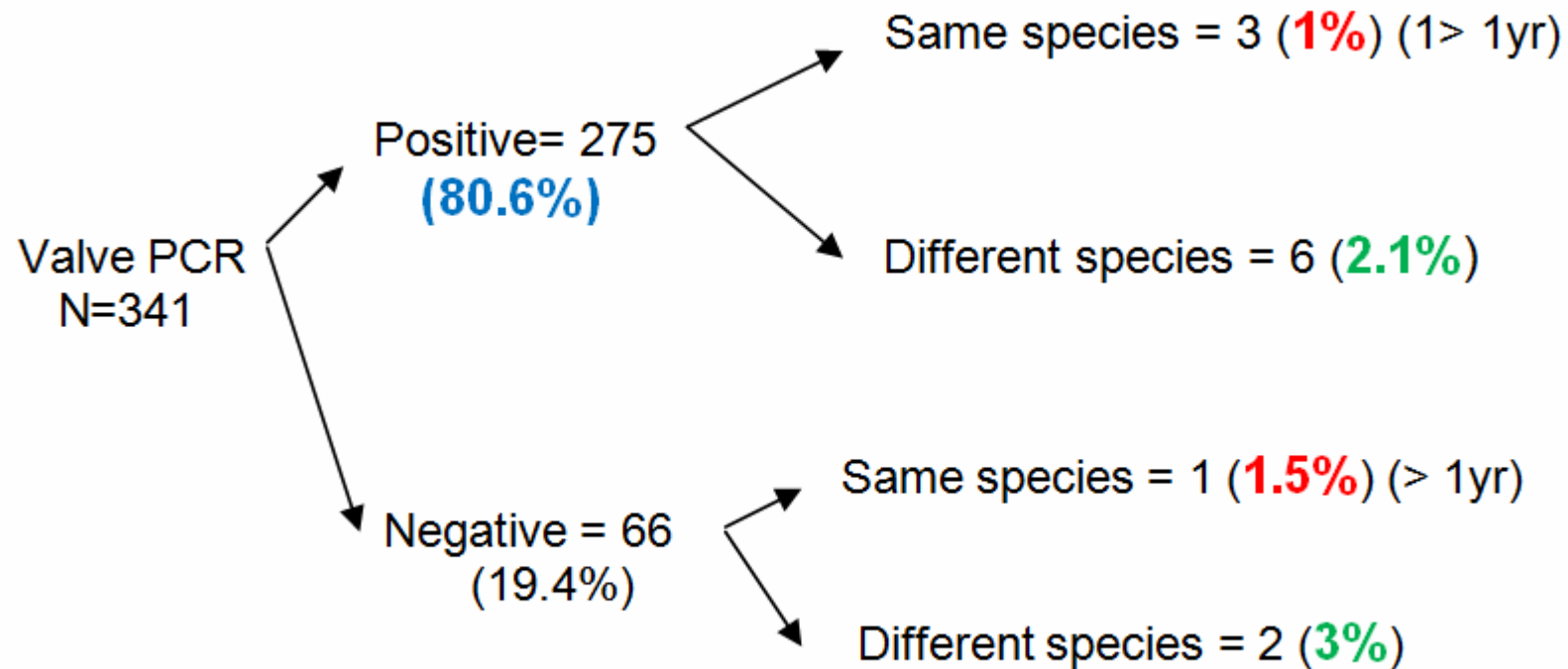
- 1,956 patients - **879 (44.9%)** operated on and **675 (76.8%)** survived
 - Median postsurgical therapy: 36.5 d
 - **≤ 2 wks: 116 (17.2%)**
 - 2-4 wks: 212 (31.4%)
 - 4- 6 wks: 209 (31%)
 - > 6 wks: 47 (7%)

GAMES series. Valve culture and 2nd episodes



NO relationship with time of postoperative therapy

GAMES series. Valve PCR



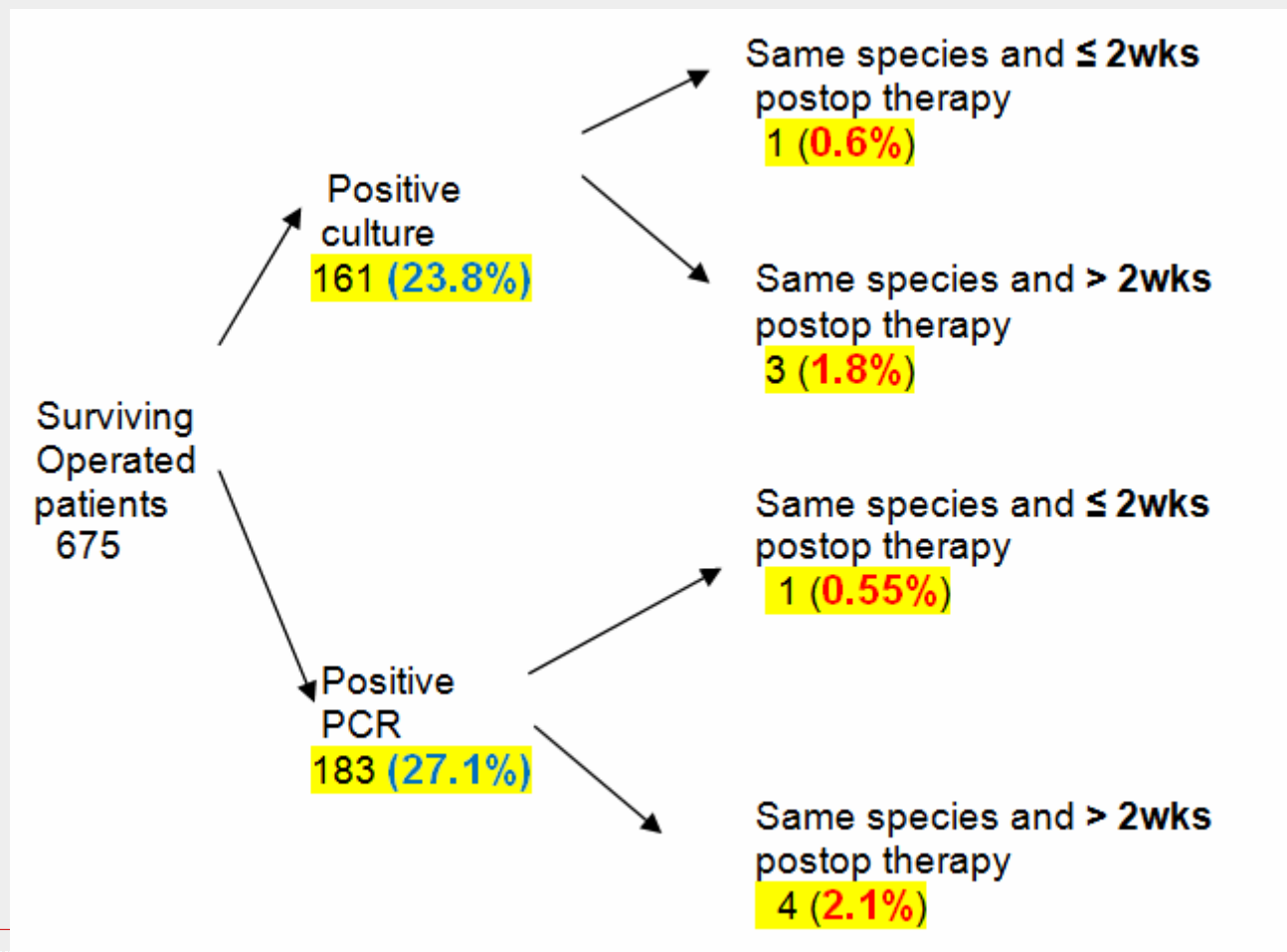
GAMES series.

Surgical patients surviving the episode

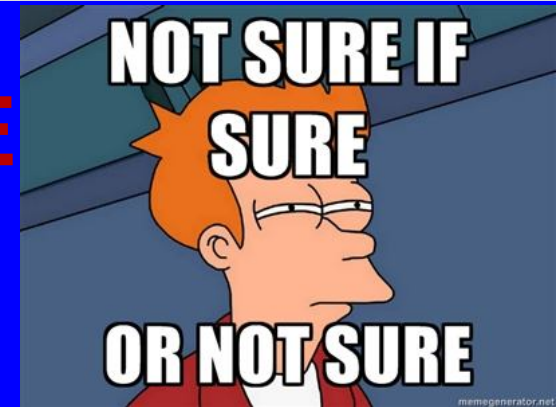
	≤ 2 wks postop therapy	> 2 wks postop therapy	p
Etiology			
<i>Streptococcus</i> spp.	43 (37.1)	126 (26.9%)	.03
<i>Staphylococcus</i> spp.	33 (28.4)*	161 (34.4%)	.23
<i>Enterococcus</i> spp.	14 (12.1)	64 (13.7%)	.65
Recurrence 1 year	5 (4%)	18 (3.8%)	.82
Same species	3 (2.5%)	9 (1.9%)	.23
First six months	3 (2.5%)	10 (2.1%)	.92
Different species	2 (1.7%)	9 (1.9%)	.23

*15 *S. aureus*

and short Postoperative therapy in surviving patients



Postoperative therapy of IE



- Recommendations
- What is a relapse?
- Short or long therapy?
- Could we do better?

Multicentric clinical trial

- Badly needed
- Inclusion criteria
 - Surgery
 - Culture negative
 - Culture positive??
- Exclusion criteria
 - Hemodialysis, IVDU ??
- Septic metastases – PET?

We may be ignoring many distant foci

Preliminary Results of a Prospective Ongoing Study.

M. Kestler¹, P. Muñoz¹, M. Rodríguez-Creixems¹, F. Jimenez², A. Rotger², A. Mari², J. Orcajo², J.C. Alonso² and E. Bouza¹.

1: Microbiology and Infectious Diseases Department. 2: Nuclear Medicine Department. Instituto de Investigación Sanitaria Gregorio Marañón. Hospital General Universitario Gregorio Marañón. Madrid, Spain. Calle Doctor Esquerdo 46, 28007. Madrid, Spain. Phone: (0034) 915868453 E-mail: kestler.martha@gmail.com



- PET-CT showed ≥ 1 lesions in 28/34 patients (**82.3%**)
- **Major clinical impact** in 15 cases (**44.1%**)
- PET-CT was the **first diagnostic technique** in 15/24 true positives (**62.5%**)
- **Infectious complications** were detected in **58.8%** of IE patients and **only 40% had related signs or symptoms.**



11 infections (**55%**), were only disclosed by
PET/CT

ICE: Future Projects

Determining the Optimal Duration of Antibiotic therapy following Valve Surgery for IE

❖ ICE prospective observational study

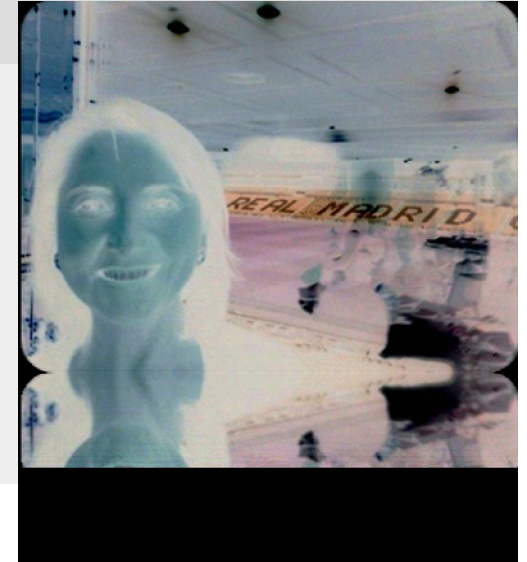
- status: applying for funding
- anticipated start date: Fall 2014
- contacts: Vivian Chu, Khaula Baloch

❖ DASIE: randomized clinical trial

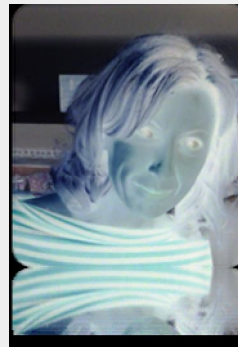
- **status: planning phase 2013-2014 (NIH grant)**
- protocol being finalized
- sending out site questionnaires
- site recruitment
- application for execution of trial 2014
- contacts: Vivian Chu, Suzanne Aycok

Conclusions

- Relapse is very very uncommon in operated patients
- We can probably reduce significantly the postoperative antimicrobial therapy of IE
- The population needs to be defined



Thank you very much



AHA Guidelines

Level of Evidence: A). Other recommendations (Class IIa, Level of Evidence: C) listed herein are based largely on in vitro data and consensus opinion and include the following 3 criteria. First, the counting of days of recommended duration of therapy should begin on the first day on which blood cultures were negative in cases in which blood cultures were initially positive. At least 2 sets of blood cultures should be obtained every 24 to 48 hours until bloodstream infection is cleared. Second, for patients with native valve endocarditis who undergo valve resection with prosthetic valve replacement, the postoperative treatment regimen should be one that is recommended for prosthetic valve treatment rather than one that is recommended for native valve treatment. If the resected tissue is culture positive, then an entire course of antimicrobial therapy is recommended after valve resection. If the resected tissue is culture negative, then the recommended duration of prosthetic valve treatment should be given less the number of days of treatment administered for native valve infection before valve replacement. Third, in

- Native Valve endocarditis that require VR
 - Postop treatment of PVE
 - Resected tissue culture positive: entire course of AB therapy
 - Resected tissue culture negative: entire course of PVE minus days of pre-op treatment

European guidelines

Drug treatment of PVE should last longer (at least 6 weeks) than that of native valve endocarditis (NVE) (2–6 weeks), but is otherwise similar, except for staphylococcal PVE where the regimen should include rifampin whenever the strain is susceptible.

In NVE needing valve replacement by a prosthesis during antibiotic therapy, the post-operative antibiotic regimen should be that recommended for NVE, not for PVE. In both NVE and PVE, the duration of treatment is based on the first day of effective antibiotic therapy, not on the day of surgery. After surgery, a new full course of treatment should only start if valve cultures are positive,^{109a} the choice of antibiotic being based on the susceptibility of the latest recovered bacterial isolate.

- In NVE needing VR, the post-op AB regimen should be that recommended for NVE, **not for PVE.**

If **valve cultures are positive**: a **new full course** of treatment

If **valve cultures are negative**: **completion** of the prescheduled course

Mandell



SECTION G CARDIOVASCULAR INFECTIONS

Endocarditis and Intravascular Infections

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usually was controlled easily with medical therapy. Organisms visible on Gram stain, positive cultures, or annular abscesses at the time of surgery are associated with late complications.⁶⁹¹ Although the topic has not been systematically studied, most authorities suggest that, if there is evidence of active IE at the time of valve replacement surgery, antibiotic therapy should be continued postoperatively for at least several weeks. Such evidence might include vegetations that remain

If the prosthetic valve has to be replaced and the resected cardiac tissue is culture positive, an entire course of antimicrobial therapy is recommenced, discounting the duration of treatment before valve surgery. There has been no report to date that antibiotic resistance

ANTIBIOTIC THERAPY FOLLOWING SURGERY — Following valve replacement or surgical removal of vegetations with valve repair for active bacterial endocarditis, antibiotics should be continued for at least the planned duration of therapy (four to six weeks) with longer therapy if cultures of the surgically-removed tissue are positive.

The 2004 European Society of Cardiology (ESC) guidelines on infective endocarditis recommend another full course of antimicrobial treatment if the valve culture obtained at surgery is positive [10]. If the culture is negative, the ESC recommends that the full treatment course be completed (counting the duration of preoperative antibiotics), but stipulate that treatment should be continued for at least 7 to 15 days postoperatively. The rate of relapse after surgery following such a regimen is very low (3 of 358 patients) in one report [58].