Epidémiologie de l'endocardite infectieuse

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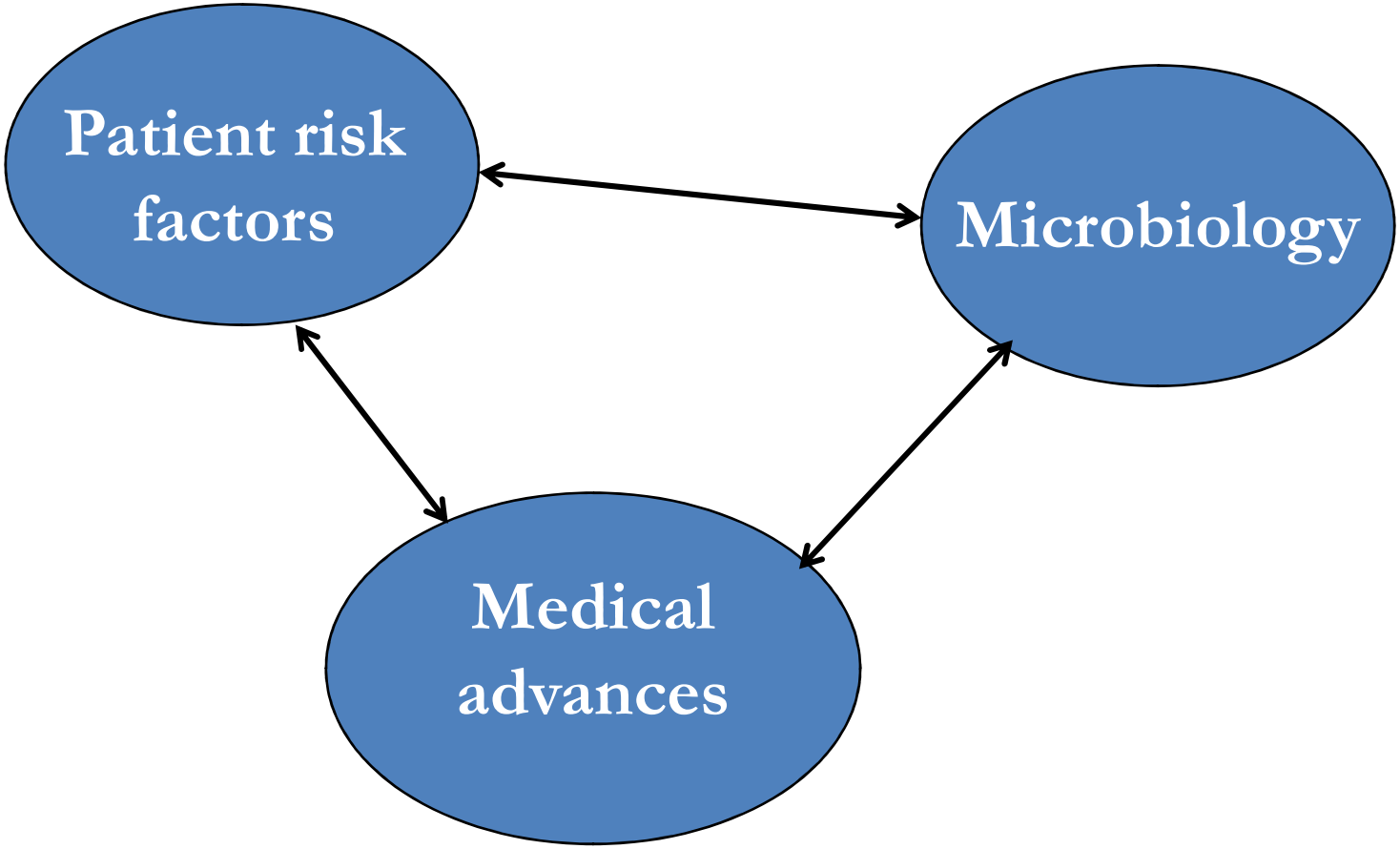
cours de collège infectiologie Sousse le27/02/2013

ENDOCARDITIS

- There is a change in epidemiology
- Clinical features of IE remains classical
- Diagnosis of IE is difficult to confirm
- IE Treatment has been optimized
- IE Prophylaxis will have no/exceptional Indications

Changing Epidemiology of Endocarditis



Clinical Presentation, Etiology, and Outcome of Infective Endocarditis in the 21st Century

The International Collaboration on Endocarditis–Prospective Cohort Study

David R. Murdoch, MD, MSc; G. Ralph Corey, MD; Bruno Hoen, MD; José M. Miró, MD, PhD; Vance G. Fowler Jr, MD, MHS; Arnold S. Bayer, MD; Adolf W. Karchmer, MD; Lars Olaison, MD, PhD; Paul A. Pappas, MS; Philippe Moreillon, MD, PhD; Stephen T. Chambers, MD, MSc; Vivian H. Chu, MD, MHS; Vicenç Falcó, MD; David J. Holland, MB, ChB, PhD; Philip Jones, MD; John L. Klein, MD; Nigel J. Raymond, MB, ChB; Kerry M. Read, MB, ChB; Marie Francoise Tripodi, MD; Riccardo Utili, MD; Andrew Wang, MD; Christopher W. Woods, MD, MPH; Christopher H. Cabell, MD, MHS; for the International Collaboration on Endocarditis–Prospective Cohort Study (ICE-PCS) Investigators

Background: We sought to provide a contemporary picture of the presentation, etiology, and outcome of infective endocarditis (IE) in a large patient cohort from multiple locations worldwide.

Methods: Prospective cohort study of 2781 adults with definite IE who were admitted to 58 hospitals in 25 countries from June 1, 2000, through September 1, 2005.

Results: The median age of the cohort was 57.9 (interquartile range, 43.2-71.8) years, and 72.1% had native valve IE. Most patients (77.0%) presented early in the disease (<30 days) with few of the classic clinical hallmarks of IE. Recent health care exposure was found in one-quarter of patients. *Staphylococcus aureus* was the most common pathogen (31.2%). The mitral (41.1%) and aortic (37.6%) valves were infected most commonly. The following complications were common: stroke (16.9%), embolization other than stroke (22.6%), heart failure (32.3%), and intracardiac abscess (14.4%). Surgical therapy was common (48.2%), and in-hospital mortality remained high (17.7%). Prosthetic valve involvement (odds ratio, 1.47; 95% confidence interval, 1.13-1.90), increasing age (1.30; 1.17-1.46 per 10-year interval), pulmonary edema (1.79; 1.39-2.30), *S aureus* infection (1.54; 1.14-2.08), coagulase-negative staphylococcal infection (1.50; 1.07-2.10), mitral valve vegetation (1.34; 1.06-1.68), and paravalvular complications (2.25; 1.64-3.09) were associated with an increased risk of in-hospital death, whereas viridans streptococcal infection (0.52; 0.33-0.81) and surgery (0.61; 0.44-0.83) were associated with a decreased risk.

Conclusions: In the early 21st century, IE is more often an acute disease, characterized by a high rate of *S aureus* infection. Mortality remains relatively high.

Arch Intern Med. 2009;169(5):463-473

What is the Burden of Disease?

- Usual incidence 2-7 cases/100,000 person-years
  - Diagnostic criteria and reporting variable
  - Only 20% of clinically diagnosed cases definite IE
- 10-20,000 new cases/year in US
- No significant change in overall incidence last 30 years

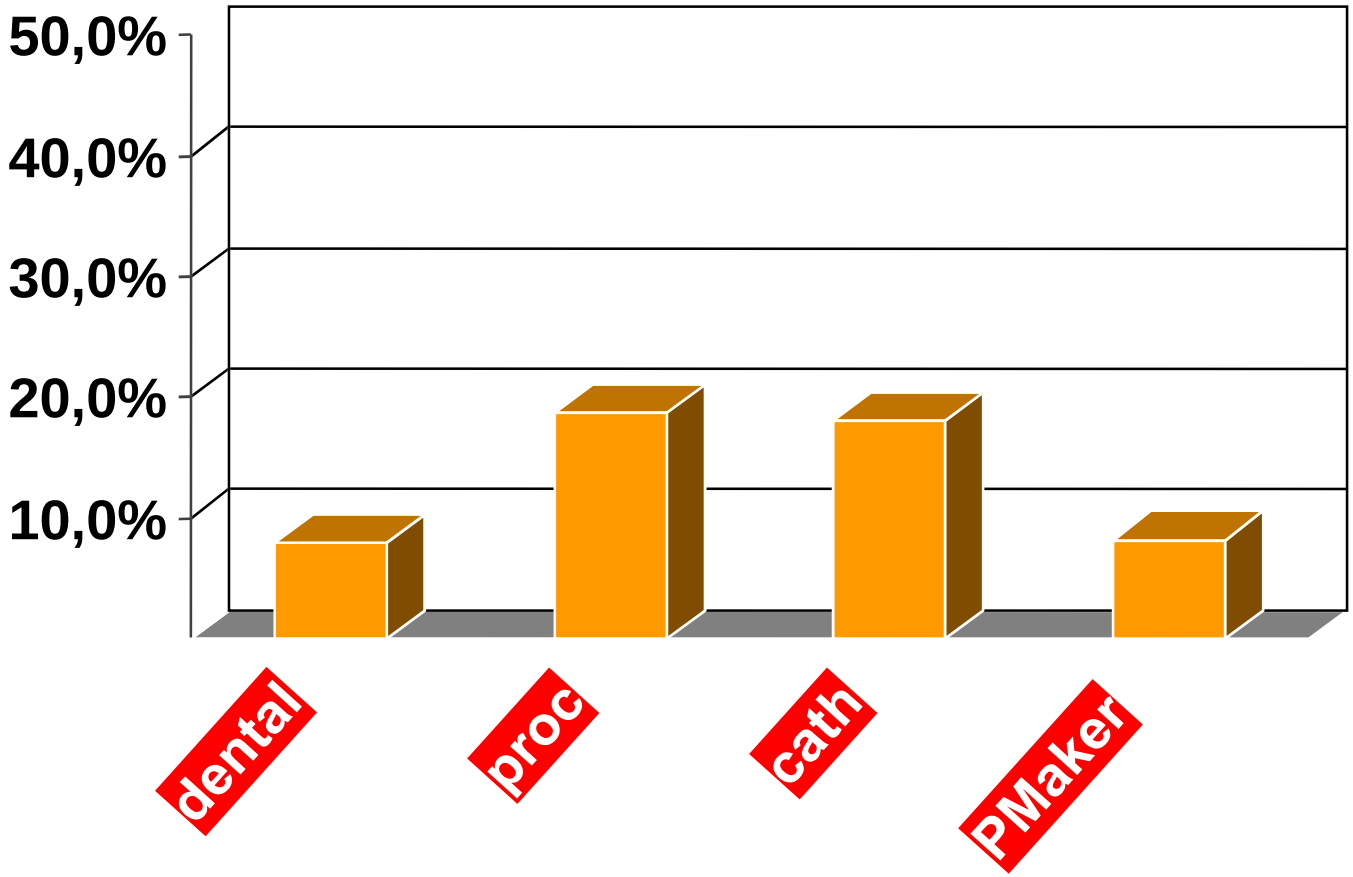
Murdoch. Arch Intern Med. 2009;169.

Table 2. Baseline Characteristics and Predisposing Conditions in 2781 Patients With Definite Endocarditis[a]

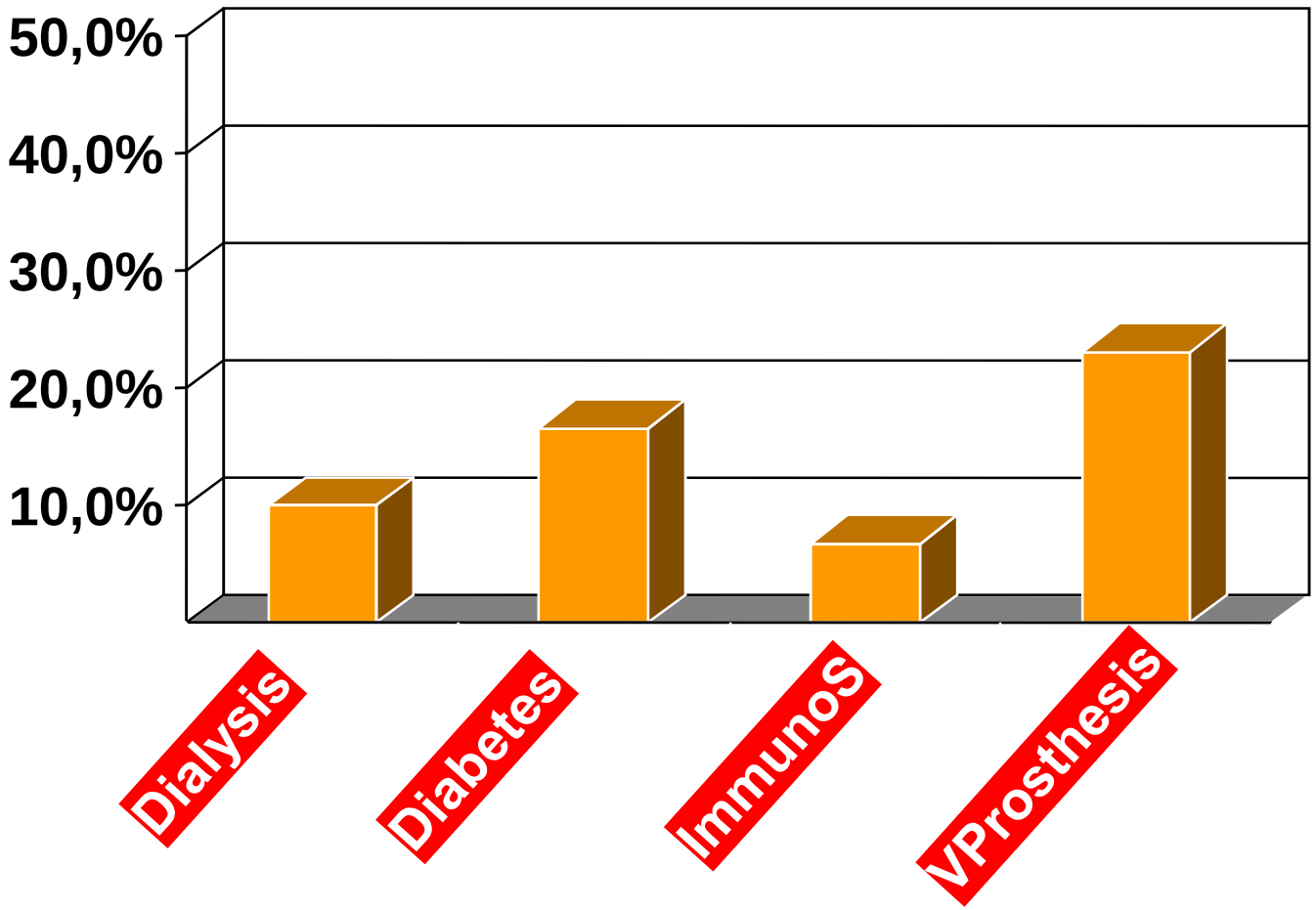
	Total Cohort	Patients Admitted Directly to Study Sites Only[b]	Region				*P* Value for the Difference in Regions
			North America	South America	Europe	Other	
Baseline characteristics							
Age, median (IQR), y	57.9 (43.2-71.8)	59.8 (44.2-73.1)	52.9 (44.1-66.4)	56.8 (40.3-70.4)	61.4 (45.1-72.7)	58.0 (40.5-72.9)	<.001
Male	1889/2777 (68)	1045/1556 (67)	388/596 (65)	179/254 (70)	873/1212 (72)	449/715 (63)	<.001
First sign to admission <1 mo	2088/2711 (77)	1201/1529 (79)	496/582 (85)	166/244 (68)	896/1174 (76)	530/711 (75)	<.001
Hemodialysis	220/2777 (8)	130/1556 (8)	124/596 (21)	20/254 (8)	49/1210 (4)	27/717 (4)	<.001
Diabetes mellitus	447/2764 (16)	261/1550 (17)	158/592 (27)	25/253 (10)	169/1207 (14)	95/712 (13)	<.001
HIV positive	58/2748 (2)	41/1540 (3)	16/594 (3)	4/236 (2)	33/1211 (3)	5/707 (0.7)	.02
Cancer	230/2772 (8)	160/1553 (10)	52/596 (9)	15/251 (6)	101/1210 (8)	62/715 (9)	.56
IE type							.05
Native valve	1901/2636 (72)	1048/1471 (71)	411/573 (72)	167/246 (68)	860/1166 (74)	463/651 (71)	
Prosthetic valve	563/2636 (21)	321/1471 (22)	116/573 (20)	66/246 (27)	227/1166 (20)	154/651 (24)	
Pacemaker/ICD	172/2636 (7)	102/1471 (7)	46/573 (8)	13/246 (5)	79/1166 (7)	34/651 (5)	
Predisposing conditions							
Current IV drug use	268/2746 (10)	157/1540 (10)	93/587 (16)	1/249 (0.4)	113/1203 (9)	61/707 (9)	<.001
Previous IE	222/2780 (8)	138/1557 (9)	66/596 (11)	26/254 (10)	84/1213 (7)	46/717 (6)	.003
Invasive procedure within 60 d	690/2581 (27)	392/1463 (27)	162/508 (32)	64/247 (26)	289/1145 (25)	175/681 (26)	.03
Chronic IV access	244/2763 (9)	142/1548 (9)	148/595 (25)	12/251 (5)	56/1205 (5)	28/712 (4)	<.001
Endocavitary device							
Pacemaker	262/2752 (10)	146/1540 (9)	55/595 (9)	23/252 (9)	137/1191 (12)	47/714 (7)	.005
ICD	27/2720 (1)	15/1521 (1)	16/593 (3)	0/249 (0)	8/1172 (0.7)	3/706 (0.4)	<.001
Congenital heart disease	311/2656 (12)	167/1481 (11)	62/582 (11)	53/244 (22)	111/1156 (10)	85/674 (13)	<.001
Native valve predisposition	884/2761 (32)	538/1547 (35)	147/596 (25)	93/252 (37)	370/1201 (31)	274/712 (38)	<.001

Only 3.3% had rheumatic valve disease

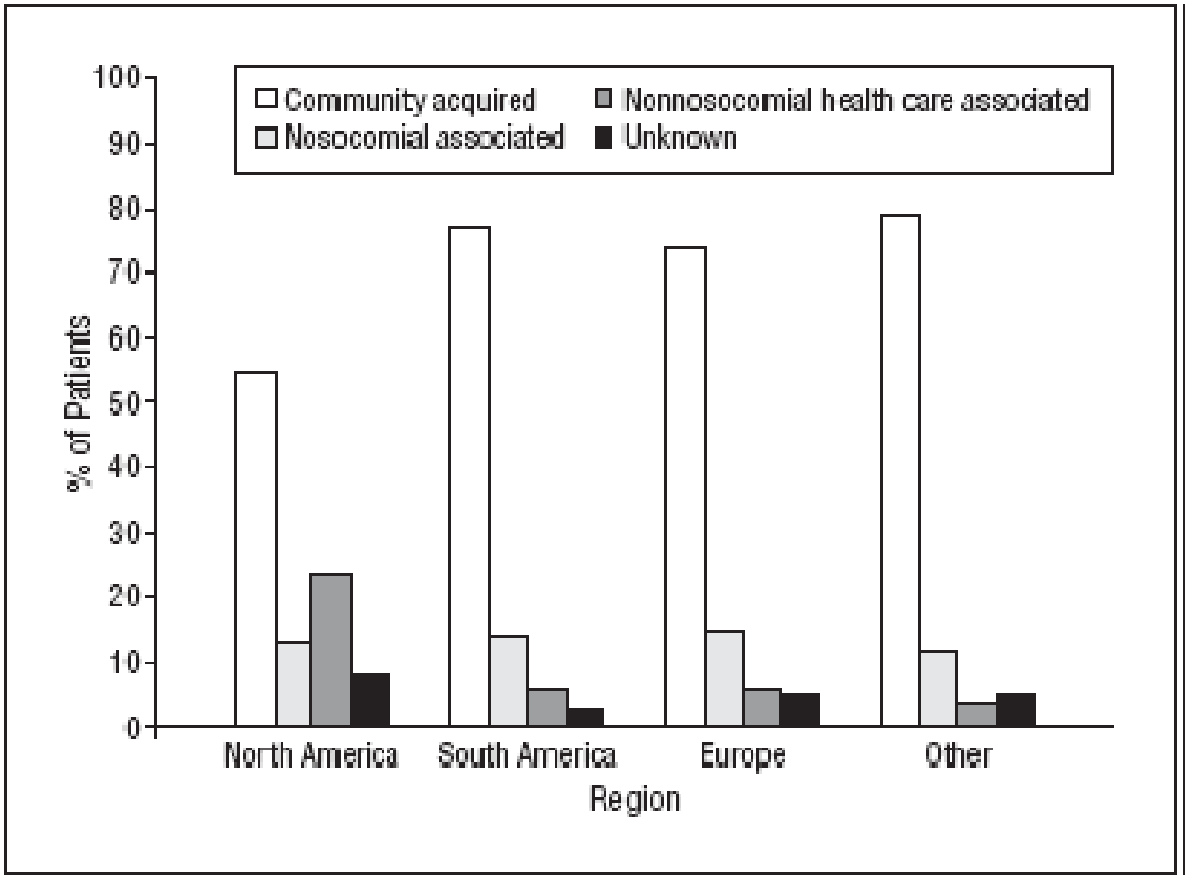
Exposures - Now:
ICE/ PCS



Host Factors / Exposures - ICE PCS



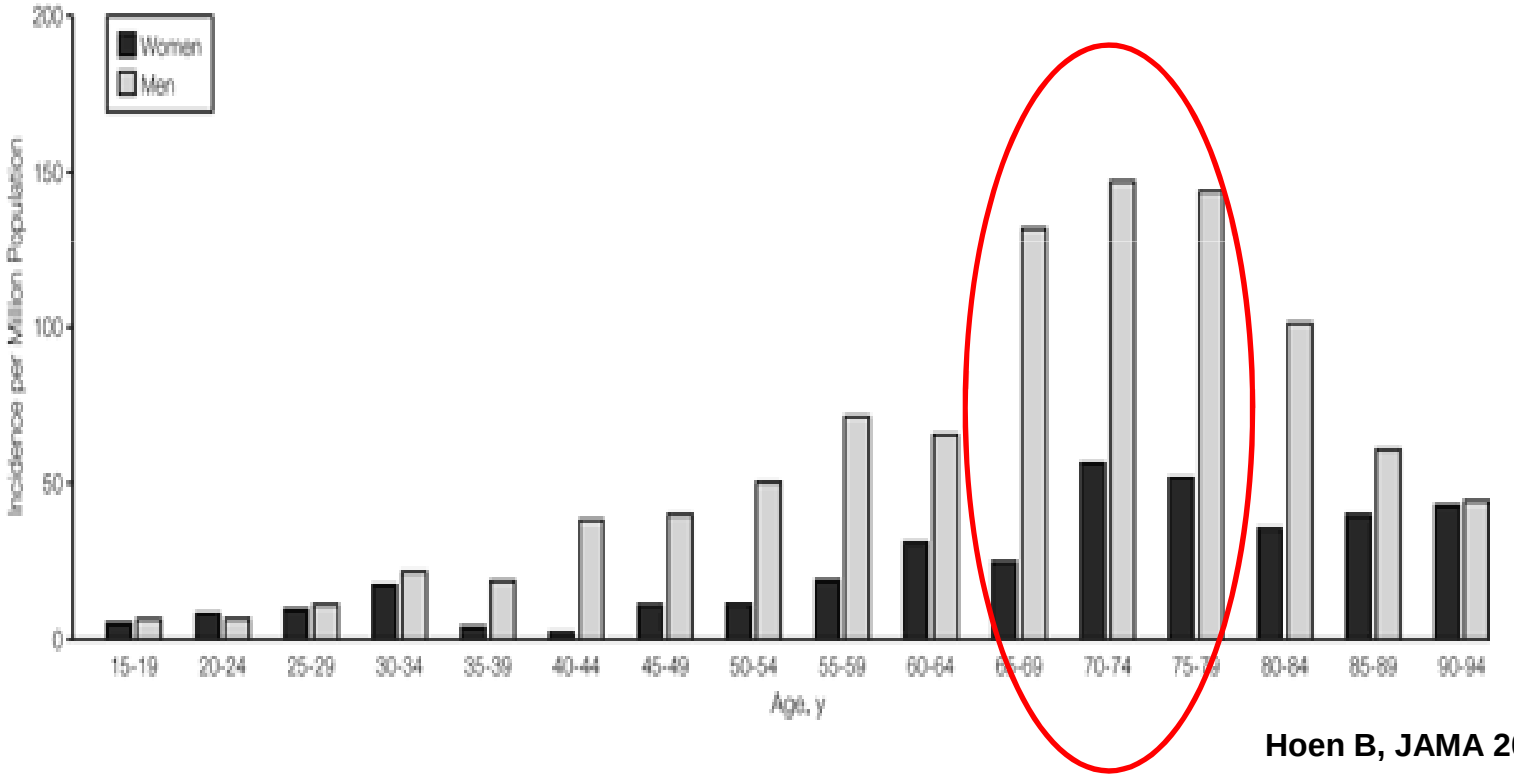
Health-Care Associated IE



DistribClinical and Laboratory Findings of 2781 Patients with Definite Endocarditisution of location of acquisition of 2781 patients with definite endocarditis

Murdoch. Arch Intern Med. 2009;169

Incidence of Infective Endocarditis by Age and Sex in the Study Population.



Hoen B, JAMA 2002

Hoen et al, JAMA 2002;288:75-81

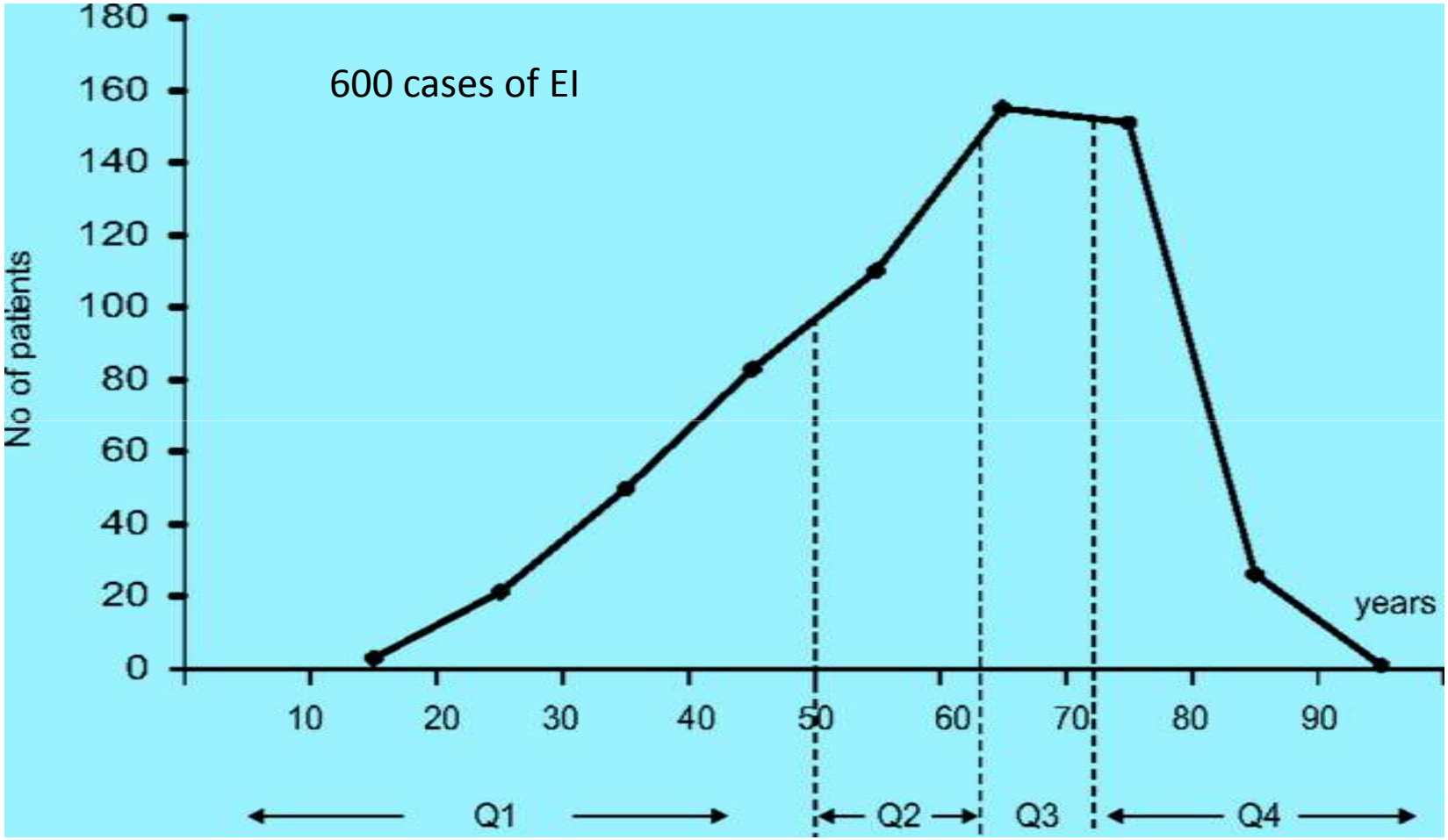
Aspects épidémiologiques

Étude multicentrique en 1999 par l ’AEPEI

- 6 régions françaises: 26% de la population
- 16 millions d ’habitants
- 817 pts avec endocardite présumée
- **390 endocardites certaines** selon la classification de Duke
- 277 hommes/113 femmes: **59.5** ± 17.2 ans

Incidence: 31 cas/million d ’habitants

Figure 1. Patient distribution by age-specific quartiles (Q).



López J et al. Circulation 2010;121:892-897

American Heart Association
Learn and Live

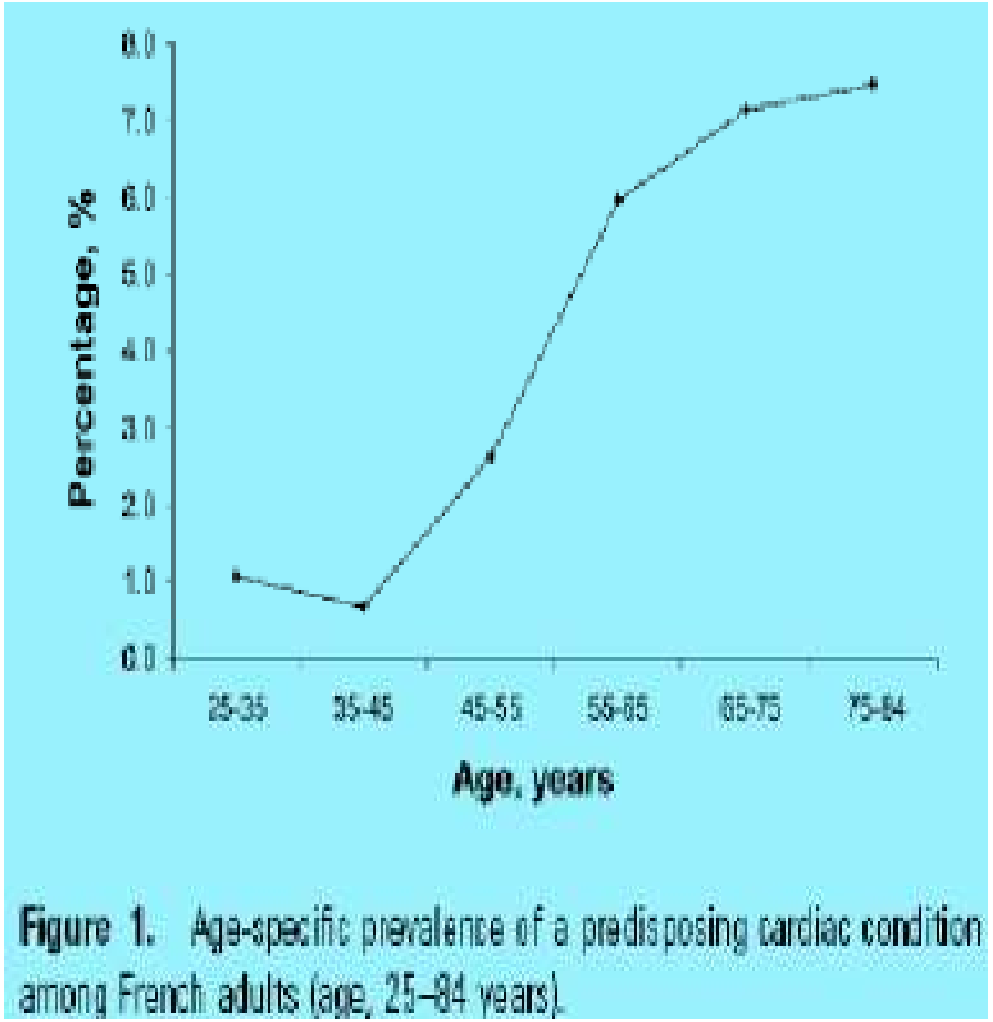


Figure 1. Age-specific prevalence of a predisposing cardiac condition among French adults (age, 25–84 years).

X. Duval Clin Infect Dis 2006 15;42:102-7

EPIDEMIOLOGY ·Multicentic study France 1999

Table 1. Distribution of Underlying Heart Disease in Patients (N = 390) With Infective Endocarditis

	No. (%)
Native valve disease*	119 (31)
Left heart	112 (91)
Right heart	6 (5)
Both sides	1 (1)
Prosthetic valve	63 (16)
Congenital heart disease	4 (1)
Unspecified heart murmur	19 (5)
No previously known underlying heart disease	185 (47)

Hoen et al, JAMA 2002;288:75-81

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Temporal Trends in Infective Endocarditis in the Context of Prophylaxis Guideline Modifications

Three Successive Population-Based Surveys

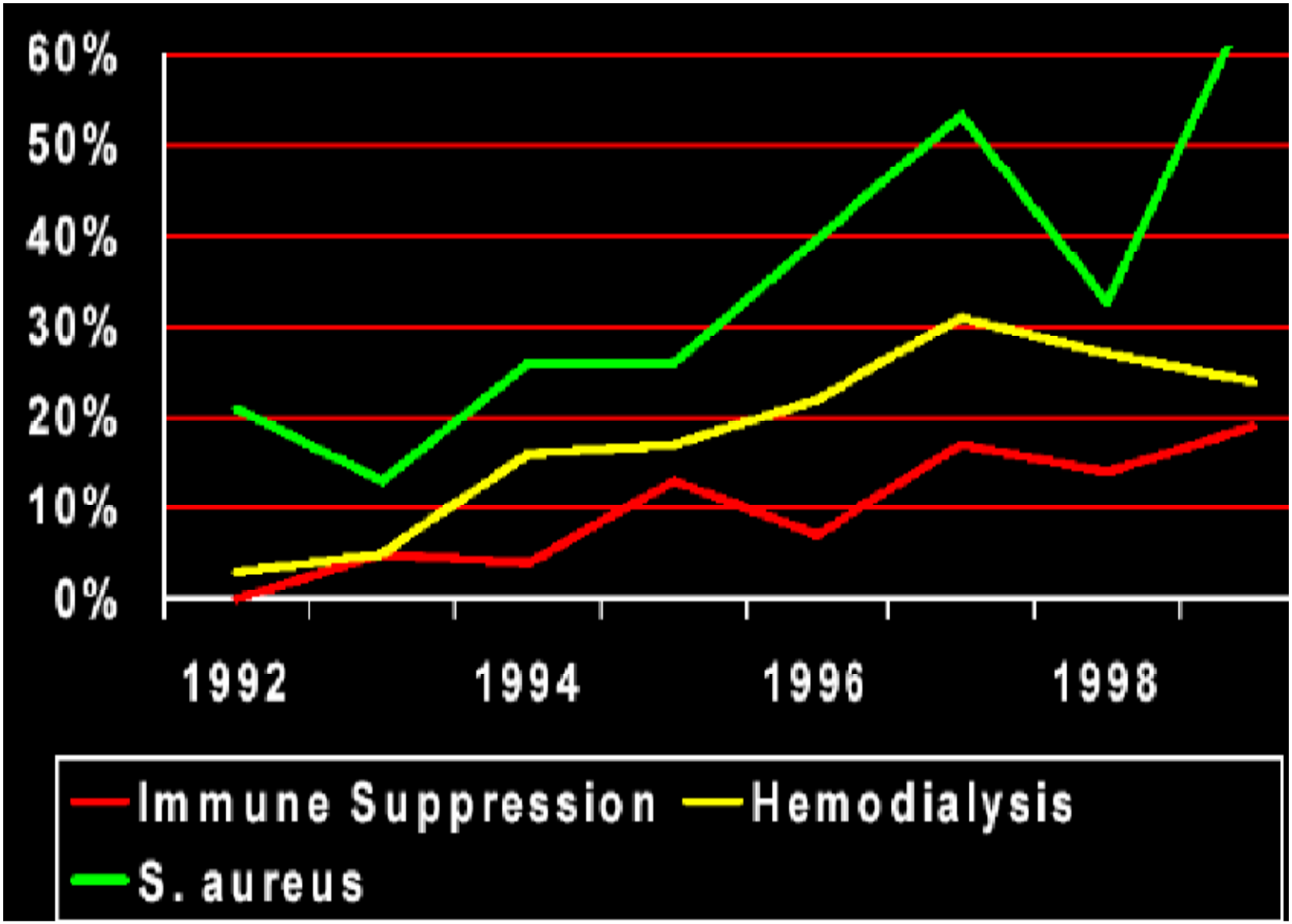
Xavier Duval, MD, PhD,*†‡ François Delahaye, MD, PhD,§‖ François Alla, MD, PhD,¶#

EPIDEMIOLOGY :Multicentic study France 1999

Table 2. Location of Infective Endocarditis (IE) in Patients (N = 390)

Location	No. (%)
Aortic valve	136 (35)
Mitral valve	112 (29)
Aortic and mitral valves	55 (14)
Tricuspid valve	37 (9)
Pulmonic valve	2 (1)
Bilateral IE	6 (2)
Pacemaker	18 (5)
With left-sided IE	5 (1)
Without left-sided IE	13 (4)
Undetermined*	24 (6)

Hoen et al, JAMA 2002;288:75-81



Duke University Medical Center, Durham, NC, from 1993 to 1999
Cabell, Arch Internal Med 2002

Clinical /Laboratory findings in 2781 Patients with Definite IE

Findings	No (%) of pts	
Fever, temperature 38°C	2322/2428	(96)
Splinter hemorrhages	213/2655	(8)
Osler nodes	77/2648	(3)
Janeway lesions	123/2650	(5)
Roth spots	50/2649	(2)
Vascular embolic event	456/2665	(17)
Conjunctival hemorrhage	122/2655	(5)
Splenomegaly	284/2662	(11)
New murmur	1068/2232	(48)
Worsening of old murmur	359/1787	(20)
Elevated ESR	1611/2645	(61)
Elevated C-reactive protein level	1632/2650	(62)
Elevated rheumatoid factor	138/2549	(5)
Hematuria	666/2587	(26)

Murdoch DR, Arch Intern Med, 2009

Clinical presentation/complications

Changing +++

Cardiac complications 30-50%

- Valvular regurgitation Heart failure+++
- Perivalvular abscesses
  (30-40% at surgery/autopsy)

Omari, B, Chest 1998

Neurologic complications 30%

Renal complications

Vertebral osteomylitis

…

Microbiologic etiology of IE

Cause of Endocarditis	No. (%) of Patients[a]						
	Total Cohort (N=2781)	Patients Admitted Directly to Study Sites Only[b] (n=1558)	Region				*P* Value for the Difference Between Regions
			North America (n=597)	South America (n=254)	Europe (n=1213)	Other (n=717)	
Staphylococcus aureus	**869** (31)	487 (31)	256 (43)	43 (17)	339 (28)	231 (32)	<.001
Coagulase-negative staphylococcus	**304** (11)	161 (10)	69 (12)	18 (7)	156 (13)	61 (9)	.005
Viridans group streptococci	**483** (17)	288 (19)	54 (9)	66 (26)	198 (16)	165 (23)	<.001
Streptococcus bovis	**165** (6)	101 (7)	9 (2)	17 (7)	116 (10)	23 (3)	<.001
Other streptococci	**162** (6)	101 (7)	38 (6)	16 (6)	66 (5)	42 (6)	.86
Enterococcus species	**283** (10)	158 (10)	78 (13)	21 (8)	111 (9)	73 (10)	.05
HACEK	**44** (2)	26 (2)	2 (0.3)	6 (2)	19 (2)	17 (2)	.02
Fungi/yeast	**45** (2)	25 (2)	20 (3)	3 (1)	13 (1)	9 (1)	.002
Polymicrobial	**28** (1)	23 (2)	8 (1)	1 (0.4)	13 (1)	6 (0.8)	.60
Negative culture findings	**277** (10)	122 (8)	41 (7)	51 (20)	123 (10)	62 (9)	<.001
Other	**121** (4)	66 (4)	22 (4)	12 (5)	59 (5)	28 (4)	.61

Murdoch. Arch Intern Med. 2009;169.

Changing Microbiology of IE

- *Staphylococcus aureus* now the most common cause worldwide, 31% of patients

- Other gram positives important
  - Viridans strep, coagulase-negative staph, *Enterococcus*

- Fastidious organisms
  - HACEK 2% (0.3% in N. America)
    - *Haemophilus, Aggregatibacter, Cardiobacterium, Eikenella, Kingella*
  - Fungi/yeast 2%

- Culture negative 10%

Microorganism: Meta-analysis 3784 cases Endocarditis

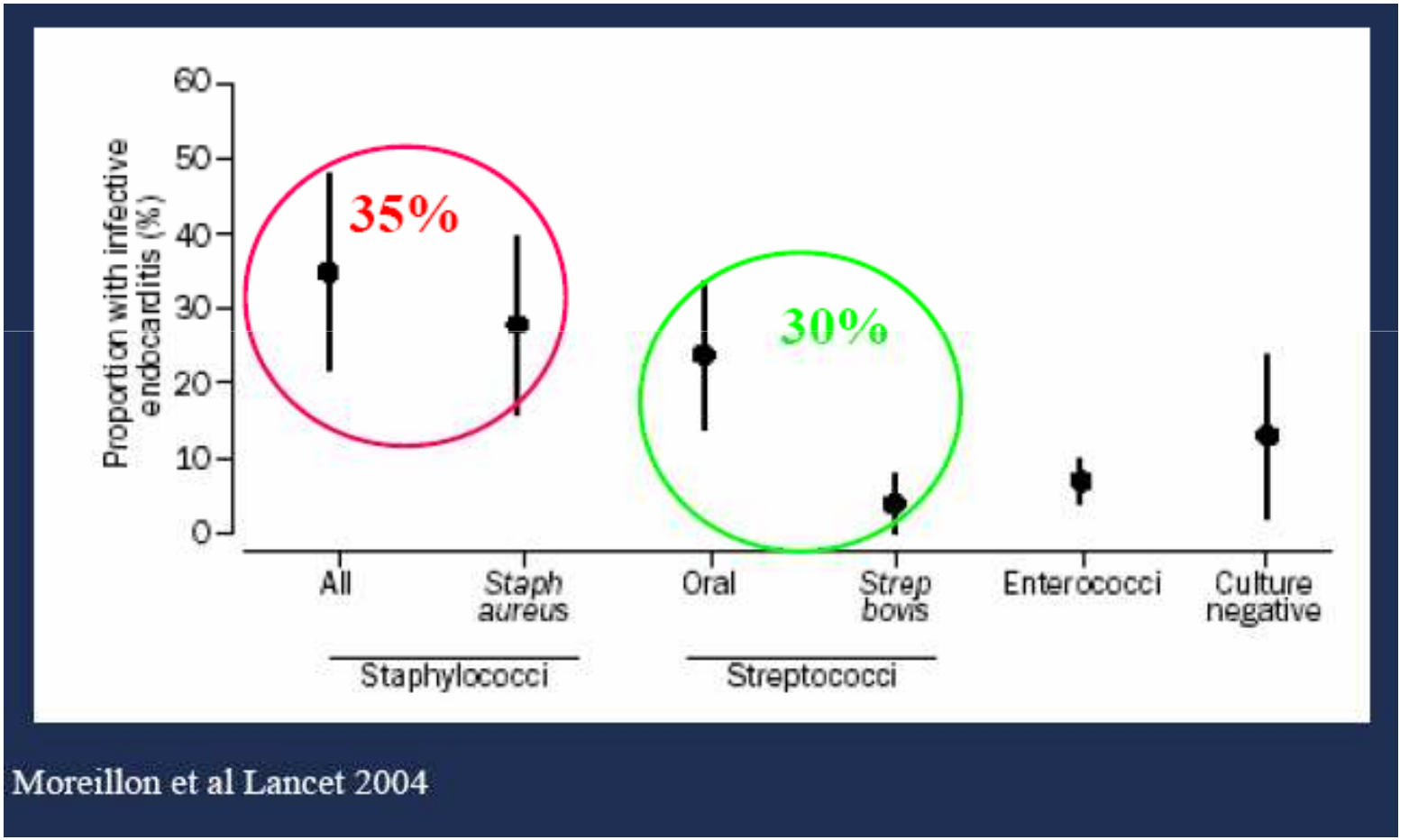


Table 5. Surgery and Mortality During the Initial Hospital Stay as a Function of Different Variables in Patients (N = 390) With Infective Endocarditis*

Variable	Total No. (%)	Surgery		Mortality	
		No. (%)	*P* Value	No. (%)	*P* Value
All	390 (100)	191 (49)	. . .	62 (16)	. . .
Sex					
Women	113 (29)	42 (37)	.03	20 (18)	.53
Men	277 (71)	150 (54)		42 (15)	
Location					
Only mitral valve	112 (29)	52 (46)	<.001	20 (18)	.67
Only aortic valve	136 (35)	82 (60)		22 (16)	
Aortic and mitral	55 (14)	40 (73)		11 (20)	
Right-sided or bilateral	45 (12)	14 (31)		4 (9)	
Pacemaker	18 (5)	5 (28)		2 (11)	
Unknown	24 (6)	0		3 (13)	
Previous heart disease					
Native valve disease	119 (31)	67 (56)	.29	14 (12)	.20
Prosthetic valve	63 (16)	29 (46)		15 (24)	
Miscellaneous	23 (6)	11 (48)		3 (13)	
No known heart disease	185 (47)	83 (45)		30 (16)	
Microorganisms					
Streptococci	196 (50)	106 (54)	.02	22 (11)	.02
Enterococci	29 (7)	15 (52)		5 (17)	
Staphylococci	115 (29)	43 (37)		29 (25)	
Others or ≥2	31 (8)	20 (63)		5 (17)	
No microorganism	19 (5)	9 (45)		2 (10)	
Valve surgery					
Yes	191 (49)	. . .	. . .	11%	.02
No	199 (51)	. . .		20%	

HOEN et all JAMA 2002 288 75-81

-2 Etudes rétrospectives multicentriques

- 1991 - 2000
- 2001 to 2011

Results

2.285.900 habitants [163 Endocarditis (15 cases/year)]

557.700 habitants [98 Endocarditis (8,9 cases/year)]

466.700 habitants [45 Endocardites (4,1 cases/year)]

869.700 habitants [92 cas Endocarditis (8,4 cases/year)]

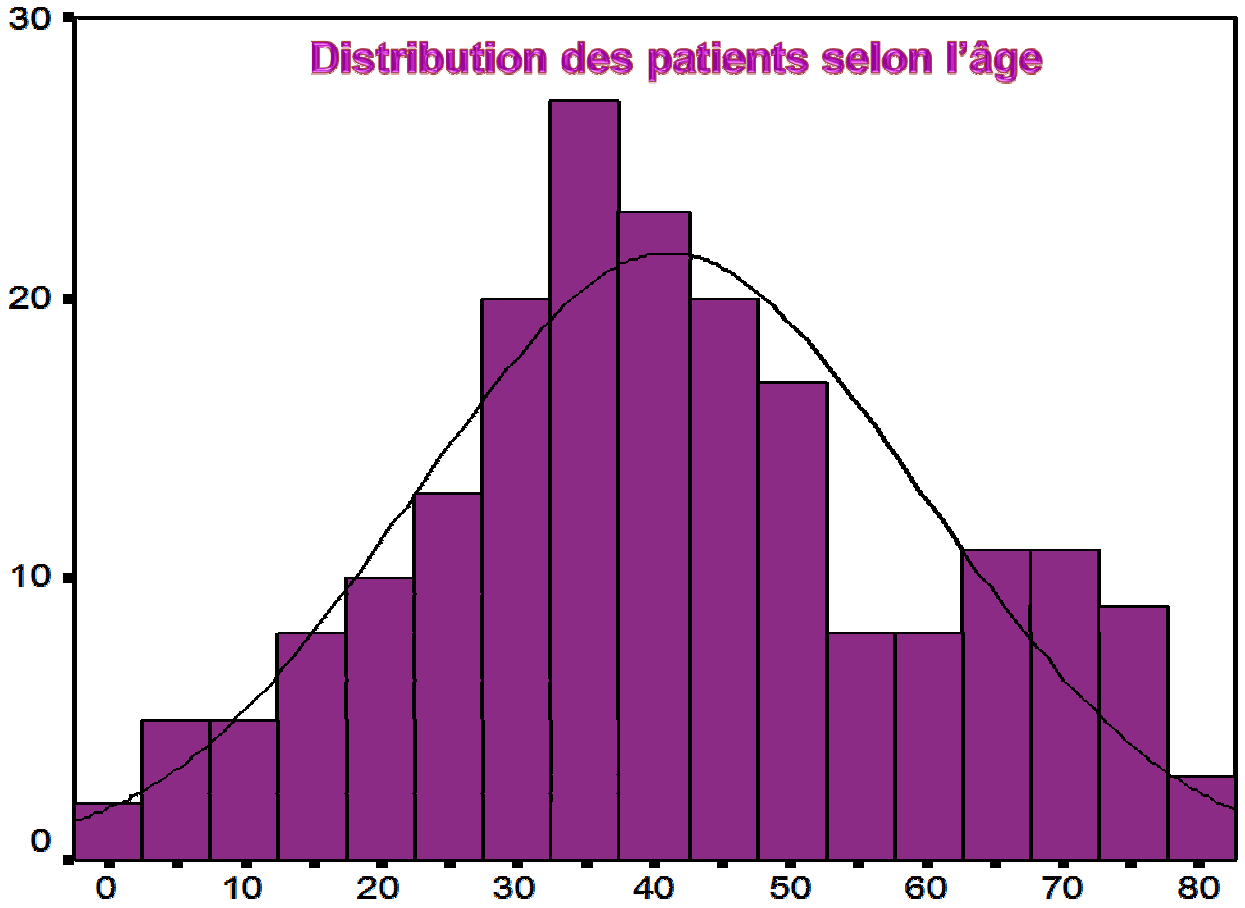
Total : 4181000 habitants

mean number: 36,1 case /year

➥Incidence: 4 cases/ 100000 habitants/ year

Epidemiological caracteristics

- **Age**



30% : <30 ans

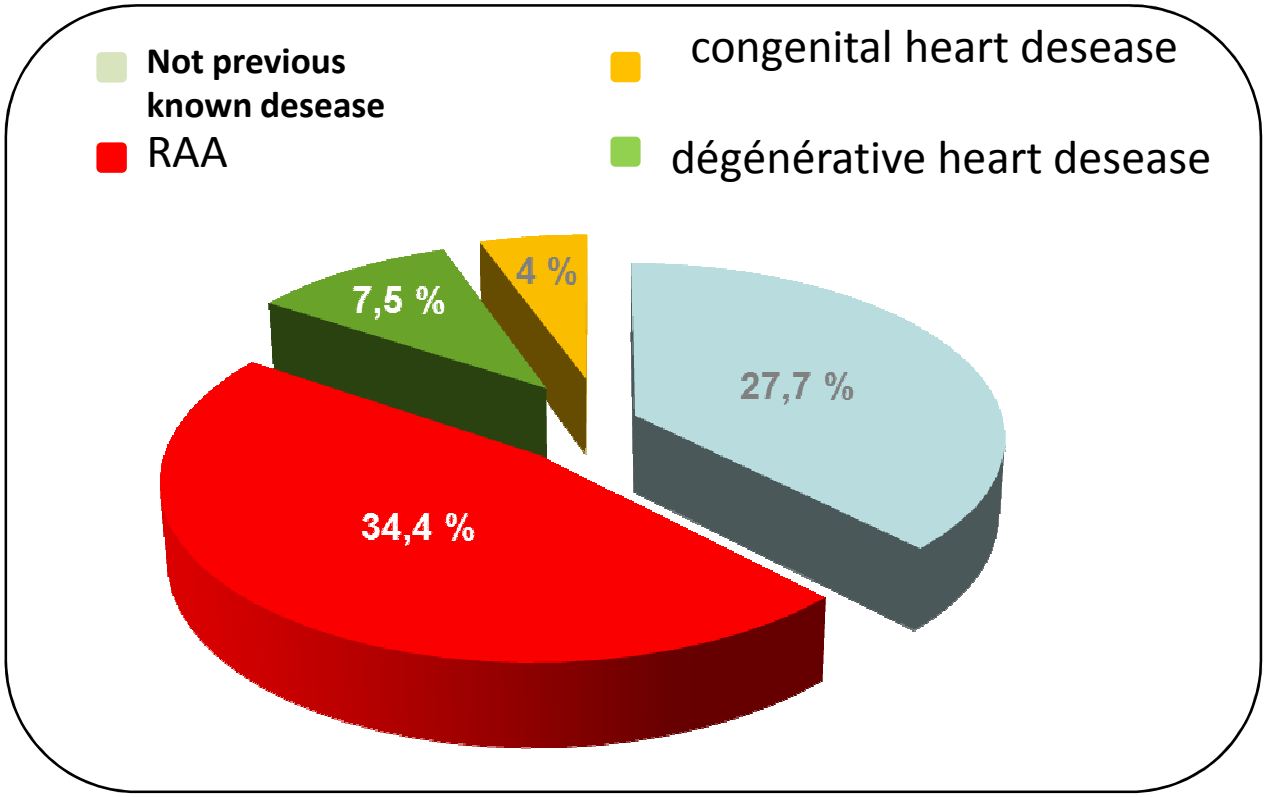
Mean age : 42 ± 18,44

Results

Epidemiological Caracteristics

- Sex-ratio : 234/164 (1.42)
- native valve endocarditis : 292 (73,36 %)
- prosthetic valve endocarditis : 92 (23%)
  - Early Endocarditis: 24 cas (26 %)
  - Late Endocarditis : 69 cas (74.19 %)
- pace maker Endocarditis : 16 (4 %)

- **Underlying Heart desease : 277 (72,3%)**



- **Les facteurs de co-morbidité**
  - **Diabetes: 33 cas (8.3%)**
  - **IRC hémodialysis : 12 cas (3%)**
  - **Toxicomania : 5 cas (1.3%)**

International Journal of Infectious Diseases (2007) 11, 430–433

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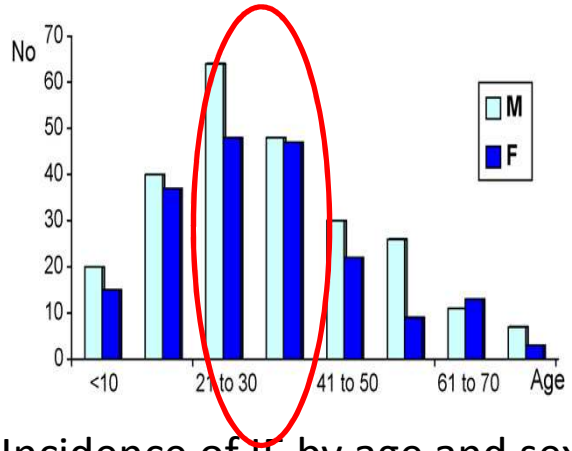
Epidemiology of infective endocarditis in Tunisia: a 10-year multicenter retrospective study

Letaief A, Int J of Inf Dis 2007

mean (SD) age 32.4 (16.8) years)



Incidence of IE by age and sex in 450 patients.

Table 1 Distribution of underlying heart disease in 440 cases of infective endocarditis

Underlying heart disease	No. (%)
Native valve disease	364 (82.7)
Rheumatic valve disease	199 (45.2)
Not previously known	100 (22.7)
Congenital heart disease	39
Degenerative	24
Other	2
Prosthetic valve	76 (17.3)

Epidemiology of infective endocarditis in Tunisia: a 10-year multicenter retrospective study 1991-2000

1991-2000

Table 1 Distribution of underlying heart disease in 440 cases of infective endocarditis

Underlying heart disease	No. (%)
Native valve disease	364 (82.7)
Rheumatic valve disease	199 (45.2)
Not previously known	100 (22.7)
Congenital heart disease	39
Degenerative	24
Other	2
Prosthetic valve	76 (17.3)

2000/2011

Native valve
73,26%
RAA 34,4%

Prothetic valve
23%

Results

clinical-epidemiological features

	Europe 2001 N=159	France 1999 N= 390	Tunisia 1991-2000 N=440	Tunisia 2001-2011 N=398
mean age	57	59.5	32.4	42,07
Sex ratio	-	2	1.25	1.42
prothetic valve EI	41 (26%)	63 (16%)	76 (17.3%)	92 (23 %)
Underlying heart desease	53 (45%)	142 (37%)	264 (60%)	277 (72.3%)
Rheumatic valve desease	-	-	199 (45.2%)	137 (34,4%)
congenital heart desease	-	4 (1%)	39 (8.9%)	40 (10%)
Right heart EI	8 (5%)	39 (10%)	20 (4.5%)	16 (4%)
pace maker EI	4 (2.5%)	18 (5%)	-	16 (4%)

Underling heart desease

			Valve native				Prothèse
	Année	Nbre	RAA	Dégénér.	Congénit	C.sain*	
B. Ismaïl-Tunis(1)	66-85	210	142 (67%)		8 (4%)	2 (1%)	58 (27%)
Cetinkaya-Ankara(2)	74-99	228	147 (64%)		11 (5%)	17 (7,5%)	
Delahaye-France(3)	90-91	415		139 (33%)	21 (5%)	141 (34%)	90 (22%)
Série Tunisienne	90-00	440	201 (45,7%)	24 (5,4%)	39 (10%)	100 (22%)	76 (17,3%)
	20 01-2011	398	34,4%	7,5%	4%	23%	27,7%

(1) L'information cardiologique, Dec 1986 ; (2) Cetinkaya, International J Antimicrobial Agents 18 (2001):1-7 ;
(3) Delahaye, Eur Heart J 1995; 16 : 394-401 ; (4) Habib Ann. Cardiol. Angéol. 1998,47 (10) : 735-8.

suspected Portal of entry ➢ 129 cases (32,4 %)

	Total (n=398)	VN (n=292)	VP (n=93)	p
Dental procedure	96 (27%)	81 (30.2%)	15 (17.2%)	0.5
Endoscopy	1 (0,3%)	_	_	_
Cardiac Chirurgy	24 (6.4%)	5 (2%)	19 (23%)	0.001
Skin	8 (4%)	5 (2.5%)	3 (1.5%)	NS
Other	11 (5.4%)			

Results

Clinical caracteristics

	Total (n=398)	VN (n=292)	VP (n=93)	p
Delay consultation(day)	23.8	27.54	8.37	0.003
Fever>38°	334 (83.9%)	133 (83.6%)	40 (95.2%)	0.05
Heart murmur	249 (62,6%)	210 (59,5%)	36 (44,4%)	0.001
Heart fealure	28 (14.4%)	25 (16.4%)	3 (7.3%)	NS
Cerebral emboli	32 (16%)	25 (16%)	7 (16%)	0.07
Périphéric emboli	9 (4.4%)	5 (3.1%)	4 (9.5%)	
Secondary localisations	20 (10%)	18 (11.3%)	2 (4.8%)	0.18
Purpura	3 (1.5%)	3 (1.9%)	0	0.37
lesions of Janeway	4 (2%)	4 (2.5%)	0	0.29
Osler Nodes	2 (1%)	1 (0.6%)	1 (2.4%)	0.3
Mycotic aneurysms	1(0.5%)	1 (0.6%)	0	0.6

Les données échocardiographiques

- **ETT : 398 cas (100%) / ETO : 314 cas (82.8%)**

- **Localisation of E I:**

  - Mitral valve :144(36,2%)
  - Aortic valve :134 (33,7)
  - Tricuspide valve :16 (4%)
  - Pulmonary valve :10 (2,5%)
  - Mitro-aortic :26(6,5%)
  - Other (pace maker) : 16(4%)

- **Prothèse : 92 (23%)**

microbiological Data

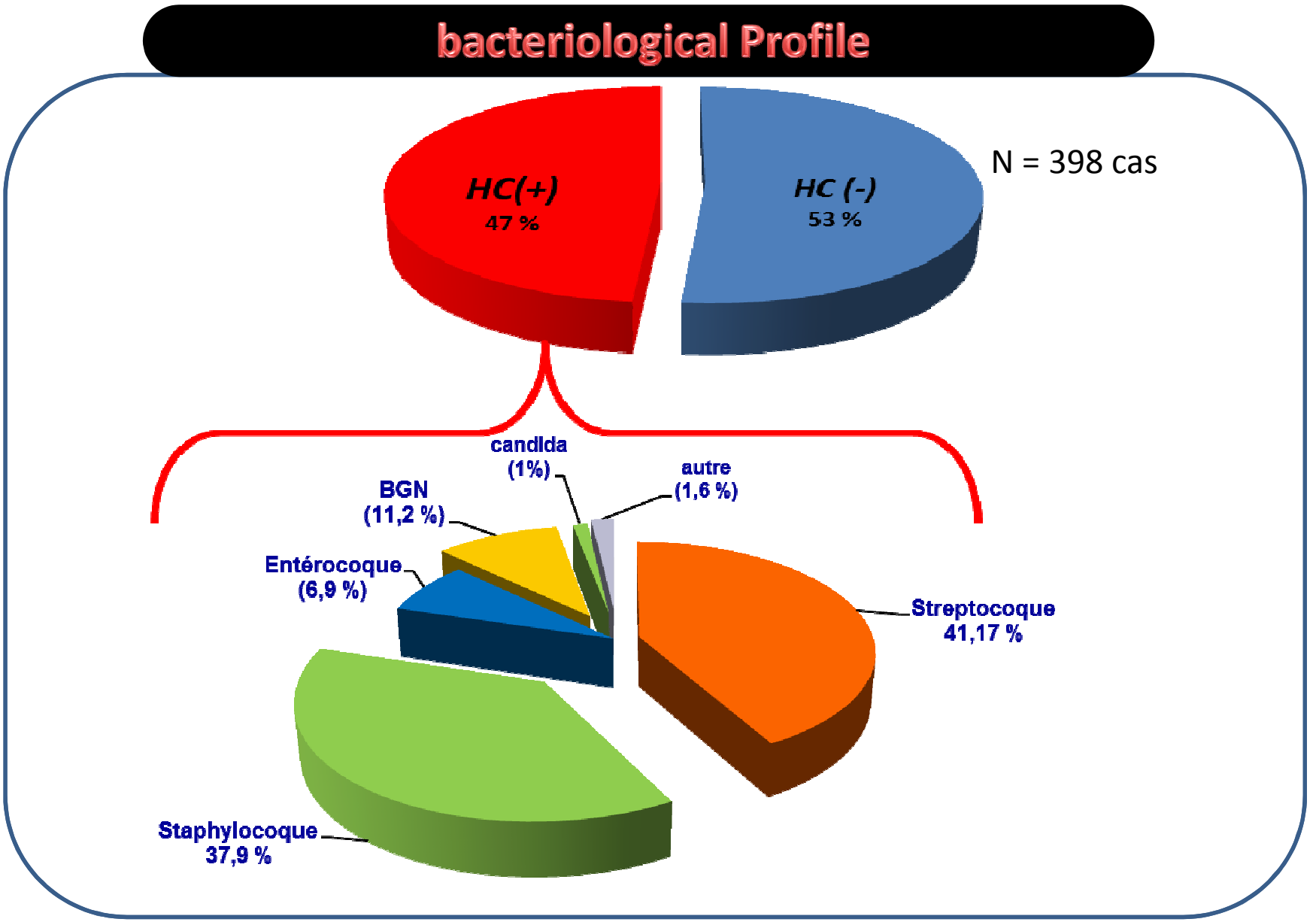
Blood culture HC positives : 172 cas 47%

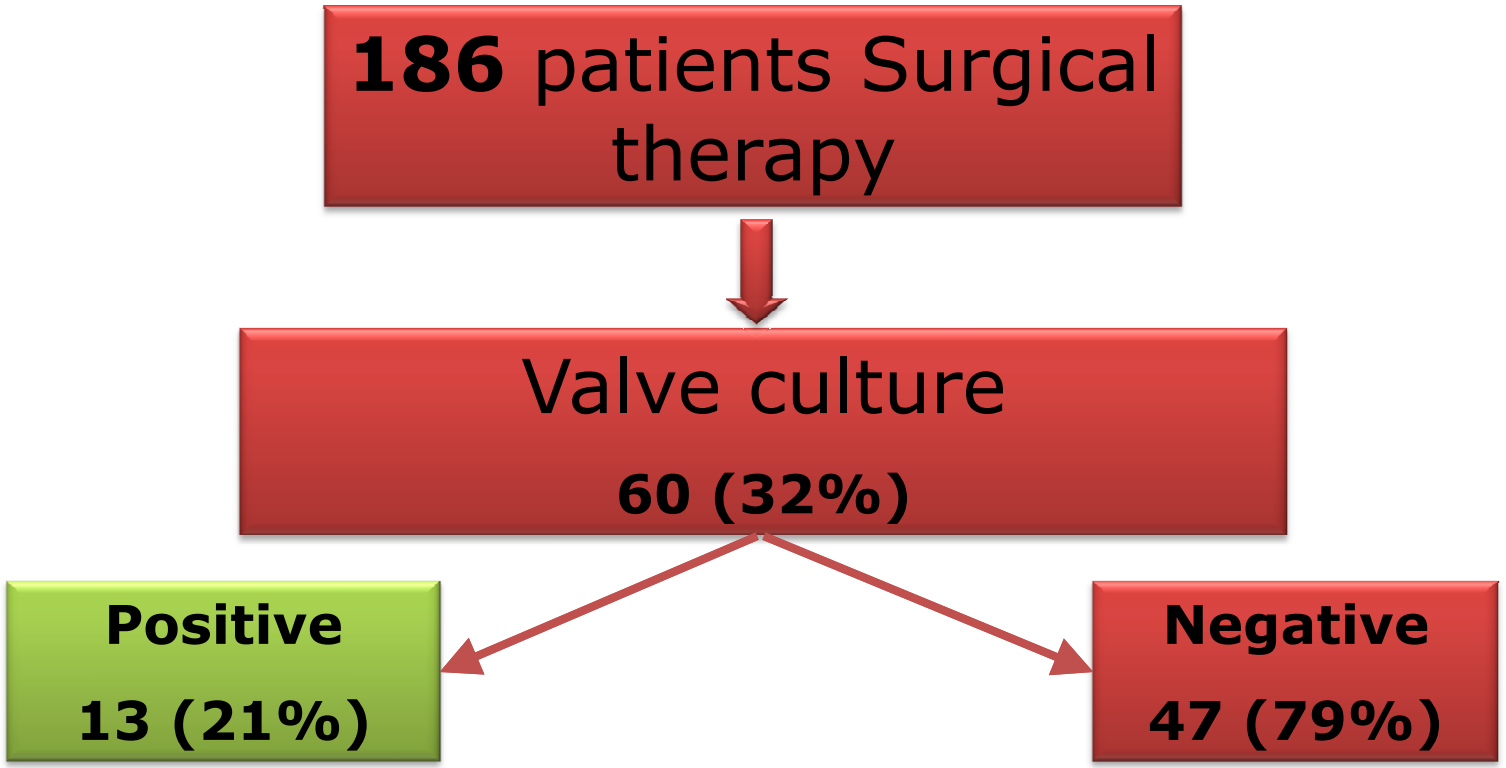
	Total n=398	HC(+) n = 187	HC(-) n = 211	p
Previous Antibiotherapy	97 (24,4%)	38 (20,3 %)	59 (27,9 %)	0.32
Mean Number blood culture	5.9	5,96	5.65	0.4
Endocardite probable	134 (33,6 %)	29 (15,5 %)	102 (48,3%)	-
Endocardite certaine	184(46,23 %)	129 (68,9%)	55 (26%)	-

La sérologie

	sérologies F 81 (40%)		sérologie + 16 (4%)	
Chlamydia	88	(20%)	0	
Brucella	103	(25,9%)	3	(1.5%)
Coxiella burnetii	88	(22%)	1	(0.5%)
Bartonella	51	(12,8%)	2	(1%)

bacteriological Profile




186 patients Surgical therapy
Valve culture
60 (32%)
Positive
13 (21%)
Negative
47 (79%)
A. Baumanii : 1
B. quintana : 1
E. feacalis : 2
S. adjacens : 1
Kytococcus : 1
Lactobacillus : 1
SCN : 4
S. gordonii : 1
H. parainluenzae : 1

Distribution of causative microorganisms

microbiological profile of Endocarditis

	Europe 2001 n =159	France 1999 n = 390	Tunisie 1991-2000 n = 440	Tunisie 2001-2011 n = 398
Streptococci	28%	225 (58%)	76 (17.3%)	77 (19,3%)
Enterococci	14%	29 (8%)	17 (3.9%)	13 (3.3%)
Staphylococci	33%	115 (29%)	79 (18%)	71(17,8%)
Other	10%	21 (8%)	49 (4.4%)	24 (06%)
No microorganism identified	14%	19 (5%)	219 (49.8%)	211 (53%)

Bacteriology

	NG	Streptocoque D +enteroc	Autres	Staphylocoque aureus	CN	Autres	HC (-)
Delahaye (3)	27	23	7	18	4	11	8
Habib (94-96, 71 cas) (4)	16,9	19,7	5,6	18,5	9,8	25*	4,2
B. Ismaïl (1)		8,5	26,6	11,5	3,3	4,1	46
Cetinkaya (2)	7,5	6,9	6	11,8	4,8	13	50
Série Tunisienne 1990-2000	10,7	4,3	6,1	12	6	11	49,8%
Serie Tunisienne 2001 2011	19,3%			17,3%		53%	

Surgical Therapy

	Total (n=398)	VN (n=292)	VP (92)	p
Surgery	186 (47%)	142 (48%)	44 (47%)	0.03
Indications :				
Hemodynamic	82 (44%)	67 (47%)	15 (34%)	0.001
Annular Abces	28 (15%)	12 (14%)	4 (16%)	0.7
Size of vegetation>10	69 (29%)	55 (38%)	14 (31%)	0.4
Mobility of vegetation	54 (29%)	44 (30%)	23 (11.8%)	0.8
Prosthetic desinsertion	11 (2,8%)			

Results

Evolution

	Total (n=398)	VN (n=292)	VP (n=92)	p
Hospital stay means (day)	39 ± 22,16j	40.31	40,31	0.86
Delay of d'apyrexia(day)	6,79 ± 7,7j	6,53j	6,82	0.82
Complications :				
Neurologic	51 (12,8%)	34 (14,8%)	17 22,4%)	0.12
Secondary Localisations	39 (9,8%)	31 (13,6%)	7 (9,6%)	0.32
Recidive	13 (3.3%)	9 (4.1%)	3 (4,2%)	0.9
Mortality	49 (12,3%)	33 (14%)	21 (16%)	0.08

Results

Evolution and series

	Europe 2001 n=159	France 1999 n= 390	Tunisie 1991-2000 n=440	Tunisie 2001-2011 n=398
Complications :				
Neurologic	24 (15%)	60 (15.3%)	89 (16.3%)	51 (12,8%)
secondary Localisations	-	-	26 (6%)	39 (9,8%)
Surgery	82 (52%)	191 (49%)	223 (50.6%)	186 (47%)
Mortality	20 (12.6%)	62 (16%)	90 (20.6%)	49 (12,3%)

Results

Evolution / microorganism

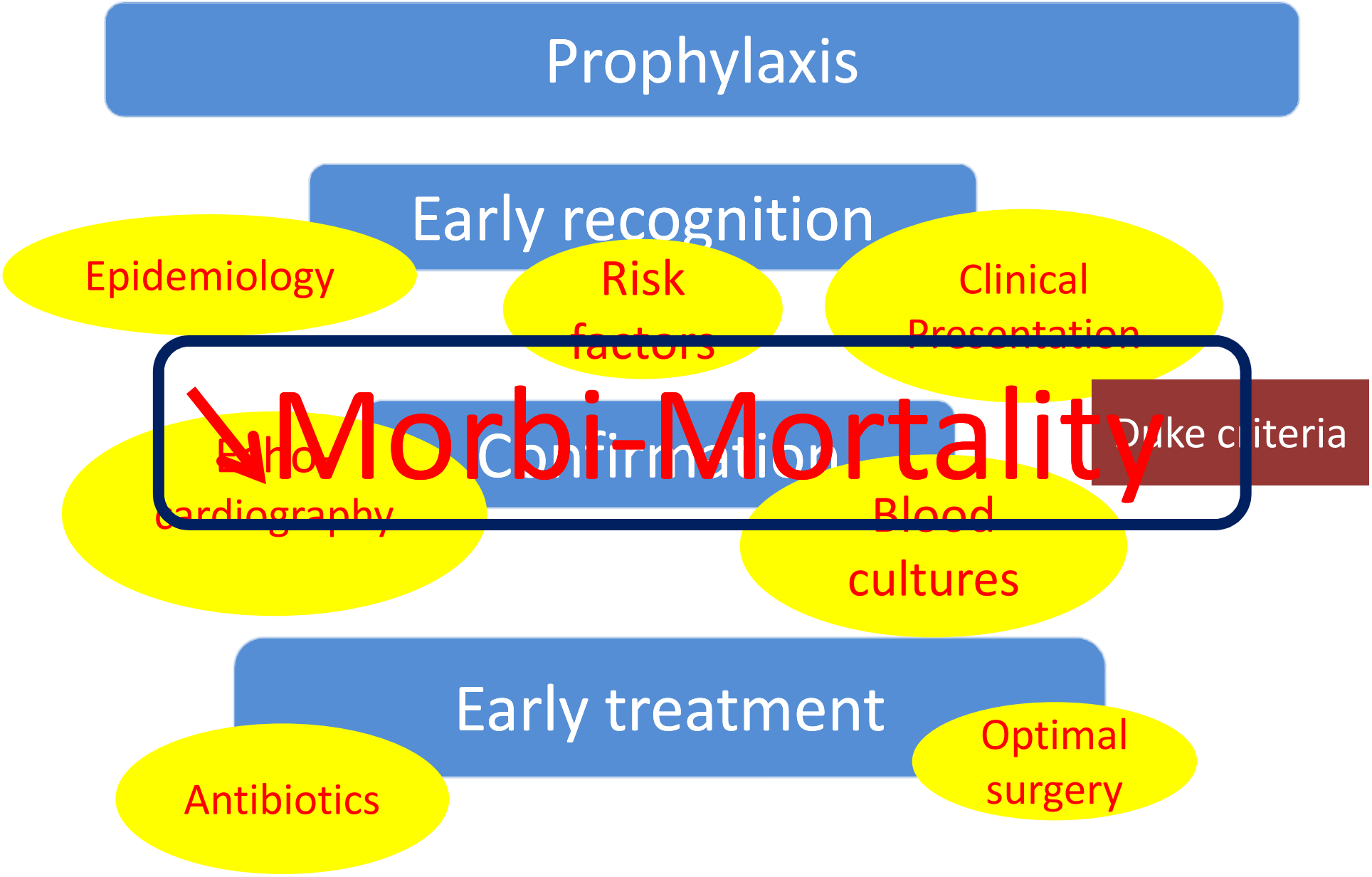
	Streptocoques	SCN	*S. aureus*	GNI*
Delay of apyrexia (day)	4.06	6.3	5.75	4.7
Neurological complications	7 (16.7%)	5 (20.8%)	6 (40%)	11 (12.2%)
Localisations secondaires	4 (9.5%)	2 (8.3%)	3 (20%)	7 (7.7%)
Mean Duration of antibiotherapy(day)	33.7	45.2	31.9	37.1
Early Surgery	22 (51.2%)	14 (58.3%)	8 (53.3%)	44 (46.8%)
Récidives	5 (13.2%)	1 (4.2%)	0	2 (2.4%)
Décès	6 (15%)	1 (4.2%)	5 (35.7%)	15 (17%)

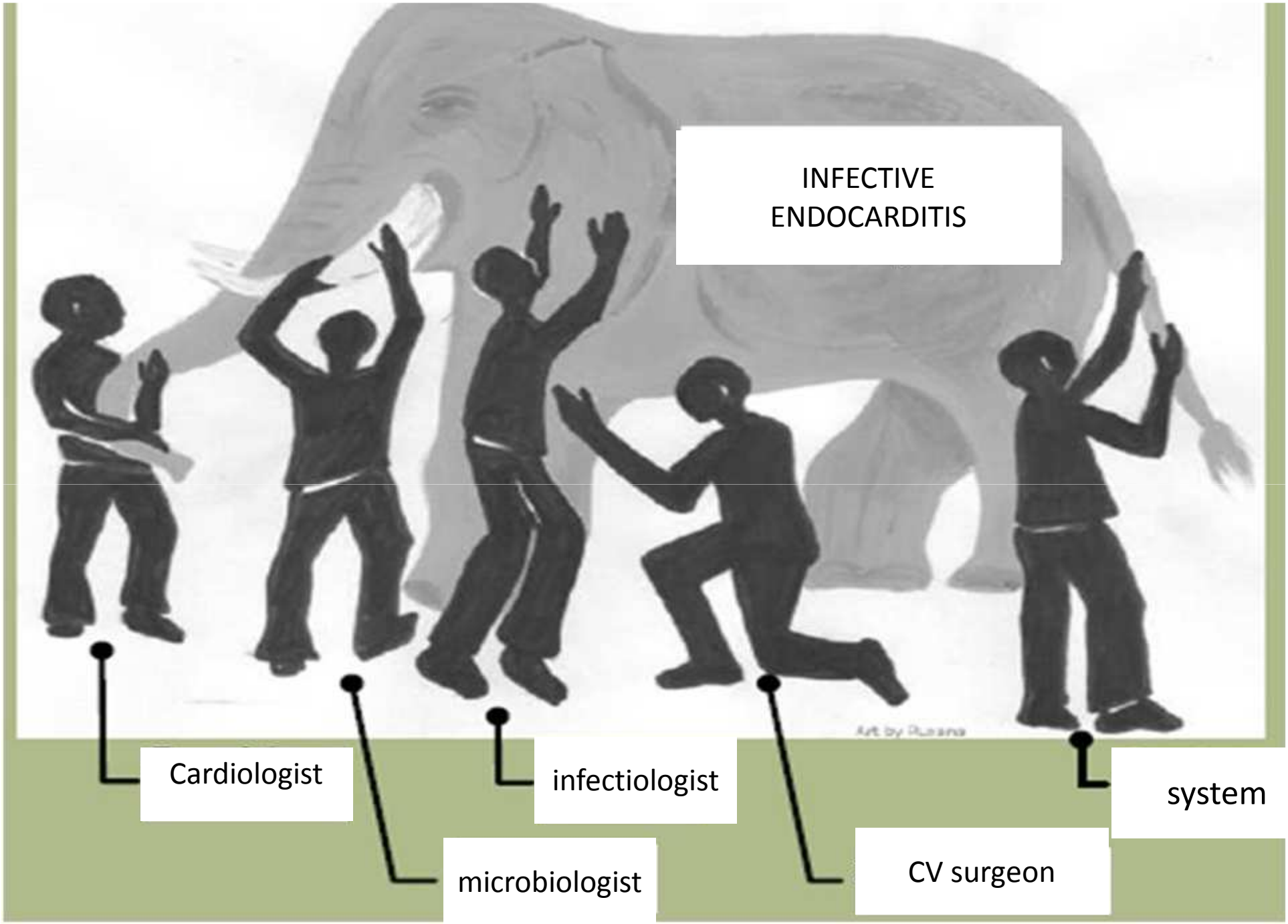
*GNI : aucun germe identifié

Conclusion

- Incidence des EI : **4 cas/100000 habitants/year**
- Mean age **: 42 ans**
- Underlying heart desease : **RAA 40.4 %**
- Antibiotic before diagnosis : **31 %**
- Enquête microbiologic positive (HC/sérology/valve): **55.2 %**
- Staphylococci + Streptococci : **80%**
- Surgery : **47 %**
- Mortality : **12,3%**

→ National de survey of IE


Prophylaxis
Early recognition
Epidemiology
Risk factors
Clinical Presentation
Morbi-Mortality
Duke criteria
Blood cultures
Early treatment
Antibiotics
Optimal surgery


INFECTIVE ENDOCARDITIS
Cardiologist
microbiologist
infectiologist
CV surgeon
system