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Literature review

Strategy:

- Pubmed 1993-2003 (review)
- Key phrases = Infective endocarditis associated with: epidemiology, pathogenesis, clinics, experimental, therapy
- Only studies with ≥ 30 patients

Results:

- 3784 episodes (median pts/study = 156, range 30-415)
- mean age varied 36 – 69 years

Lancet 2004; 363:139-149

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Incidence:

(Endocarditis per 100,000 patients/year)

Overall median = 3.6 (range 0.3-22.4)

- in patients < 50 years old: $\leq 5\%$
- in patients ≥ 50 years old: $> 15\%$

Incidence in the literature:

- 2-6 per 100,000 patients per year

Lancet 2004; 363:139-149

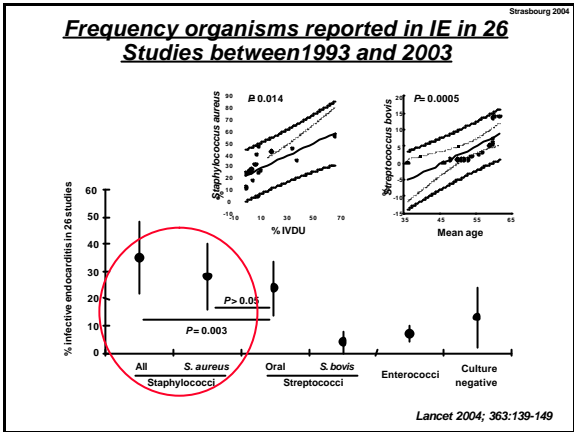
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Mortality of Infective Endocarditis

Median in-hospital mortality = 16% (median 11-26)

Study period	Episodes	Native/prosthetic valves (%)	Global mortality	Source
1980-90	210	181/29 (16%)	21.4%	Watanakunakorn. 1993 Medicine;72:90-102
1984-88	125	...	23%	Hogevik et al. 1995 Medicine;74:324-39
1990...	300	231/69 (30%)	26%	Mansur et al. 1996. Thorac cardiovasc Surgeon;44: 2-10

Mortality *S. aureus* PVE = 47.5% (in 61 cases)
(ICE study; Chirouze et al CID 2004;38:1323-1327)

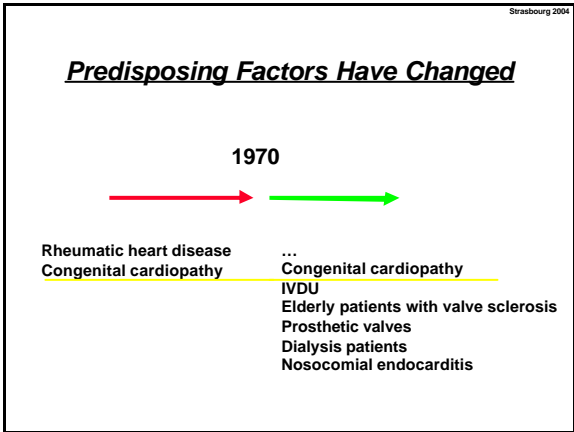


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Frequency of IE by Pathogen (%)

Pathogens	Native valve	IVDU	Prosthetic early	Prosthetic late
Staphylococci	105 (47)	109 (69)	6 (100)	39 (39)
<i>S. aureus</i>	96 (43)	109 (69)	0 (0)	25 (24)
Coag. negative	9 (4)	0 (0)	6 (100)	15 (15)
Streptococci	72 (32)	36 (23)	0 (0)	35 (35)
Enterococci	12 (6)	5 (3)	0 (0)	13 (13)
HACEK	6 (3)	0 (0)	0 (0)	5 (5)
Other bacteria	9 (4)	3 (2)	0 (0)	6 (7)
Fungi	2 (1)	2 (1.5)	NS	NS
Neg. blood cult.	15 (7)	2 (1.5)	NS	NS

Adapted from Watanakunakorn.C. Medicine 1993; Mathew.J Arch Intern Med 1995; Sandre RM. Clin Infect Dis 1996; Tornos.E. Clin Infect Dis 1997



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“Liaison Dangereuse”

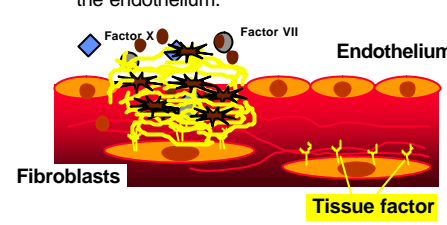
<p>Host</p> <ul style="list-style-type: none"> - Tissue factor - Monocytes - Endothelium - Platelets 	<p>Bacterium</p> <ul style="list-style-type: none"> - Adhesins (MSCRAMMs) - Fibrinogen/fibronectin-binding proteins - Regulation
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40-60% des personnes > 50 ans ont des lésions valvulaires dégénératives

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1. Tissue Factor

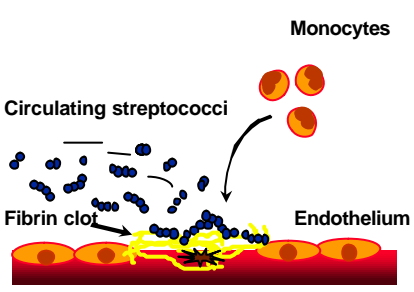
- 43 kDa membrane-bound glycoprotein
- Activates factors VII-X and triggers coagulation
- Expressed constitutively on all cells except for the endothelium.



The diagram shows a cross-section of an endothelial cell membrane. On the surface, there are yellow Y-shaped structures labeled 'Tissue factor'. Above the membrane, Factor VII (represented by a red circle) and Factor X (represented by a blue diamond) are shown. Arrows indicate the interaction between these factors and the tissue factor on the endothelium. Below the endothelium, fibroblasts are shown, with one of them having a yellow Y-shaped structure labeled 'Tissue factor' on its surface.

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Colonization of endothelial lesions



The diagram illustrates the process of bacterial colonization at an endothelial lesion. It shows a cross-section of the endothelium with a yellow fibrin clot on its surface. Circulating streptococci (blue spheres) are shown moving towards the lesion. Monocytes (orange cells) are also present near the lesion. The endothelium is shown as a layer of cells with a yellow fibrin clot on its surface.

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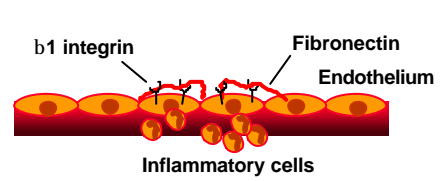
Host: Endothelium



A micrograph showing a network of white, fibrous structures, likely representing the endothelium or a fibrin clot, against a dark background.

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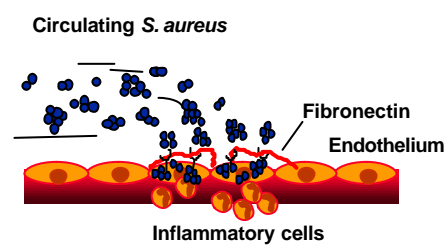
Colonization of intact endothelium



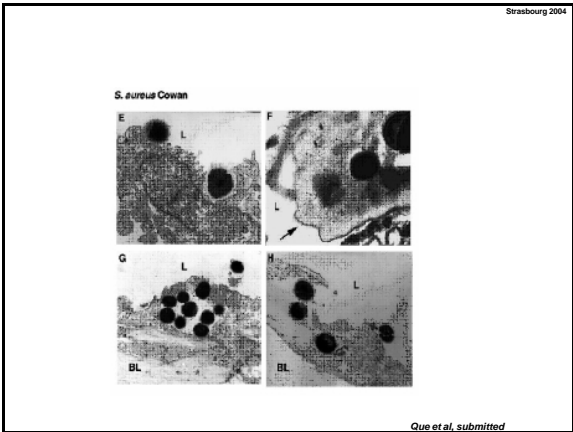
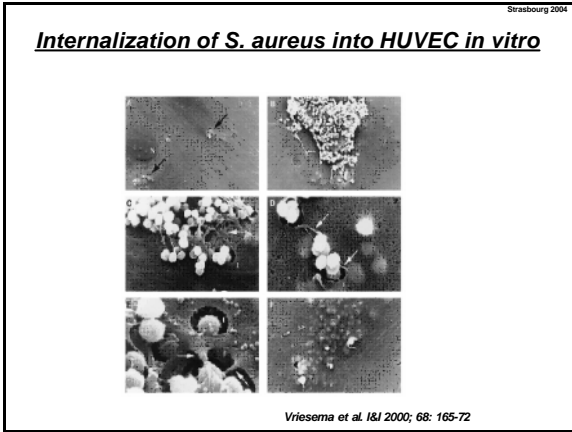
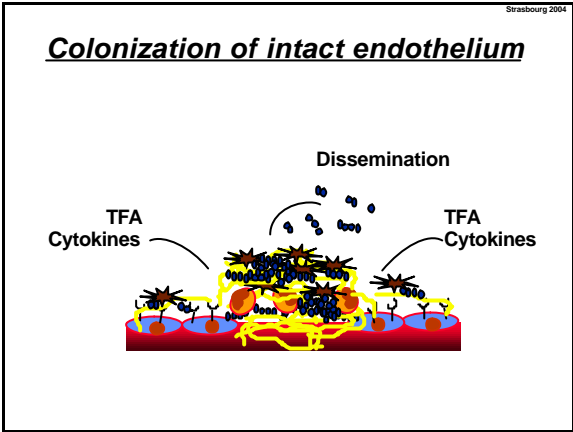
The diagram shows a cross-section of the endothelium. Inflammatory cells (orange cells) are shown adhering to the endothelium. The endothelium is shown as a layer of cells with b1 integrin (red structures) and fibronectin (yellow structures) on its surface. The inflammatory cells are shown with b1 integrin (red structures) and fibronectin (yellow structures) on their surface.

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Colonization of intact endothelium



The diagram shows a cross-section of the endothelium. Circulating S. aureus (blue spheres) are shown adhering to the endothelium. The endothelium is shown as a layer of cells with fibronectin (yellow structures) on its surface. The S. aureus are shown with fibronectin (yellow structures) on their surface. Inflammatory cells (orange cells) are also shown near the lesion.



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S. aureus adhesins (MSCRAMMs) involved in IE pathogenesis

Adherence substrate	MSCRAMM	Gene or function	Demonstrated in experimental IE	References
Fibrinogen/fibrin	Clumping factor A	<i>cifA</i>	Yes	45;65;53
	Clumping factor B	<i>cifB</i>	No	45
	Coagulase	<i>coa</i>	No	45;47
	Extracellular fibrinogen binding protein	<i>efb</i> (formerly <i>fib</i>)	No	106;107
Fibronectin	Fibronectin-binding protein A	<i>fbpA</i>	No	108
	Fibronectin-binding protein A and B	<i>fnbA</i> , <i>fnbB</i>	Yes no	53;54
Collagen	Collagen-binding protein	<i>cna</i>	No	109
Broad spectrum ECM	MHC class II analog (Map or Eap)	<i>map</i> or <i>eap</i>	No	110;111
	Serine-aspartate repeat proteins (SDR)	<i>sdr</i> gene family	No	112

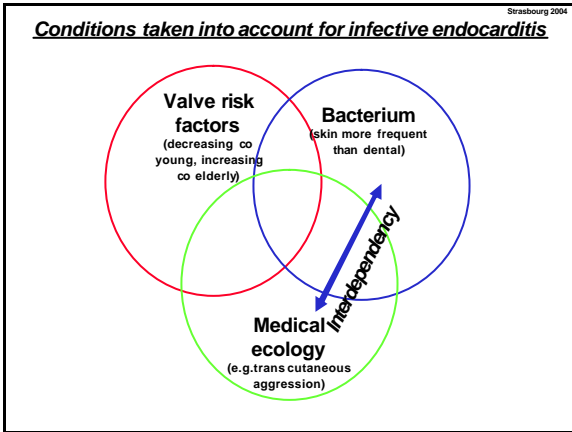
Infect. Dis. Clin North Am. 2002; 16:297

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Risk of invasive *Staphylococcus aureus* infection

Underlying condition	No. of patients with ISA infection (n = 226)	Annual incidence, per 100,000	Relative risk (95% confid. int.)	P value
Hemodialysis	24	7692	257.2 (160-393.6)	<.001
Peritoneal dialysis	3	4918	150.0 (30.5-441.1)	<.001
HIV infection	4	778	23.7 (6.4-61.4)	<.001
Solid organ transplantation	3	683	20.7 (4.2-61.3)	<.001
Heart disease	114	362	20.6 (15.8-27.0)	<.001
Cancer	47	348	12.9 (9.1-17.8)	<.001
Illicit intravenous drug use	13	321	10.1 (5.3-17.7)	<.001
Alcohol abuse	31	241	8.2 (5.4-12.0)	<.001
Diabetes mellitus	48	192	7.0 (5.0-9.7)	<.001
Stroke	16	200	6.4 (3.6-10.6)	<.001
Chronic obstructive pulmonary disease	26	120	3.9 (2.5-5.9)	<.001
Systemic lupus erythematosus	2	80	2.4 (0.3-8.7)	.3
Rheumatoid arthritis	5	5	2.4 (0.3-8.7)	.3

Laupland et al. J Infect Dis 2003; 187(9):1452-9



“Liaison Dangereuse”

Host

- Tissue factor
- Monocytes
- Endothelium
- Platelets

Bacterium

- Adhesins (MSCRAMMs)
- Fibrinogen/fibronectin-binding proteins
- Regulation

Medical ecology

