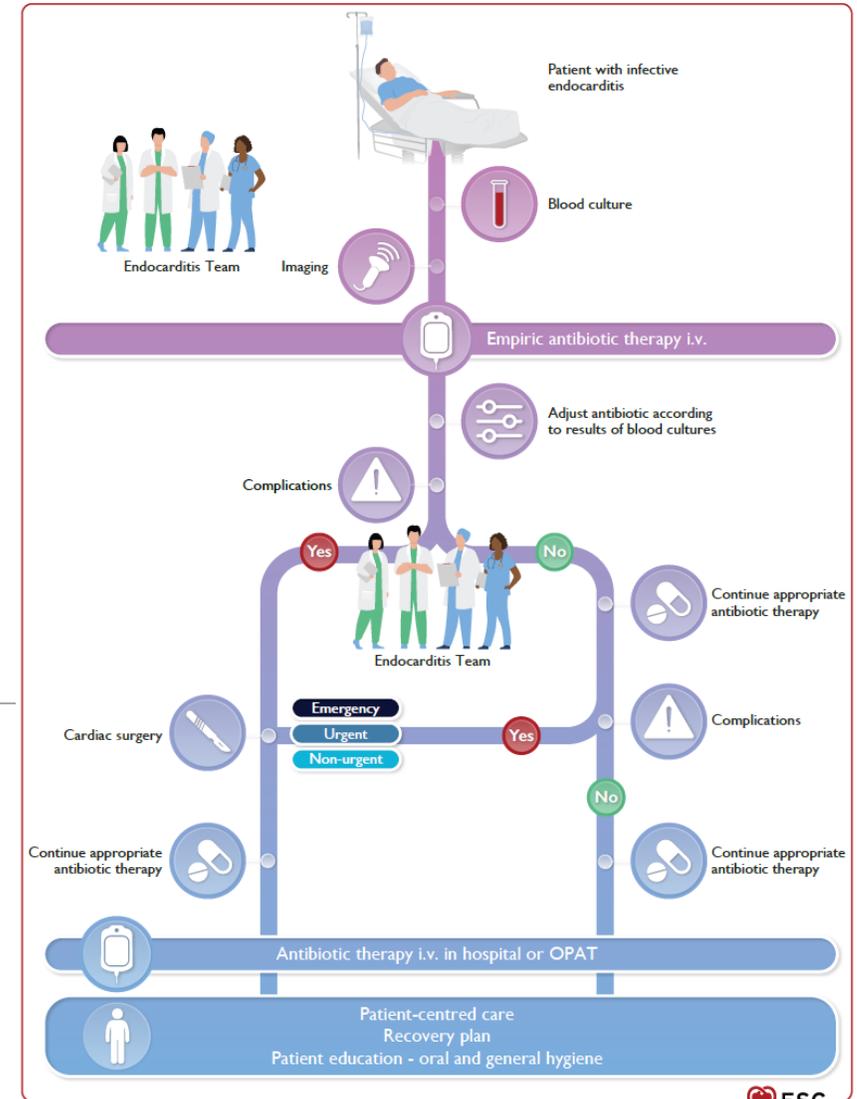


ENDOCARDITIS INFECCIOSA

DRA. CRISTINA MARTÍN GÓMEZ

ENF. INFECCIOSAS / MED. INTERNA



PROFILAXIS

ETIOLOGÍA

CLÍNICA

DIAGNÓSTICO

PRONÓSTICO

TRATAMIENTO

RECURRENCIA

CASOS ESPECIALES

OTROS ASPECTOS



ESC
European Society
of Cardiology

European Heart Journal (2023) 00, 1–95
<https://doi.org/10.1093/eurheartj/ehad193>

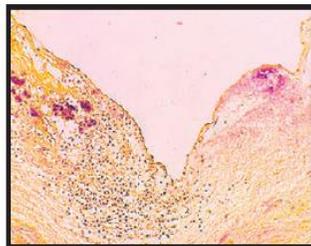
ESC GUIDELINES

2023 ESC Guidelines for the management of endocarditis

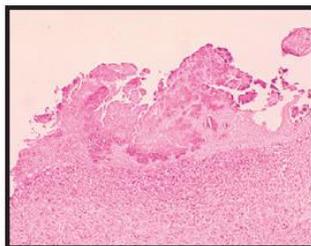
Developed by the task force on the management of endocarditis of the European Society of Cardiology (ESC)

Endorsed by the European Association for Cardio-Thoracic Surgery (EACTS) and the European Association of Nuclear Medicine (EANM)

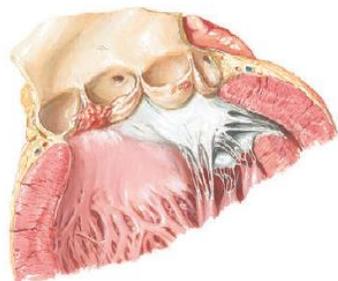
Early lesions



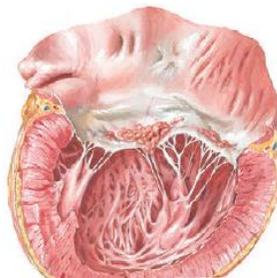
Deposit of platelets and organisms (stained dark), edema, and leukocytic infiltration in very early bacterial endocarditis of aortic valve



Development of vegetations containing clumps of bacteria on tricuspid valve

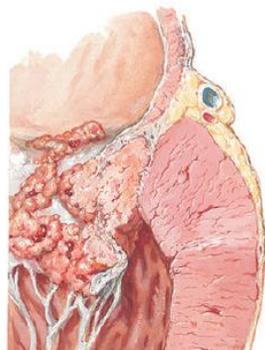


Early vegetations of bacterial endocarditis on bicuspid aortic valve

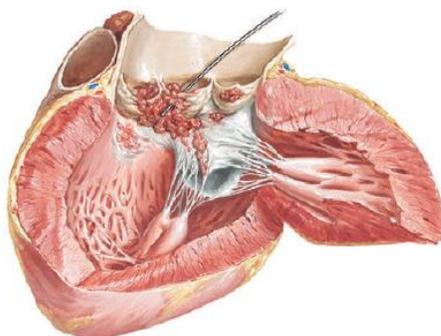


Early vegetations of bacterial endocarditis at contact line of mitral valve

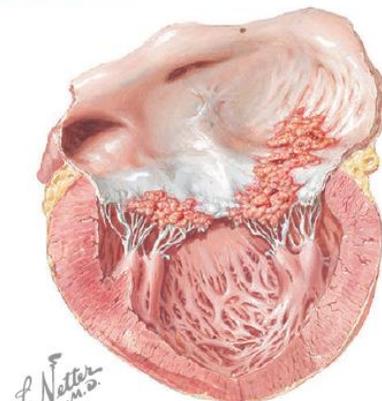
Advanced lesions



Vegetations of bacterial endocarditis on under- and atrial surface of mitral valve



Advanced bacterial endocarditis of aortic valve: perforation of cusp; extension to anterior cusp of mitral valve and chordae tendineae: "jet lesion" on septal wall

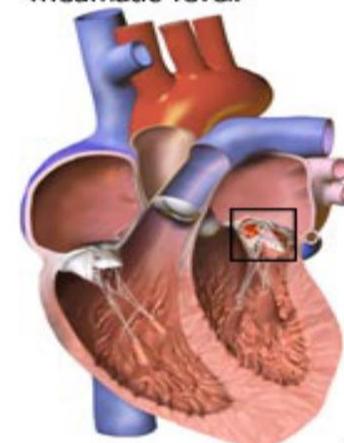


F. Netter M.D.

Advanced lesion of mitral valve: vegetations extending onto chordae tendineae with rupture of two chordae; also extension to atrial wall and contact lesion on opposite

Endocarditis

An infection of the innermost layers of the heart. It may occur in people with congenital and valvular diseases, and those who have had rheumatic fever.



Vegetations

© 2004 - Duplication not permitted

Healthy valve



Infected valve



	PROFILAXIS
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POBLACIÓN CON
ALTO RIESGO



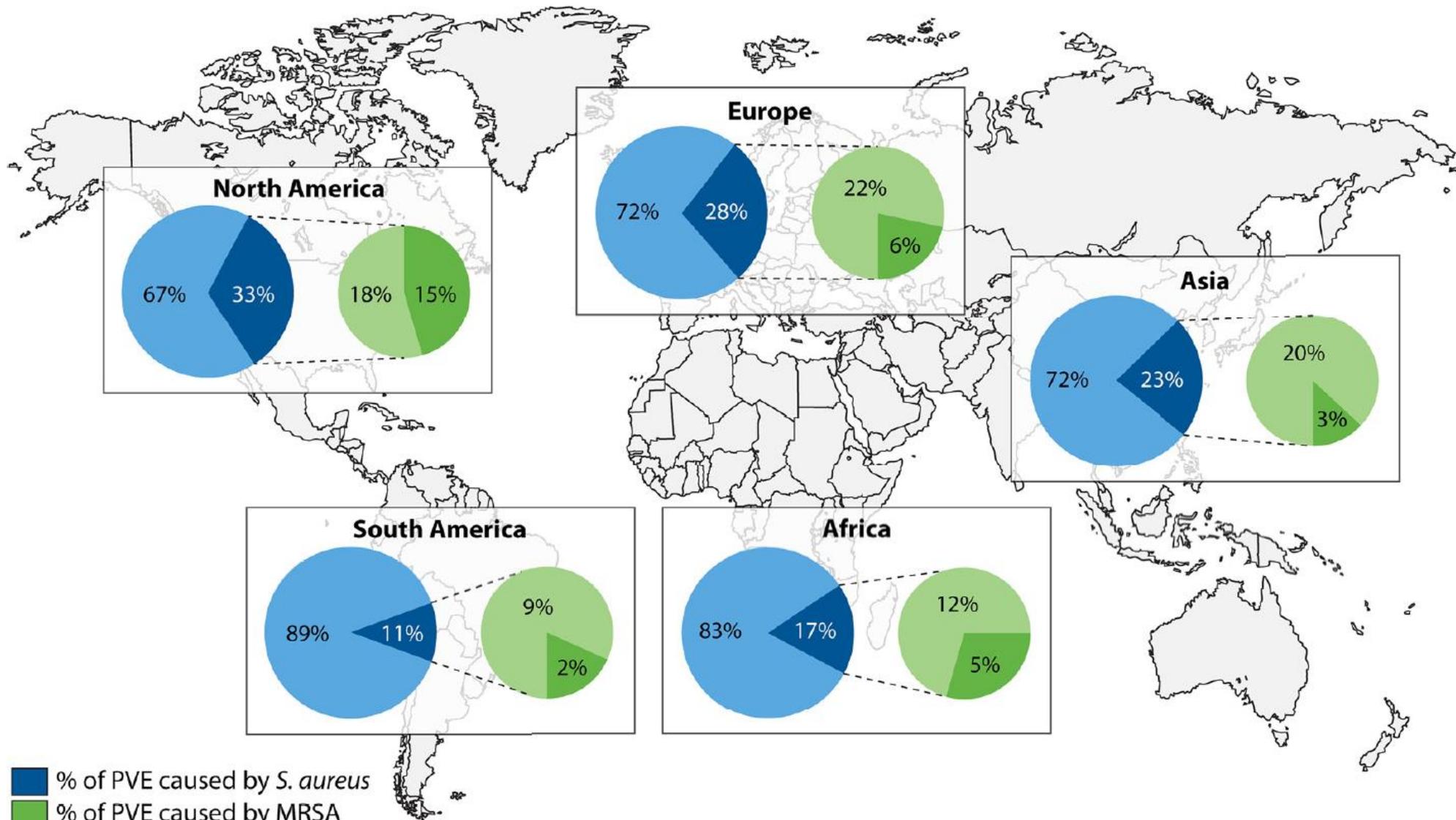
BACTERIEMIA

PROCEDIMIENTOS DENTALES

PROCEDIMIENTOS NO DENTALES

Situation	Antibiotic	Single-dose 30–60 min before procedure	
		Adults	Children
No allergy to penicillin or ampicillin	Amoxicillin	2 g orally	50 mg/kg orally
	Ampicillin	2 g i.m. or i.v.	50 mg/kg i.v. or i.m.
	Cefazolin or ceftriaxone	1 g i.m. or i.v.	50 mg/kg i.v. or i.m.
Allergy to penicillin or ampicillin	Cephalexin ^{a,b}	2 g orally	50 mg/kg orally
	Azithromycin or clarithromycin	500 mg orally	15 mg/kg orally
	Doxycycline	100 mg orally	<45 kg, 2.2 mg/kg orally >45 kg, 100 mg orally
	Cefazolin or ceftriaxone ^b	1 g i.m. or i.v.	50 mg/kg i.v. or i.m.

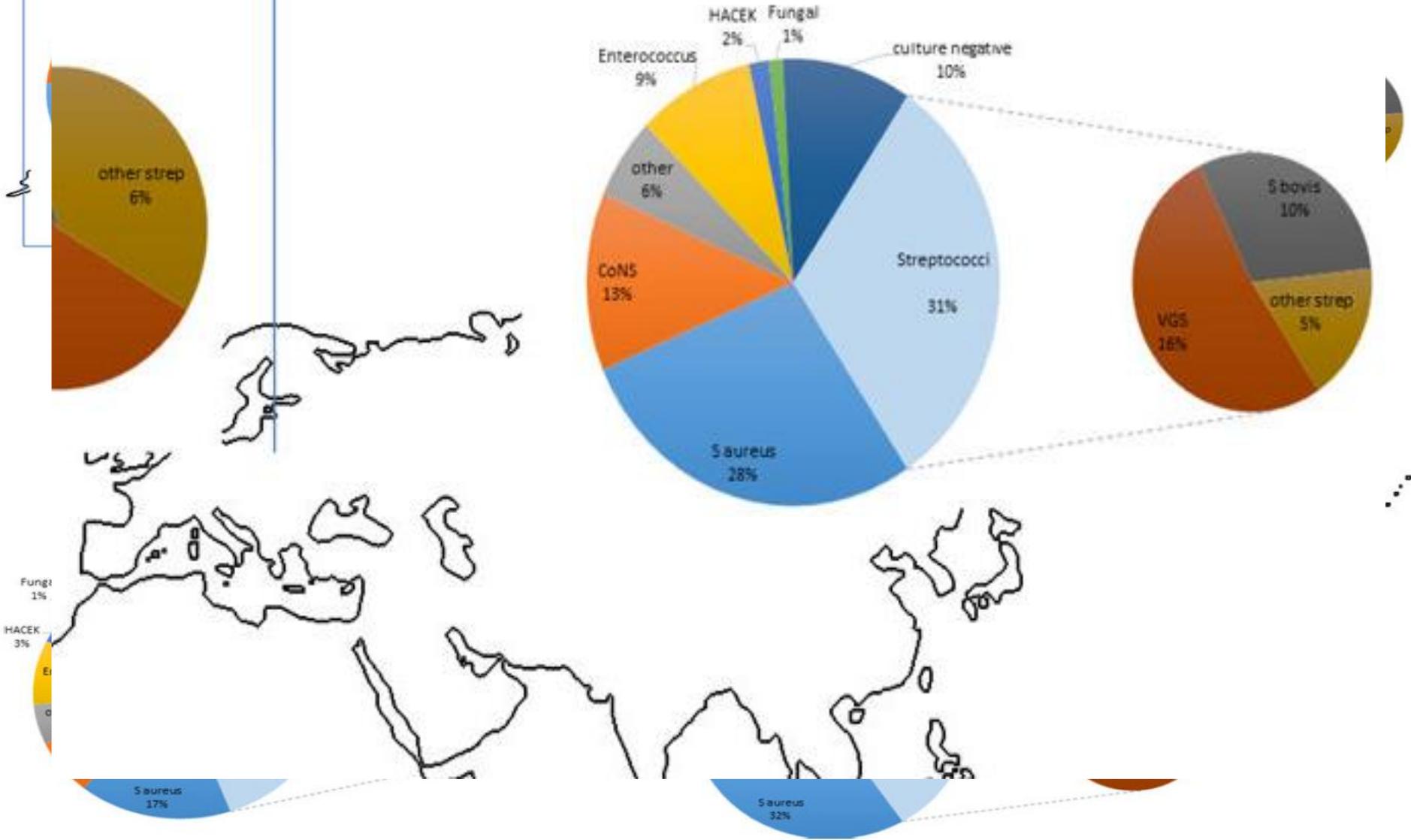
	PROFILAXIS
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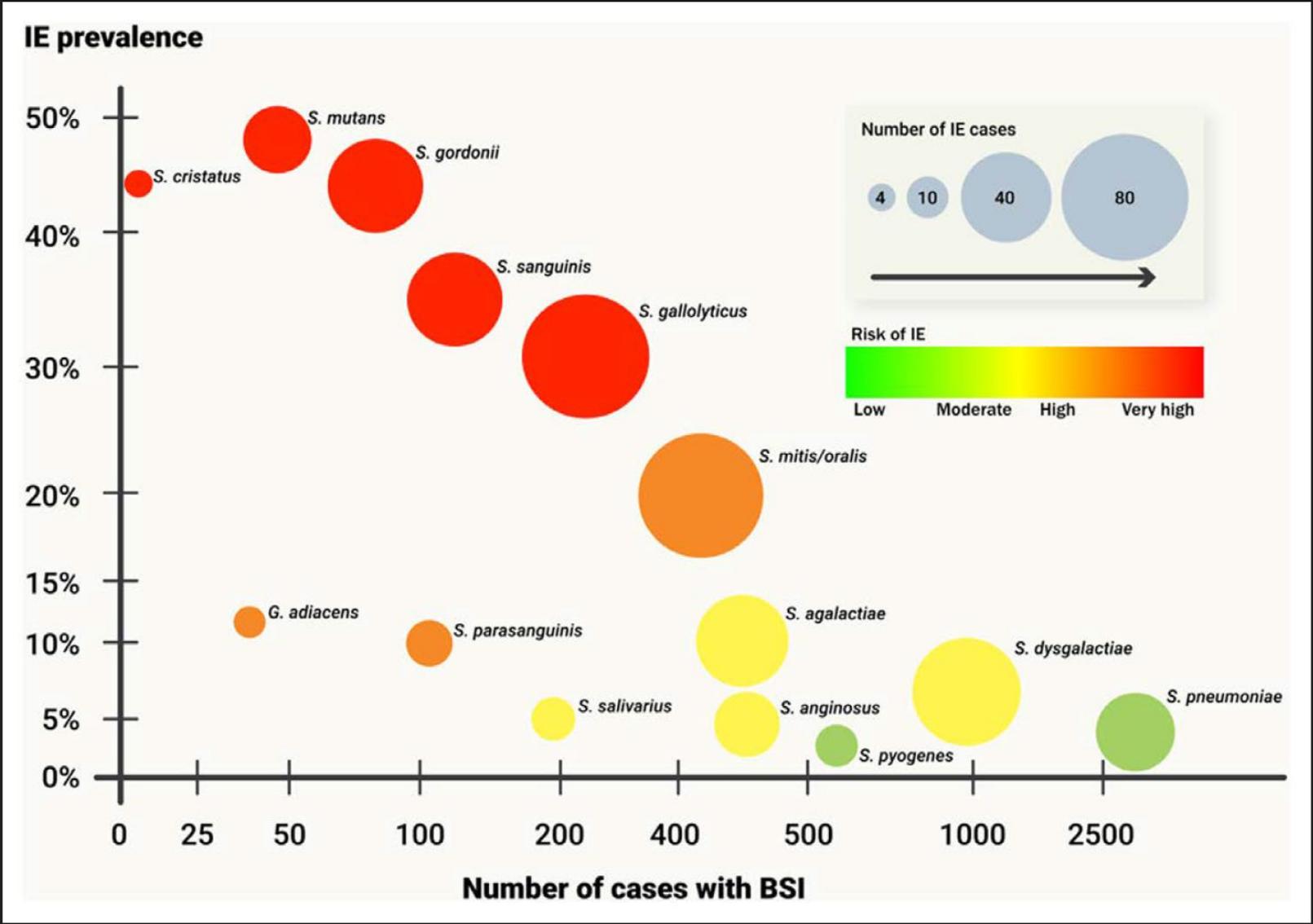
- % of PVE caused by *S. aureus*
- % of PVE caused by MRSA
- % of PVE caused by MSSA
- % of PVE caused by other microorganisms

Noi

Europe



ETIOLOGÍA

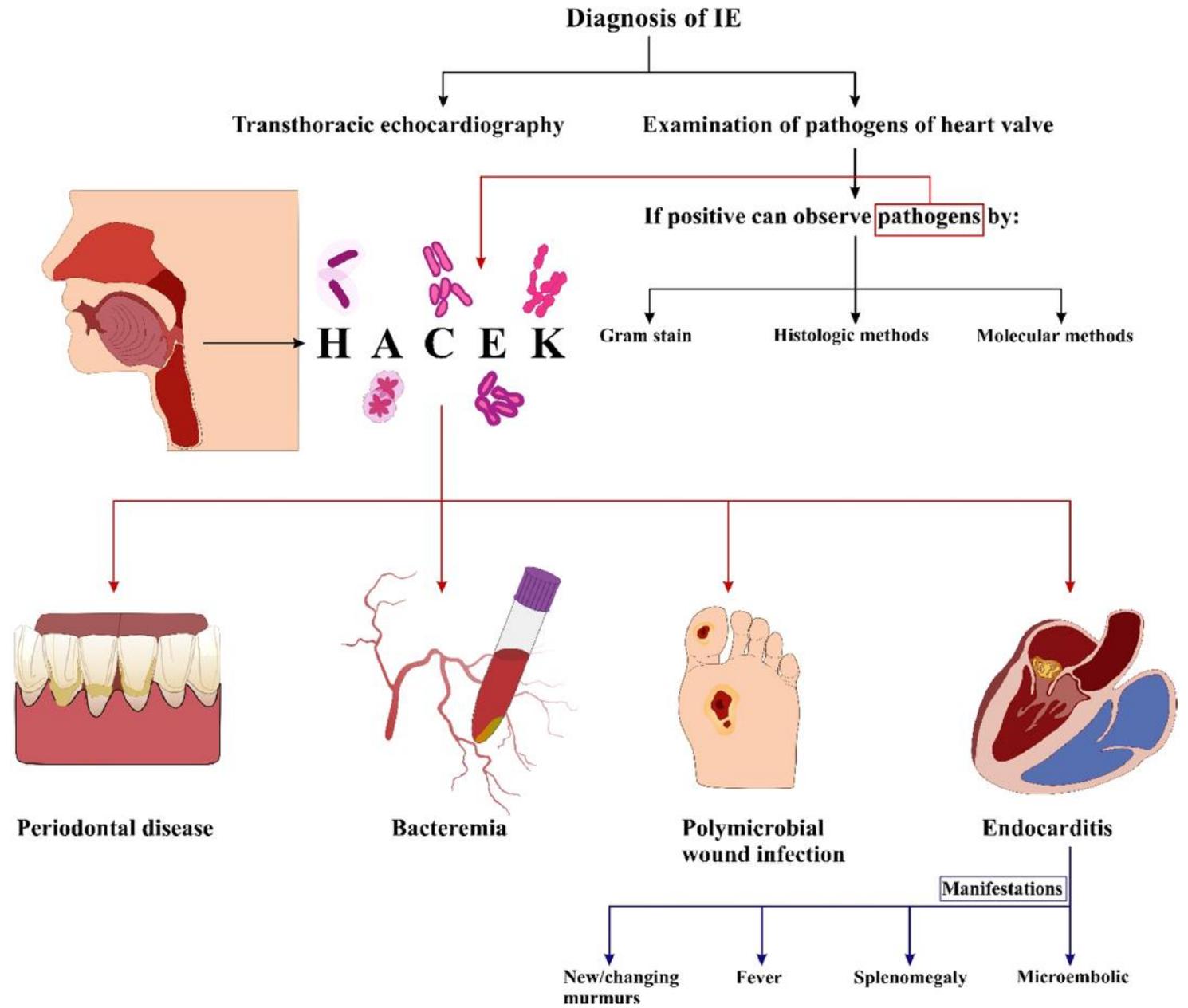


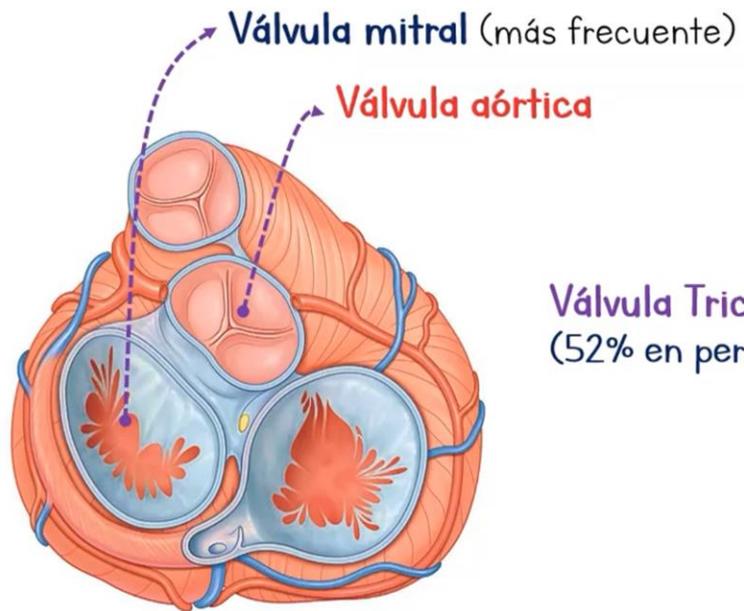
[Circulation](#)

ORIGINAL RESEARCH ARTICLE

Prevalence of Infective Endocarditis in Streptococcal Bloodstream Infections Is Dependent on Streptococcal Species

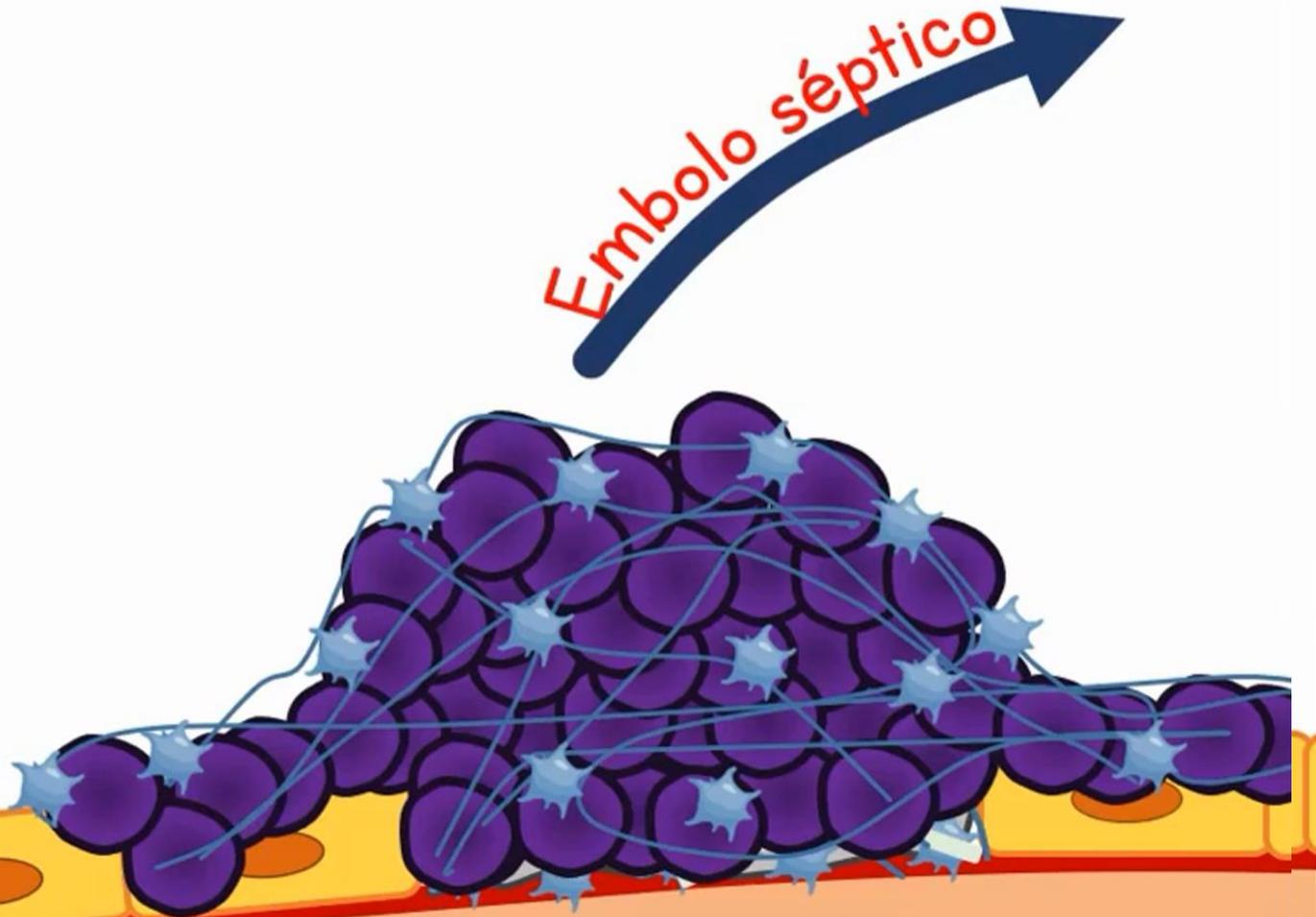
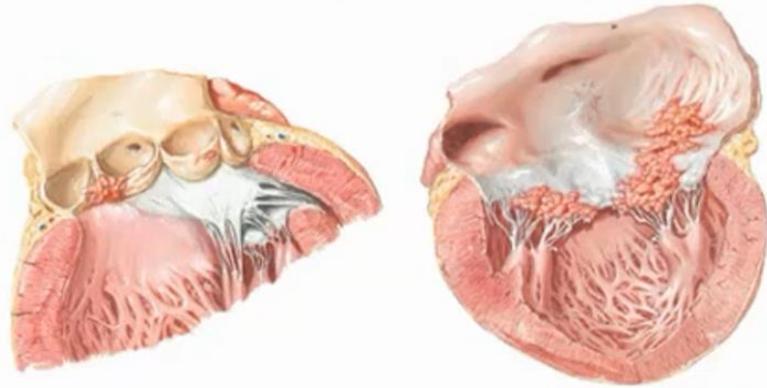
The HACEK group of bacteria—*Haemophilus parainfluenzae*, *Aggregatibacter* spp. (*A. actinomycetemcomitans*, *A. aphrophilus*, *A. paraphrophilus*, and *A. segnis*), *Cardiobacterium hominis* and *valvarum*, *Eikenella corrodens*, *Kingella kingae* and *denitrificans*- are fastidious





Válvula Tricúspide
(52% en personas adictas a las drogas)

1. Alteración estructural del endocardio.
2. Flujo Turbulento.
3. Lesión en el endocardio.
4. Deposito de plaquetas, fibronectina, fibrina.
5. Se produce la ETNB (vegetación estéril).
6. Bacteriemia.
7. Adhesión de las bacterias a los ETNB.
8. Colonización y formación de VEGETACIÓN.



	PROFILAXIS
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CLÍNICA

Sospecha en :

Todos los pacientes con sepsis o fiebre de origen desconocido en presencia de factores de riesgo.

Fiebre y hemocultivos positivos en ausencia de otro foco de infección, especialmente con uno o más factores de riesgo.

CLÍNICA

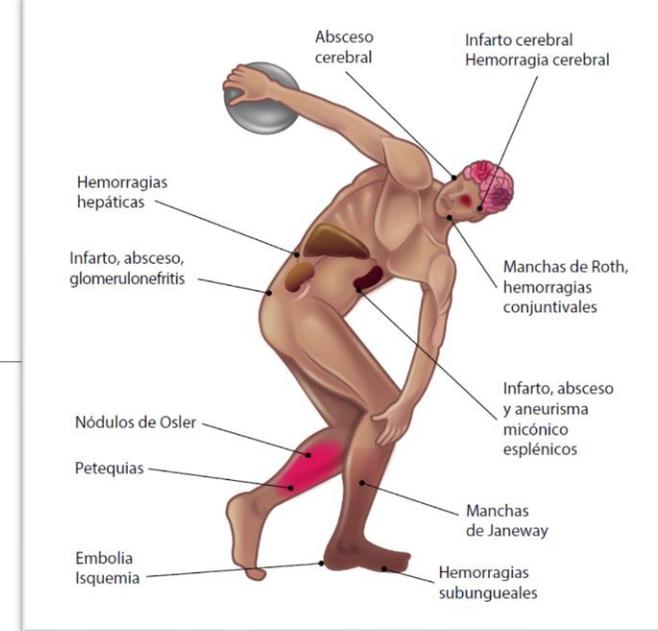
Cardiac risk factors

Previous infective endocarditis
Valvular heart disease
Prosthetic heart valve
Central venous or arterial catheter
Transvenous cardiac implantable electronic device
Congenital heart disease

Non-cardiac risk factors

Central venous catheter
People who inject drugs
Immunosuppression
Recent dental or surgical procedures
Recent hospitalization
Haemodialysis

	PVE (%) (n = 939)	NVE (%) (n = 1764)	CIED (%) (n = 308)
Signs and symptoms			
Fever	77.3	78.9	72.3
Cough	13.1	20.1	12.8
Dizziness	9.9	11.4	8.8
Cerebrovascular accident	7.3	7.2	2.4
Syncope	2.6	2.8	2.4
Cardiac murmur	65.6	70.8	31.5
Congestive heart failure	27.1	27.7	28.9
Cardiogenic shock	1.4	2.7	2.6
Septic shock	6.3	7.1	5.5



Osler nodes	1.1	2.6	0.6
Janeway lesions	1.9	4.9	0.6
Roth spots	0.4	2.1	0.3
Complications			
Paravalvular abscess	13.8	11.5	7.8
Spondylitis	4.5	5.8	4.5
Embolic events	21.4	30.1	11.7
Pulmonary	9.5	27.5	75.0
Cerebral	51.2	43.3	16.7
Splenic	25.9	22.0	5.6
Coronary	2.0	3.2	2.8
Renal	7.5	11.1	2.8
Hepatic	1.5	2.4	0.0
Peripheral	12.4	12.2	2.8
Haemorrhagic stroke	1.7	2.7	0.6

CIED, Cardiac implanted electronic devices; EURO-ENDO, European Infective Endocarditis; NVE, native valve endocarditis; PVE, prosthetic valve endocarditis. Adapted from the EURO-ENDO registry.⁷



SOSPECHA:

Cualquier paciente que presente fiebre y/o fenómenos embólicos y/o soplo de nueva dehiscencia protésica.

Pacientes de edad avanzada.
Pacientes con inmunodeficiencia
Insuficiencia renal o cardíaca
Grupos de alto riesgo (CC o válvulas protésicas).

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DIAGNÓSTICO

1. Laboratorio.
2. Microbiología.
3. Anatomía Patológica.
4. Pruebas de imagen.

DIAGNÓSTICO

1. Laboratorio

Elevación de PCR y procalcitonina; VSG; leucocitosis/leucopenia; anemia; hematuria macroscópica,...

Marcadores de disfunción de órganos diana (lactatemia, aumento de bilirrubina, trombocitopenia, cambios en la concentración sérica de creatinina).

Aumento de marcadores inflamatorios complejos inmunitarios

2. Microbiología: Hemocultivos

3. Anatomía Patológica

4. Pruebas de imagen

DIAGNÓSTICO

1. Laboratorio
2. Microbiología.
 1. **Hemocultivos positivos.**
 2. Hemocultivos negativos.
3. Anatomía Patológica
4. Pruebas de imagen

LABORATORIO Y MICROBIOLOGÍA

S. AUREUS (31%) > ESTREPTOCOCOS ORALES (17%) > ESTAFILOCOCOS COAGULASA NEGATIVOS (11%)

DIAGNÓSTICO

S. AUREUS (31%) > ESTREPTOCOCOS ORALES (17%) > ESTAFILOCOCOS COAGULASA NEGATIVOS (11%)

EI CON HEMOCULTIVOS NEGATIVOS

Pathogen	Diagnostic procedures
<i>Brucella</i> spp.	Serology, blood cultures, tissue culture, immunohistology, and 16S rRNA sequencing of tissue
<i>C. burnetii</i>	Serology (IgG phase I >1:800), tissue culture, immunohistology, and 16S rRNA sequencing of tissue
<i>Bartonella</i> spp.	Serology (IgG phase I >1:800), blood cultures, tissue culture, immunohistology, and 16S rRNA sequencing of tissue
<i>T. whipplei</i>	Histology and 16S rRNA sequencing of tissue
<i>Mycoplasma</i> spp.	Serology, tissue culture, immunohistology, and 16S rRNA sequencing of tissue
<i>Legionella</i> spp.	Serology, blood cultures, tissue culture, immunohistology, and 16S rRNA sequencing of tissue
Fungi	Serology, blood cultures, 18S rRNA sequencing of tissue
Mycobacteria (including <i>Mycobacterium chimaera</i>)	Specific blood cultures, 16S rRNA sequencing of tissue

Ig, immunoglobulin; rRNA, ribosomal ribonucleic acid.

DIAGNÓSTICO

1. Laboratorio

2. Microbiología.

1. Hemocultivos positivos.

2. Hemocultivos negativos

❖ Antibiótico previo.

❖ Hongos y bacterias de crecimiento exigente:

❖ Cultivo en medios específicos.

❖ Serología de *Coxiella Burnetii*, *Bartonella* spp, *Aspergillus* spp, *Mycoplasma pneumoniae*, *Brucella* spp, y *Legionella pneumophila*.

❖ PCR para *Tropheryma whipplei*, *Bartonella* spp y hongos (*Candida* spp y *Aspergillus* spp).

❖ Descartar endocarditis no infecciosa:

❖ Anticuerpos antinucleares.

❖ Síndrome antifosfolipídico: anticuerpos anticardiolipina IgG y anti-B2-glicoproteína IgG e IgM

❖ Si bioprótesis porcina y marcadores de respuesta alérgica:

❖ Anticuerpos antiporcino.

❖ Inadecuada técnica microbiológica.

3. Anatomía Patológica

4. Pruebas de imagen

DIAGNÓSTICO

S. AUREUS (31%) > ESTREPTOCOCOS ORALES (17%) > ESTAFILOCOCOS COAGULASA NEGATIVOS (11%)

EI CON HEMOCULTIVOS NEGATIVOS

EI NO INFECCIOSA

ANTICUERPOS ANTINUCLEARES
SINDROME ANTIFOSFOLIPIDICO

DIAGNÓSTICO

1. Laboratorio

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1. Hemocultivos positivos.

2. Hemocultivos negativos

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❖ Hongos y bacterias de crecimiento exigente:

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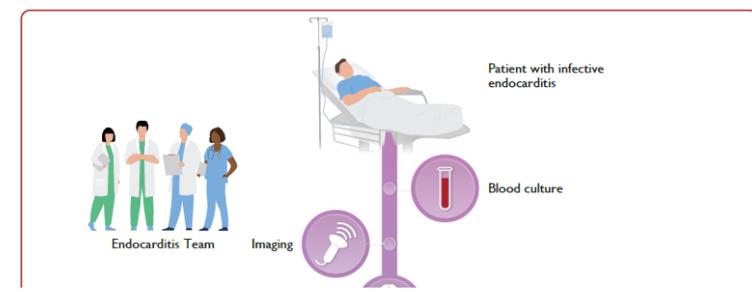
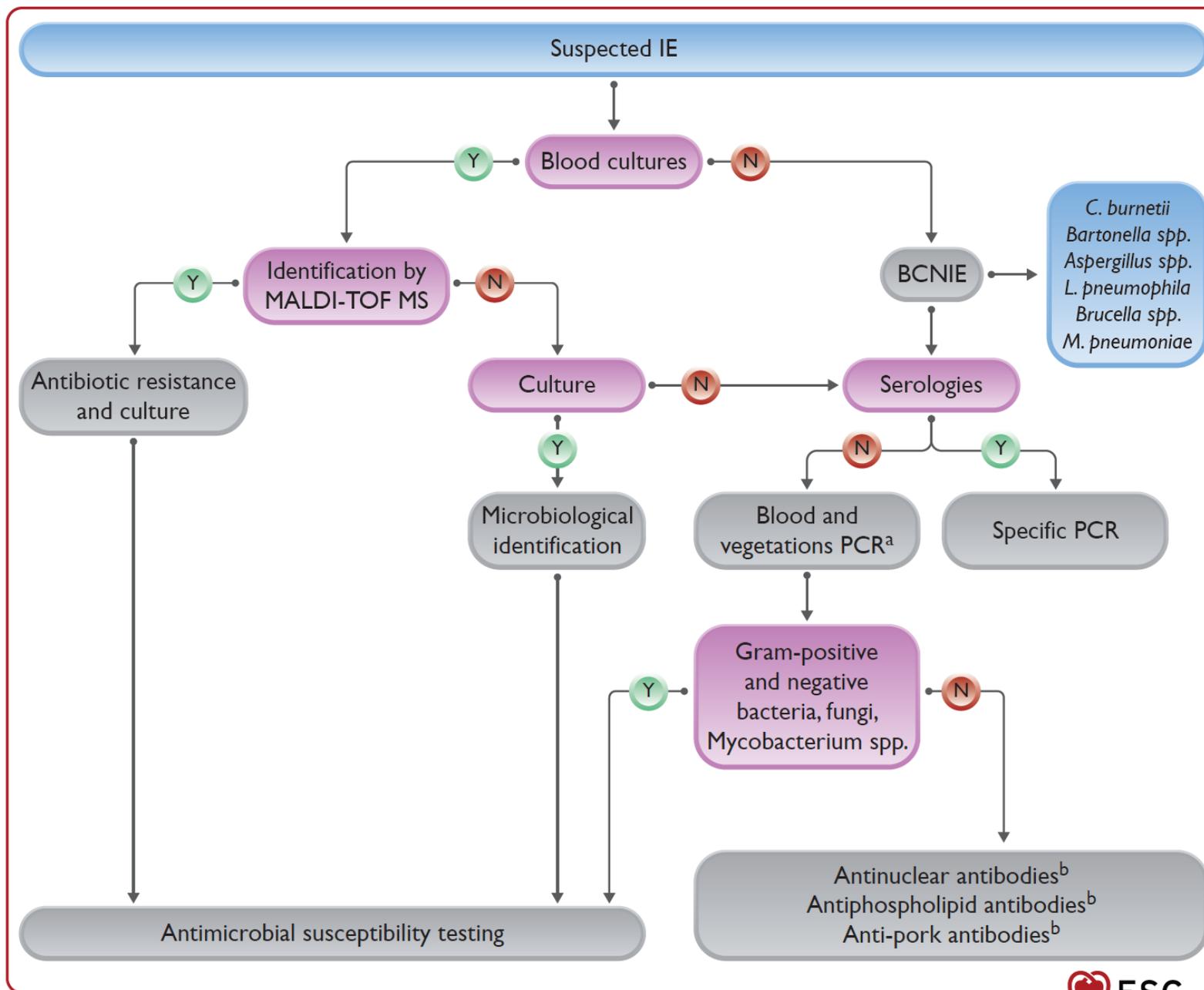
❖ Si bioprótesis porcina y marcadores de respuesta alérgica:

❖ Anticuerpos antiporcino.

❖ Inadecuada técnica microbiológica.

3. Anatomía Patológica

4. Pruebas de imagen



DIAGNÓSTICO

1. Laboratorio
2. Microbiología.
3. Anatomía Patológica
4. Pruebas de imagen

Ecocardiografía.

TAC

RMN

PET-TAC

DIAGNÓSTICO

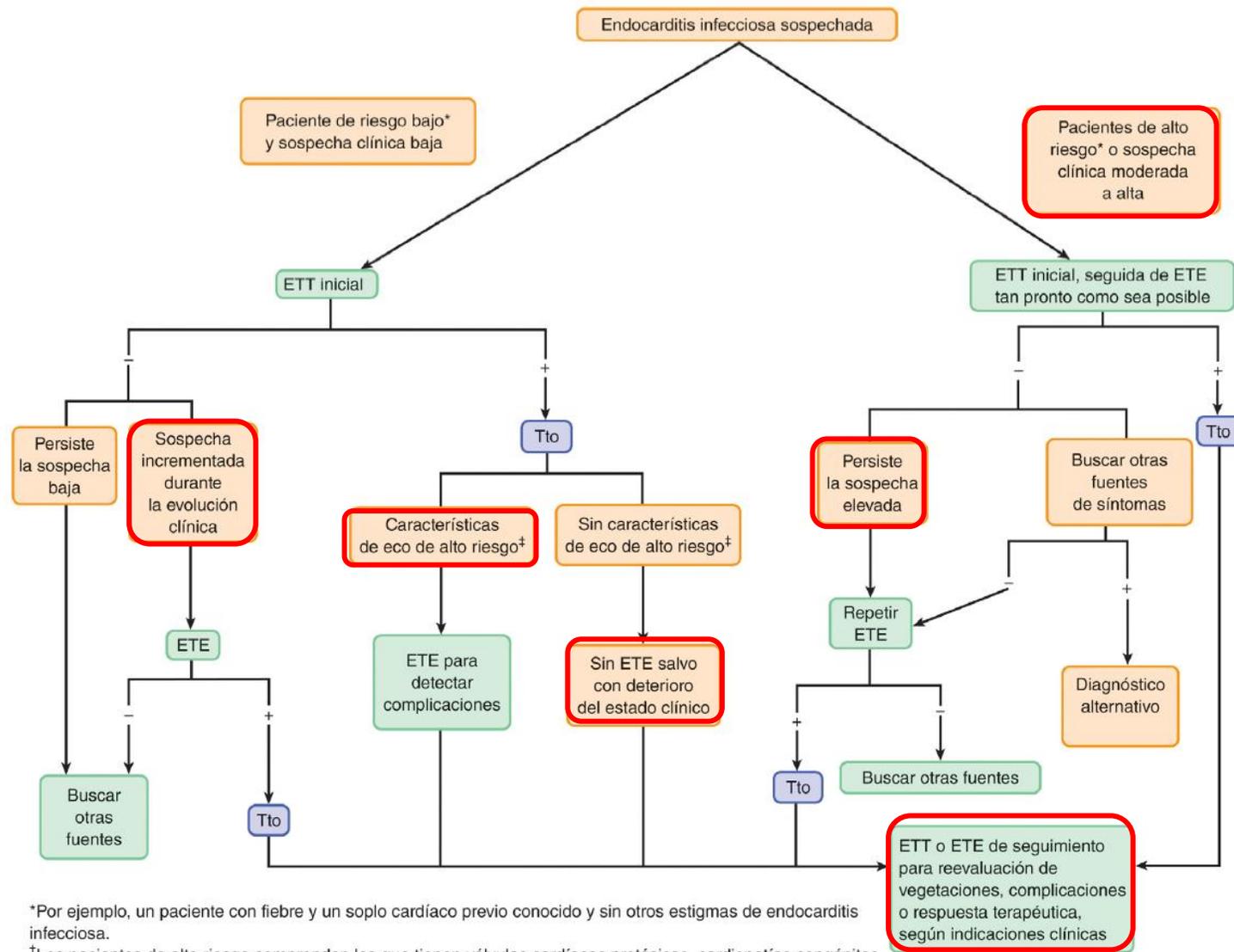
1. Laboratorio
2. Microbiología.
3. Anatomía Patológica
4. Pruebas de imagen

Ecocardiografía.

TAC

RMN

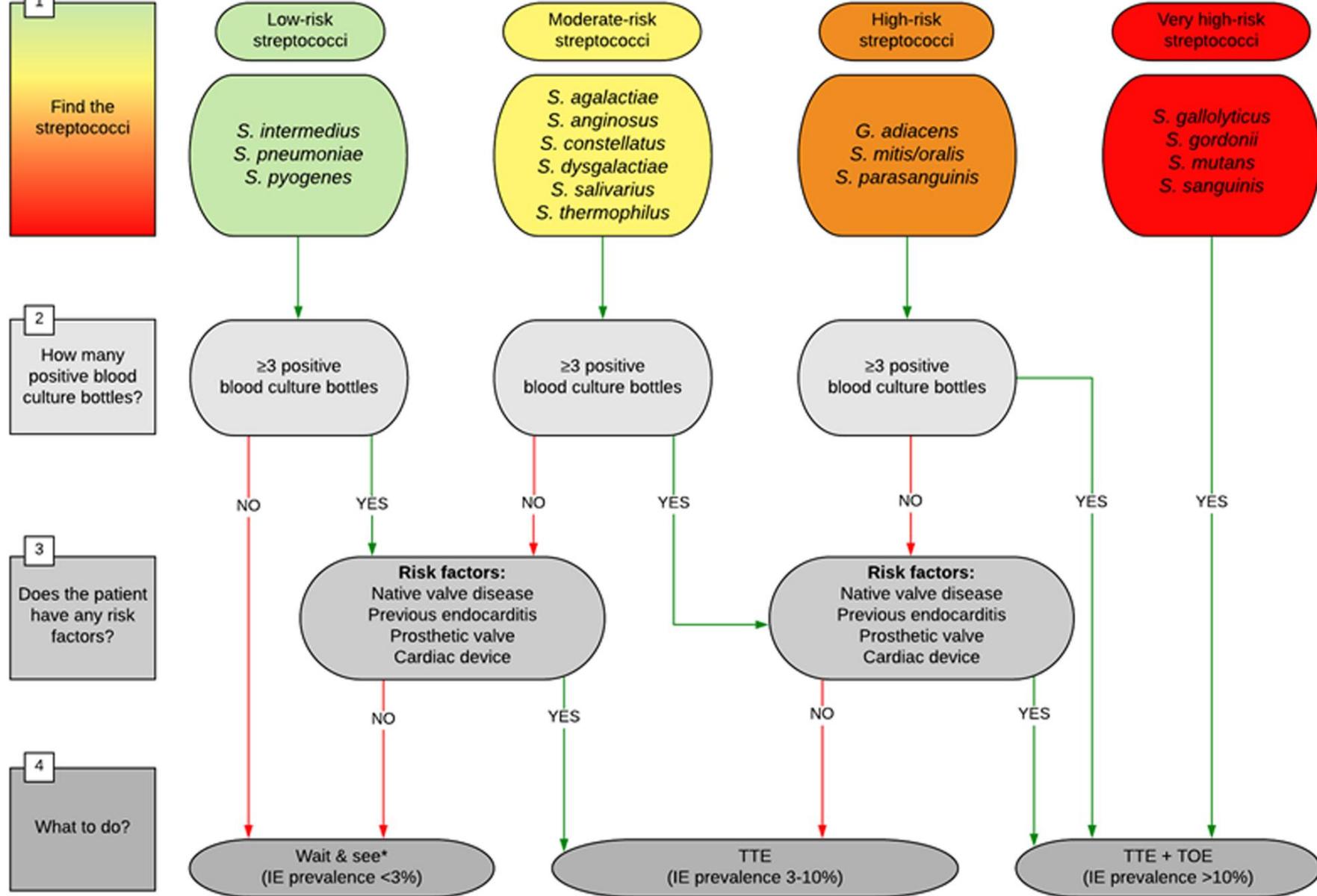
Técnicas de imagen nuclear



*Por ejemplo, un paciente con fiebre y un soplo cardíaco previo conocido y sin otros estigmas de endocarditis infecciosa.

†Los pacientes de alto riesgo comprenden los que tienen válvulas cardíacas protésicas, cardiopatías congénitas, endocarditis previa, nuevo soplo, insuficiencia cardíaca u otros estigmas de endocarditis.

‡Entre las características ecocardiográficas de alto riesgo se cuentan vegetaciones grandes o móviles, insuficiencia valvular, indicios de extensión perivalvular o disfunción ventricular secundaria.



*Echocardiography is not initially recommended unless there is a strong clinical suspicion of endocarditis such as persistent or recurrent bacteraemia, metastatic infectious phenomenon (e.g. embolic event) or signs of acute heart failure.

Proposal for the use of echocardiography in bloodstream infections due to different streptococcal species

Sandra Chamat-Hedemand^{1,2*}, Niels Eske Bruun^{1,3,4}, Lauge Østergaard⁵, Magnus Arpi⁶, Emil Fosbøl⁶, Jonas Boel⁶, Louise Bruun Østergaard⁷, Trine K. Lauridsen⁷, Gunnar Gislason^{2,7}, Christian Torp-Pedersen^{8,9} and Anders Dahl¹



DIAGNÓSTICO

1. Laboratorio
2. Microbiología.
3. Anatomía Patológica
4. Pruebas de imagen

Ecocardiografía.

TAC

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Técnicas de imagen nuclear

DIAGNÓSTICO

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Ecocardiografía.

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Técnicas de imagen nuclear

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1. Laboratorio
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Ecocardiografía.

TAC

RMN

Técnicas de imagen nuclear

- Microorganisms demonstrated by culture or histologic examination of a vegetation, a vegetation that has embolized, or an intracardiac abscess specimen; or
- Pathologic lesions; vegetation or intracardiac abscess confirmed by

CRITERIOS DIAGNÓSTICOS

Major criteria

(i) Blood cultures positive for IE

- (a) Typical microorganisms consistent with IE from two separate blood cultures:
Oral streptococci, *Streptococcus gallolyticus* (formerly *S. bovis*), HACEK group, *S. aureus*, *E. faecalis*
- (b) Microorganisms consistent with IE from continuously positive blood cultures:
- ≥ 2 positive blood cultures of blood samples drawn > 12 h apart.
 - All of 3 or a majority of ≥ 4 separate cultures of blood (with first and last samples drawn ≥ 1 h apart).
- (c) Single positive blood culture for *C. burnetii* or phase I IgG antibody titre $> 1:800$.

(ii) Imaging positive for IE:

Valvular, perivalvular/periprosthetic and foreign material anatomic and metabolic lesions characteristic of IE detected by any of the following imaging techniques:

- Echocardiography (TTE and TOE).
- Cardiac CT.
- [18F]-FDG-PET/CT(A).
- WBC SPECT/CT.

- Fever, temperature $> 38^\circ\text{C}$.
- Vascular phenomena, major arterial emboli, septic pulmonary infarcts, mycotic aneurysm, intracranial haemorrhage, conjunctival haemorrhages, and Janeway lesions.
- Immunologic phenomena: glomerulonephritis, Osler nodes, Roth spots, and rheumatoid factor.
- Microbiological evidence: positive blood culture but does not meet a major criterion as noted above^a or serologic evidence of active infection with organism consistent with IE.

Definite:

- 2 major criteria.
- 1 major criterion and at least 3 minor criteria.
- 5 minor criteria.

Possible:

- 1 major criterion and 1 or 2 minor criteria.
- 3–4 minor criteria.

Rejected:

- Does not meet criteria for definite or possible at admission with or without a firm alternative diagnosis.

- Microorganisms demonstrated by culture or histologic examination of a vegetation, a vegetation that has embolized, or an intracardiac abscess specimen; or

CRITERIOS DIAGNÓSTICOS

Minor criteria

- (i) Predisposing conditions (i.e. predisposing heart condition at high or intermediate risk of IE or PWIDs)^a**
- (ii) Fever defined as temperature >38°C**
- (iii) Embolic vascular dissemination (including those asymptomatic detected by imaging only):**
 - Major systemic and pulmonary emboli/infarcts and abscesses.
 - Haematogenous osteoarticular septic complications (i.e. spondylodiscitis).
 - Mycotic aneurysms.
 - Intracranial ischaemic/haemorrhagic lesions.
 - Conjunctival haemorrhages.
 - Janeway's lesions.
- (IV) Immunological phenomena:**
 - Glomerulonephritis.
 - Osler nodes and Roth spots.
 - Rheumatoid factor.
- (V) Microbiological evidence:**
 - Positive blood culture but does not meet a major criterion as noted above.
 - Serological evidence of active infection with organism consistent with IE.

spots, and rheumatoid factor.

- Microbiological evidence: positive blood culture but does not meet a major criterion as noted above^a or serological evidence of active infection with organism consistent with IE.

2023 ESC Guidelines for the management of endocarditis

Developed by the task force on the management of endocarditis of the European Society of Cardiology (ESC)

Endorsed by the European Association for Cardio-Thoracic Surgery (EACTS) and the European Association of Nuclear Medicine (EANM)

Possible:

- 1 major criterion and 1 or 2 minor criteria.
- 3–4 minor criteria.

Rejected:

- Does not meet criteria for definite or possible at admission with or without a firm alternative diagnosis.

CRITERIOS DIAGNÓSTICOS

Major criteria

Pathologic criteria

- Microorganisms demonstrated by culture or histologic examination of a vegetation, a vegetation that has embolized, or an intracardiac abscess specimen; or
- Pathologic lesions; vegetation or intracardiac abscess confirmed by histologic examination showing active endocarditis

Blood culture positive for IE

- Typical microorganisms consistent with IE from 2 separate blood cultures:
 - Oral streptococci, *Streptococcus gallolyticus*, HACEK group, *Staphylococcus aureus*; or
 - Community-acquired enterococci, in the absence of a primary focus; or
- Microorganisms consistent with IE from persistently positive blood cultures, defined as follows:

• At least 2 positive cultures of blood samples drawn >12 h apart.

Major criteria

(i) Blood cultures positive for IE

- (a) Typical microorganisms consistent with IE from two separate blood cultures:
 - Oral streptococci, *Streptococcus gallolyticus* (formerly *S. bovis*), HACEK group, *S. aureus*, *E. faecalis*
- (b) Microorganisms consistent with IE from continuously positive blood cultures:
 - ≥ 2 positive blood cultures of blood samples drawn >12 h apart.
 - All of 3 or a majority of ≥ 4 separate cultures of blood (with first and last samples drawn ≥ 1 h apart).
- (c) Single positive blood culture for *C. burnetii* or phase I IgG antibody titre >1:800.

(ii) Imaging positive for IE:

IE Classification (at admission and during follow-up)

Definite:

- 2 major criteria.
- 1 major criterion and at least 3 minor criteria.
- 5 minor criteria.

Possible:

- 1 major criterion and 1 or 2 minor criteria.
- 3–4 minor criteria.

Rejected:

- Does not meet criteria for definite or possible at admission with or without a firm alternative diagnosis.

fever, temperature ≥ 38.0 °C.

- Vascular phenomena, major arterial emboli, septic pulmonary infarcts, mycotic aneurysm, intracranial haemorrhage, conjunctival haemorrhages, and Janeway lesions.
- Immunologic phenomena: glomerulonephritis, Osler nodes, Roth spots, and rheumatoid factor.
- Microbiological evidence: positive blood culture but does not meet a major criterion as noted above^a or serologic evidence of active infection with organism consistent with IE.

Definite:

- 2 major criteria.
- 1 major criterion and at least 3 minor criteria.
- 5 minor criteria.

Possible:

- 1 major criterion and 1 or 2 minor criteria.
- 3–4 minor criteria.

Rejected:

- Does not meet criteria for definite or possible at admission with or without a firm alternative diagnosis.

I. MAJOR CRITERIA

A. Microbiologic Major Criteria

(1) Positive blood cultures

i. **Microorganisms that commonly cause IE^a isolated from 2 or more blood cultures**

ii. **Microorganisms that occasionally or rarely cause IE isolated from 2 or more blood cultures**

(2) Positive laboratory tests

i. **Positive polymerase chain reaction (PCR) or other nucleic acid-based test for *Coxiella burnetii* or *Bartonella quintana* from blood**

or

ii. ***Coxiella burnetii* antiphase I immunoglobulin G (IgG) antibody titer ≥ 1:800**

iii. **Indirect immunofluorescence assays (IFA) for detection of IgM immunoglobulin G (IgG) titer ≥ 1:800 [24, 25]^d**

B. Imaging Major Criteria

(1) Echocardiography and **cardiac computed tomography (CT)** imaging

i. Echocardiography and/or **cardiac CT** showing vegetation,^a valvular/annular abscess, or intracardiac fistula^l

or

ii. Significant new valvular regurgitation on echocardiography as compared with previous echocardiography if regurgitation is not sufficient.

or

iii. New partial dehiscence of prosthetic valve as compared with previous echocardiography
(2) **Positron emission computed tomography with 18F-fluorodeoxyglucose (PET/CT) showing abnormal metabolic activity^k involving a native or prosthetic valve, intracardiac device leads or other prosthetic material**

C. Surgical Major Criteria

Evidence of IE documented by direct inspection during heart surgery with microbiologic confirmationⁿ

II. MINOR CRITERIA

A. Predisposition

– **Previous history of IE**

– Prosthetic valve^o

– Previous valve repair^o

– Congenital heart disease^p

– More than mild regurgitation or stenosis of any etiology

– **Endovascular intracardiac implantable electronic device (CIED)**

– Hypertrophic obstructive cardiomyopathy

– Injection drug use

B. *Fever Documented temperature greater than 38.0 °C (100.4 °F)*

C. *Vascular Phenomena Clinical or radiological evidence of arterial emboli, septic pulmonary infarcts, cerebral or splenic abscess, mycotic aneurysm, intracranial hemorrhage, conjunctival hemorrhages, Janeway lesions, purulent purpura*

D. *Immunologic Phenomena Positive rheumatoid factor, Osler nodes, Roth spots, or immune complex-mediated glomerulonephritis^q*

E. Microbiologic Evidence, Falling Short of a Major Criterion

1) Positive blood cultures for a microorganism consistent with IE but not meeting the requirements for Major Criterion^r

or

2) **Positive culture, PCR, or other nucleic acid based test (amplicon or shotgun sequencing, *in situ* hybridization) for an organism consistent with IE^r from a sterile body site other than cardiac tissue, cardiac prosthesis, or arterial embolus; or a single finding of a skin bacterium by PCR on a valve or wire without additional clinical or microbiological supporting evidence [51]**

F. Imaging Criteria

Abnormal metabolic activity as detected by [18F]FDG PET/CT within 3 mo of implantation of prosthetic valve, ascending aortic graft (with concomitant evidence of valve involvement), intracardiac device leads or other prosthetic material

G. Physical Examination Criteria^s

New valvular regurgitation identified on auscultation if echocardiography is not available. Worsening or changing of preexisting murmur not sufficient

Clinical Infectious Diseases

VIEWPOINTS

IDSA

Infectious Diseases Society of America

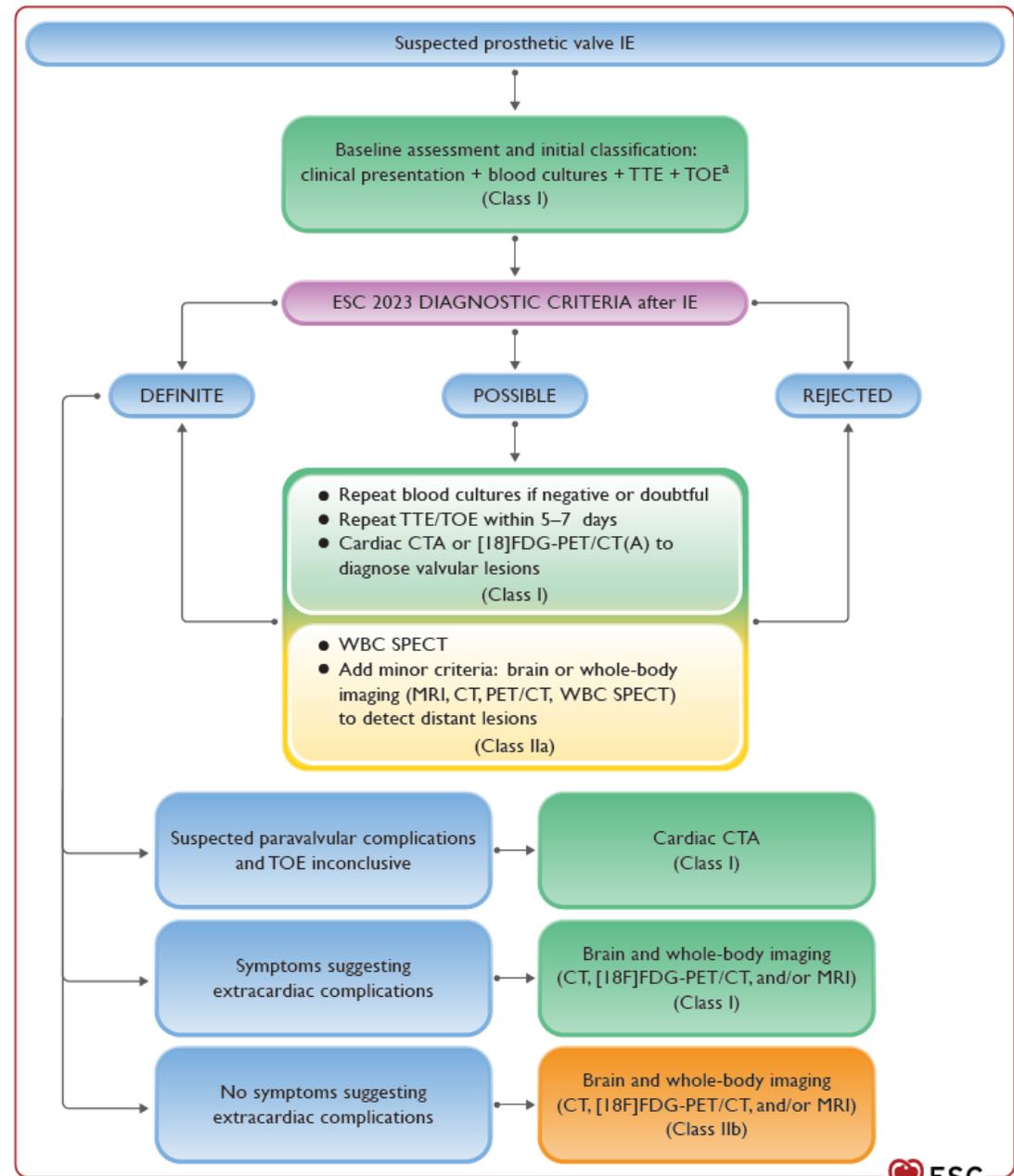
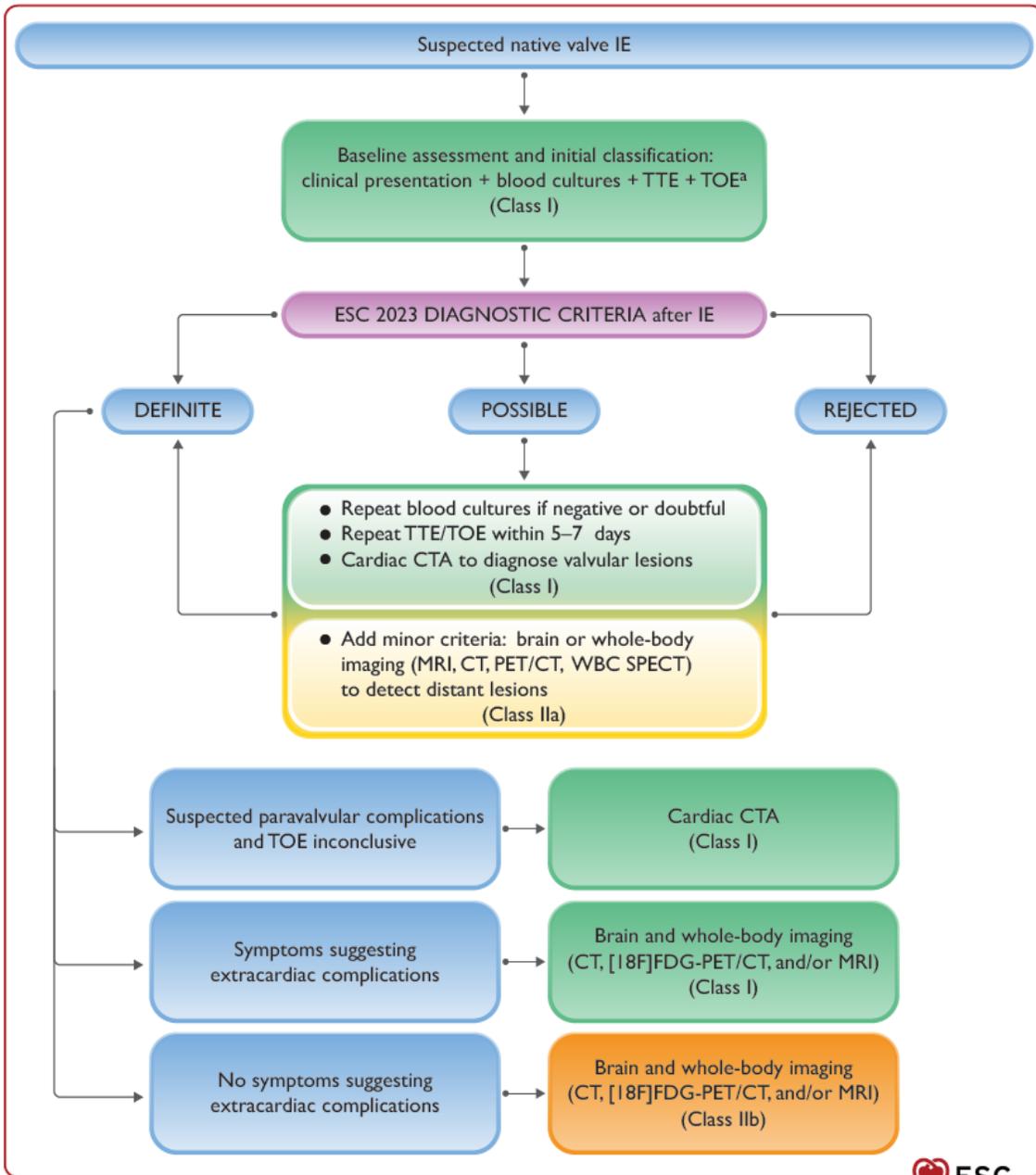
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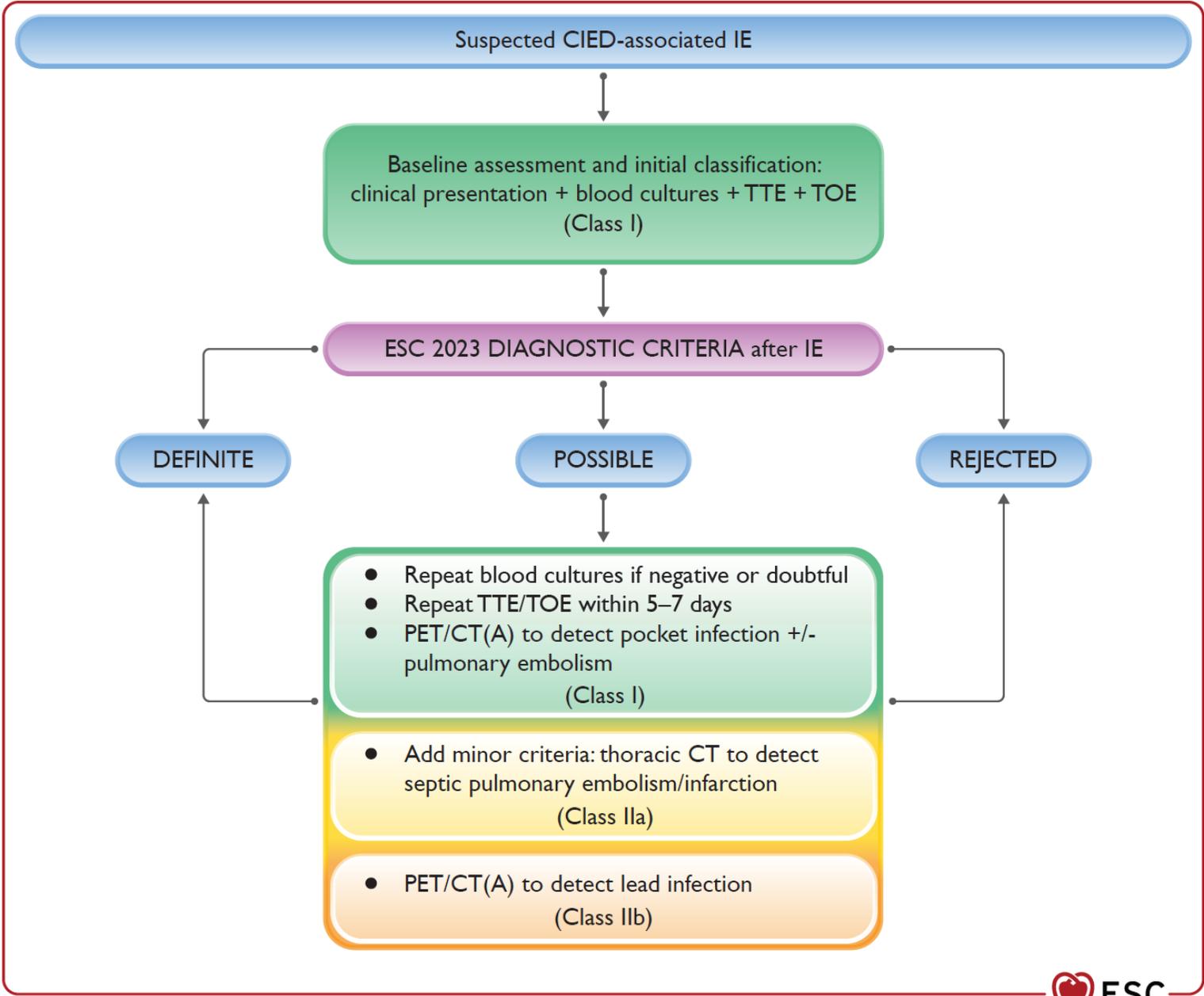
Heart Valve Medicine Association

OXFORD

The 2023 Duke-International Society for Cardiovascular Infectious Diseases Criteria for Infective Endocarditis: Updating the Modified Duke Criteria

Yancey D, Fowler Jr.,^{1,2} David T. Durack,³ Christine Sutton-Suzy,⁴ Eugenio Athan,⁵ Arnold S. Bayer,^{6,7} Anna Lisa Chaimic,⁸ Anders Dahl,⁹ Louis DiBernardo,¹⁰ Emanuele Durante-Mangoni,¹¹ Xavier Duval,¹² Claudio Querido Fortes,¹³ Emil Fechal,¹⁴ Margaret M. Hannan,¹⁵ Barbara Hasso,¹⁶ Bruno Hoss,¹⁷ Adali W. Karchmer,¹⁸ Carlos A. Mestres,¹⁹ Cathy A. Petti,^{17,20} Maria Nazarena Pizzi,¹⁹ Stephen D. Preston,¹⁹ Albert Roque,²⁰ Francisco Vandenesch,^{17,21} Jan T. M. van der Meer,²² Thomas W. van der Vaart,²³ and Jose M. Miró²⁴





DIAGNÓSTICO DIFERENCIAL

Bacteriemia por microorganismos típicos en ausencia de vegetación.

Presencia de vegetación en ausencia de bacteriemia.

DIAGNÓSTICO DIFERENCIAL

Bacteriemia por microorganismos típicos en ausencia de vegetación.

- ✓ Repetir pruebas de imagen
- ✓ Plantear la posibilidad de la existencia de focos ocultos
 - ✓ Realizar tratamiento como si fuera EI ?

DIAGNÓSTICO DIFERENCIAL

Presencia de vegetación en ausencia de bacteriemia.

- ✓ Diagnóstico diferencial con EI con cultivos negativos, incluida endocarditis trombótica no infecciosa

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	PRONÓSTICO
	TRATAMIENTO
	RECURRENCIA
	CASOS ESPECIALES
	OTROS ASPECTOS

FACTORES RELACIONADOS CON MAL PRONÓSTICO

Patient characteristics

- **Older age.**
- **Prosthetic valve IE.**
- **Haemodialysis.**
- **Unsuitable for surgery (e.g. frailty).**
- Diabetes mellitus.
- High Charlson Comorbidity Index.

Clinical complications of IE

- **Heart failure.**
- **Cerebral complications.**
- **Septic shock.**
- Renal failure.

Microbiological features

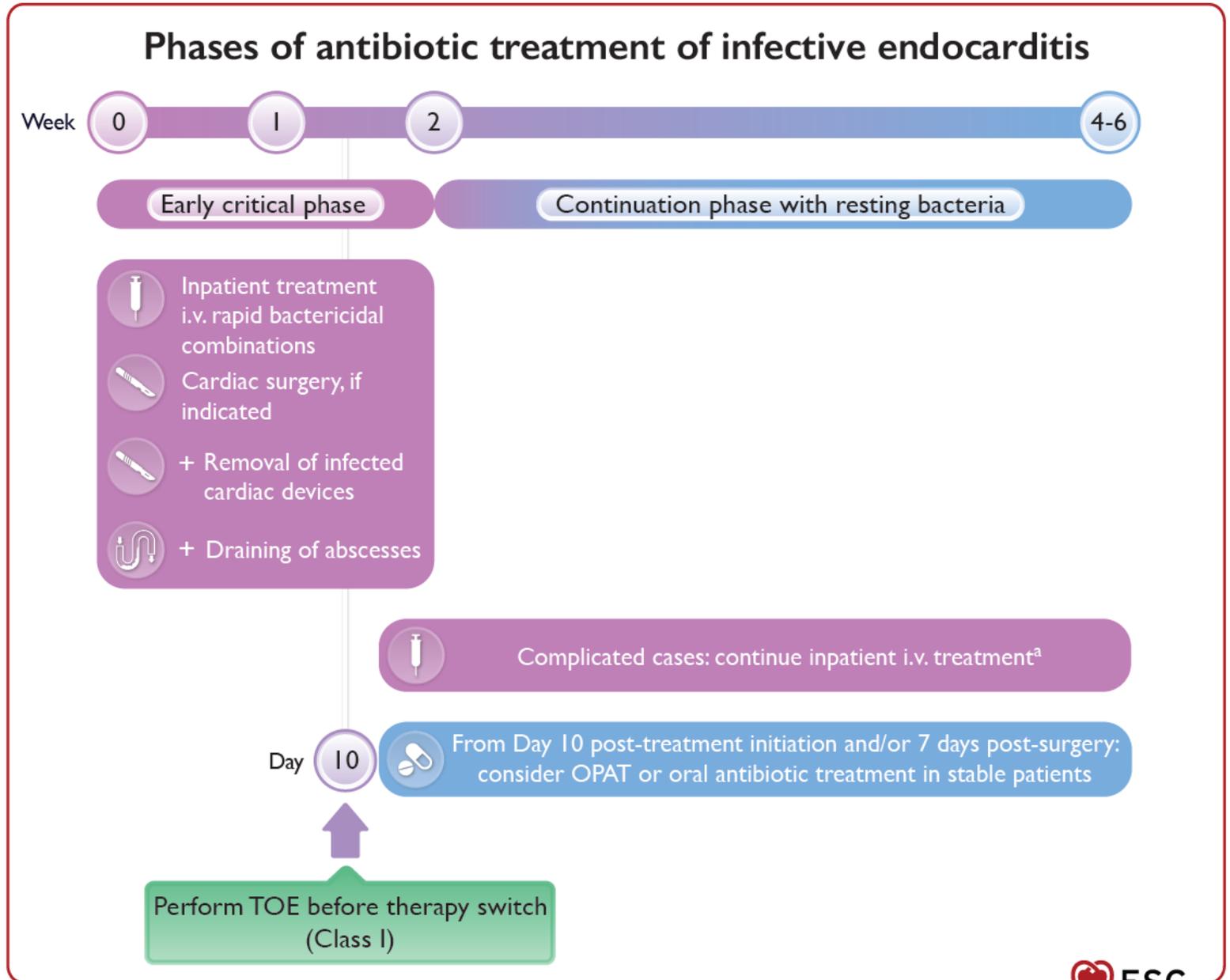
- ***S. aureus*.**
- Fungi.
- Non-HACEK Gram-negative bacilli.
- Persistent bacteraemia.

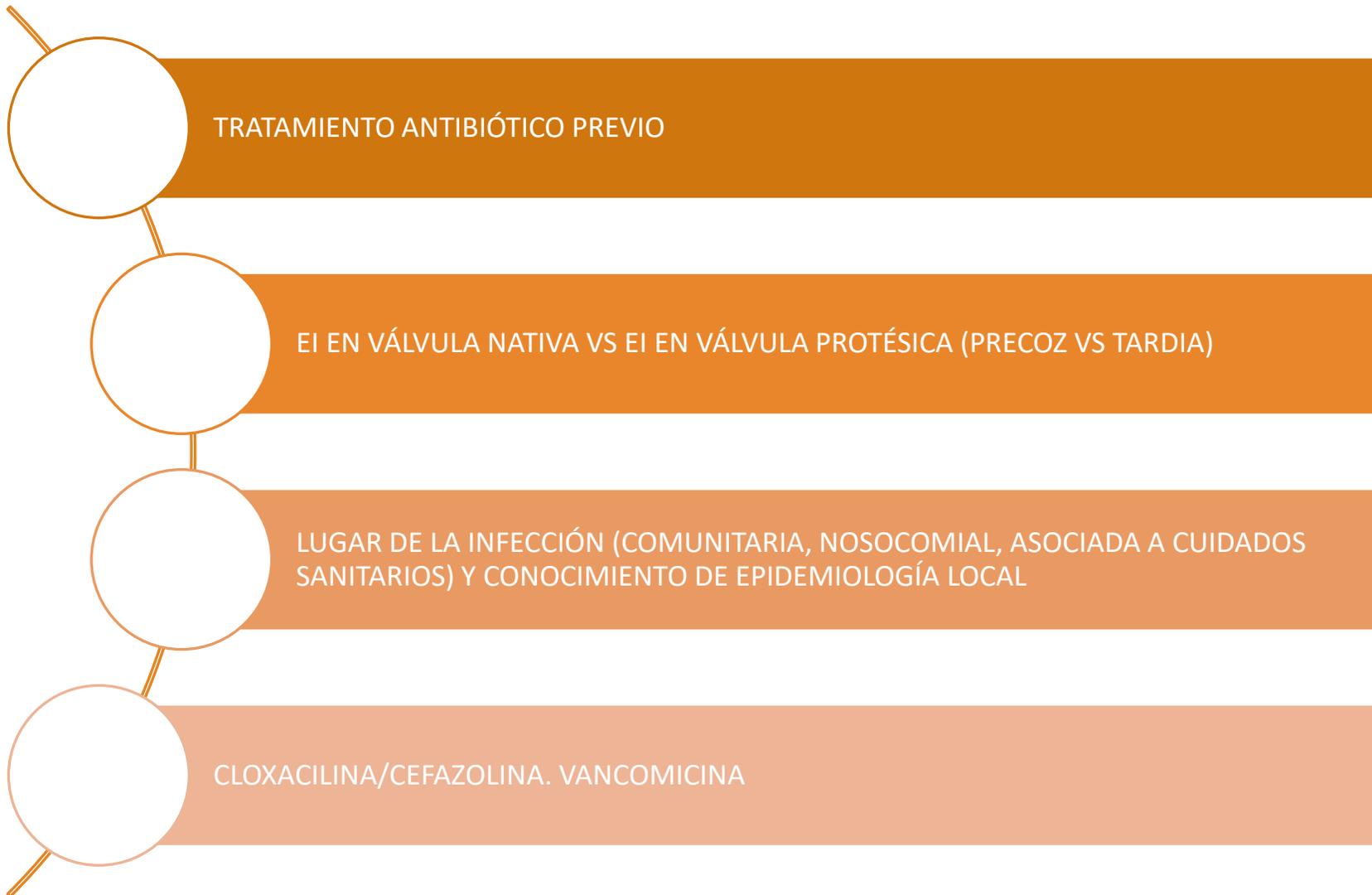
Echocardiographic findings

- **Periannular complications.**
- Left-sided infective endocarditis.
- Vegetation size >10 mm.
- Severe left-sided valve regurgitation.
- Reduced left ventricular ejection fraction.
- Pulmonary hypertension.
- Prosthetic valve dysfunction.
- Severe diastolic dysfunction or echocardiographic signs of elevated left ventricular diastolic pressures.

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TRATAMIENTO





Recommendation Table 10 — Recommendations for antibiotic regimens for initial empirical treatment of infective endocarditis (before pathogen identification)^a

Recommendations		Class ^b	Level ^c
In patients with community-acquired NVE or PVE (≥ 12 months post-surgery), ampicillin combination with ceftriaxone or with (Flu)cloxacillin and gentamicin should be considered using the following doses: ²⁵⁵			
In patients with early PVE (< 12 months post-surgery) or nosocomial and non-nosocomial healthcare-associated IE, vancomycin or daptomycin combined with gentamicin and rifampin may be considered using the following doses: ³⁹⁵			
<i>Adult antibiotic dosage and route</i>		Allergy to beta-lactams	
Ampicillin	12 g/day i.v. in 4–6 divided doses	Vancomycin ^e	30 mg/kg/day i.v. in 2 doses
Ceftriaxone	4 g/day i.v. or i.m. in 1 dose	Daptomycin	10 mg/kg/day i.v. in 1 dose
(Flu)cloxacillin	12 g/day i.v. in 4–6 divided doses	Gentamicin ^d	3 mg/kg/day i.v. or i.m. in 3 doses
Gentamicin ^d	3 mg/kg/day i.v. or i.m. in 3 doses	Rifampin	900–1200 mg i.v. in 3 doses
<i>Paediatric antibiotic dosage and route</i>		In patients with community-acquired NVE or late PVE (≥ 12 months post-surgery) who are allergic to penicillin, cefazolin, or vancomycin in combination with gentamicin may be considered using the following doses:	
Ampicillin	300 mg/kg/day i.v. in 4 divided doses	<i>Adult antibiotic dosage and route</i>	
Ceftriaxone	100 mg/kg i.v. or i.m. in 1 dose	Cefazolin	6 g/day i.v. in 3 doses
(Flu)cloxacillin	200–300 mg/kg/day equally divided doses	Vancomycin ^e	30 mg/kg/day i.v. in 2 doses
Gentamicin ^d	3 mg/kg/day i.v. or i.m. in 3 divided doses	Gentamicin ^d	3 mg/kg/day i.v. or i.m. in 1 dose

TRATAMIENTO AMBULATORIO Y/O ORAL

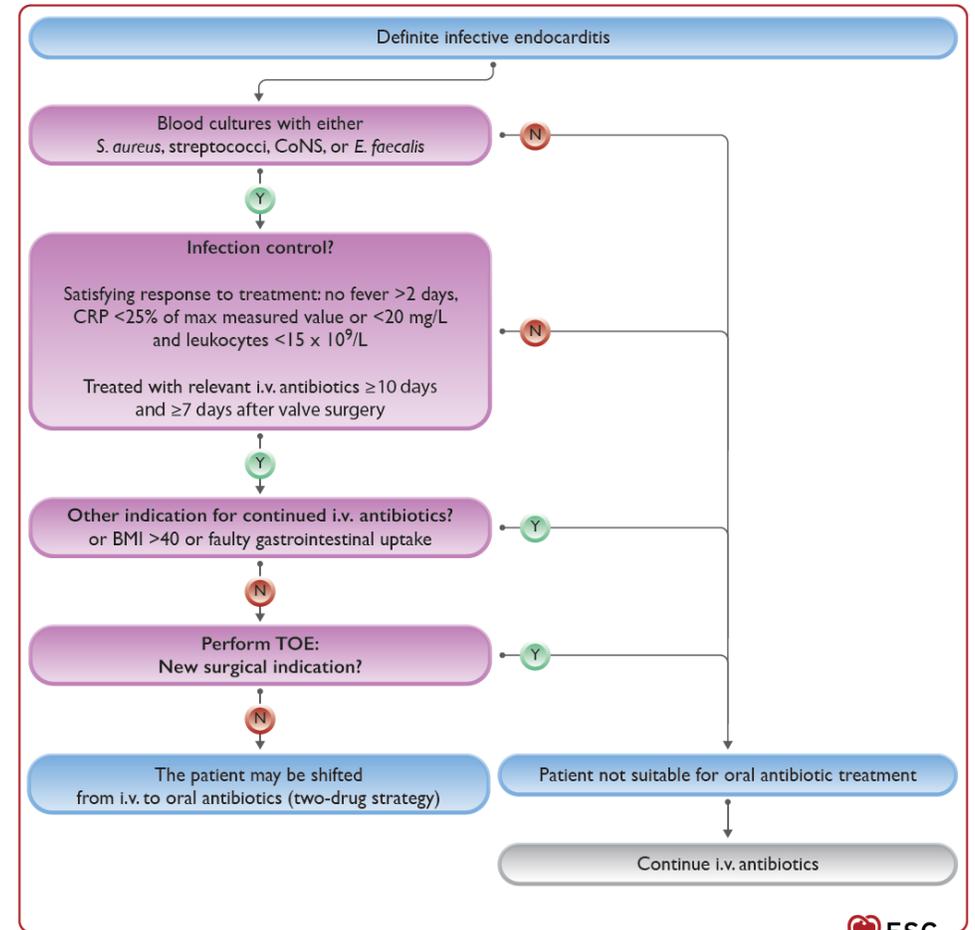
OPAT: la misma combinación de antibióticos que los administrados en la fase aguda.

Incluye:

- Hemocultivos.
- Parámetros clínicos.
- ETE

Evaluación:

- Enfermería / día.
- Médico: 1-3/sem.



TRATAMIENTO ORAL AMBULATORIO

Penicillin-and methicillin-susceptible <i>S. aureus</i> & CoNS	Methicillin-susceptible <i>S. aureus</i> & CoNS	Methicillin-resistant CoNS	<i>E. faecalis</i>	Penicillin-susceptible streptococci	Penicillin-resistant streptococci
Amoxicillin 1 g × 4 Rifampin 600 mg × 2	Dicloxacillin 1 g × 4 Rifampin 600 mg × 2	Linezolid 600 mg × 2 Fusidic acid 750 mg × 2	Amoxicillin 1 g × 4 Moxifloxacin 400 mg × 1	Amoxicillin 1 g × 4 Rifampin 600 mg × 2	Linezolid 600 mg × 2 Rifampin 600 mg × 2
Amoxicillin 1 g × 4 Fusidic acid 750 mg × 2	Dicloxacillin 1 g × 4 Fusidic acid 750 mg × 2	Linezolid 600 mg × 2 Rifampin 600 mg × 2	Amoxicillin 1 g × 4 Linezolid 600 mg × 2	Amoxicillin 1 g × 4 Moxifloxacin 400 mg × 1	Moxifloxacin 400 mg × 1 Rifampin 600 mg × 2
Moxifloxacin 400 mg × 1 Rifampin 600 mg × 2	Moxifloxacin 400 mg × 1 Rifampin 600 mg × 2		Amoxicillin 1 g × 4 Rifampin 600 mg × 2	Amoxicillin 1 g × 4 Linezolid 600 mg × 2	Linezolid 600 mg × 2 Moxifloxacin 400 mg × 1
Linezolid 600 mg × 2 Rifampin 600 mg × 2	Linezolid 600 mg × 2 Rifampin 600 mg × 2		Linezolid 600 mg × 2 Moxifloxacin 400 mg × 1	Linezolid 600 mg × 2 Rifampin 600 mg × 2	
Linezolid 600 mg × 2 Fusidic acid 750 mg × 2	Linezolid 600 mg × 2 Fusidic acid 750 mg × 2		Linezolid 600 mg × 2 Rifampin 600 mg × 2	Linezolid 600 mg × 2 Moxifloxacin 400 mg × 1	

INDICACIONES DE CIRUGÍA

C. De emergencia: en 24 h.

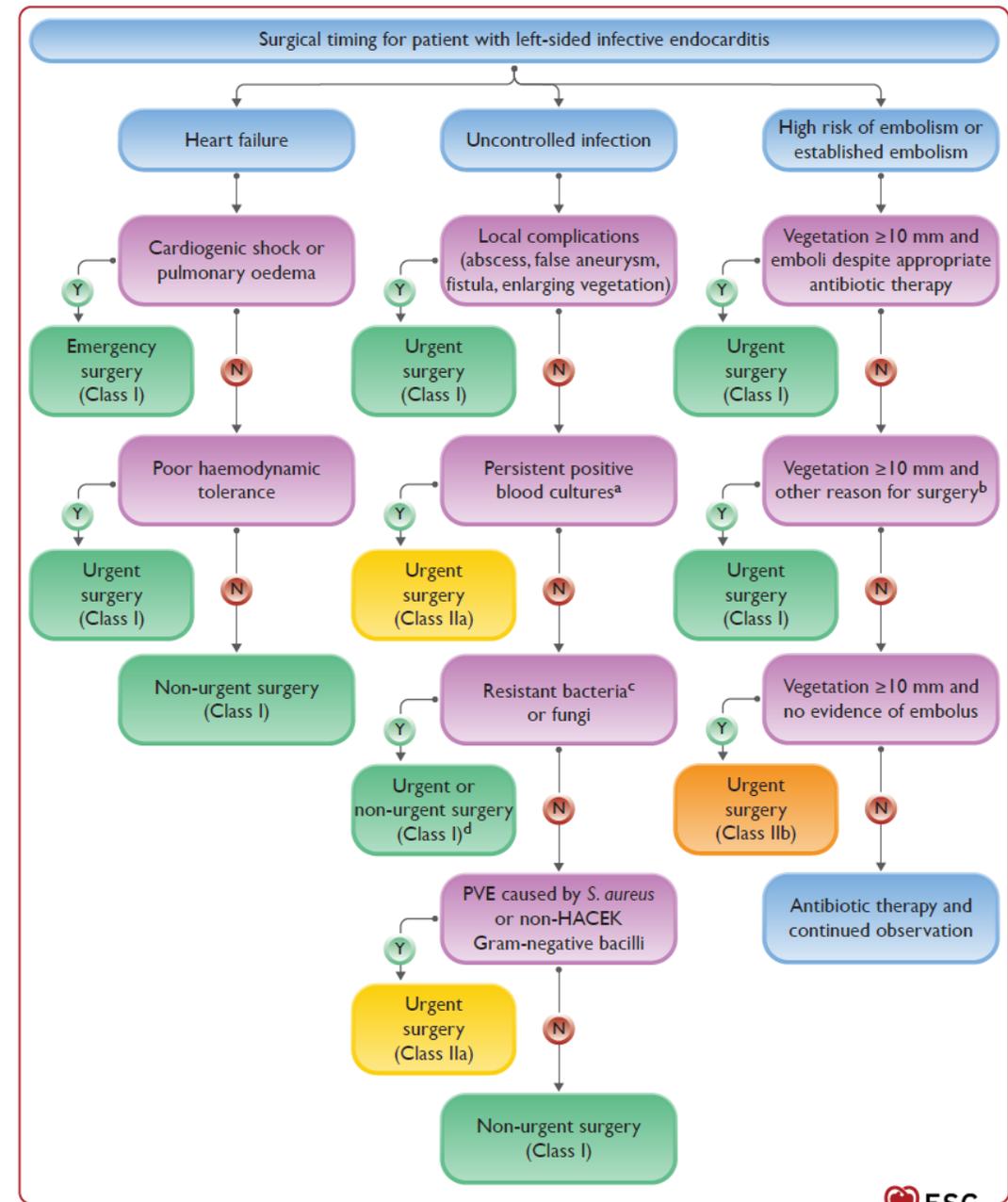
C. Urgente: 3-5 días

^a A pesar de antibioterapia apropiada durante > 1 semana y control de foco de émbolos sépticos

^b Pacientes con disfunción valvular significativa que es o no es resultado directo de la endocarditis

^c *S. aureus*, enterococo resistente a vancomicina, Gram negativos del grupo HACEK, hongos

^d Urgente para *S. aureus*. No urgente para el resto



SEGUIMIENTO

Evaluación clínica inicial y ETE basal al terminar el tratamiento antimicrobiano.

Repetición de forma seriada.

Recommendation Table 18 — Recommendations for post-discharge follow-up

Recommendations	C
Patient education on the risk of recurrence and preventive measures, with emphasis on dental health, and based on the individual risk profile, is recommended during follow-up. ⁶⁰⁸	C
Addiction treatment for patients following PWID-related IE is recommended. ^{606,607}	C
Cardiac rehabilitation including physical exercise training should be considered in clinically stable patients based on an individual assessment. ^{605,609}	C
Psychosocial support may be considered to be integrated in follow-up care, including screening for anxiety and depression, and referral to relevant psychological treatment. ^{605,609}	C

Education of high-risk patients to prevent infective endocarditis

- 

Maintain good dental hygiene

 - Use dental floss daily
 - Brush teeth morning and evening
 - See your dentist for regular check-ups
- 

Maintain good skin hygiene

 - Minimize risk of skin lesions
 - In case of lesions, observe for signs of infection (redness, swelling, tenderness, puss)
 - Avoid tattoos and piercings
- 

Be mindful of infections

If experiencing fever for no obvious reason, contact your doctor, and discuss appropriate action based on your risk of endocarditis
- 

Do not self prescribe antibiotics
- 

Show this card to your doctors before any interventions

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RECURRENCIA: RECAÍDA Y REINFECCIÓN

- ✓ RECAÍDA: episodio repetido de EI causado por el mismo microorganismo y representa fallo de tratamiento.
- ✓ REINFECCIÓN: Infección causada por un microorganismo diferente (> 6 meses tras el episodio inicial).



Recaída y reinfección deberían ser manejados como EI complicada

Table 13 Factors associated with an increased rate of relapse of infective endocarditis

Inadequate antibiotic treatment (i.e. agent, dose, duration)
Resistant microorganisms (i.e. <i>Brucella</i> spp., <i>Legionella</i> spp., <i>Chlamydia</i> spp., <i>Mycoplasma</i> spp., <i>Mycobacterium</i> spp., <i>Bartonella</i> spp., <i>C. Burnetii</i> , fungi)
Infective endocarditis caused by <i>S. aureus</i> and <i>Enterococcus</i> spp.
Polymicrobial infection in people who inject drugs
Periannular extension
Prosthetic valve endocarditis
Persistent metastatic foci of infection (abscesses)
Resistance to conventional antibiotic regimens
Positive valve culture
Persistence of fever at the 7th post-operative day
Chronic kidney disease, especially on dialysis
High-risk behaviour, inability to adhere to medical treatment
Poor oral hygiene

RECURRENCIA- Recaída

Duración insuficiente del tratamiento original.

Elección subóptima de los antibióticos iniciales.

Existencia de un foco de infección persistente.

Factores asociados a un aumento en la tasa de recaídas

- Tratamiento antibiótico inadecuado (fármaco, dosis, duración)
- Microorganismos resistentes, p. ej., *Brucella* spp., *Legionella* spp., *Chlamydia* spp., *Mycoplasma* spp., *Mycobacterium* spp., *Bartonella* spp., *Coxiella burnetii*, hongos
- Infección polimicrobiana en un ADVP
- Tratamiento antimicrobiano empírico para EI con hemocultivo negativo
- Extensión perianular
- EI en válvula protésica
- Focos de infección metastásicos persistentes (abscesos)
- Resistencia a regímenes antibióticos convencionales
- Cultivos valvulares positivos
- Persistencia de fiebre el séptimo día posoperatorio
- Diálisis crónica

ADVP: adicto a drogas por vía parenteral; EI: endocarditis infecciosa.

RECURRENCIA- Reinfeción

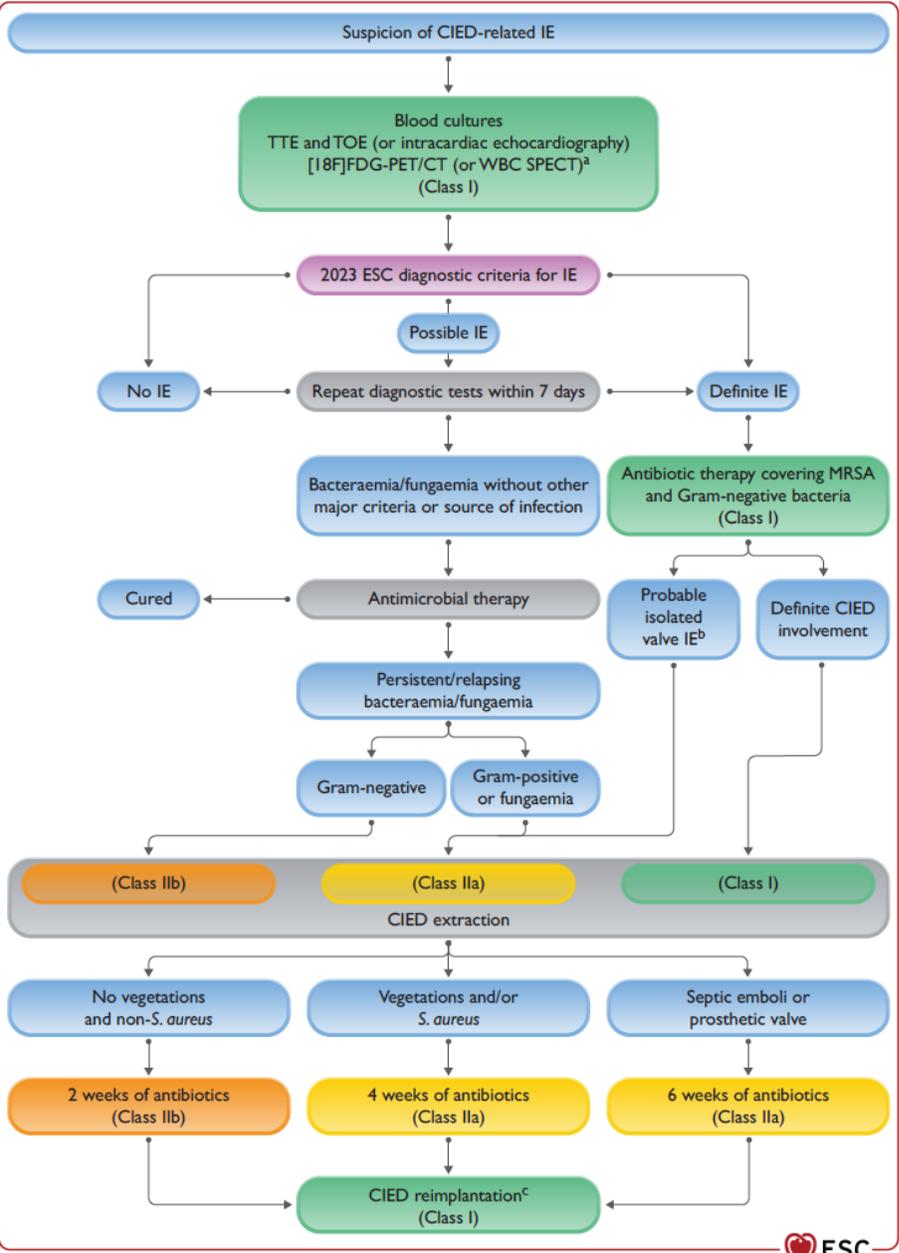
Más frecuente en : UDVP, EVP, diálisis crónica y múltiples factores de riesgo de EI.

Mayor riesgo de muerte y sustitución valvular.

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INFECCIÓN DE DISPOSITIVOS CARDIACOS ELECTRÓNICOS IMPLANTABLES

- INFECCIÓN LOCALIZADA:
 - Infección herida quirúrgica (infección aguda sin afectación del bolsillo o dispositivo).
 - Infección bolsillo aislada (limitada al dispositivo)
- INFECCIÓN SISTÉMICA: con o sin infección del bolsillo; con o sin infección visible de vegetaciones en las válvulas tricúspide o pulmonar o cables de estimulación.
- EI RELACIONADA CON DISPOSITIVO CARDIACO ELECTRÓNICO IMPLANTABLE: Evidencia de infección del dispositivo con signos clínicos de infección del bolsillo y/o hallazgos de imagen que cumplen criterios de EI valvular.



ENDOCARDITIS INFECCIOSA DERECHA

➤ F. de riesgo:

- Enf. Cardiacas congénitas.
- Catéteres intravasculares.
- Dispositivos cardiacos electrónicos implantables.
- Inmunocomprometidos.
- UDVP.

➤ Etiología:

- *S. aureus* y ECN > *Streptococcus* (alcohólicos y diabéticos). *Ps. aeruginosa* y otros Gram negativos son causas raras. *Cándida albicans* en pacientes inmunocomprometidos.
- Válvula tricúspide > Válvula pulmonar.

➤ DIAGNÓSTICO:

- Fiebre. Bacteriemia. Sobrecarga pulmonar. Émbolos sépticos pulmonares múltiples.
- Confirmación con ecocardiograma : vegetaciones en válvula tricúspide o menos frecuente en pulmonar.

➤ PRONÓSTICO:

- Mejor pronóstico que El izda.
- Peor si asociado a dispositivo; inmunocomprometidos (sobre todo si infección fúngica)

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TRATAMIENTO ANTICOAGULANTE Y ANTITROMBÓTICO

Recommendation Table 22 — Recommendations for the use of antithrombotic therapy in infective endocarditis

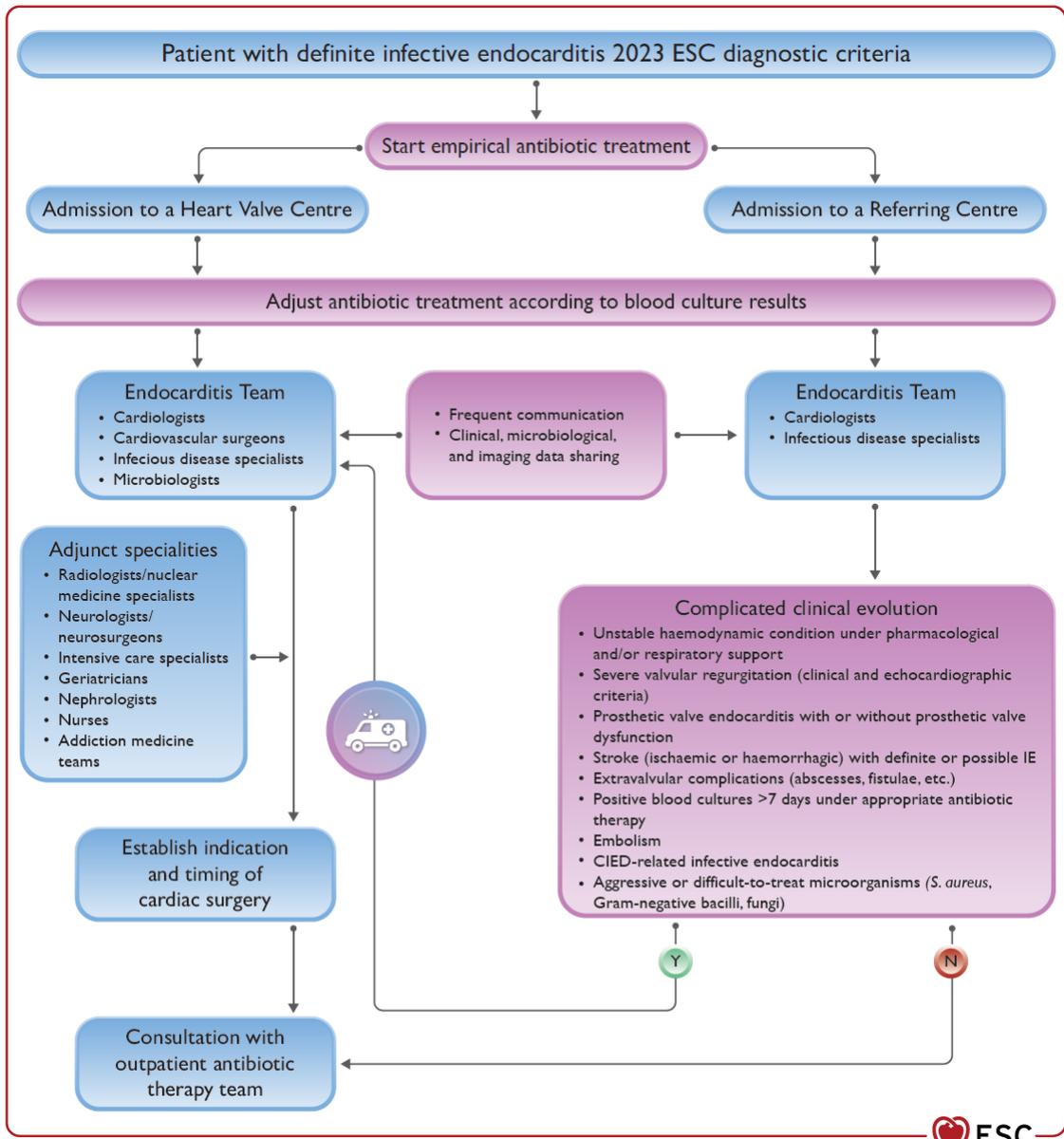
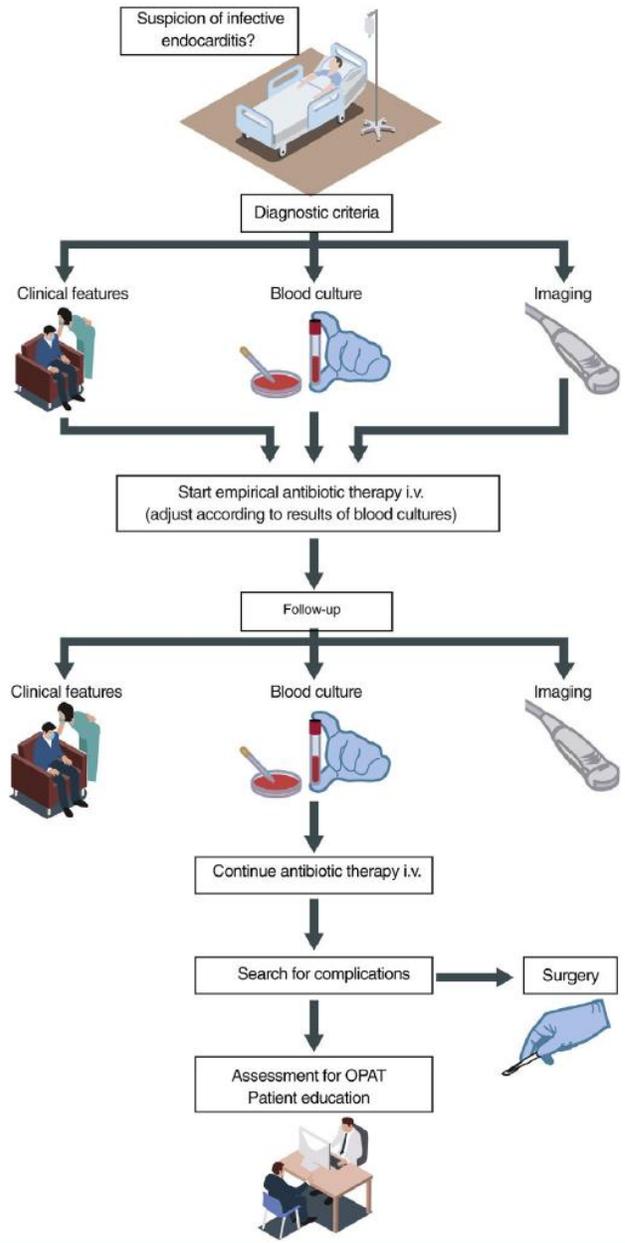
Recommendation	Class ^a	Level ^b
Interruption of antiplatelet or anticoagulant therapy is recommended in the presence of major bleeding (including intracranial haemorrhage). ^{482,483}	I	C
In patients with intracranial haemorrhage and a mechanical valve, reinitiating unfractionated heparin should be considered as soon as possible following multidisciplinary discussion. ⁸¹⁷	IIa	C
In the absence of stroke, replacement of oral anticoagulant therapy by unfractionated heparin under close monitoring should be considered in cases where indication for surgery is likely (e.g. <i>S. aureus</i> IE). ^{451,817}	IIa	C
Thrombolytic therapy is not recommended in patients with IE. ^{481,491}	III	C

EI TROMBÓTICA NO BACTERIANA

- ❖ 1,1% a 1,6%.
- ❖ Pacientes con algún factor predisponente y/o estado de hipercoagulabilidad:
 - ❖ Lupus eritematoso.
 - ❖ Endocarditis de Libman – Sacks.
 - ❖ Endocarditis marántica.
 - ❖ Coagulación intravascular diseminada.
 - ❖ Otras enfermedades crónicas: tuberculosis o enfermedad autoinmune.
- ❖ Por : incremento de factores de coagulación, de citocinas, y alta expresión de factor tisular.
- ❖ Presentación: ictus (60%). IC (21%). Síndrome coronario agudo (7%).
- ❖ Diagnóstico. ETT. Válvula mitral (62%) > válvula aórtica (24%).
- ❖ Diagnóstico diferencial: EI, excrecencias de Lambl, fibroelastoma, tumores/masas benignas.



ENDOCARDITIS TEAM



Gracias



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