

# RELEVANZ DER ESC ENDOKARDITIS RICHTLINIEN 2023 FÜR DIE PRAXIS

21.11.2024

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INEKTILOGIE & SPITALHYGIENE HIRSLANDEN ZENTRALSCHWEIZ

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- ESC Endokarditis Richtlinien 2023
- Auflösung Fallbeispiel
- Konklusionen

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## **FALLBEISPIEL**

### **HERR M. 1945**

- PA:
  - St. n. biologischer Aortenklappenprothese 2017
  - Ossär metastasierendes Prostatakarzinom 2011 unter Xtandi und Denosumab in Progression
- Aktuelles Leiden:
  - Status febrilis ohne anamnestische oder klinische Symptome eines Organsystems im Sinne eines Infektfokus, neu kardiale Dekompensation und tk VHF, kreislaufstabil
  - Lc 5.8 G/l, CRP 145 mg/l, Kreatinin 95 µmol/l und eGFR 71 ml/min

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## ESC ENDOKARDITIS RICHTLINIEN 2023

### KLINISCHER VERDACHT

**Table S1** Symptoms and signs of infective endocarditis in the EURO-ENDO registry

	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

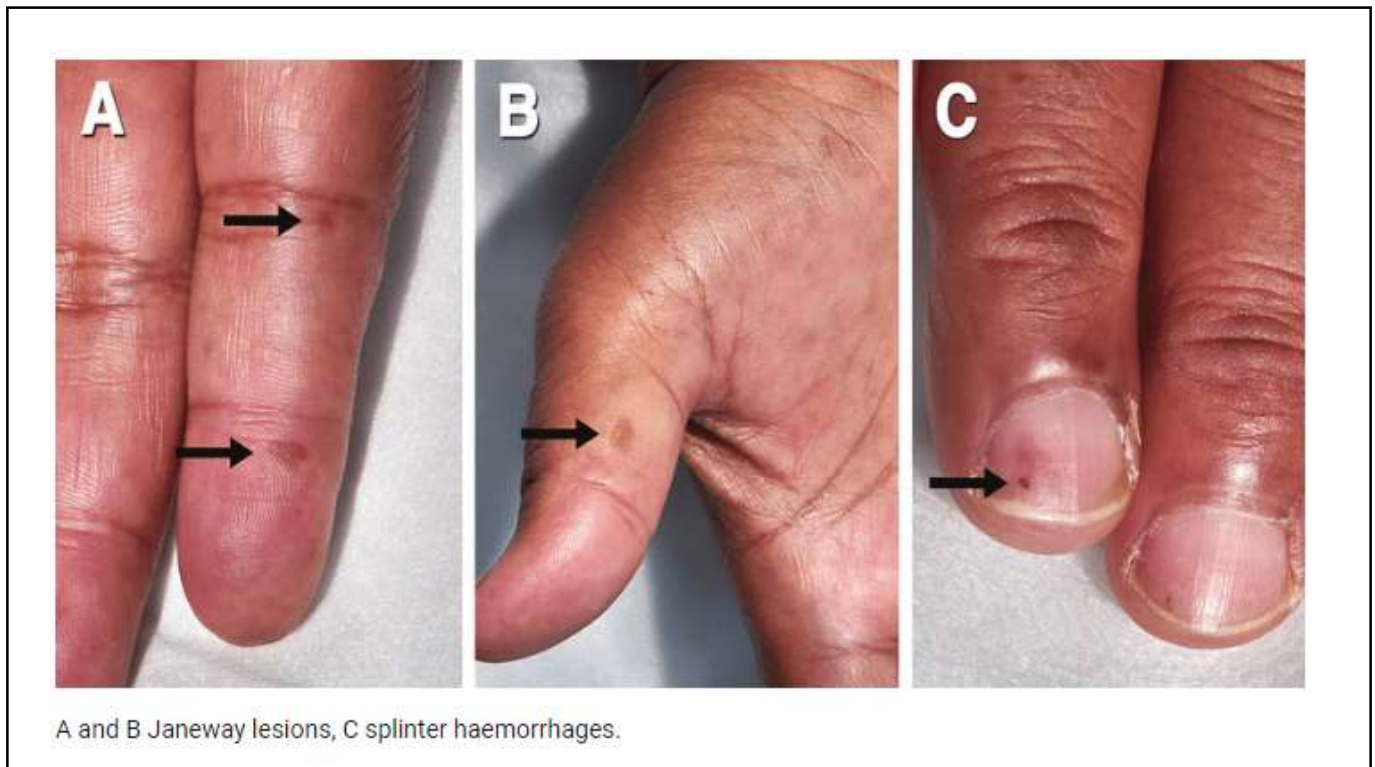
Osler nodes	1.1	2.6	0.6
Janeway lesions	1.9	4.9	0.6
Roth spots	0.4	2.1	0.3
Complications			
Paravalvular abscess	13.8	11.5	7.8
Spondylitis	4.5	5.8	4.5
Embolic events	21.4	30.1	11.7
Pulmonary	9.5	27.5	75.0
Cerebral	51.2	43.3	16.7
Splenic	25.9	22.0	5.6
Coronary	2.0	3.2	2.8
Renal	7.5	11.1	2.8
Hepatic	1.5	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.<sup>7</sup>

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## ESC ENDOKARDITIS RICHTLINIEN 2023 DIAGNOSTIK

- I. MAJOR CRITERIA
  - A. Microbiologic Major Criteria
    - (1) Positive blood cultures
      - i. Microorganisms that commonly cause IE<sup>a</sup> isolated from 2 or more separate blood culture sets (Typical)<sup>b</sup>
      - or
      - ii. Microorganisms that occasionally or rarely cause IE isolated from 3 or more separate blood culture sets (Nontypical)<sup>b</sup>
  - (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.

### Schrittmacher

- Weitere mögliche Bildgebung: Kardio-CT, Kardio-MRI, PET/CT

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## FRAGE 2: WELCHES VORGEHEN STIMMT NICHT BEI NEGATIVEN BLUTKULTUREN?

- a) Ich rufe die Infektiologie an.
- b) Falls in den Blutkulturen kein Erreger nachweisbar ist, dann kann es sich nicht um eine Endokarditis handeln.
- c) Ich schlage in den ESC Endokarditis nach und suche, was Gründe für eine kulturnegative Endokarditis sein könnten.

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## ESC ENDOKARDITIS RICHTLINIEN 2023 KULTURNEGATIVE ENDOKARDITIS

- Serologie für Brucellen, Coxiellen, Bartonellen, Mycoplasmen
- BACTEC Myco/F Lytic-Blutkulturflaschen für Mykobakterien und Schimmelpilze
- PCR aus EDTA-Blut für Legionellen
- Ggf. Diagnostik M. Whipple (Screening PCR aus Speichel/Stuhl)



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# ESC ENDOKARDITIS RICHTLINIEN 2023

## KULTURNEGATIVE ENDOKARDITIS

### I. MAJOR CRITERIA

#### A. Microbiologic Major Criteria

(2) Positive laboratory tests

**i. Positive polymerase chain reaction (PCR) or other nucleic acid-based technique<sup>a</sup> for *Coxiella burnetii*, *Bartonella* species, or *Tropheryma whippelii* from blood**

or

ii. *Coxiella burnetii* antiphase I immunoglobulin G (IgG) antibody titer >1:800 [24]<sup>d</sup>, or isolated from a single blood culture

or

**iii. Indirect immunofluorescence assays (IFA) for detection of IgM and IgG antibodies to *Bartonella henselae* or *Bartonella quintana* with immunoglobulin G (IgG) titer  $\geq$ 1:800 [24, 25]<sup>d</sup>**

### II. MINOR CRITERIA

#### 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<sup>a</sup>

or

2) **Positive culture, PCR, or other nucleic acid based test (amplicon or shotgun sequencing, *in situ* hybridization) for an organism consistent with IE<sup>a</sup> 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]**

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# ESC ENDOKARDITIS RICHTLINIEN 2023

## NICHT INFEKTIÖSE ENDOKARDITIS

= Non-bacterial thrombotic endocarditis

- Bei Hyperkoagulopathie (SLE, APL)
- Bei malignen Erkrankungen (marantische Endokarditis)
- Autoimmune Erkrankungen

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## AUFLÖSUNG FALLBEISPIEL HERR M. 1945

- 2 x 2 Blutkulturen vom 04.05.2024: Kein Wachstum
- Urinsediment vom 04.05.2024: Keine Hinweise auf Glomerulonephritis
- 2 x 2 Blutkulturen (ZVK / peripher) vom 05.05.2024: kein Wachstum
- TEE 05.05.2024: Nachweis einer Vegetation am posterioren Segeln der Kunstklappe (Bioklappe), ohne Abszess
- Rheumafaktor vom 06.05.2024: 18 IU/ml
- Serologie vom 06.05.2024: *Bartonella henselae* IgG negativ, *Coxiella burnetii* IgG/IgM negativ, Aspergillus Antigen (Galactomannan) negativ
- EDTA-Blutprobe vom 06.05.2024: *Mycoplasma hominis*, *Mycoplasma pneumoniae* und *Tropheryma whippelii* PCR allesamt negativ
- Urinprobe vom 07.05.2024: Legionella pneumophila Antigen negativ
- Citrat-Blutprobe vom 10.05.2024: Mykobakterien Kultur folgt
- EDTA-Blutprobe vom 14.05.2024: bakterielle Breitband PCR negativ
- Serologie vom 14.05.2024: Anti-nukleäre Antikörper (ANA) negativ, Anti-Ro52 Antikörper 29.0 U/ml positive, Anti-Cardiolipin Antikörper IgG/IgM negativ, Anti-β2 Glykoprotein 1 Antikörper IgG/IgM negativ
- Serologie vom 14.05.2024: *Chlamydia trachomatis* IgG 237 AU/ml (positiv), IgA negativ, *Chlamydia pneumoniae* IgG 92 U/ml (positiv), IgM negativ, *Brucella* IgA/IgM/IgG negativ, *Mycoplasma pneumoniae* IgG/IgM negativ.
- TEE vom 14.05.2024: oszillierende Vegetation des posterioren Segels, Durchmesser 7.5mm, ohne Abszess/Perforation/Dehiszenz
- 1 x 2 Blutkultur (ZVK) vom 16.05.2024: Kein Wachstum



### Nicht-bakterielle thrombotische Endokarditis der biologischen Aortenkunstklappe (Libman-Sacks), ED 04.05.2024

- A.e. i.R. metastasiertem Prostata-CA
- Status nach Aortenklappenersatz 2017
- TEE 05.05.2024: Nachweis einer Vegetation am posterioren Segeln der Kunstklappe (Bioklappe), ohne Abszess
- TEE vom 14.05.2024: oszillierende Vegetation des posterioren Segels, Durchmesser 7.5mm, ohne Abszess/Perforation/Dehiszenz
- kein Hinweis auf eine Glomerulonephritis

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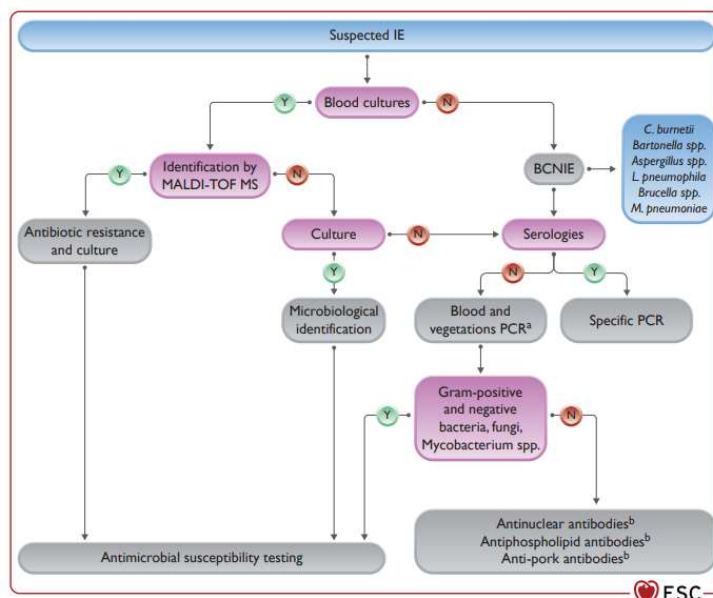
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## KONKLUSIONEN



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# KONKLUSIONEN

## I. DEFINITE ENDOCARDITIS

### A. Pathologic Criteria

(1) **Microorganisms identified<sup>a</sup> in the context of clinical signs of active endocarditis in a vegetation; from cardiac tissue; from an explanted prosthetic valve or sewing ring; from an ascending aortic graft (with concomitant evidence of valve involvement); from an endovascular intracardiac implantable electronic device (CIED); or from an arterial embolus**

or

(2) **Active endocarditis<sup>a</sup> (may be acute<sup>a</sup> or subacute/chronic<sup>a</sup>) identified in or on a vegetation; from cardiac tissue; from an explanted prosthetic valve or sewing ring; from an ascending aortic graft (with concomitant evidence of valve involvement); from a CIED; or from an arterial embolus**

### B. Clinical Criteria

(1) 2 Major Criteria

or

(2) 1 Major Criterion and 3 Minor Criteria

or

(3) 5 Minor Criteria

## II. POSSIBLE ENDOCARDITIS

A. 1 Major Criterion And 1 Minor Criterion

or

B. 3 Minor Criteria

## III. REJECTED ENDOCARDITIS

A. Firm alternate diagnosis explaining signs/symptoms<sup>a</sup>

or

B. **Lack of recurrence despite antibiotic therapy for less than 4 d.**

or

C. No pathologic or macroscopic evidence of IE at surgery or autopsy, with antibiotic therapy for less than 4 d.

or

D. Does not meet criteria for possible IE, as above

<sup>a</sup>By culture, staining, immunologic techniques, polymerase chain reaction (PCR), or other nucleic acid-based tests including amplicon (16S, 18S, internal transcribed spacer) sequencing, metagenomic (shotgun) sequencing, or in situ hybridization on fresh or paraffin-fixed tissue. Molecular techniques and tissue staining (Gram stain, periodic acid-Schiff with diastase, Girocott, or silver stains such as Warthin-Starry, Steiner, or Dieterle) should be interpreted cautiously, particularly in patients with a prior episode of IE because such tests can remain positive for extended periods following successful treatment. Antibiotic therapy before tissue procurement may also significantly alter microorganism morphology and staining characteristics. Test specificity is influenced by several factors, and false positives can occur. Test interpretation should always be in the context of clinical and histological evidence of active endocarditis. A single finding of a skin bacterium by PCR on a valve or wire without additional clinical or microbiological supporting evidence should be regarded as Minor Criterion and not Definite IE [51].

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Clinical Infectious Diseases  
VIEWPOINTS

AIDSA  
American Infectious Diseases Society  
hivmmd  
oxford

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

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# KONKLUSIONEN

## I. MAJOR CRITERIA

### A. Microbiologic Major Criteria

(1) Positive blood cultures

**i. Microorganisms that commonly cause IE<sup>a</sup> isolated from 2 or more separate blood culture sets (Typical)<sup>b</sup>**

or

**ii. Microorganisms that occasionally or rarely cause IE isolated from 3 or more separate blood culture sets (Nontypical)<sup>b</sup>**

(2) Positive laboratory tests

**i. Positive polymerase chain reaction (PCR) or other nucleic acid-based technique<sup>c</sup> for *Coxiella burnetii*, *Bartonella* species, or *Tropheryma whippelii* from blood**

or

**ii. *Coxiella burnetii* antiphase I immunoglobulin G (IgG) antibody titer >1:800 [24]<sup>d</sup>, or isolated from a single blood culture**

or

**iii. Indirect immunofluorescence assays (IFA) for detection of IgM and IgG antibodies to *Bartonella henselae* or *Bartonella quintana* with immunoglobulin G (IgG) titer  $\geq$ 1:800 [24, 25]<sup>d</sup>**

### B. Imaging Major Criteria

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

**i. Echocardiography and/or cardiac CT showing vegetation,<sup>e</sup> valvular/leaflet perforation,<sup>f</sup> valvular/leaflet aneurysm,<sup>g</sup> abscess,<sup>h</sup> pseudoaneurysm,<sup>i</sup> or intracardiac fistula<sup>j</sup>**

or

**ii. Significant new valvular regurgitation on echocardiography as compared with previous imaging. Worsening or changing of preexisting regurgitation is not sufficient.**

or

**iii. New partial dehiscence of prosthetic valve as compared with previous imaging [52]**

**(2) Positron emission computed tomography with 18F-fluorodeoxyglucose ([18F]FDG PET/CT imaging)**

**Abnormal metabolic activity<sup>k</sup> involving a native or prosthetic valve, ascending aortic graft (with concomitant evidence of valve involvement), intracardiac device leads or other prosthetic material<sup>l</sup>**

### C. Surgical Major Criteria

**Evidence of IE documented by direct inspection during heart surgery neither Major Imaging Criteria nor subsequent histologic or microbiologic confirmation<sup>m</sup>**

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# KONKLUSIONEN

## II. MINOR CRITERIA

### A. Predisposition

#### – Previous history of IE

- Prosthetic valve<sup>a</sup>
- Previous valve repair<sup>a</sup>
- Congenital heart disease<sup>b</sup>
- 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<sup>3</sup>

### 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<sup>4</sup>

or

- 2) Positive culture, PCR, or other nucleic acid based test (amplicon or shotgun sequencing, *in situ* hybridization) for an organism consistent with IE<sup>5</sup> 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<sup>6</sup>

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

Endokarditis – daran denken

# HERZLICHEN DANK

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