Enfektif Endokardit Epidemiyolojisi ve Hastalık Yükü

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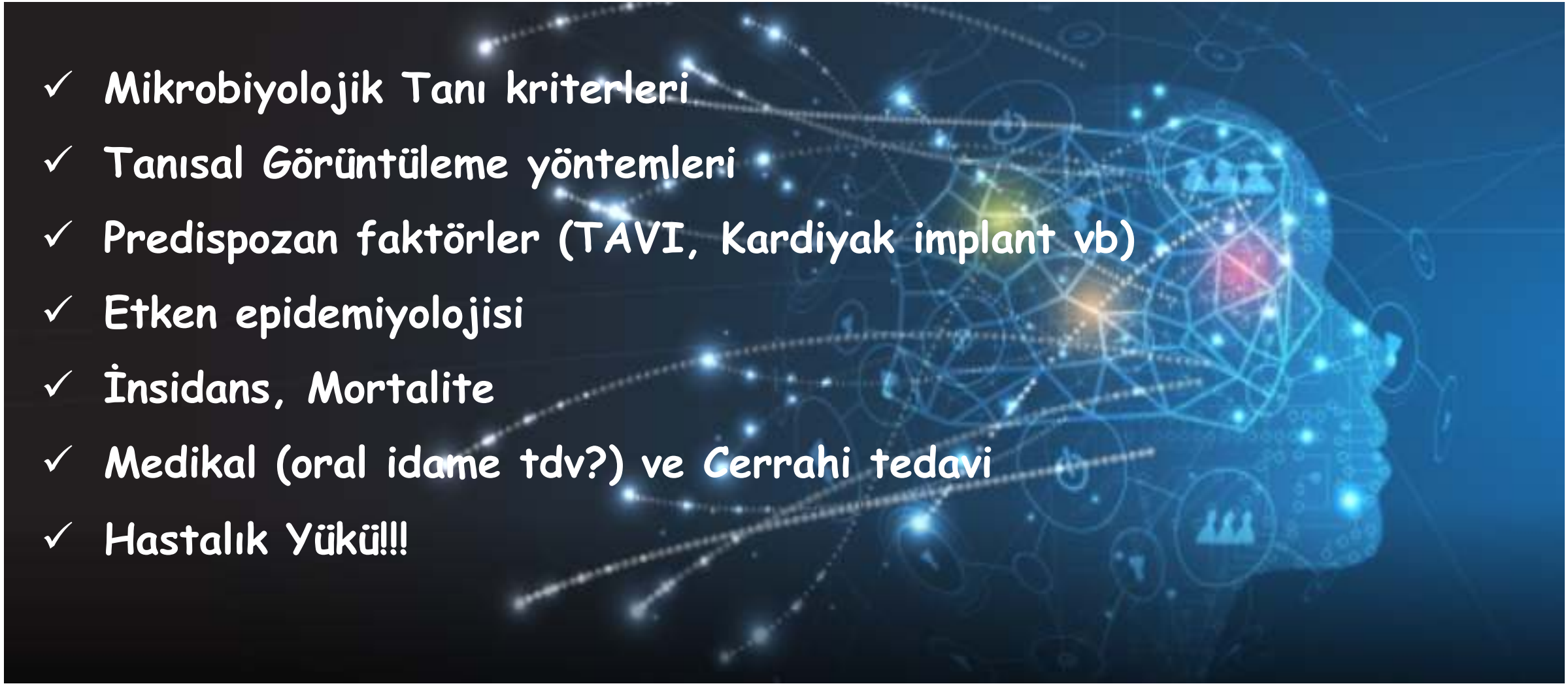
Enfektif endokardit paradigmasında radikal bir değişikliğe tanık oluyoruz!!



- ✓ Mikrobiyolojik Tanı kriterleri
- ✓ Tanısal Görüntüleme yöntemleri
- ✓ Predispozan faktörler (TAVI, Kardiyak implant vb)
- ✓ Etken epidemiyolojisi
- ✓ İnsidans, Mortalite
- ✓ Medikal (oral idame tdv?) ve Cerrahi tedavi
- ✓ Hastalık Yükü!!!

- ✓ Genç yaş grubu
- ✓ *Streptokok viridans* sık etken
- ✓ Romatizmal kapak hastalığı

- ✓ İleri yaş, komorbid hastalar
- ✓ Kardiyak cihaz, protez, TAVI, SVK
- ✓ İV ilaç kullanımı
- ✓ Stafilokok, enterokoklar, GNB

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)

ESC 2023- Endokardit Epidemiyolojisi

- ✓2019 yılında, tahmini yıllık insidansı 13.8 vaka/100.000 kişi, 66.300 ölüm
- ✓Mortalite 0.87/100 000 popülasyon
- ✓Tanısal test kullanım sıklığındaki artış ile tanı konma sıklığı ↑
- ✓*E. faecalis*, *S. aureus* ve streptokok bakteriyemilerinde ekokardiyografi kullanım sıklığı↑
- ✓Kardiyak BT ve PET kullanımı ile tanı konulan vakalarda ↑

2023 ESC Guidelines for the management of endocarditis

Tanı Kriterlerinde değişiklik -Tipik etkenler!!

Table 14 Definitions of the terms used in the European Society of Cardiology 2015 modified criteria for the diagnosis of infective endocarditis

Major criteria
1. Blood cultues positive for IE
a. Typical microorganisms consistent with IE from 2 separate blood cultures: • *Viridans streptococci, Streptococcus gallolyticus (Streptococcus bovis), HACEK group, Staphylococcus aureus;* or • Community-acquired enterococci, in the absence of a primary focus; or

Table 10 Definitions of the 2023 European Society of Cardiology modified diagnostic criteria of infective endocarditis

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.

Clin Infect Dis. 2022 Sep 29;75(6):1097-1102. doi: 10.1093/cid/ciac181.

Sign of the Times: Updating Infective Endocarditis Diagnostic Criteria to Recognize Enterococcus faecalis as a Typical Endocarditis Bacterium

Anders Dahl [1 2], Vance G Fowler [3], José M Miro [2 4], Niels E Bruun [5 6]

Abstract

The
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- ✓***Prospektif çok merkezli kohort***
- ✓***E. faecalis*** bakterivemisi olan 344 hasta, 90 hastada endokardit

ıke

- ✓Toplum/hastane kaynaklı olmasına ve **enfeksiyon odağı olup olmadığına bakılmaksızın** *E. faecalis* tipik bir İE etkeni olarak kabul edilmeli
- ✓Eski Duke ölçütleri, *E. faecalis* EE'nin **%30'unu kaçırıyor**
- ✓ESC 2023 de tipik etkenler arasına alındı

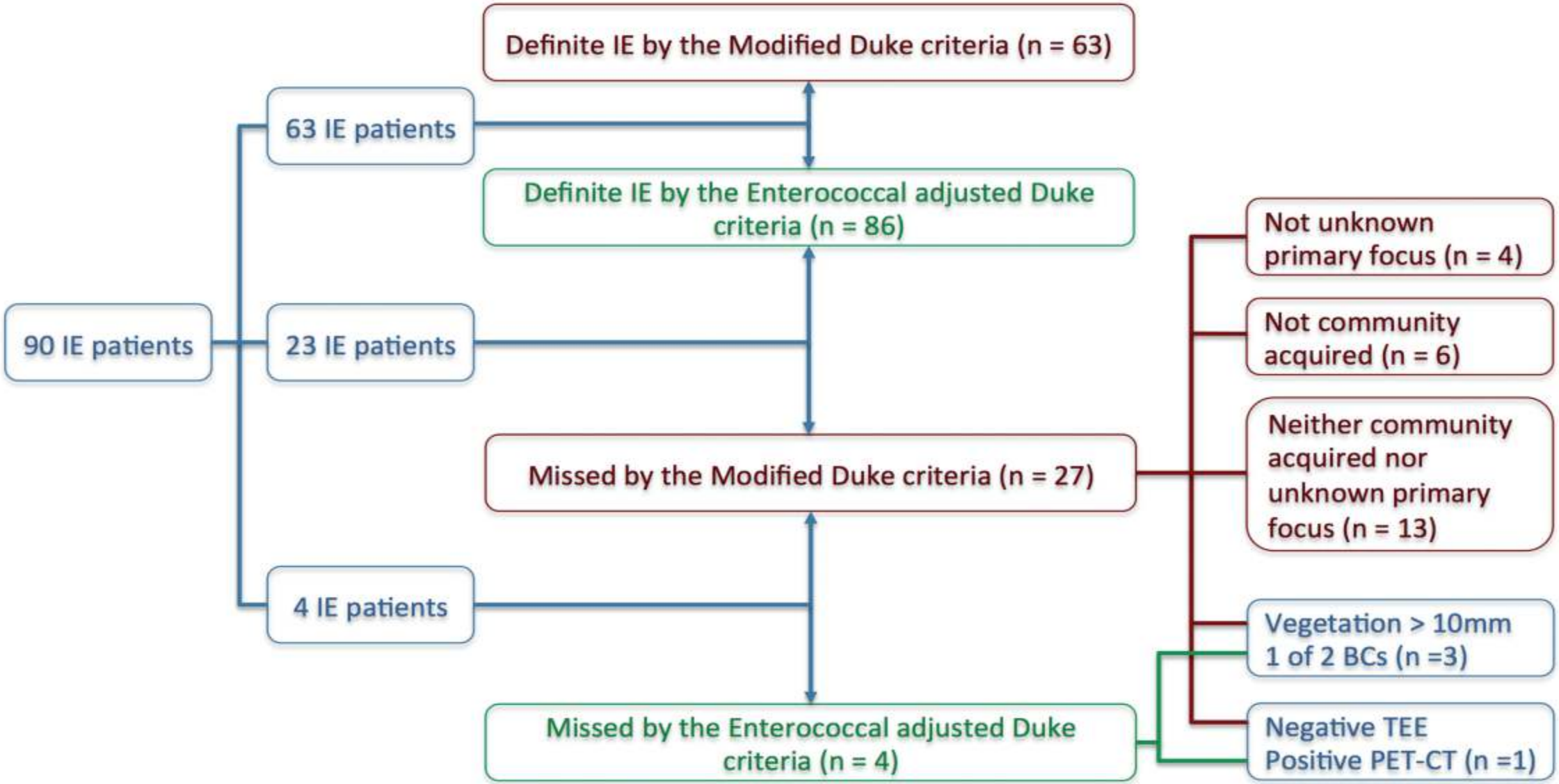


Figure 2. Overview of misclassified definite IE according to the modified Duke criteria and the enterococcal adjusted Duke criteria. Four cases of definite IE were misclassified by both sets of criteria, whereas an additional 23 IE cases were misclassified only by the modified Duke criteria and classified correctly by the enterococcal adjusted Duke criteria. Abbreviations: BC, blood culture; IE, infective endocarditis; PET-CT, positron emission tomography–computed tomography; TEE, transesophageal echocardiography.

Clin Infect Dis. 2022 Sep 29;75(6):1097-1102. doi: 10.1093/cid/ciac181.

ESC 2023 EE Risk Faktörleri

Table 8 Cardiac and non-cardiac risk factors

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

Kardiyak

- ✓İE öyküsü
- ✓Kapak hastalığı
- ✓Protez kapak
- ✓Santral venöz/arteriyel kateter
- ✓Transvenöz kardiyak implante edilebilen cihaz

Non- kardiyak

- ✓Santral venöz kateter
- ✓İV ilaç kullanımı
- ✓İmmünsüpresyon
- ✓Yakın zamanda diş/cerrahi işlem
- ✓Yakın zamanda hastane yatışı
- ✓Hemodiyaliz

2023 ESC Guidelines for the management of endocarditis

> Front Med (Lausanne). 2022 Mar 9:9:774224. doi: 10.3389/fmed.2022.774224. eCollection 2022.

The Global, Regional, and National Burden and Trends of Infective Endocarditis From 1990 to 2019: Results From the Global Burden of Disease Study 2019

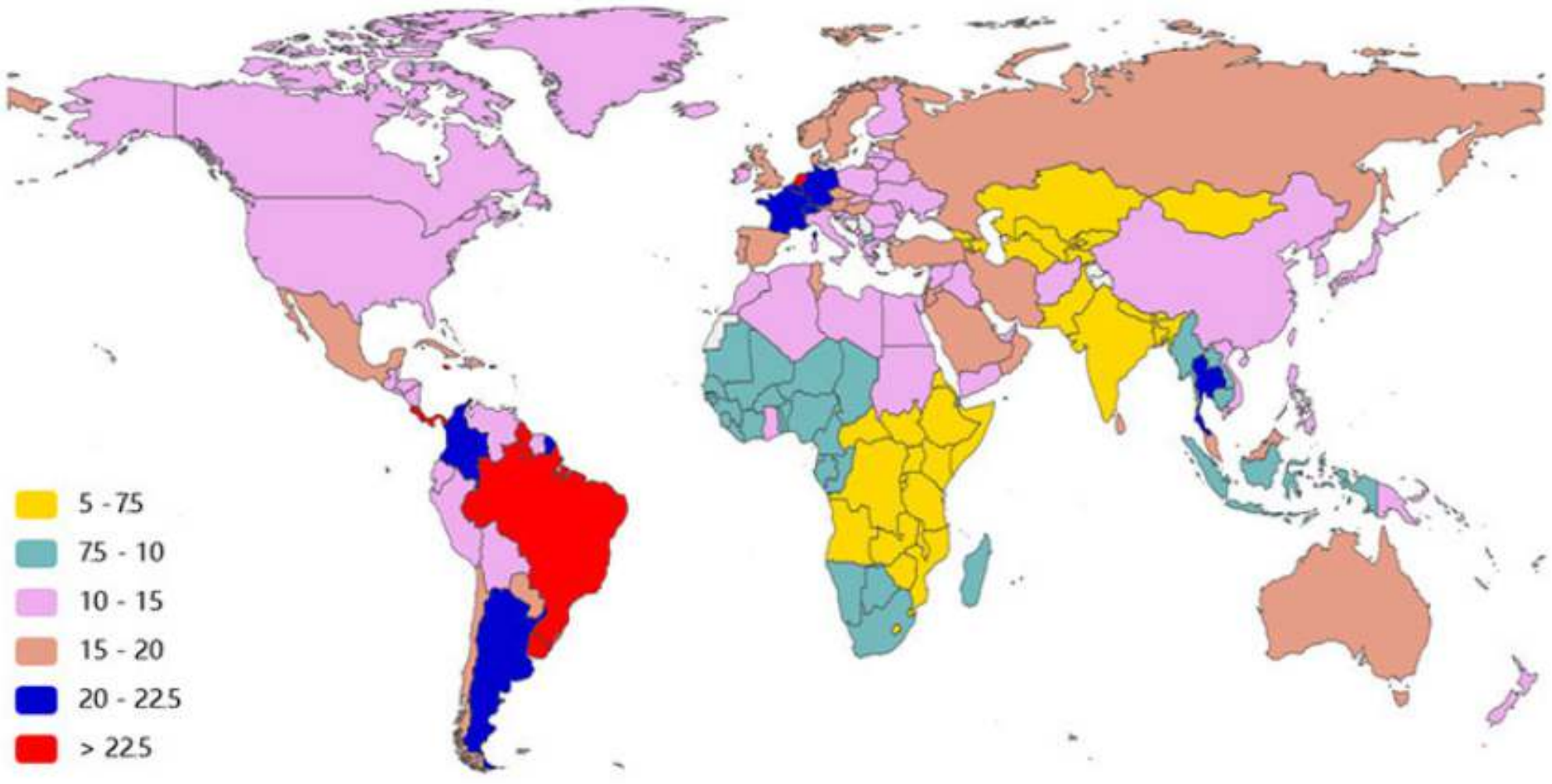
Huilong Chen [1], Yuan Zhan [2], Kaimin Zhang [3], Yiping Gao [4], Liyuan Chen [5], Juan Zhan [6],

Results: Globally, the number of IE cases and deaths has increased sharply during the past 30 years from 478,000 in 1990 to 1,090,530 in 2019 and from 28,750 in 1990 to 66,320 in 2019, and both presented an upward temporal trend annually (EAPC:1.2

- İnsidans ve mortalite global olarak ↑ (190/204 ülke)
- 1990 ➲ 2019; Vaka sayısı 478.000 ➲**1.090.530**

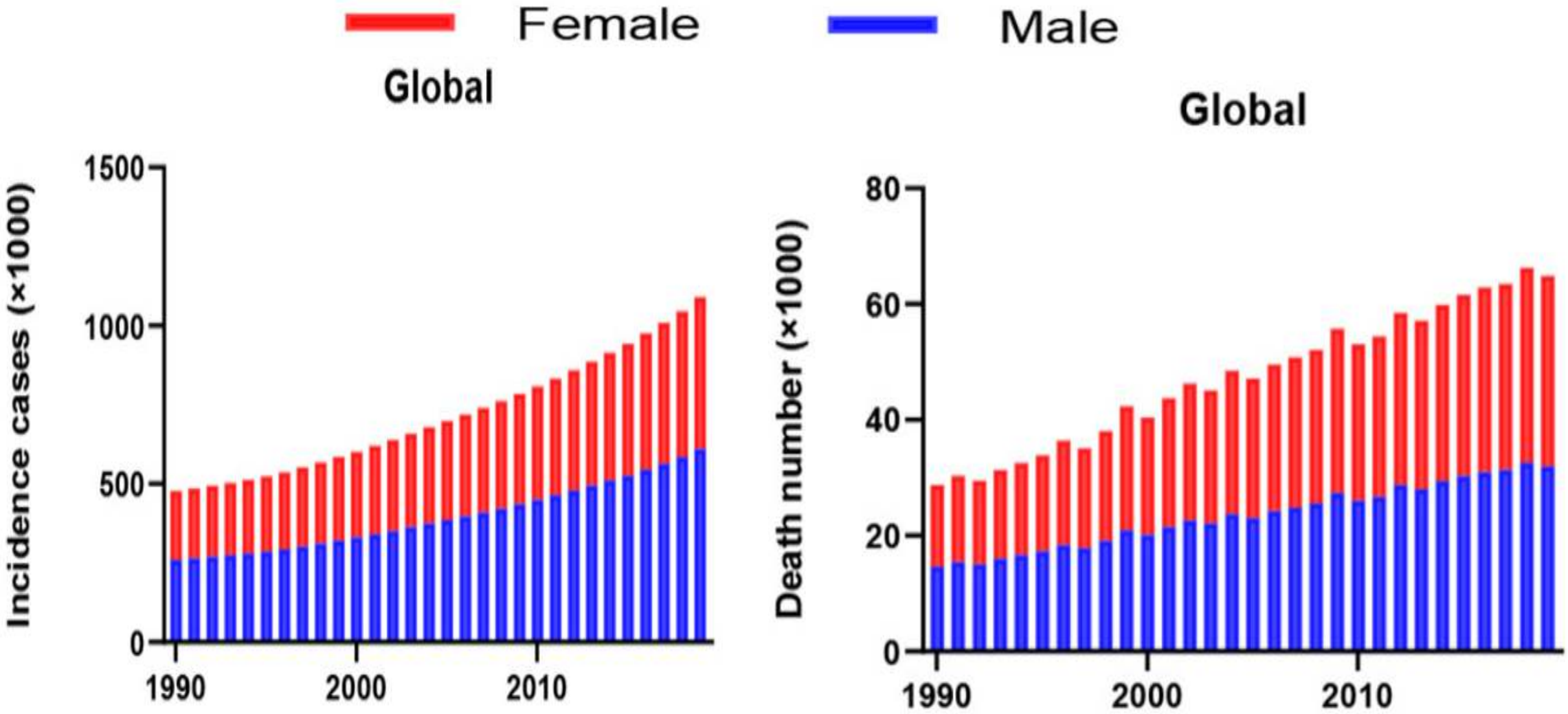
  Mortalite 28.750 ➲ **66.320**
- **Erkekler ve yaşlılar daha ciddi etkilenmekte**

A



The ASIR of IE around the world in 2019

ASIR, age-standardized incident rate per 100,000 population

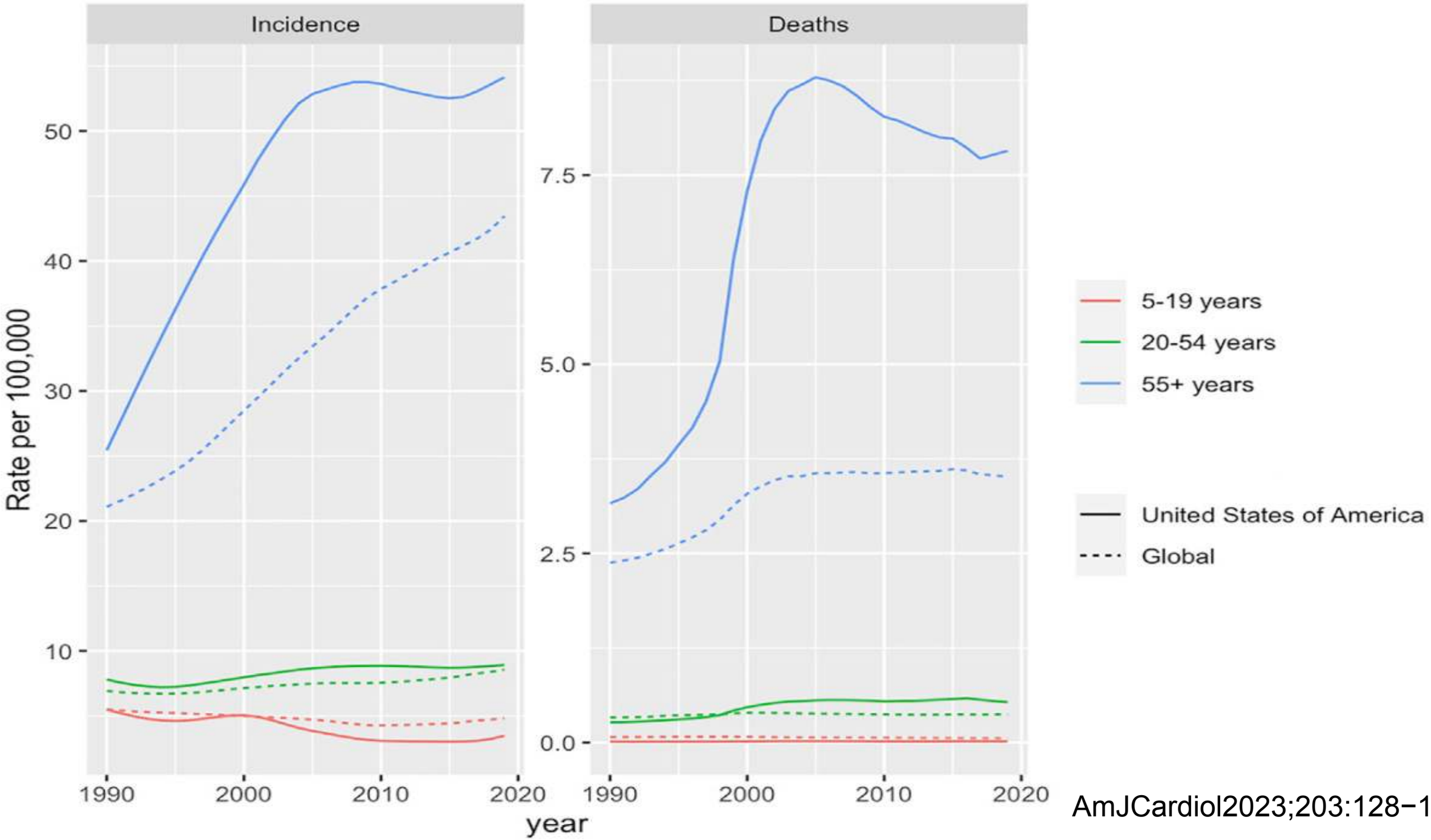


The change trends of infective endocarditis incidences, deaths and DALYs from 1990 to 2019.

> Am J Cardiol. 2023 Sep 15:203:128-135. doi: 10.1016/j.amjcard.2023.07.018. Epub 2023 Jul 24.

Gender, Age, and Regional Disparities in the Incidence and Mortality Trends of Infective Endocarditis in the United States Between 1990 and 2019

- İnsidans ve hastalık yükü global olarak ↑
- USA Sağlık maliyeti; **2003'te 1.58 milyar$ ➲2016 2.34 milyar$**
- ASIR; yaşa göre standardize edilmiş insidans hızı
- 1990 ➲2019; 10.2 ➲ 14.4/100.000 kişi
- **İnsidans artış hızı; erkeklerde %45.8**, kadınlarda; %34.1
- **>55 yaşta artış hızı %112.7**

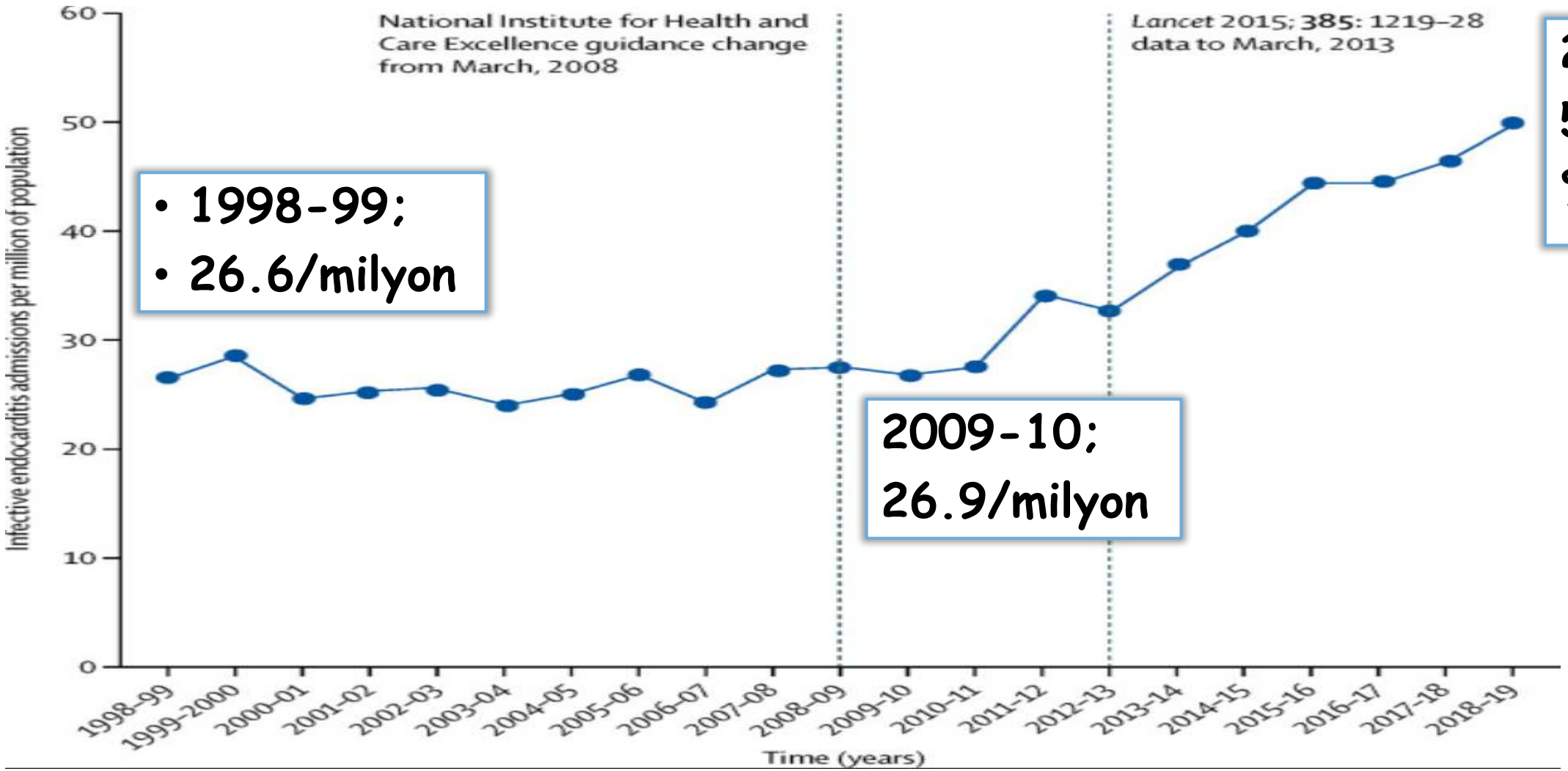


AmJCardiol2023;203:128−135

An alarming rise in incidence of infective endocarditis in England since 2009: why?

THE LANCET Published: April 25, 2020

Martin H Thornhill ✉ • Mark J Dayer • Jon Nicholl • Bernard D Prendergast • Peter B Lockhart • Larry M Baddour



- 1998-99;
- 26.6/milyon

2009-10;
26.9/milyon

2018-19;
50/milyon
%86↑

- ✓Mart 2008'de İngiltere Ulusal Sağlık Enstitüsü (NICE) endokardit profilaksi önerisini kaldırdı

- ✓2015 yılında Lancet'te yayınlanan makalede NICE rehber önerisi sonrası İngiltere'de endokardit profilaksisinde anlamlı↓, EE insidansında ↑ bildirildi ($p<0{\cdot}0001$)

- ✓Mikrobiyolojik veri olmaması nedeniyle insidanstaki bu artış profilaksi verilmemesi ile mi ilişkili, yoksa ileri yaş, risk grubundaki hasta sayısındaki artış vs gibi durumlarla mı ilişkili?

Global magnitude and temporal trend of infective endocarditis, 1990–2019: results from the Global Burden of Disease Study

Xiaorong Yang [1,2], Hui Chen [1,2], Dandan Zhang[3], Lin Shen[3,4], Guipeng An[5,6]*, and Shaohua Zhao [3,4]*

Introduction

Infective endocarditis (IE) is a rare but frightening disease in the field of cardiology. It is heterogeneous in aetiology, clinical manifestations, and course of disease.[1–4] Ten years ago, the global annual incidence of IE was estimated to be 3–10 per 100 000 people.[5,6] Epidemiological studies have shown that the incidence of IE continues to increase in many countries.[7,8]

Despite improvements in diagnosis and treatment, IE is still associated with high mortality, up to 22% in hospitals and up to 40% in 5 years.[9–12] In the past few decades, due to the ageing of the population, the increase in the use of cardiac implantable electronic devices (CIEDs), the increase in the number of patients receiving haemodialysis for end-stage renal disease, and more congenital heart disease patients surviving to adulthood, the population at risk of IE has increased.[6,13,14] The changes in the national guidelines on the use of antibiotics to prevent IE are also related to the significant increase in the incidence of IE.[15–18]

ESC European Society of Cardiology

European Journal of Preventive Cardiology (2022) **29**, 1277–1286
https://doi.org/10.1093/eurjpc/zwab184

Journal of Clinical Medicine
1 September 2023
MDPI

Editorial

Epidemiology, Diagnosis, Treatment, and Prognosis of Infective Endocarditis

Manuel Martínez-Sellés [1,2,3,*] and Patricia Muñoz [1,2,4,5]

- İleri yaş, komorbid hastalarda mortalite↑
- **Nozokomiyal ve sağlık bakım ilişkili endokardit sıklığında ↑**
  - Hastane yatışından 48 saat sonra gelişen veya tanıdan önceki 6 ay içinde riskli invaziv işlem uygulaması
- Multidisipliner endokardit takımı (EHKM, kardiyolog, KVC, radyolog)
- Erken tanı, endikasyon varlığında cerrahi!!


Endocarditis Team

Observational Study > Turk J Med Sci. 2022 Apr;52(2):445-455. doi: 10.55730/1300-0144.5332. Epub 2022 Apr 14.

Endocarditis–TR: Diagnosis, treatment, and prognosis of the infective endocarditis patients admitting tertiary centres of Turkey

Ali Nazmi Çalık [1], Özlem Arıcan Özlük [2], Mehmet Baran Karataş [1], Yiğit Çanga [1], Semih Eren [1],

Results: A total of 208 IE patients from 7 tertiary centres in Turkey were enrolled in the study. The study population included 125 (60.1%) native valve IE (NVE), 65 (31.3%) prosthetic IE (PVIE), and 18 (8.7%) intracardiac device-related IE (CDRIE). One hundred thirty-five patients (64.9%) were culture positive, and the most frequent pathogenic agent was methicillin-susceptible Staphylococcus aureus (MSSA) (18.3%). Among 155 (74.5%) patients with an indication for surgery, only 87 (56.1%) patients underwent surgery. The all-cause mortality rate was 29.3% in-hospital follow-up. Multivariable Cox regression analysis revealed that absence of surgery when indicated (HR: 3.29 95% CI: 0.93-11.64 p = 0.05), albumin level at admission (HR: 0.46 95% CI: 0.29-0.73 P < 0.01), abscess formation (HR: 2.11 95% CI: 1.01-4.38 p = 0.04) and systemic embolism (HR: 1.78 95% CI: 1.05-3.02 p = 0.03) were ascertained independent predictors of in-hospital all-cause mortality.

ESC European Society of Cardiology
European Heart Journal (2019) 40, 3222–3233
doi:10.1093/eurheartj/ehz620

Clinical presentation, aetiology and outcome of infective endocarditis. Results of the ESC-EORP EURO-ENDO (European infective endocarditis) registry: a prospective cohort study

Gilbert Habib [1,2]*, Paola Anna Erba [3,4], Bernard Iung [5], Erwan Donal[6],

Methods and results Prospective cohort of 3116 adult patients (2470 from Europe, 646 from non-ESC countries), admitted to 156 hospitals in 40 countries between January 2016 and March 2018 with a diagnosis of IE based on ESC 2015 diagnostic

- ✓2016 -2018 prospektif kohort, 40 ülke 156 merkez, 3116 hasta
- ✓%65.55 toplum kaynaklı endokardit
- ✓Doğal kapak %56.6 (1764)
- ✓Protez kapak %30.1 (939)
- ✓**Cihaz ilişkili %9.9 (308)**

ESC European Society of Cardiology
European Heart Journal (2019) 40, 3222–3233
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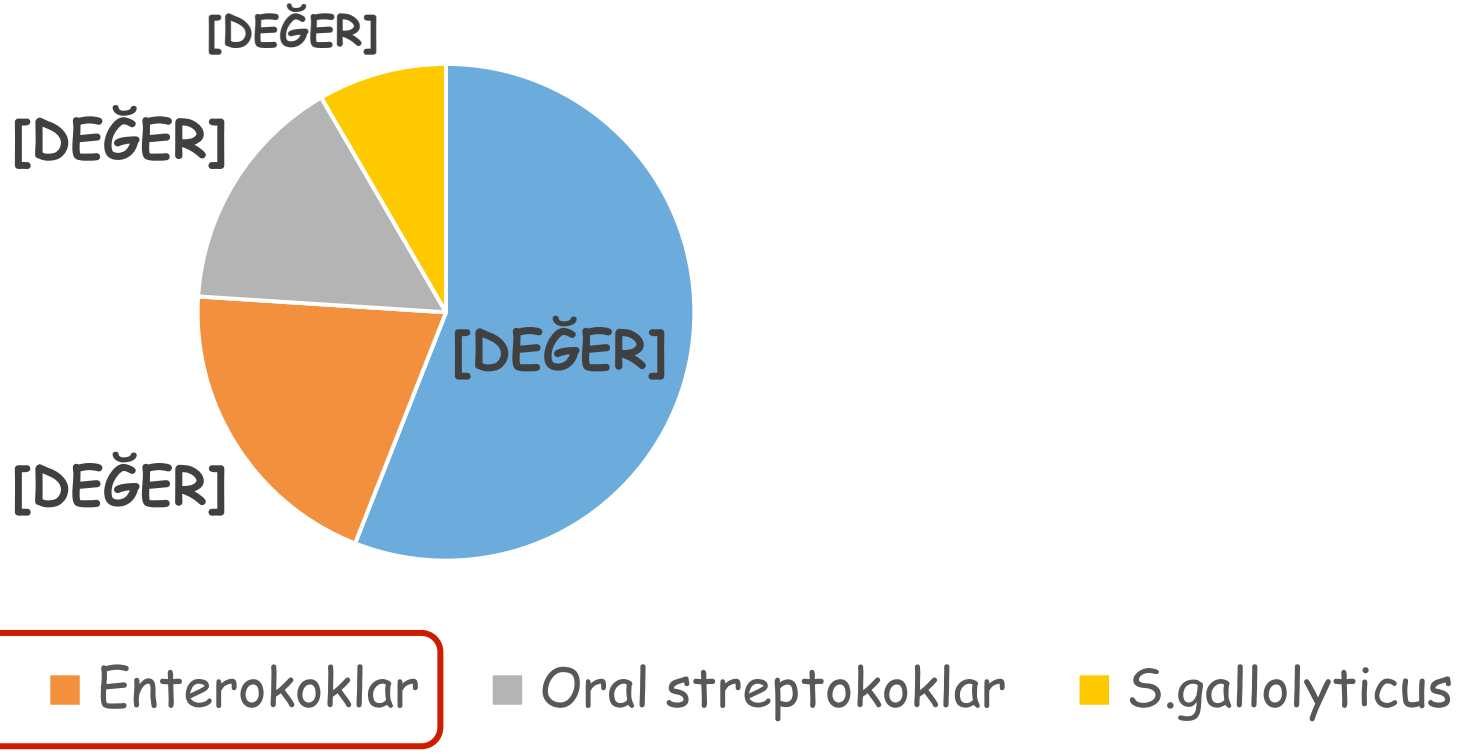
Gilbert Habib [1,2]*, Paola Anna Erba [3,4], Bernard Iung [5], Erwan Donal[6],

Etken dağılımı



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Clinical presentation, aetiology and outcome of infective endocarditis. Results of the ESC-EORP EURO-ENDO (European infective endocarditis) registry: a prospective cohort study

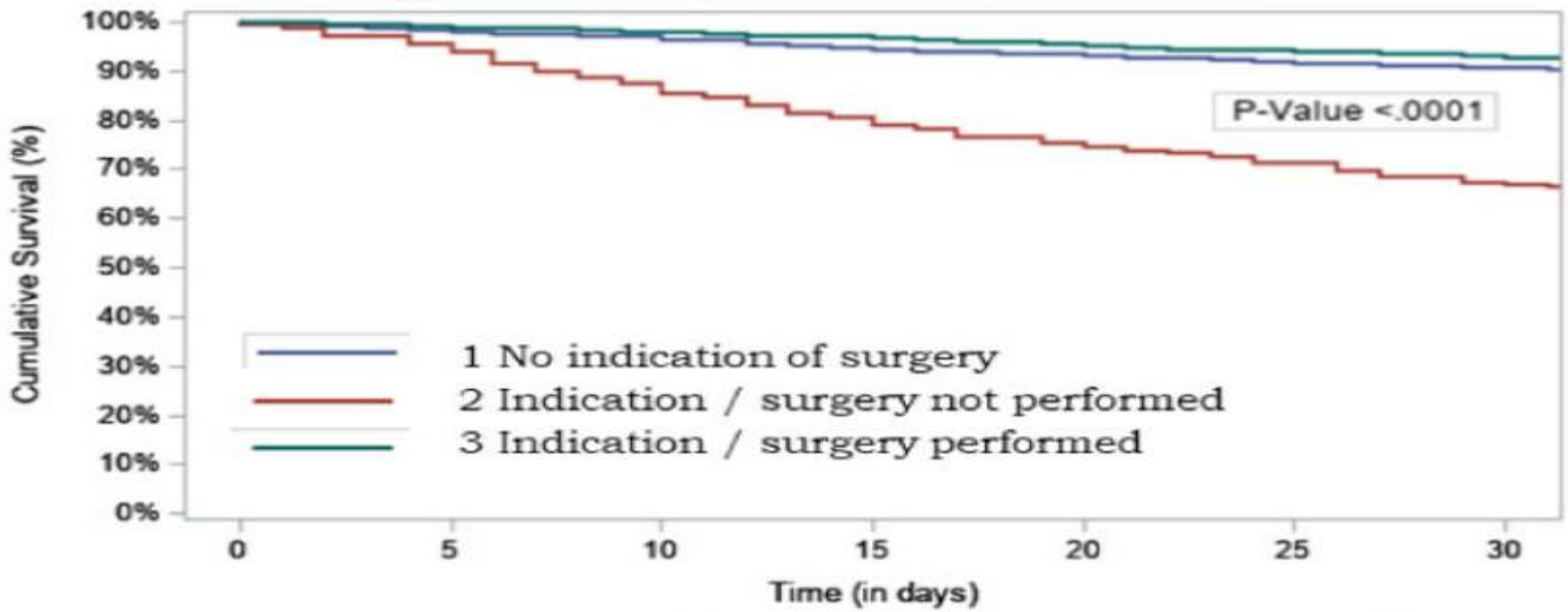
Gilbert Habib [1,2]*, **Paola Anna**

Table 4 Multivariable Cox re causes of death at discharge (1-

	Ha rat
Charlson index	1.0
Creatinine >2 mg/dL	1.5
Congestive heart failure	2.0
Vegetation length > 10 mm	2.1
Cerebral complication	2.2
Abscess	1.5
Indication—surgery not performed	2.8
Indication—surgery performed	0.6

In-hospital mortality in EURO-ENDO

adjusted Kaplan-Meier curves



Highest one-month mortality in patients with failure to undertake surgery despite a guideline recommended indication

Infect Dis Ther (2023) 12:1083–1101
https://doi.org/10.1007/s40121-023-00763-8

ORIGINAL RESEARCH

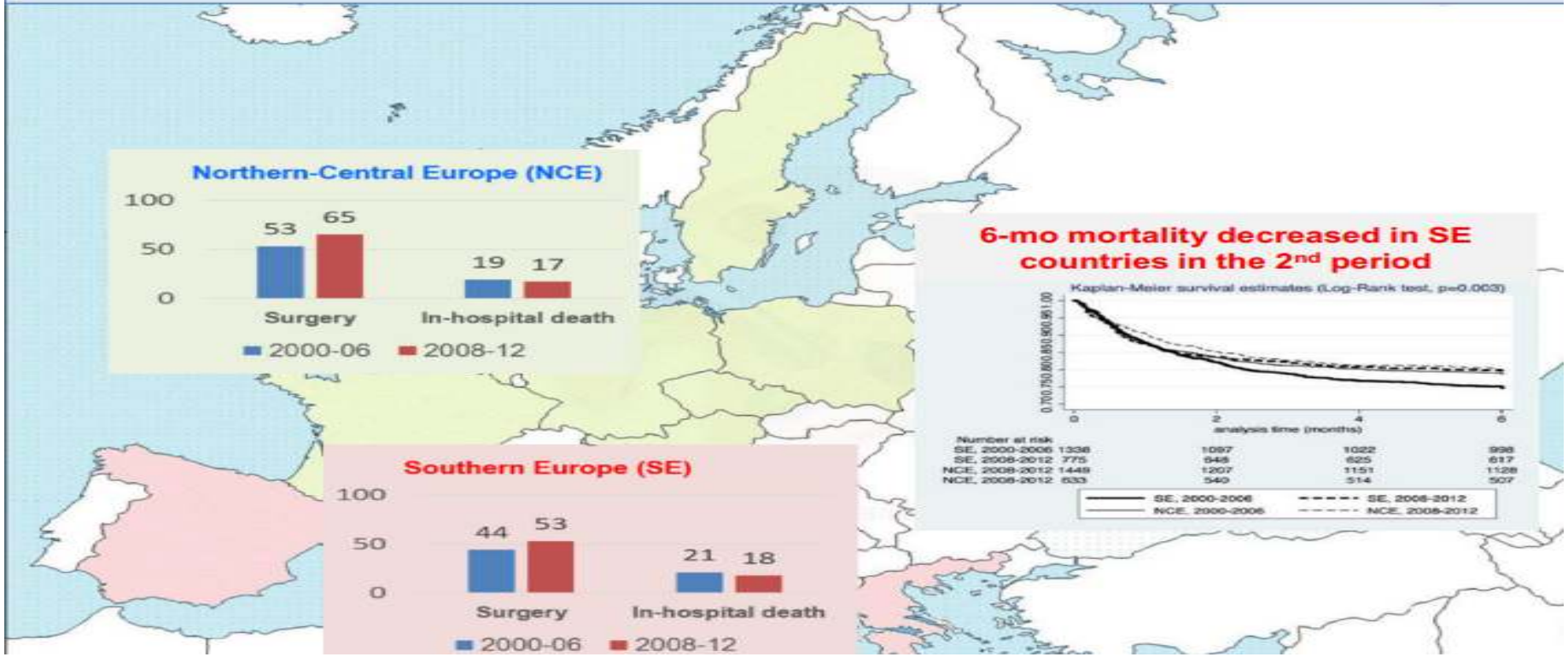
Epidemiological Changes and Improvement in Outcomes of Infective Endocarditis in Europe in the Twenty-First Century: An International Collaboration on Endocarditis (ICE) Prospective Cohort Study (2000–2012)

Juan Ambrosioni · Marta Hernández-Meneses · Emanuele Durante-Mangoni ·

Main conclusions:

- The complexity of IE cases has increased in Europe between 2000 and 2012 with a rise in the proportion of patients who benefit from surgical treatment.
- Although the percentage of in-hospital and 6-month mortality decreased modestly, this may represent a significant improvement in the overall management and prognosis of IE in Europe.

Objectives: The study aimed to compare IE epidemiological features and outcomes according to predefined European regions (NCE vs. SE) and between two different time periods (2000-06 vs. 2008-12) in this Century.



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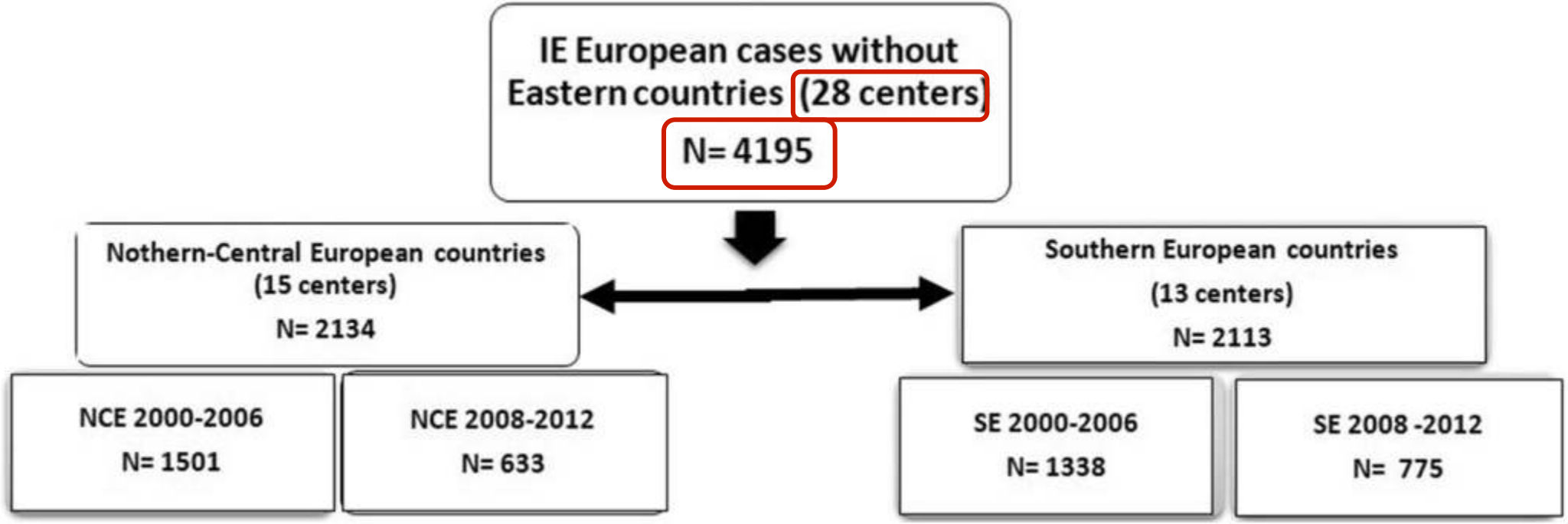


(IQR) age was 63.7 (49–74) years and 69.4% were males. Native valve IE (NVE), prosthetic valve IE (PVE), and device-related IE were diagnosed in 68.3%, 23.9%, and 7.8% of cases, respectively; 52% underwent surgery and 19.3%

- Medyan yas 63.7 (49 - 74), %69.4 erkek

- İleri yaş
- Akut prezenteasyon
- Hemodiyaliz
- Kanser ve DM

→ 2. dönemde daha fazla

	Total *N* = 4195	Early period (2000–2006) *N* = 2787	Later period (2008–2012) *N* = 1408	*p*
N-IE (*N* = 3879)	726 (18.7%)	470 (18.1%)	256 (20%)	0.17
HA-IE (*N* = 3879)	243 (6.3%)	162 (6.2%)	81 (6.3%)	0.95
IE type				
Native (*N* = 4123)	2816 (68.3%)	1909 (70%)	907 (64.9%)	< 0.01
Prosthetic (*N* = 4123)	985 (23.9%)	619 (22.7%)	366 (26.2%)	0.01
CIED endocarditis (*N* = 4123)	322 (7.8%)	198 (7.3%)	124 (8.9%)	0.08

N nosocomial, *HA* healthcare-associated; *CIED* cardiovascular implantable electronic devices

Table 2 Microbiologic etiology comparative analyses between the two predefined regions and two periods of overall cohort

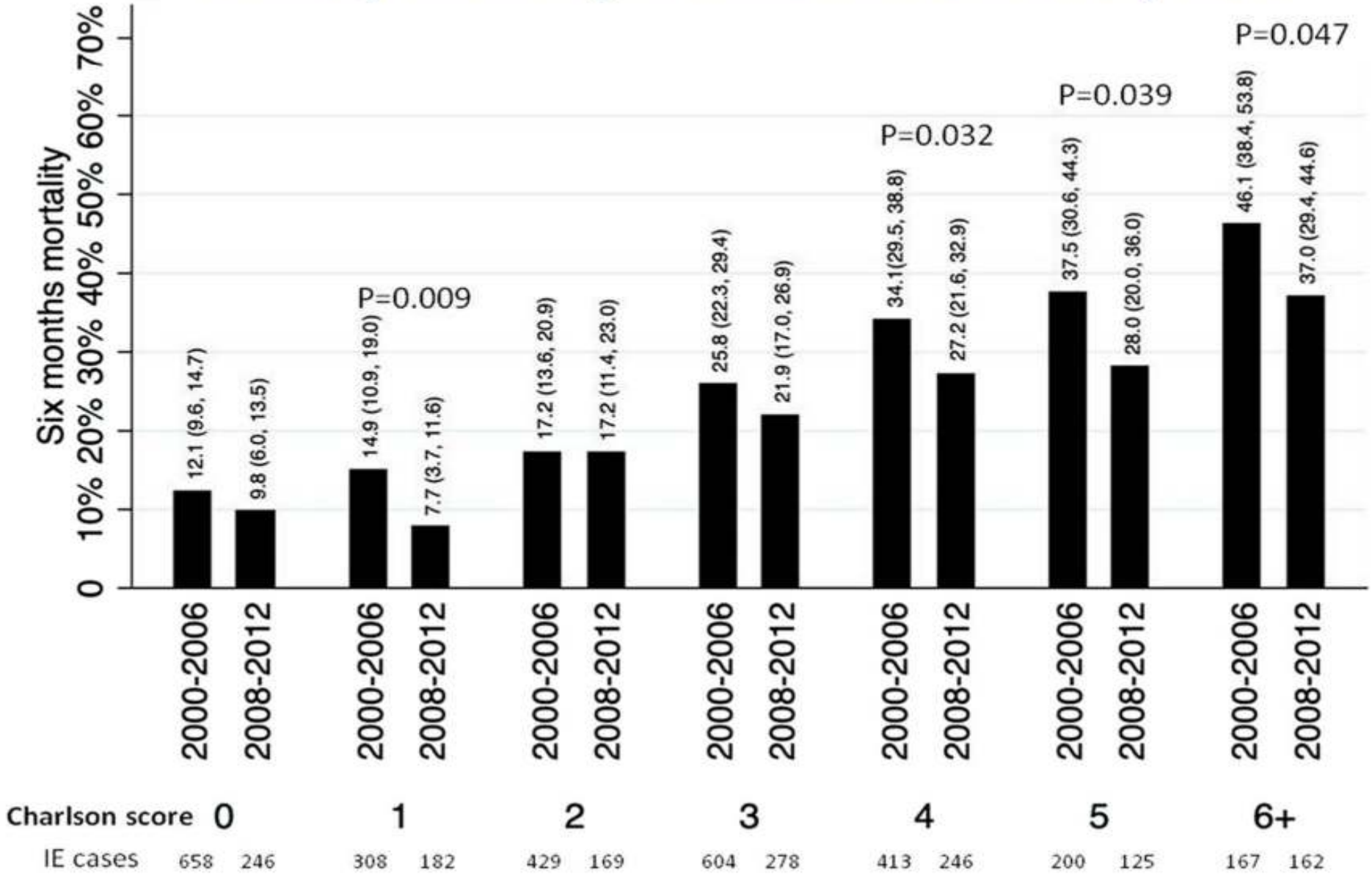
	Total $N = 4195$	NCE $N = 2082$	SE $N = 2113$	*p*-Value	Early period (2000–2006) $N = 2787$	Later period (2008–2012) $N = 1408$	*p*-Value
Staphylococcus aureus ($N = 3882$)	1039 (26.8%)	506 (26.2%)	533 (27.2%)	0.59	711 (27.2%)	328 (26.3%)	0.61
Viridans group Streptoccoci ($N = 3882$)	655 (17.4%)	295 (15.9%)	360 (18.2%)	0.16	443 (18%)	212 (16.7%)	0.39
Coagulase negative *Staphylococcus* ($N = 3882$)	510 (13.6%)	219 (10.8%)	291 (14.9%)	< 0.01	327 (12.5%)	183 (14.8%)	0.09
Enterococcus spp. ($N = 3882$)	427 (10.5%)	202 (10.1%)	225 (10.8%)	0.60	269 (8.9%)	158 (12.5%)	< 0.01
Streptococcus gallolyticus ($N = 3882$)	330 (9%)	173 (12.3%)	157 (7.3%)	< 0.01	221 (8.8%)	109 (9%)	0.90
Other streptococci[a] ($N = 3882$)	257 (7.2%)	143 (10.1%)	144 (5.8%)	< 0.01	159 (6.4%)	98 (8.1%)	0.11
Gram negative (not HACEK[b]) ($N = 3882$)	132 (4%)	59 (3.1%)	73 (3.7%)	0.37	83 (3.2%)	49 (3.9%)	0.25
Polymicrobial ($N = 3882$)	85 (1.6%)	59 (2.6%)	26 (1.2%)	< 0.01	44 (0.5%)	41 (3%)	< 0.01
Negative culture ($N = 3882$)	235 (4.9%)	124 (2.6%)	111 (5.9%)	< 0.01	219 (8%)	16 (1.1%)	< 0.01

Table 4 Multivariable analysis of factors associated with in-hospital mortality and 6-month mortality of overall cohort

	In-hospital mortality			Six-month mortality		
	Multivariate OR	CI 95%	*p*-Value	Multivariate OR	CI 95%	*p*-Value
Charlson score	1.36	(1.24, 1.50)	< 0.01	1.34	(1.01, 1.66)	0.04
Prosthetic valve IE	1.62	(1.26, 2.10)	< 0.01	1.68	(1.30, 2.17)	< 0.01
Staphylococcus aureus[a]	1.82	(1.43, 2.34)	< 0.01	1.72	(1.32, 2.24)	< 0.01
ConS[a]	1.59	(1.17, 2.21)	< 0.01	1.48	(1.07, 2.09)	< 0.01
Viridans group Streptoccoci[a]	0.38	(0.21, 0.72)	< 0.01	0.64	(0.44, 0,92)	0.02
Intracardiac vegetation	1.57	(1.14, 2.19)	< 0.01	1.59	(1.15, 2.19)	< 0.01
Stroke	2.47	(1.91, 3.18)	< 0.01	2.31	(1.79, 3.01)	< 0.01
CHF	2.79	(2.24, 3.49)	< 0.01	2.77	(2.21, 3.46)	< 0.01
Persistent positive blood culture	2.69	(1.91, 3.78)	< 0.01	2.65	(1.84, 3.81)	< 0.01
Paravalvular complications	1.83	(1.43, 2.32)	< 0.01	1.81	(1.42, 2.32)	< 0.01
N IE and HA IE versus CA IE	1.89	(1.56, 2.27)	< 0.01	1.30	(1.01, 1.66)	0.04
In-hospital surgery	0.69	(0.55, 0.87)	< 0.01	0.68	(0.54, 0.86)	< 0.01
European region (SE versus NCE)	1.33	(0.88, 1.45)	0.18	1.33	(0.91, 1.41)	0.27
Period (2008–2012 versus 2000–2006)	0.54	(0.40, 0.76)	< 0.01	0.53	(0.39, 0.73)	< 0.01

This analysis was adjusted by age and gender

Mortality according to Charlson Comorbidity index



Eur J Clin Microbiol Infect Dis. 2021; 40(5): 1103–1106.
Published online 2020 Dec 30. doi: 10.1007/s10096-020-04134-w
PMCID: PMC8084830
PMID: 33378000

Endocarditis due to *Staphylococcus lugdunensis*—a retrospective national registry–based study

Malin Hagstrand Aldman,[1,2] Magnus Rasmussen,[1,2] Lars Olaison,[3,4] and Lisa I. Påhlman[1,2,5]

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Abstract

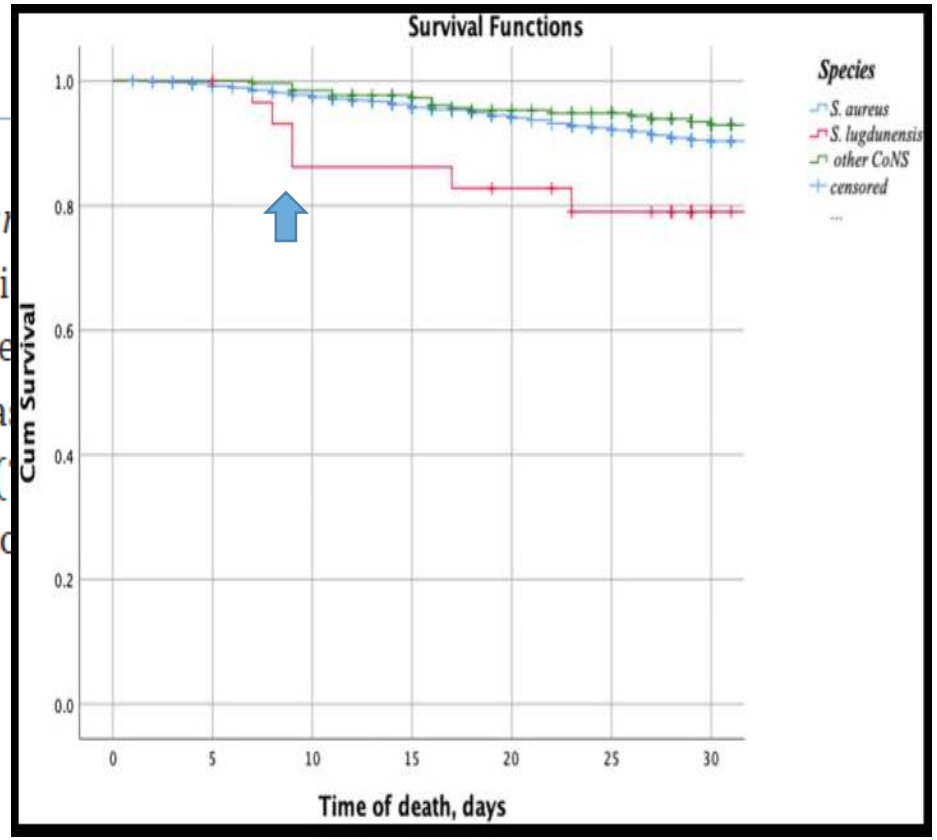
We present characteristics of infective endocarditis (IE) caused by *Staphylococcus lugdu*

✓2008-2018, stafilokok EE olan 2184 olgu

✓ 1892 *S.aureus*, 262 KNS, 30 *S. lugdunensis*

✓ *S. lugdunensis* vs diğer stafilokok İE

✓**En yüksek mortalite *S. lugdunensis*'te (%20)**



Open Forum Infectious Diseases

MAJOR ARTICLE 2 February 2023

Epidemiology and Clinical Outcomes of Non-HACEK

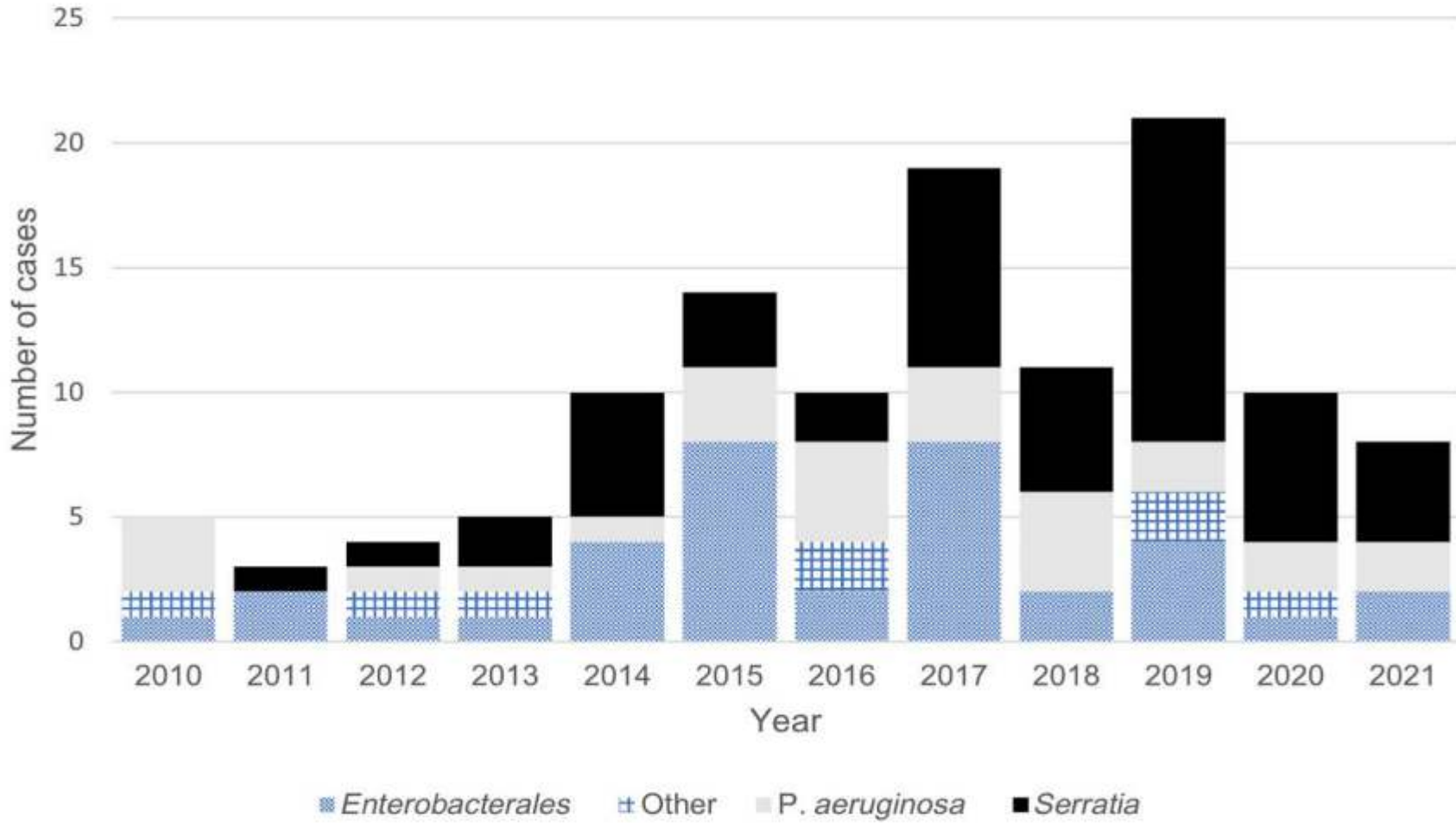


Figure 2. GNIE cases over time by pathogen. Abbreviation: GNIE, gram-negative infective endocarditis.

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Influence of the type of pathogen on the clinical course of infectious complications related to cardiac implantable electronic devices

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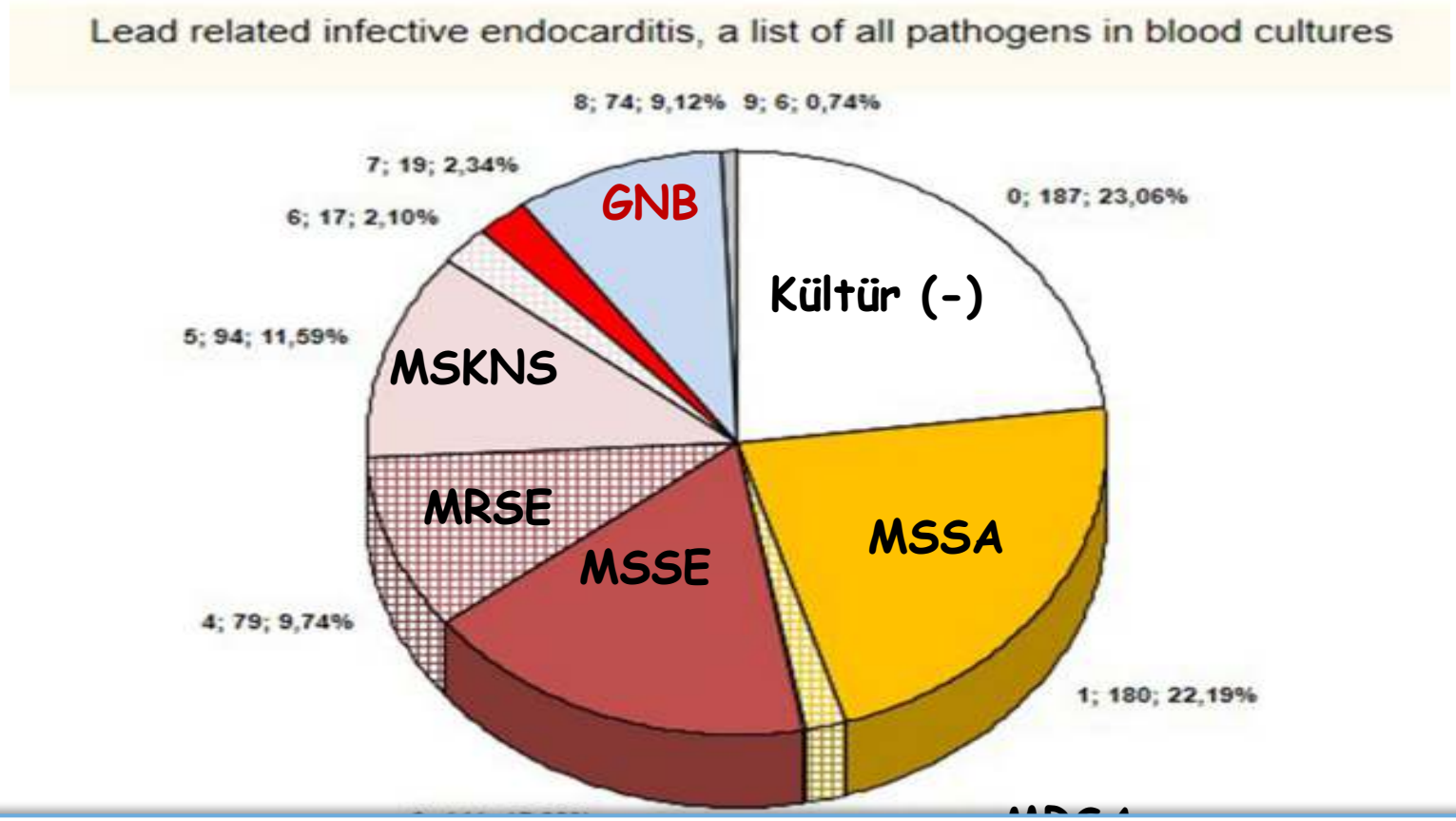
- Lead çıkartılan, lead ilişkili EE (773 hasta) ve cep enfeksiyonu (468 hasta) toplam **1241 hastada**

✓MSSA %22.9 ve %18.3

✓MSSE %17.39 ve %16.63

✓Diğer stafilokoklar %11.59 ve %6.46

✓Gram negatifler %9.12 ve %5



- *S. aureus*'ta lead süresi KNS'ye göre daha kısa
- *S. aureus*'ta vejetasyon daha sık
- Klinik başarı ve komplikasyonlar tüm etkenlerde benzer

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ORIGINAL ARTICLE

Staphylococcus aureus bacteraemia, cardiac implantable electronic device, and the risk of endocarditis: a retrospective population–based cohort study

Abstract

Patients with cardiac implantable electronic device (CIED) and *Staphylococcus aureus* bacteraemia (SAB) are at risk of having infective endocarditis (IE). The objectives were to describe a Swedish population-based cohort of patients with CIED

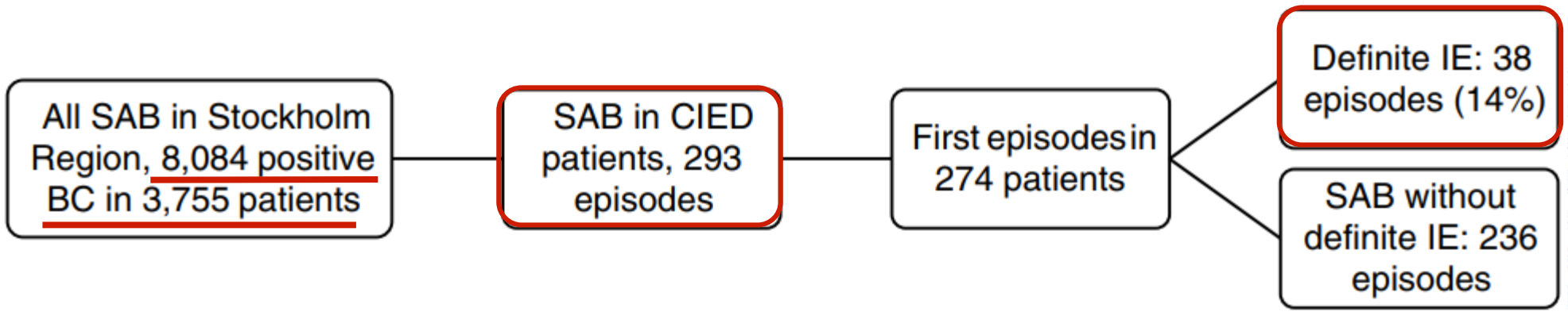

Fig. 1 Flow chart of patients with CIED and SAB

Table 2 Variables independently correlated to CIED IE in MVA by forward stepwise regression

Variables	Odds ratio (95% CI)	*p*-value	Suggested points in score
Predisposition for IE	2.4 (1.04–5.7)	0.040	1
Community acquisition	3.8 (1.6–9.3)	0.003	2
Embolization	12.6 (2.7–58)	0.001	6
Time to positivity ≤ 15 h	8.1 (1.8–36)	0.006	4
Positive BC after start of therapy	3.3 (1.2–6.7)	0.016	1.5

The score was given the name the CTEPP score from the first letter of each variable

- CTEPP skoru ≥2 ise EE tanısı için sensitivitesi %97, spesifitesi %25
  Negatif prediktif değeri %98

Son yıllarda Endokardit epidemiyolojisinde çok hızlı bir değişim ve dönüşüm yaşanmakta!!!