16TH SYMPOSIUM ISCVID BARCELONA

The hidden face of IE: clinical characteristics and prognosis in community centres

Parc Taulí Sabadell
Hospital Universitari

I3PT
INSTITUT D'INVESTIGACIÓ I INNOVACIÓ PARC TAULÍ

UAB
Universitat Autònoma de Barcelona

Oriol Gasch Blasi
Infectious Diseases Department
Parc Taulí University Hospital. Sabadell.

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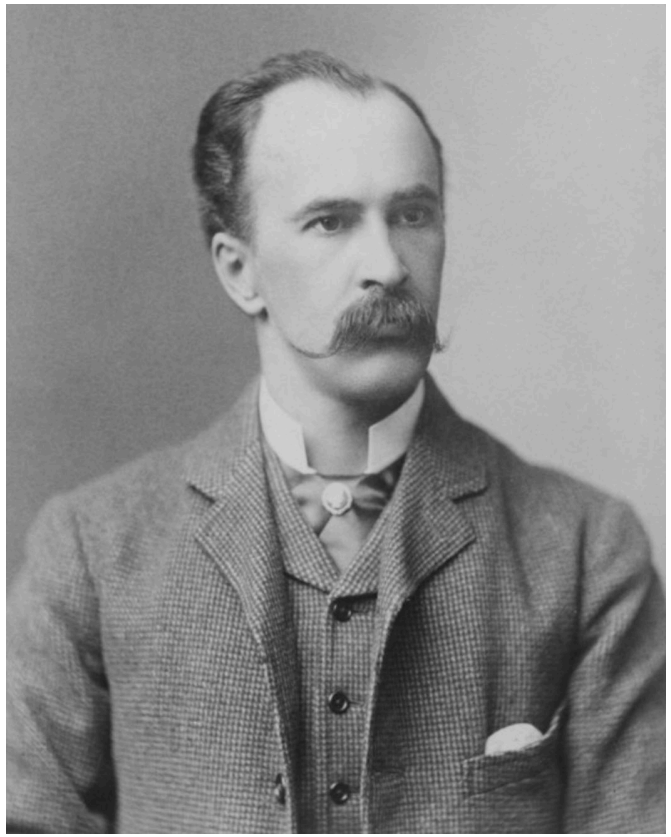
No conflicts of interest



March 7, 1885.] THE BRITISH MEDICAL JOURNAL.

THE GULSTONIAN LECTURES,
ON
MALIGNANT ENDOCARDITIS.

Delivered at the Royal College of Physicians of London, March, 1885.

By WILLIAM OSLER, M.D.,
Professor of Clinical Medicine at the University of Pennsylvania, Philadelphia.

Based on his personal experience with more than 200 patients

Current knowledge on Infective Endocarditis

Clinical Presentation, Etiology and Outcome of Infective Endocarditis in the 21st Century: The International Collaboration on Endocarditis-Prospective Cohort Study

Murdoch DR. Arch Intern Med. 2009

2,781 adult patients with IE
58 Hospitals from 25 countries
Jun. 2000 – Sep. 2005
Minimum enrollment of 12 cases per year in centres with access to cardiac surgery

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

Habib. G European Heart Journal 2019

3,116 adult patients with IE
156 Hospitals from 40 countries
Jan. 2016 - Mar. 2018

→ Low-volume centres 7,6%
High-volume centres 92,4%

Current Epidemiology and Outcome of Infective Endocarditis

A Multicenter, Prospective, Cohort Study

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Muñoz P. Medicine 2015

1,804 adult patients with IE
25 Spanish Hospitals
Jan. 2008 - Dec. 2012

International cohorts

	ICE	EURO-ENDO
Study period	2000-2005	2016-18

Miró JM. European Heart Journal 2019

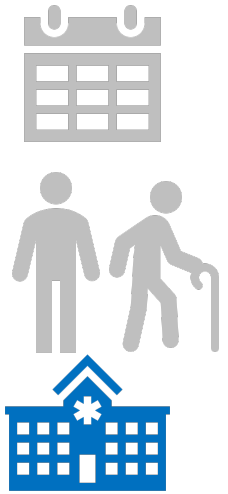
International cohorts

	ICE	EURO-ENDO
Study period	2000-2005	2016-18
Age, median (IQR)	58 (43-72)	63 (46-73)

Miró JM. European Heart Journal 2019

International cohorts

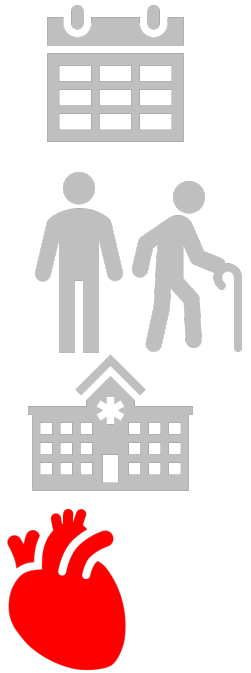
	ICE	EURO-ENDO
Study period	2000-2005	2016-18
Age, median (IQR)	58 (43-72)	63 (46-73)
Place of acquisition		
Community-acquired IE	72%	66%
Nosocomial HCA IE	14%	20%
Non-nosocomial HCA IE	9%	13%



Miró JM. European Heart Journal 2019

International cohorts

	ICE	EURO-ENDO
Study period	2000-2005	2016-18
Age, median (IQR)	58 (43-72)	63 (46-73)
Place of acquisition		
Community-acquired IE	71.5%	66%
Nosocomial HCA IE	14%	20%
Non-nosocomial HCA IE	9%	13%
IE Type		
Native	72%	59%
Prosthetic	21%	31%
CIED endocarditis	7%	10%



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Place of acquisition		
Community-acquired IE	71.5%	66%
Nosocomial HCA IE	14%	20%
Non-nosocomial HCA IE	9%	13%
IE Type		
Native	72%	59%
Prosthetic	21%	31%
CIED endocarditis	7%	10%
Microbiology		
Viridans group Streptoccoci	17%	12%
Enterococcus spp.	10%	16%
Staphylococcus aureus	31%	31%
CNS	11%	13%
Streptococcus gallolyticus	6%	7%

Miró JM. European Heart Journal 2019

International cohorts

	ICE	EURO-ENDO
Complications		
Stroke	17%	27%
Embolization non-stroke	23%	25%
CHF	32%	41%
Persistent positive BC	9%	13%
Intracardiac abscess	14%	18%
New conduction abnormality	8%	16%

Miró JM. European Heart Journal 2019

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	ICE	EURO-ENDO
Complications		
Stroke	17%	27%
Embolization non-stroke	23%	25%
CHF	32%	41%
Persistent positive BC	9%	13%
Intracardiac abscess	14%	18%
New conduction abnormality	8%	16%
Indication surgery	NA	69%
Cardiac surgery	48%	51%

18% patients with surgical indication were not operated

Miró JM. European Heart Journal 2019

International cohorts

	ICE	EURO-ENDO
Complications		
Stroke	17%	27%
Embolization non-stroke	23%	25%
CHF	32%	41%
Persistent positive BC	9%	13%
Intracardiac abscess	14%	18%
New conduction abnormality	8%	16%
Indication surgery	ND	69%
Cardiac surgery	48%	51%
In-hospital mortality	18%	17%

Miró JM. European Heart Journal 2019

International cohorts.
Risk factors for in-hospital death

Clinical Presentation, Etiology and Outcome of Infective Endocarditis in the 21st Century: The International Collaboration on Endocarditis-Prospective Cohort Study

Variable[a]	Original Model OR[b]	95% CI	p-value
Age in ten year intervals	1.30	1.17–1.46	<0.001
Male gender	0.99	0.74–1.34	0.97
Transferred from another health care facility	0.97	0.74–1.29	0.85
Prosthetic valve endocarditis	1.47	1.13–1.90	0.004
Hemodialysis	1.06	0.73–1.53	0.76
Diabetes	1.28	0.88–1.86	0.20
Intravenous drug use	0.93	0.51–1.70	0.82
Cancer	1.04	0.65–1.67	0.86
Other chronic illness	1.36	0.95–1.95	0.10
Invasive procedure	0.96	0.66–1.39	0.82
Congenital heart disease	1.22	0.74–2.02	0.44
Elevated erythrocyte sedimentation rate	0.57	0.44–0.73	<0.001
Radiographic pulmonary edema	1.79	1.39–2.30	<0.001
Health care-associated acquisition	1.30	0.85–1.98	0.23
S. aureus IE	1.54	1.14–2.08	0.005
Coagulase-negative staphylococci IE	1.50	1.07–2.10	0.02
Viridans group streptococci IE	0.52	0.33–0.81	0.004
Mitral valve vegetation	1.34	1.06–1.68	0.01
Paravalvular complications	2.25	1.64–3.09	<0.001
Surgery during this episode	0.61	0.44–0.83	0.002

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

	Hazard ratio	95% CI	P-value*
Charlson index	1.07	[1.04–1.11]	<0.0001
Creatinine >2 mg/dL	1.58	[1.19–2.11]	<0.0017
Congestive heart failure	2.09	[1.58–2.77]	<0.0001
Vegetation length > 10 mm	2.12	[1.64–2.73]	<0.0001
Cerebral complication	2.21	[1.61–3.04]	<0.0001
Abscess	1.50	[1.07–2.10]	0.0186
Indication—surgery not performed	2.84	[2.00–4.03]	<0.001
Indication—surgery performed	0.63	[0.43–0.92]	0.0169

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TABLE 4. Independent Risk Factors for In-Hospital Mortality

Factor	OR	95% CI	*P*
Age	1.02	1.01–1.03	<0.01
Immunosuppressive therapy	2.61	1.68–4.04	<0.01
Previous heart surgery (previous to the episode of IE)	1.53	1.17–2.00	.002
CNS event	2.47	1.91–3.19	<0.01
Atrial fibrillation	1.45	1.09–1.93	.011
S. aureus	2.34	1.75–3.12	<0.01
Fungi	3.12	1.50–6.49	.002
Intracardiac complication	1.67	1.30–2.14	<0.01
Heart failure	2.97	2.30–3.83	<0.01
Septic shock	5.18	3.62–7.40	<0.01

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International cohorts.
Risk factors for in-hospital death

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Patient's background

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Type of affected valve

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Local complications/Echocardiographic findings

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Patricia Muñoz, MD, PhD, Martha Kestler, MD, Arístides De Alarcon, MD, PhD, José María Miro, MD, PhD, Javier Bermejo, MD, PhD, Hugo Rodríguez-Abella, MD, María Carmen Fariñas, MD PhD, Manuel Cobo Belaustegui, MD, Carlos Mestres, MD, PhD, Pedro Llinares, MD, PhD, Miguel Goenaga, MD, Enrique Navas, MD, PhD, José Antonio Oteo, MD, PhD, Paola Tarabini, MD, and Emilio Bouza, MD, PhD, on behalf of the Spanish Collaboration on Endocarditis-Grupo de Apoyo al Manejo de la Endocarditis Infecciosa en España (GAMES) (see Acknowledgment)

TABLE 4. Independent Risk Factors for In-Hospital Mortality

Factor	OR	95% CI	P
Age	1.02	1.01–1.03	<0.01
Immunosuppressive therapy	2.61	1.68–4.04	<0.01
Previous heart surgery (previous to the episode of IE)	1.53	1.17–2.00	.002
CNS event	2.47	1.91–3.19	<0.01
Atrial fibrillation	1.45	1.09–1.93	.011
S. aureus	2.34	1.75–3.12	<0.01
Fungi	3.12	1.50–6.49	.002
Intracardiac complication	1.67	1.30–2.14	<0.01
Heart failure	2.97	2.30–3.83	<0.01
Septic shock	5.18	3.62–7.40	<0.01

Systemic manifestations/complications

Murdoch DR. Arch Intern Med. 2009, Habib. G European Heart Journal 2019, Muñoz P. Medicine 2015

International cohorts.
Risk factors for in-hospital death

Clinical Presentation, Etiology and Outcome of Infective Endocarditis in the 21st Century: The International Collaboration on Endocarditis-Prospective Cohort Study

Variable[a]	Original Model OR[b]	95% CI	p-value
Age in ten year intervals	1.30	1.17–1.46	<0.001
Male gender	0.99	0.74–1.34	0.97
Transferred from another health care facility	0.97	0.74–1.29	0.85
Prosthetic valve endocarditis	1.47	1.13–1.90	0.004
Hemodialysis	1.06	0.73–1.53	0.76
Diabetes	1.28	0.88–1.86	0.20
Intravenous drug use	0.93	0.51–1.70	0.82
Cancer	1.04	0.65–1.67	0.86
Other chronic illness	1.36	0.95–1.95	0.10
Invasive procedure	0.96	0.66–1.39	0.82
Congenital heart disease	1.22	0.74–2.02	0.44
Elevated erythrocyte sedimentation rate	0.57	0.44–0.73	<0.001
Radiographic pulmonary edema	1.79	1.39–2.30	<0.001
Health care-associated acquisition	1.30	0.85–1.98	0.23
S. aureus IE	1.54	1.14–2.08	0.005
Coagulase-negative staphylococci IE	1.50	1.07–2.10	0.02
Viridans group streptococci IE	0.52	0.33–0.81	0.004
Mitral valve vegetation	1.34	1.06–1.68	0.01
Paravalvular complications	2.25	1.64–3.09	<0.001
Surgery during this episode	0.61	0.44–0.83	0.002

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

	Hazard ratio	95% CI	P-value*
Charlson index	1.07	[1.04–1.11]	<0.0001
Creatinine >2 mg/dL	1.58	[1.19–2.11]	<0.0017
Congestive heart failure	2.09	[1.58–2.77]	<0.0001
Vegetation length > 10 mm	2.12	[1.64–2.73]	<0.0001
Cerebral complication	2.21	[1.61–3.04]	<0.0001
Abscess	1.50	[1.07–2.10]	0.0186
Indication—surgery not performed	2.84	[2.00–4.03]	<0.001
Indication—surgery performed	0.63	[0.43–0.92]	0.0169

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Microbiology

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Surgery

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Limitations of International cohorts

Non-cardiac surgery centres and community hospitals under-represented.

- ICE: 42% Transferred from another health facility

- EURO-ENDO: Low-volume centres 7,6%
High-volume centres 92,4%

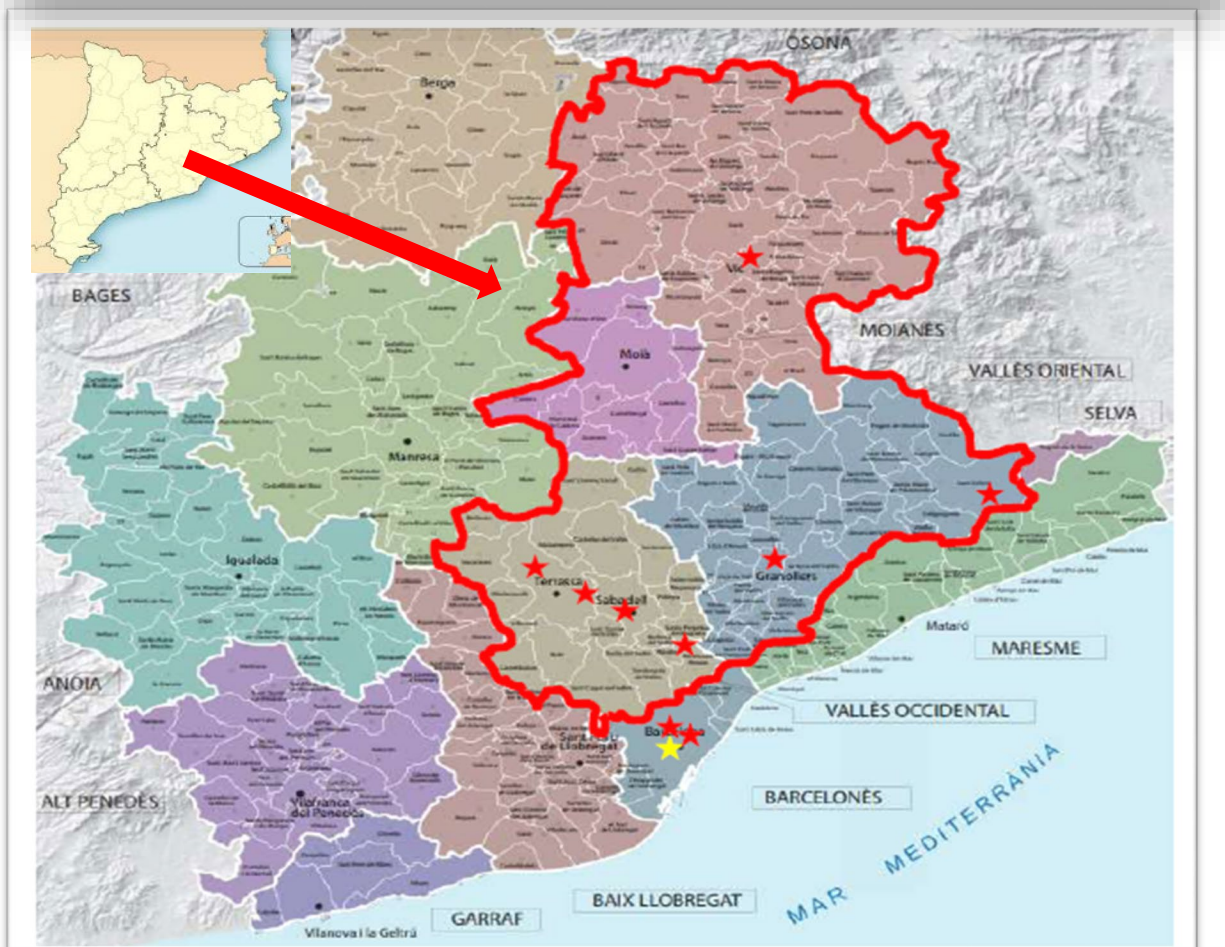
- Demographics, clinical presentation, aetiology
- Frequency of episodes diagnosed
- Diagnostic tools (i.e [18F]FDG PET/CT), cardiac CT…)
- Direct availability of cardiac surgeon
- Prognostic factors

Central Catalonia 10 Endocarditis Teams (CC10ET)

CatSalut Servei Català de la Salut

Generalitat de Catalunya Departament de Salut

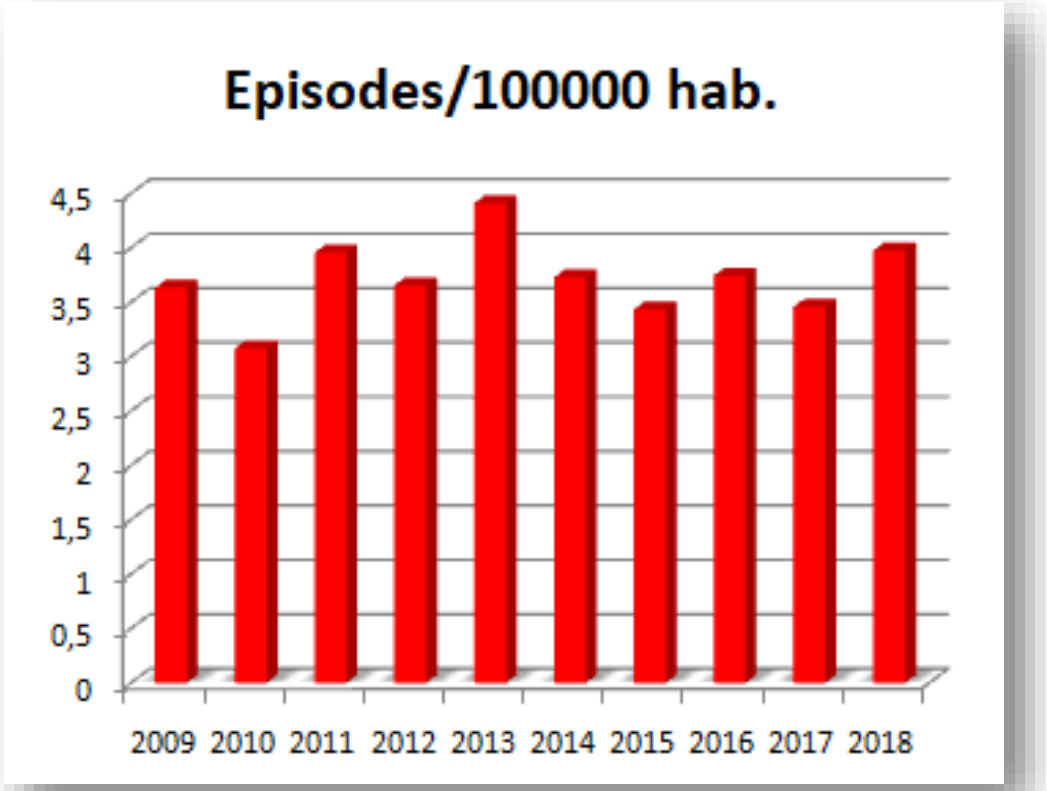
CatSalut. Instrucció 08/2014
Ordenació i configuració del model organitzatiu dels serveis de cirurgia cardíaca



- Area 2,900 Km^2
- 2.2 million inhabitants
- 9 Hospitals and the referral centre for cardiac surgery

Central Catalonia 10 Endocarditis Teams (CC10ET)

502 episodes of infective endocarditis (2009-2018)

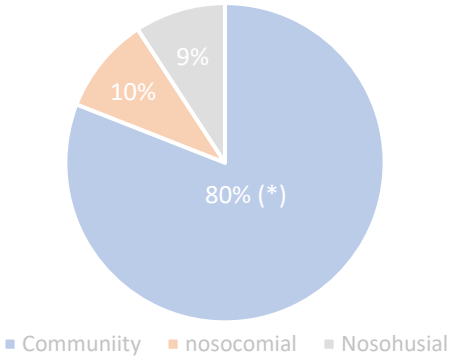


3.5 episodes/100.000 inhabitants CI 95% (3.45-3.56)

Central Catalonia 10 Endocarditis Teams (CC10ET)

DEMOGRAPHICS	
Age (P_{25}-P_{75})	72 (60-80)
Charlson (P_{25}-P_{75})	5 (3-7)

CC10ET > EURO-ENDO > ICE



(*) CC10ET > ICE> EURO-ENDO

MICROBIOLOGY n (%)	
S. aureus SASM	109 (21.7) 93 (17.5)
GVS	101 (20.1)
E. faecalis	64 (12.7)
CNS	56 (11.2)
S. gallolyticus	50 (10)

ICE = EURO-ENDO > CC10ET

CC10ET > ICE > EURO-ENDO

EURO-ENDO > CC10ET > ICE

EURO-ENDO > ICE = CC10ET

CC10ET > EURO-ENDO = ICE

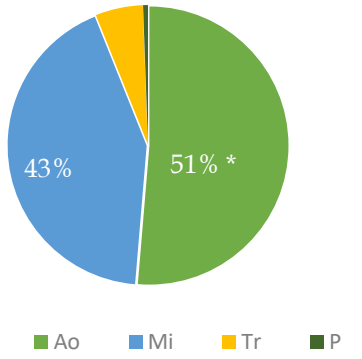
ECHOCARDIOGRAPHY n (%)	
Native Biological Pr. Mechanical Pr CIEDs	362 (72.1) 70 (13.9) 44 (8.8) 37 (7.4)
Severe valve insufficiency	156 (31)
Intracardiac abscess	60 (12)
Fistula	28 (5.6)
Vegetation >10 mm	375 (75) 43.5

CC10ET =ICE >EURO-ENDO

ICE > CC10ET

EURO-ENDO > ICE > CC10ET

ICE > EURO-ENDO = CC10ET



(*) CC10ET = EURO-ENDO > ICE

Central Catalonia 10 Endocarditis Teams (CC10ET)

COMPLICATIONS n (%)	
Acute Pulmonary edema Cardiogenic shock	28 (6) 22 (4)
Persistent bacteraemia	29 (6)
Ischaemic stroke Haemorrhagic stroke Systemic embolisms	61 (12) 13 (3) 136 (27)

EURO-ENDO > ICE > **CC10ET**

EURO-ENDO > ICE > **CC10ET**

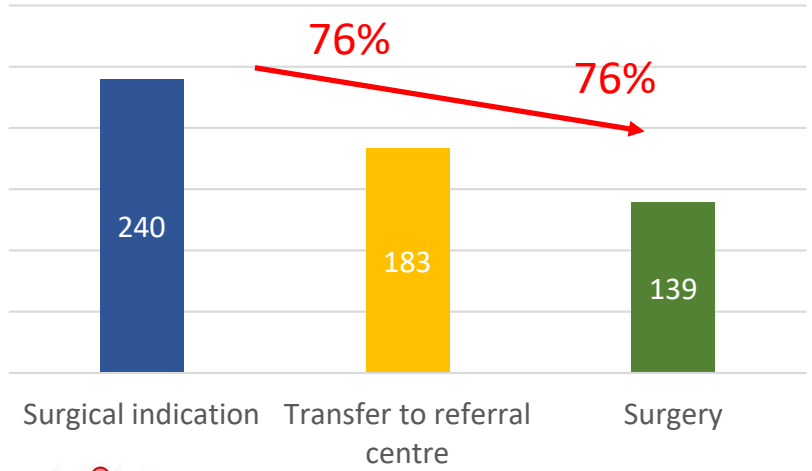
EURO-ENDO > ICE > **CC10ET**

CC10ET = ICE = EURO-ENDO

SURGERY	
Surgical indication	240 (48)
Transferred to referral centre	183 (37)
Surgery	139 (28)

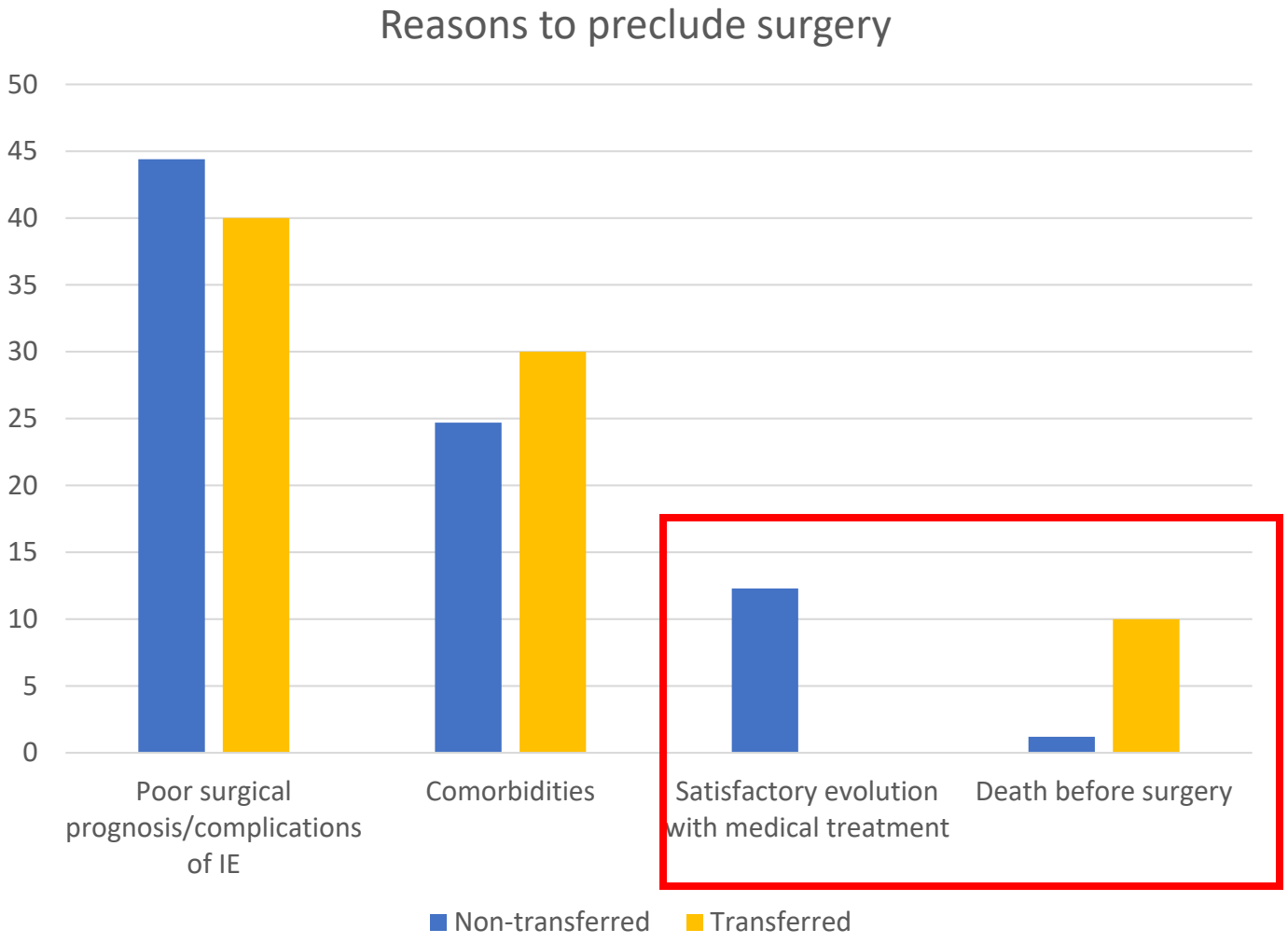
EURO-ENDO > **CC10ET**

ICE = EURO-ENDO > **CC10ET**



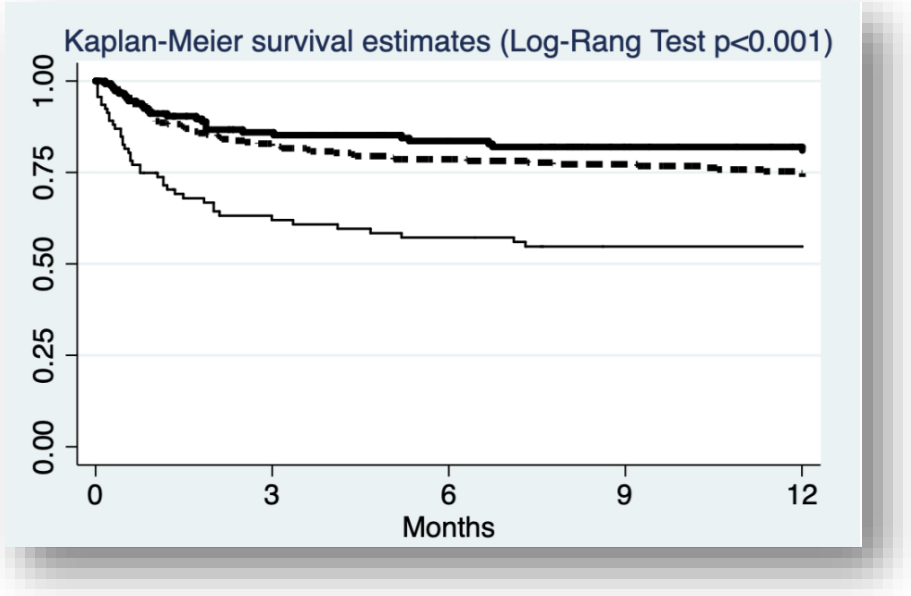
101 patients, 42% of all surgical indications **were not operated**

Central Catalonia 10 Endocarditis Teams (CC10ET)



OUTCOMES	
In-hospital mortality	98 (19.5)
One-year mortality	139 (30)

CC10ET >= ICE = EURO-ENDO



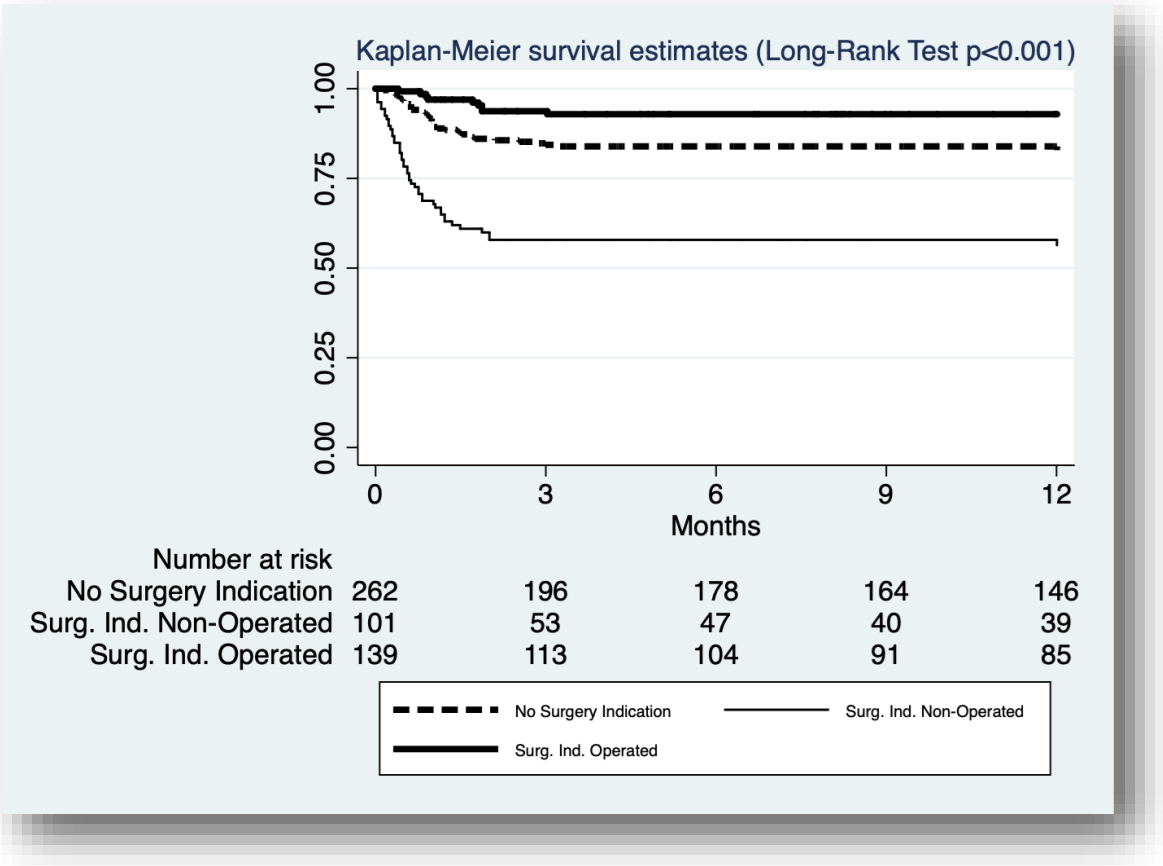
Central Catalonia 10 Endocarditis Teams (CC10ET)

Risk factors for In-hospital mortality

	OR	IC 95%	p-valor
Charlson score	1.19	(1.09, 1.30)	<0.001
Community acquisition	0.52	(0.29, 0.93)	0.027
Staphylococcus aureus	1.93	(1.08, 3.47)	0.027
Cardiac insufficiency	3.87	(2.28, 6.57)	<0.001
CNS embolism	2.95	(1.41, 5.14)	0.004
Surgery	0.42	(0.20, 0.87)	0.020

Risk factors for one-year mortality

	OR	IC 95%	p-valor
Charlson score	1.23	(1.13, 1.33)	<0.001
Staphylococcus aureus	1.82	(1.04, 3.18)	0.035
Cardiac insufficiency	3.74	(2.27, 6.16)	<0.001
Surgery	0.41	(0.21, 0.79)	0.008



(*) Transfer to cardiac surgery centre 1.23 (0.84-3.95)

Central Catalonia 10 Endocarditis Teams (CC10ET)

Among patients with surgical indication, are those transferred similar to not transferred?

	Transferred 183 (36.5)	Non-transferred 88 (17.5)	p-value
Male, n (%)	141 (77)	50 (56.8)	<0.001
Age (years), median (IQR)	67.0 (54-75)	79.0 (68.0-84.5)	<0.001
Charlson index, median (IQR)	3.0 (2.0-5.0)	6.0 (4.0-7.0)	<0.001
Community acquired, n (%)	155 (84.7)	62 (70.5)	0.004
Staphylococcus aureus, n (%)	29 (15.8)	25 (28.4)	0.011
Aortic Valve, n (%)	115 (62.8)	35 (39.8)	<0.001
Vegetation size (mm), median (IQR)	13.0 (9.0-17.0)	8.0 (6.0-13.0)	<0.001
Vegetation >10 mm, %	86 (66.7)	19 (33.3)	<0.001
Intracardiac abscess, n (%)	44 (24)	12 (13.6)	0.041
Intracardiac fistula, n (%)	25 (13.7)	3 (3.4)	0.008
CHF, n (%)	88 (48)	28 (29.8)	0.009

Not-transferred patients are older and have more comorbidities but have fewer echocardiographic and clinical findings associated with severity.

Central Catalonia 10 Endocarditis Teams (CC10ET)

Among unoperated patients WITH surgical indication, those transferred are different from those who were not?

	Non-transferred (n= 81)	Transferred (n=20)	p-value
Male, n (%)	46 (56,8)	17 (85)	0,004
Severe regurgitation	27 (33.3)	13 (65)	0,009
Vegetation >10 mm, %	19 (33.3)	11 (66.7)	0,006
Vegetation size (mm), median (IQR)	8.0 (6.0-13.0)	13.5 (10.0-18.5)	0,002
Persistent bacteraemia, n (%)	5	0	0,023
One-year mortality, n (%)	44 (56.4)	11 (57.9)	0,907
One-year surgical treatment, n (%)	3 (3.7)	0 (0)	0,081

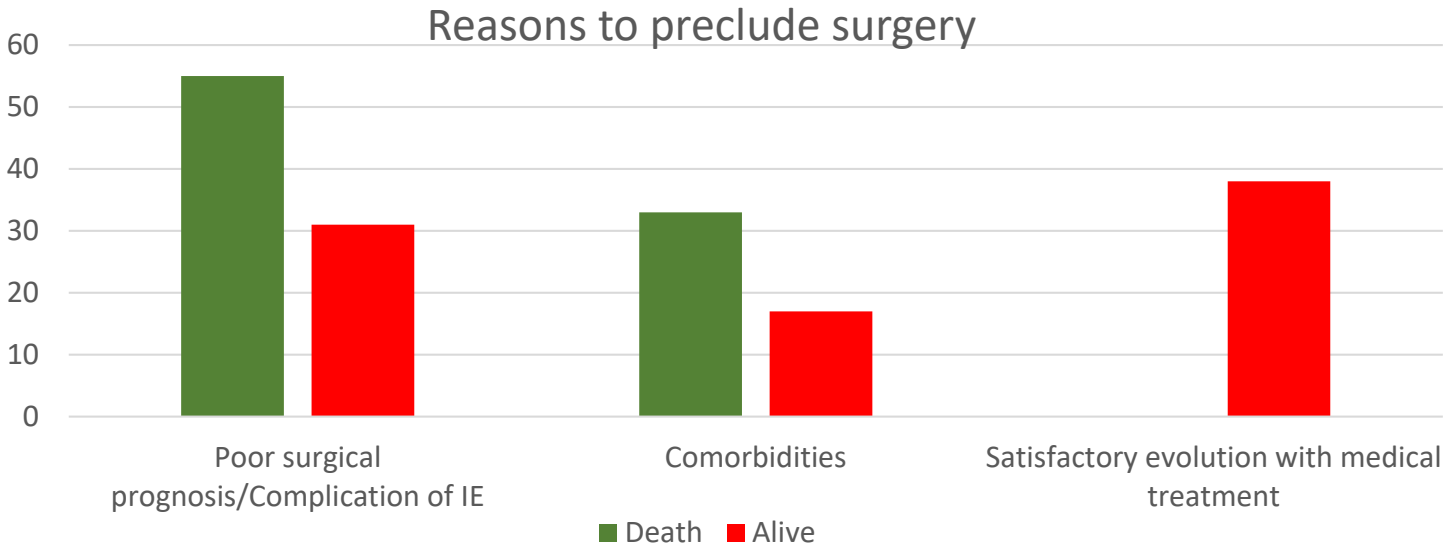
Transferred patients have more echocardiographic and clinical findings that confer severity, but are similar in terms of comorbidities.

One-year mortality in both groups is similar

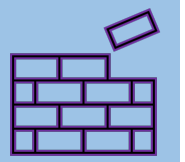
Central Catalonia 10 Endocarditis Teams (CC10ET)

Among unoperated patients WITH surgical indication, those that died within the first year are different from those who alive?

	Death (n=55)	Alive (n=42)	p-value	OR (CI95%)
Charlson index, median (IQR)	6.0 (5.0-8.0)	4.0 (3.0-6.0)	<0.001	1,29 (1.08-1.54)
Heart Failure n (%)	26 (47.3)	9 (21,4)	0,006	3,08 (1,20-7,91)



Conclusions



The hidden face of IE

Conclusions

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These patients have differential characteristics with respect to those diagnosed at tertiary hospitals.

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These patients have differential characteristics with respect to those diagnosed at tertiary hospitals.

They are under-represented in large international cohorts.

Many thanks,

Central Catalonia 10 Endocarditis Teams (CC10ET) members:
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