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SCORES PRONÓSTICOS EN LA ENDOCARDITIS INFECCIOSA: ¿ESTÁ JUSTIFICADO SU USO?

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INTRODUCCIÓN

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- Alrededor de la mitad de pacientes con endocarditis (40-70%) pueden requerir tratamiento quirúrgico.
- La mortalidad de la enfermedad es elevada.
- La cirugía mejora el pronóstico, pero su morbi-mortalidad también es importante.
- Una % de pacientes con indicación quirúrgica no se operan.
- Disponer de *scores* pronósticos podría ayudar a la toma de decisiones.

SCORES PRONÓSTICOS EN CIRUGÍA CARDÍACA

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- UTILIDADES:
  - Intentar predecir el pronóstico en un paciente individual.
  - Ayudar a la toma compartida de decisiones.
  - Control de calidad interno.
  - *Benchmarking* entre diferentes centros.
- LIMITACIONES:
  - Variables importantes no incluidas en los *scores*:
    - Aorta en porcelana.
    - Cirrosis hepática...
  - Diferencias de resultados entre centros y equipos quirúrgicos.

EuroSCORE II†

Samer A.M. Nashef[a,*], François Roques[b], Linda D. Sharples[c], Johan Nilsson[d], Christopher Smith[a], Antony R. Goldstone[e] and Ulf Lockowandt[f]

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New EuroSCORE II (2011 ×

No es seguro | www.euroscore.org/calc.html

Aplicaciones PubMed Traductor de Google SEC Favoritos All Global Circle Recursos-e CRAI UB Aritmies.com BCN Bio-HF Calculad Blog Programa HERA

HOME euroSCORE SCORING CALCULATOR REFERENCES

euroSCORE interactive calculator

Important: The previous additive [1] and logistic [2] EuroSCORE models are out of date. A new model has been prepared from fresh data and is launched at the 2011 EACTS meeting in Lisbon. The model is called EuroSCORE II [3] - this online calculator has been updated to use this new model. If you need to calculate the older "additive" or "logistic" EuroSCORE please visit the old calculator by clicking here.

Patient related factors			Cardiac related factors		
Age [1] (years)	78	0.54	NYHA	III	.2958358
Gender	female	.2196434	CCS class 4 angina [8]	no	0
Renal impairment [2] See calculator below for creatinine clearance	moderate (CC >50 & <85)	.303553	LV function	moderate (LVEF 31%-50%)	.3150652
Extracardiac arteriopathy [3]	no	0	Recent MI [9]	no	0
Poor mobility [4]	no	0	Pulmonary hypertension [10]	no	0
Previous cardiac surgery	no	0	**Operation related factors**		
Chronic lung disease [5]	yes	.1886564	Urgency [11]	urgent	.3174673
Active endocarditis [6]	yes	0.6194522	Weight of the intervention [12]	single non CABG	.0062118
Critical preoperative state [7]	no	0	Surgery on thoracic aorta	yes	.6527205
Diabetes on insulin	yes	.3542749			
EuroSCORE II	18.10 %				
euroSCORE II	Note: This is the 2011 EuroSCORE II	Calculate Clear			

Notes about euroSCORE II

[1] Age - in completed years. Some of the weighting for age is now incorporated into the renal impairment risk factor, so it is important that all risk factors are entered to give reliable risk estimations - see note [2]. Of over 20,000 patients in the EuroSCORE database, only 21 patients were aged over 90 - therefore the risk model may not be accurate in these patients. Please exercise clinical discretion in interpreting the score. The oldest patient in the EuroSCORE database was 95 - EuroSCORE II is not validated in patients over this age.

[2] Renal impairment - there are now 3 categories based on creatinine clearance calculated using Cockcroft-Gault formula. Unlike serum creatinine in the old EuroSCORE model, some of the weighting for *age* is directly incorporated into this factor, as *age* is a component of *creatinine clearance*. The 3 categories are:

- on dialysis (regardless of serum creatinine level)
- moderately impaired renal function (50-85 ml/min)
- severely impaired renal function (<50 ml/min) off dialysis

Creatinine clearance (ml/min) = (140-age (years)) x weight (kg) x (0.85 if female) / [72 x serum creatinine (mg/dl)]

17:34 20/03/2018

22.381 pacientes
154 hospitales
43 países
Mayo-Julio 2010

-Sólo el 2,2% de los pacientes de EuroScore-II tenían endocarditis-

European Journal of Cardio-Thoracic Surgery 41 (2012) 734–745

STS RISK CALCULATOR

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●●●○○ movistar 4G 17:36 83 %

STS Risk Calculator

Dataset 2.73

Pr Procedure	De Demographics	Ri Risk
Pc Previous CV	Po Pre-op Status	Ca Cath
Op Operative	Cx Calculate	Su Support

●●●○○ movistar 4G 17:38 82 %

Home **Risk Factors**

Weight:	kg / lb	10 - 250
Height:	cm / in	20 - 251
Creatinine (mg/dl):		
Dialysis:	Yes / No	
Diabetes:	Yes / No	
Control:	None / Diet / Oral / Insulin	
Hypertension:	Yes / No	
Immunosuppression:	Yes / No	
Endocarditis:	Yes / No	
Type:	Treated / Active	
Lung Disease:	No / Mild / Mod / Sev	

Outcomes for endocarditis surgery in North America: A simplified risk scoring system

Jeffrey G. Gaca, MD,[a] Shubin Sheng, PhD,[b] Mani A. Daneshmand, MD,[a] Sean O'Brien, PhD,[b] J. Scott Rankin, MD,[c] J. Matthew Brennan, MD,[a] G. Chad Hughes, MD,[a] Donald D. Glower, MD,[a] James S. Gammie, MD,[d] and Peter K. Smith, MD[a]

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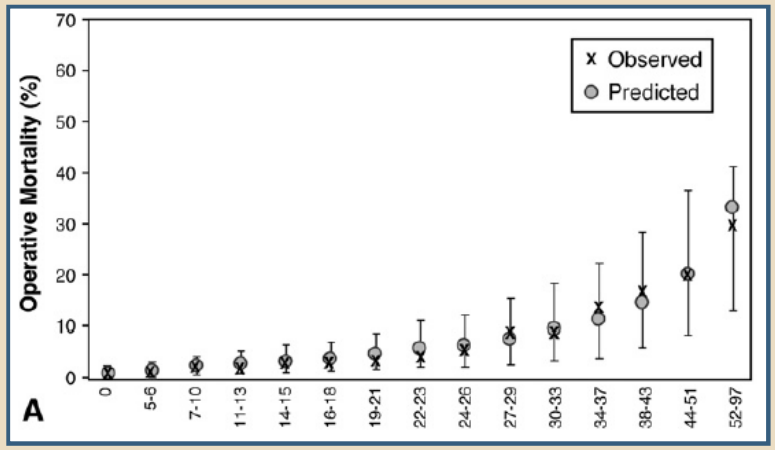
TABLE 4. Simplified model and point estimate for postoperative mortality

Parameter	Standard estimate	Probability	OR	CI	Points
Prior CABG	0.48958	<.0001	1.63163	(1.60, 1.67)	7
Status: urgent or emergency, no cardiogenic shock	0.42207	<.0001	1.52511	(1.50, 1.55)	6
Status: emergency, salvage, or cardiogenic shock	1.15279	<.0001	3.167	(3.03, 3.31)	17
Preoperative IABP or Inotropes	0.67227	<.0001	1.95869	(1.89, 2.03)	10
Multiple valve procedure	0.602	<.0001	1.82577	(1.79, 1.86)	9
Prior valve surgery	0.47119	<.0001	1.6019	(1.57, 1.64)	7
IDDM	0.54652	<.0001	1.72723	(1.68, 1.78)	8
NIDDM	0.43098	<.0001	1.53877	(1.50, 1.58)	6
Hypertension	0.342	<.0001	1.40776	(1.38, 1.43)	5
Chronic lung disease	0.34443	<.0001	1.41119	(1.38, 1.44)	5
Active endocarditis	0.69541	<.0001	2.00453	(1.97, 2.04)	10
Renal failure or Cr > 2.0	0.82723	<.0001	2.28698	(2.24, 2.33)	12
Arrhythmia	0.5043	<.0001	1.65582	(1.62, 1.69)	8

C statistic = 0.75784. *OR*, Odds ratio; *CI*, confidence interval; *CABG*, coronary artery bypass grafting; *IABP*, intra-aortic balloon pump; *IDDM*, insulin-dependent diabetes mellitus; *NIDDM*, non–insulin-dependent diabetes mellitus; *Cr*, creatinine.



STS-ACSD: 416.277 pacientes
2002-2008
13.613 operados por endocarditis (3,2%)
Mortalidad de la serie: 8,2%

J Thorac Cardiovasc Surg 2011;141:98-106

Validated Risk Score for Predicting 6-Month Mortality in Infective Endocarditis

Lawrence P. Park, PhD; Vivian H. Chu, MD, MHS; Gail Peterson, MD; Athanasios Skoutelis, MD, PhD; Tatjana Lejko-Zupa, MD, PhD; Emilio Bouza, MD, PhD; Pierre Tattevin, MD; Gilbert Habib, MD; Ren Tan, MBBS; Javier Gonzalez, MD; Javier Altclas, MD; Jameela Edathodu, MBBS; Claudio Querido Fortes, MD; Rinaldo Focaccia Siciliano, MD, PhD; Orathai Pachirat, MD; Souha Kanj, MD; Andrew Wang, MD; for the International Collaboration on Endocarditis (ICE) Investigators*

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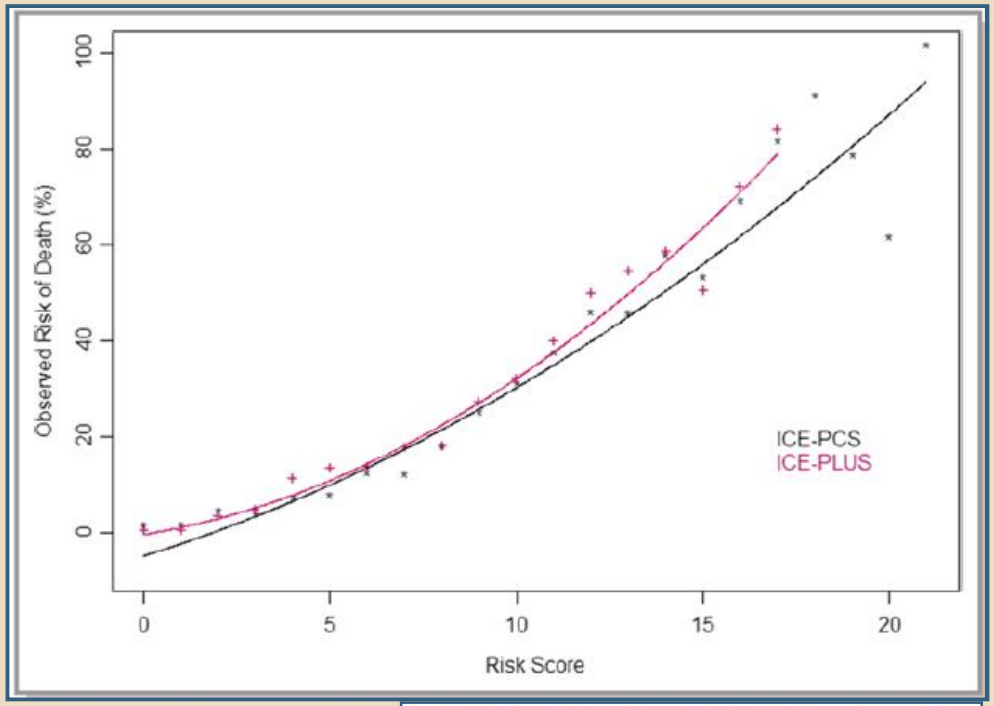
Table 5. Simplified Risk Score Calculation for 6-Month Mortality in IE

Prognostic Variable	Weight
Constant	4
Host factors	
Age ≤45 y	0
Age 46–60 y	2
Age 61–70 y	3
Age >70 y	4
History of dialysis	3
IE factors	
Nosocomial IE	2
Prosthetic IE	1
Symptoms >1 month before admission	−1
Staphylococcus aureus	1
Viridans group streptococci	−2
Aortic vegetation	1
Mitral vegetation	1
IE complications	
NYHA class 3 or 4 heart failure	3
Stroke	2
Paravalvular complication	2
Persistent bacteremia	2
Surgical treatment	−2

Probability of 6-month mortality=2.416×score+0.109×score^2−4.849. IE indicates infective endocarditis; NYHA, New York Heart Association.

Dos cohortes ICE prospectivas 2000-2012
64 hospitales en 28 países
34 centros en 18 países: 5246 pacientes
2596 pacientes operados (49%)
Mortalidad a los 6 meses 20,1%



J Am Heart Assoc. 2016;5:e003016

Valve surgery in active infective endocarditis: A simple score to predict in-hospital prognosis☆

Manuel Martínez-Sellés [a,n,*,1], Patricia Muñoz [b,o,1], Ana Arnáiz [c,1], Mar Moreno [d,1], Juan Gálvez [e,1], Jorge Rodríguez-Roda [f,1], Arístides de Alarcón [g,1], Emilio García Cabrera [g,1], María C. Fariñas [h,1], José M. Miró [i,p,1], Miguel Montejo [j,q,1], Alfonso Moreno [k,1], Josefa Ruiz-Morales [l,1], Miguel A. Goenaga [m,1], Emilio Bouza [b,o,1], on behalf of the Spanish Collaboration on Endocarditis — *Grupo de Apoyo al Manejo de la Endocarditis infecciosa en ESpaña* (GAMES) (see Appendix 1).

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Independent predictors of in-hospital mortality.

	OR (95% CI)	p value
Age (years)	1.03 (1.003–1.047)	0.03
Prosthetic valve IE	2.2 (1.2–4.0)	0.008
Substantial intracardiac destruction	1.9 (1.1–3.4)	0.02
Female sex	2.1 (1.1–3.6)	0.03
Urgent surgery	2.0 (1.2–3.1)	0.004
Staphylococcus spp	2.3 (1.3–4.1)	0.004
EuroSCORE	1.02 (1.01–1.03)	0.006

IE: infective endocarditis.

GAMES: 26 hospitales españoles
1000 pacientes. 2008-2010
437 operados (43,7%)
Mortalidad hosp. operados: 24,3%

PALSUSE SCORE

	PALSUSE
Prosthetic Valve IE	1
Age	1 (≥70 years)
Large intracardiac destruction	1
Staphylococcus spp	1
Urgent surgery	1
Sex (female)	1
EuroSCORE	1 (≥10%)

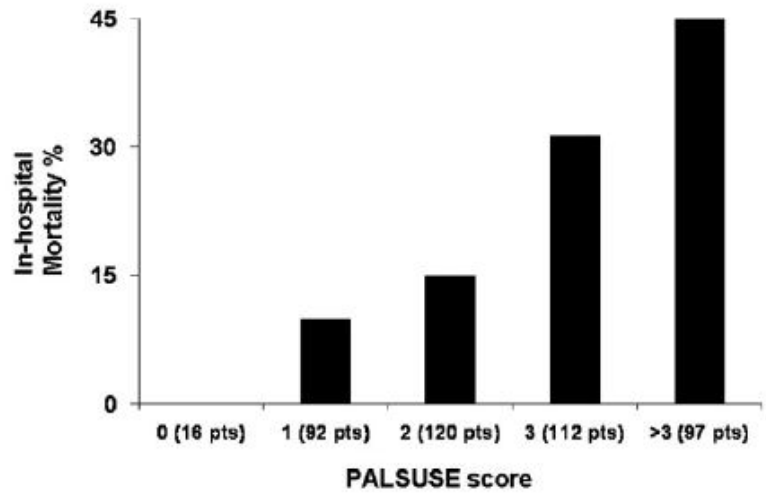

Fig. 2. In-hospital mortality according to the PALSUSE risk score. PALSUSE: prosthetic valve, age ≥ 70, large intracardiac destruction, Staphylococcus spp, urgent surgery, sex (female), EuroSCORE ≥ 10.

M. Martínez-Sellés et al. / International Journal of Cardiology 175 (2014) 133–137

Risk score for cardiac surgery in active left-sided infective endocarditis

Carmen Olmos,[1] Isidre Vilacosta,[1] Gilbert Habib,[2,3] Luis Maroto,[1] Cristina Fernández,[1] Javier López,[4] Cristina Sarriá,[5] Erwan Salaun,[2,3] Salvatore Di Stefano,[4] Manuel Carnero,[1] Sandrine Hubert,[3] Carlos Ferrera,[1] Gabriela Tirado,[1] Afonso Freitas-Ferraz,[1] Carmen Sáez,[5] Javier Cobiella,[1] Juan Bustamante-Munguira,[5] Cristina Sánchez-Enrique,[1] Pablo Elpidio García-Granja,[4] Cecile Lavoute,[3] Benjamin Obadia,[3] David Vivas,[1] Ángela Gutiérrez,[5] José Alberto San Román[4]

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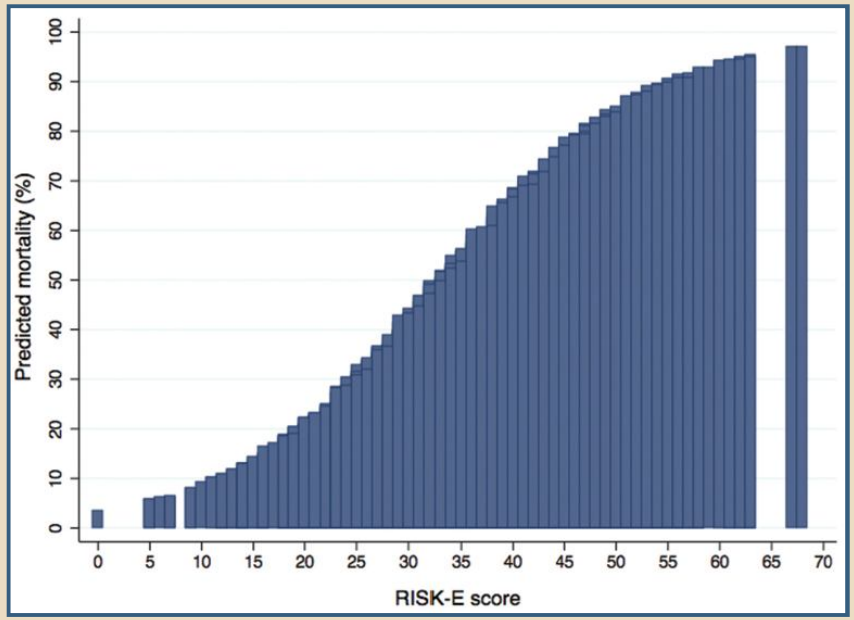
Table 2 Independent preoperative predictors of mortality in infective endocarditis by logistic regression analysis and the deriving scoring system for mortality prediction after cardiac surgery (RISK-E score)

	β coefficients	SE	p Value	Score
Age (years)				
≤51	0			0
61 (14)	0.916	0.370	0.010	9
65 (13)	1.336	0.367	<0.001	13
≥73	1.362	0.363	<0.001	14
Prosthetic endocarditis	0.645	0.239	0.007	6
Virulent microorganism*	0.903	0.392	0.020	9
Septic shock	0.702	0.350	0.041	7
Thrombocytopaenia†	0.655	0.241	0.006	7
Acute renal insufficiency	0.542	0.233	0.022	5
Cardiogenic shock	1.486	0.275	<0.001	15
Periannular complications‡	0.541	0.238	0.020	5
Constant	−3.358			

**Staphylococcus aureus* or fungi.
†Thrombocytopaenia (<1 50 000 platelets/mm^3).
‡Presence of abscess, pseudoaneurysm, fistula or prosthetic dehiscence.

RISK-E SCORE

3 hospitales españoles:
Madrid (2)/ Valladolid
1996-2014: 1299 pacientes
671 operados (51,6%)
Mortalidad 29,4%



Olmos C, *et al*. *Heart* 2017;**103**:1435–1442

A pragmatic approach for mortality prediction after surgery in infective endocarditis: optimizing and refining EuroSCORE

N. Fernández-Hidalgo [1,2,3], I. Ferreria-González [4,5,*], J.R. Marsal [4,5,6], A. Ribera [4,5], M.L. Aznar [1,2], A. de Alarcón [2,7,8], E. García-Cabrera [8], J. Gálvez-Acebal [3,8,9,10], G. Sánchez-Espín [11], J.M. Reguera-Iglesias [8,12], J. De La Torre-Lima [8,13], J.M. Lomas [6,14], C. Hidalgo-Tenorio [8,15], N. Vallejo [16], B. Miranda [17], A. Santos-Ortega [17], M.A. Castro [18], P. Tornos [17], D. García-Dorado [17], B. Almirante [1,2,3]

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Points Distribution

Previous Cardiac Surgery		42
Critical Preoperative State		42
Renal Failure		18
NYHA > I		26
Age Function	≤60	0
	65	11
	70	22
	75	33
	80	44
	85	56
	90	67
	100	78
Emergent		30
Fistulae		46
Staphylococci		20
Pulmonary HTA (NO)		48
Location: Mitral		14

Sum of Points

Points	Risk of Death
28	2.5%
55	5.0%
83	10%
114	20%
134	30%
151	40%
166	50%
181	60%
198	70%
218	80%
249	90%

2 hospitales Barcelona (HVH + HGTP) y cohorte andaluza.

779 operados 2000-2011

EuroScore 18,9%
EuroScore II: 4,7%

Mortalidad 26,8%

N. Fernández-Hidalgo et al. / Clinical Microbiology and Infection xxx (2018) 1–9

SCORES ITALIANOS

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The Need for a Specific Risk Prediction System in Native Valve Infective Endocarditis Surgery

Scientific World Journal 2012

Marisa De Feo,[1] Maurizio Cotrufo,[2] Antonio Carozza,[1] Luca S. De Santo,[1] Francesco Amendolara,[1] Salvatore Giordano,[2] Ester E. Della Ratta,[1] Gianantonio Nappi,[1] and Alessandro Della Corte[1]

Un único hospital
440 intervenciones
1980-2009
Mortalidad 9,1%

A risk factor analysis for in-hospital mortality after surgery for infective endocarditis and a proposal of a new predictive scoring system

Infection 2017;45:413-423

Giuseppe Gatti[1,3] · Bernardo Benussi[1] · Florida Gripshi[1] · Alessio Della Mattia[1] · Alberto Proclemer[1] · Antonio Cannatà[1] · Lorella Dreas[1] · Roberto Luzzati[2] · Gianfranco Sinagra[1] · Aniello Pappalardo[1]

"ANCLA Score"
Un único hospital
138 pacientes
1999-2015
Mortalidad 20,3%

A predictive model for early mortality after surgical treatment of heart valve or prosthesis infective endocarditis. The EndoSCORE☆

Int J Cardiol 2017;241:97-102

Michele Di Mauro [a,*], Guglielmo Mario Actis Dato [b], Fabio Barili [c], Sandro Gelsomino [d], Pasquale Santè [e], Alessandro Della Corte [e], Antonio Carrozza [e], Ester Della Ratta [e], Diego Cugola [f], Lorenzo Galletti [f],

26 centros italianos
2715 pacientes
2000-2015
Mortalidad 11%

Risk scores and surgery for infective endocarditis: in search of a good predictive score

Scandinavian Cardiovascular Journal 2019;53:117-124

Giuseppe Gatti[a], Sandro Sponga[b], Maddalena Peghin[c], Filippo Givone[c], Veronica Ferrara[b], Bernardo Benussi[a], Enzo Mazzaro[b], Andrea Perrotti[d], Matteo Bassetti[c], Roberto Luzzati[e], Sidney Chocron[d], Aniello Pappalardo[a] and Ugolino Livi[b]

Prognostic factors of mortality after surgery in infective endocarditis: systematic review and meta-analysis

Laura Varela Barca[1] · Enrique Navas Elorza[2] · Nuria Fernández-Hidalgo[3] · Jose Luis Moya Mur[4] · Alfonso Muriel García[5] · B. M. Fernández-Felix[5,6] · Javier Miguelena Hycka[1] · Jorge Rodríguez-Roda[1] · Jose López-Menéndez[1]

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Se identifican 11 factores preoperatorios relacionados con mayor mortalidad tras la intervención:

- Shock cardiogénico
- Cirugía urgente
- Absceso paravalvular
- Insuficiencia renal pre-op
- Cirugía cardiaca previa
- S. aureus

- Sexo femenino
- Edad
- NYHA ≥III
- Endocarditis protésica
- Afectación multivalvular

Infection 2019, in press

EJEMPLOS PRÁCTICOS

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Mujer 78 años, DM-2 (insulina), HTA, IAM 6 años antes (ICP), FEVI 45%, fiebre 15 dias y clínica IC-EAP. 4 hemocultivos +: SAMS, Eco-C: IAo grave, vegetaciones 1 cm, absceso perianular. FG 60.→ Cirugía urgente

- EuroScore-II: 19,2%
- STS: 13,7%
- STS adaptado: 9-10%
- ICE risk score: 25% (6 meses)
- PALSUSE (GAMES): 45%
- RISK-E : 38%
- EuroScore adaptado: 10-20%

Hombre 48 años, fumador sin otros FRCV. Fiebre y Sd tóxico desde 2 meses. Ingreso por AVC recuperado (TIA). 4 hemocultivos + *S. viridans*. FG 60. Eco-C: vegetaciones 2 cm en válvula mitral, IM grave. Embolias esplénicas (TC). TC craneal sin hemorragia→Cirugía urgente

- EuroScore-II: 1,7%
- STS: 1,2%
- STS adaptado: 4%
- ICE risk score: 2% (6 meses)
- PALSUSE (GAMES): 8-10%
- RISK-E: 0 puntos: 2-3%
- EuroScore adaptado: 2,5-5%

REFLEXIONES

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- *Scores*: intentar dar una cifra exacta a una situación de incertidumbre.
- Los *scores* específicos reflejan los resultados de la población estudiada.
- Para toma de decisión ante un paciente concreto: resultados de cada centro.
- Para *benchmarking* entre centros: no queda claro cual sería el mejor score.
- Algunos marcadores de riesgo se repiten en los diferentes modelos:
  - Germen: Estafilococos vs Estreptococos.
  - Complicaciones perianulares.
  - Estado del paciente: Shock / CF-IV / emergencia...

REFLEXIONES

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- Quedan aspectos importantes que no se reflejan en ningún *score*.
- DEL PACIENTE:
  - Complejidad técnica de la intervención.
  - Aorta en porcelana, hepatopatía...
- DEL CENTRO:
  - Experiencia, técnica y resultados del equipo quirúrgico.
  - Organización interna multidisciplinar (*Endocarditis Team*).
  - Cuidados post-operatorios.
  - Disponibilidad de determinadas técnicas: homoinjertos, reparación valvular, asistencias, transplante...

CONCLUSIONES

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- La cirugía es un aspecto fundamental en el tratamiento de la endocarditis infecciosa.
- La mortalidad en la mayoría de series es elevada.
- Los *scores* generales (EuroScore / STS) no recogen aspectos importantes de la EI.
- Los *scores* específicos de EI están basados en series limitadas poco generalizables.
- Es importante conocer los resultados de cada centro, trabajar como *Endocarditis Team* e individualizar las decisiones.

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