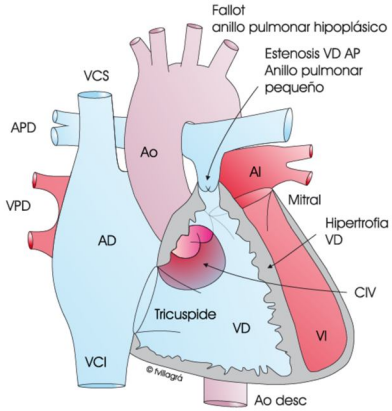
Maria del Mar Santos Sebastian
Médico adjunto Sección enfermedades infecciosas pediátricas HGU Gregorio Marañón

ENDOCARDITIS INFECCIOSA EN PEDIATRÍA



Introducción

- Poco frecuente en niños sanos.
- Menos frecuente que en adultos.
  - 0,05 a 0,12 casos por cada 1000 ingresos pediátricos.
- Importante morbi-mortalidad.
  - Mortalidad menor que en adultos: 1.1-18%.

Dixon G. Curr Opin Infect Dis.2017
Baltimore RS. Circulation 2015

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Introducción

- Aumento en la década de los 90, estabilización en los últimos años.
  - Niños con cirugía previa.
  - Mayor supervivencia de las cardiopatías congénitas.
  - Neonatos.
  - Cuidados intensivos.
- Poca evidencia científica.

Dixon G. Curr Opin Infect Dis.2017
Baltimore RS. Circulation 2015

SEICAV
Sociedad Española de Infecciones Cardiovasculares

ncbi.nlm.nih.gov

H | RSV | O | RSV | Onli... | www.cdc.... | Hospital G... | Alergia a l... | pdf.scienc... | fpies - Bus... | 14. Vacuna... | Paciente tr... | "Endoc...

NCBI Resources How To Sign in to NCBI

PubMed.gov
US National Library of Medicine
National Institutes of Health

PubMed "Endocarditis, Bacterial"[Mesh] Search

Create RSS Create alert Advanced Help

Article types
Clinical Trial
Review
Customize ...

Text availability
Abstract
Free full text
Full text

Publication dates clear
✓ 5 years
10 years
Custom range...

Species
Humans
Other Animals

Ages clear
✓ Child: birth-18 years
Infant: birth-23 months
Adult: 19+ years
Adult: 19-44 years
Aged: 65+ years
Customize ...

Clear all

Show additional filters

Format: Summary **Sort by**: Most Recent **Per page**: 20 **Send to**

Search results

Items: 1 to 20 of 164

<< First < Prev Page 1 of 9 Next > Last >>

Filters activated: published in the last 5 years, Child: birth-18 years. Clear all to show 20683 items.

1. Profile of Infective Endocarditis: At a Tertiary Care Referral Centre.
R M, V R, Nambi PS, Ramakrishnan B, Gopalakrishnan R, Sathyamurthy.
J Assoc Physicians India. 2018 Jun;66(6):60-65.
PMID: 31331138
Similar articles

2. [Marginal Féréol-Besnier erythema: rare manifestation during acute articular rhumatism].
Iraqi B, Dakhamaa BSB.
Pan Afr Med J. 2019 Mar 20;32:134. doi: 10.11604/pamj.2019.32.134.18580. eCollection 2019.
French.
PMID: 31303907 **Free PMC Article**
Similar articles

3. Epidemiological and clinical profile of infective endocarditis at a Brazilian tertiary care center: an eight-year prospective study.
Damasco PV, Correal JCD, Cruz-Campos ACD, Wajsbrot BR, Cunha RGD, Fonseca AGD, Castier MB, Fortes CQ, Jazbick JC, Lemos ERS, Rossen JW, Leão RS, Hirata Junior R, Guaraldi ALM.
Rev Soc Bras Med Trop. 2019 Jun 6;52:e2018375. doi: 10.1590/0037-8682-0375-2018.
PMID: 31188916 **Free Article**
Similar articles

Filters: Manage Filters

Sort by:
Best match | Most recent

Results by year

Download CSV

Titles with your search terms

Endocarditis and **bacterial** brain abscess in a young woman v [Medicine (Baltimore). 2019]

Prevention of infective **endocarditis** and **bacterial** resistance [Spec Care Dentist. 2019]

Screening for Q Fever during Other **Bacterial Endocarditis** in E [Case Rep Infect Dis. 2019]

See more...

Find related data

Database: Select

ncbi.nlm.nih.gov

PubMed.gov
US National Library of Medicine
National Institutes of Health

PubMed | "Endocarditis, Bacterial"[Mesh] | Search

Create RSS Create alert Advanced Help

Article types
Clinical Trial
Review
Customize ...

Text availability
Abstract
Free full text
Full text

Publication dates clear
✓ 5 years
10 years
Custom range...

Species
Humans
Other Animals

Ages clear
Child: birth-18 years
✓ Adult: 19+ years
Aged: 65+ years
Customize ...

Clear all

Show additional filters

Format: Summary **Sort by**: Most Recent **Per page**: 20 **Send to**

Search results

Items: 1 to 20 of 1105

<< First < Prev Page 1 of 56 Next > Last >>

Filters activated: published in the last 5 years, Adult: 19+ years. Clear all to show 20683 items.

1. [Infective endocarditis in Argentina: what have we learned in the last 25 years ?]
Burgos LM, Cracco MA, Fernández Oses P, Iribarren AC, Ronderos R, Nacinovich F.
Medicina (B Aires). 2019;79(4):257-264. Spanish.
PMID: 31487244 **Free Article**
Similar articles

2. "A contemporary description of staphylococcus aureus prosthetic valve endocarditis. Differences according to the time elapsed from surgery".
Sáez C, Sarriá C, Vilacosta I, Olmos C, López J, García-Granja PE, Fernández C, de Las Cuevas C, Reyes G, Domínguez L, San Román JA.
Medicine (Baltimore). 2019 Aug;98(35):e16903. doi: 10.1097/MD.0000000000016903.
PMID: 31464922 **Free PMC Article**
Similar articles

3. [Current treatment of endocarditis : Innovations and controversies].
Hitzenbichler F, Olic J, Hanses F, Salzberger B, Fischer M, Baessler A.
Internist (Berl). 2019 Oct;60(10):1111-1117. doi: 10.1007/s00108-019-00664-4. Review. German.
PMID: 31444523
Similar articles

4. [Mycotic Aneurysm of the Ulnar Artery Associated with Infective Endocarditis:Report of a Case].
Shichijo M, Sato M, Kawasaki H, Naito K.
Kyobu Geka. 2019 Aug;72(8):612-615. Japanese.
PMID: 31353355
Similar articles

Filters: Manage Filters

Sort by: Best match | Most recent

Results by year

Titles with your search terms

Find related data

Search details

```
"Endocarditis, Bacterial"[Mesh]
AND ("2014/10/20"[PDat] :
"2019/10/18"[PDat] AND "adult"
[MeSH Terms])
```

Search See more...

Recent Activity
Turn Off Clear
"Endocarditis, Bacterial"[Mesh] AND ("last 5 years"[PDat] AND adu... (1' PubMed
"Endocarditis, Bacterial"[Mesh] AND ("last 5 years"[PDat] AND ((i... (119 PubMed

AHA Scientific Statement

Infective Endocarditis in Childhood: 2015 Update

A Scientific Statement From the American Heart Association

Robert S. Baltimore, MD, Chair; Michael Gewitz, MD, FAHA, Vice Chair;
Larry M. Baddour, MD, FAHA; Lee B. Beerman, MD; Mary Anne Jackson, MD;
Peter B. Lockhart, DDS; Elfriede Pahl, MD, FAHA; Gordon E. Schutze, MD;
Stanford T. Shulman, MD; Rodney Willoughby, Jr, MD; on behalf of the American Heart Association
Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee of the Council on Cardiovascular
Disease in the Young and the Council on Cardiovascular and Stroke Nursing

In 2002, the American Heart Association (AHA) published "Unique Features of Infective Endocarditis in Childhood,"[1] which reviewed epidemiology, pathogenesis, diagnosis, clinical and laboratory findings, treatment, and prevention of infective endocarditis (IE) with particular attention to children. Since that time, other AHA reports have focused on new recommendations for treatment of IE in adults (in 2005[2]) and on major changes regarding prevention of IE (in 2007[3]). This document updates these issues and other concerns regarding IE, with specific attention to the disease as it affects infants and children. In particular, the impact of increased survival for children with congenital heart disease (CHD) on the epidemiology of IE is updated, and newer tools useful for diagnosis and treatment in the pediatric popula-

Classification of Recommendations

In pediatrics, there are not likely to be any randomized controlled trials for treatment of IE, which posed a challenge for the writing group in compiling recommendations. Therefore, many of the indications are based on consensus. In cases of strong consensus that an intervention be considered as standard-of-care practice with scientific evidence, interventions were designated as Class I indications. Where the wording of treatments indicates a recommendation, the standard classification is used. Strength of the recommendation is according to the ACC/AHA classification system for recommendations (Table 1).

Epidemiology and Clinical

SEICAV
Sociedad Española de Infecciones Cardiovasculares

European Heart Journal
doi:10.1093/eurheartj/ehv319

ESC GUIDELINES

2015 ESC Guidelines for the management of infective endocarditis

The Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC)

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

Authors/Task Force Members: Gilbert Habib* (Chairperson) (France), Patrizio Lancellotti* (co-Chairperson) (Belgium), Manuel J. Antunes (Portugal), Maria Grazia Bongiorni (Italy), Jean-Paul Casalta (France), Francesco Del Zotti (Italy), Raluca Dulgheru (Belgium), Gebrine El Khoury (Belgium), Paola Anna Erba[a] (Italy), Bernard Iung (France), Jose M. Miro[b] (Spain), Barbara J. Mulder (The Netherlands), Edyta Plonska-Gosciniak (Poland), Susanna Price (UK), Jolien Roos-Hesselink (The Netherlands), Ulrika Snygg-Martin (Sweden), Franck Thuny (France), Pilar Tornos Mas (Spain), Isidre Vilacosta (Spain), and Jose Luis Zamorano (Spain)

Downloaded from by guest

SEICAV
Sociedad Española de Infecciones Cardiovasculares

EPIDEMIOLOGIA

SEICAV
Sociedad Española de Infecciones Cardiovasculares

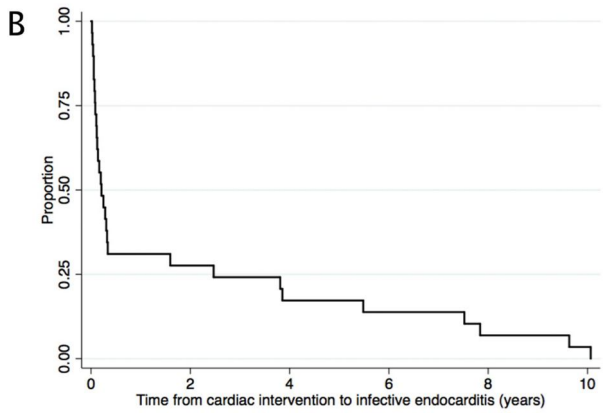
Original article

Endocarditis in children and adolescents with congenital heart defects: a Norwegian nationwide register-based cohort study

Jarle Jortveit,[1] Jakob Klcovansky,[2] Leif Eskedal,[3] Sigurd Birkeland,[4] Gaute Døhlen,[2] Henrik Holmstrøm[2,5]

- Todos niños con cardiopatía congénita Noruega 1994-2016.
- Diagnostico de endocarditis: criterios de ESC 36 casos.

- Incidencia cardiopatía congénita: **2.2/10000** niños-años.
- 75% (n 27) cardiopatías graves cianóticas.
- 75% (n 27) cirugía.
- Material protésico 96% (n 26).
- Mortalidad 8%.



Arch Dis Child 2018

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Received: 6 June 2016 | Revised: 20 September 2016 | Accepted: 3 October 2016
DOI: 10.1111/chd.12425

ORIGINAL ARTICLE

WILEY Congenital Heart Disease

Trends, microbiology, and outcomes of infective endocarditis in children during 2000–2010 in the United States

- Retrospectivo, base de datos pública USA, diagnósticos CIE-9.
- **3840** < 19 años con diagnóstico de endocarditis entre 2000-2010.

- 2% de todos los diagnósticos.
- Incidencia **0,43/100.000** niños.
- Estable a lo largo del periodo de estudio
- 56,2% 11-19 años.
- 15.4% < a 1 año.

Congenital Heart Disease WILEY

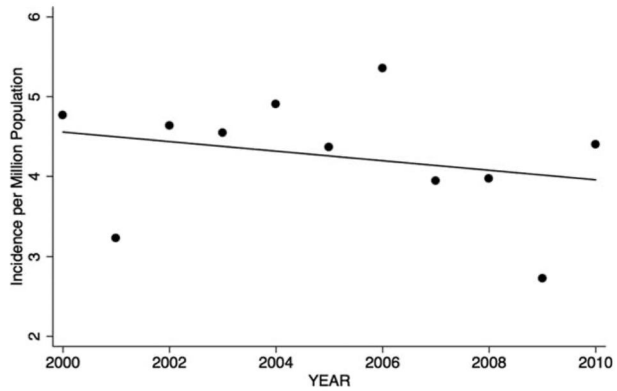


FIGURE 1 Incidence trends of infective endocarditis in US children during 2000-2010

Guptaa S 2016

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Infective Endocarditis in Children With Congenital Heart Disease

Cumulative Incidence and Predictors

- 328.185 niños con cardiopatías congénitas seguidos desde el nacimiento hasta los 18 años.

- 136 endocarditis infecciosas.
- Incidencia acumulada: **6,1 casos/1000 niños** (4,1 casos por 10000 personas año)
  - Cardiopatias cianóticas: 31/1000.
  - Canal AV: 11,1/1000.
  - Valvulopatias izquierdas 7,9/1000.

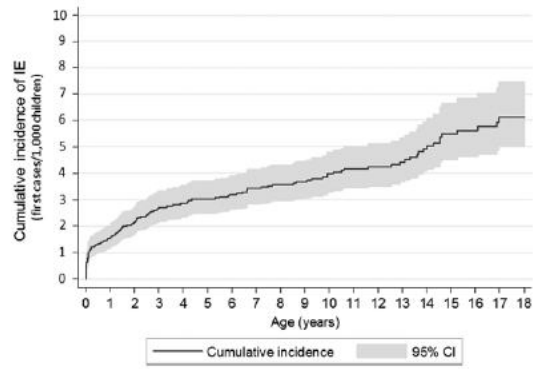
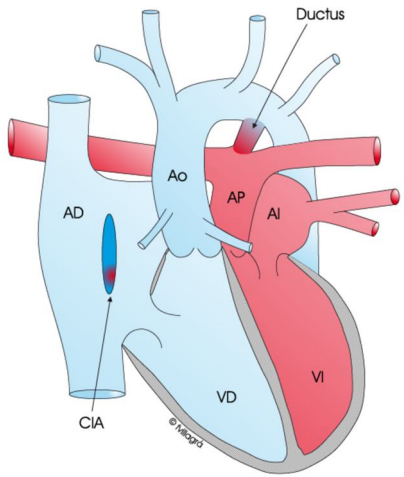


Figure 2. Cumulative incidence of IE from birth to 18 years of age in children with CHD. CHD indicates congenital heart disease; CI, confidence interval; and IE, infective endocarditis.

Rushami et al. Circulation 2013

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Factores de riesgo



- Cardiopatias congénitas.
  - Alteraciones de la válvula aórtica, comunicaciones interventriculares, tetralogía de Fallot.
  - Cardiopatías complejas cianóticas con cirugía paliativa o correctiva.
- Portadores de vías centrales.
- Ingreso en unidades de cuidados intensivos pediátricas o neonatales.

Baltimore RS. Circulation 2015

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Received: 6 June 2016 | Revised: 20 September 2016 | Accepted: 3 October 2016
DOI: 10.1111/chd.12425

ORIGINAL ARTICLE

WILEY Congenital Heart Disease

Trends, microbiology, and outcomes of infective endocarditis in children during 2000–2010 in the United States

- Retrospectivo, base de datos pública USA, diagnósticos CIE-9.
- 3840 < 19 años con diagnóstico de endocarditis entre 2000-2010.

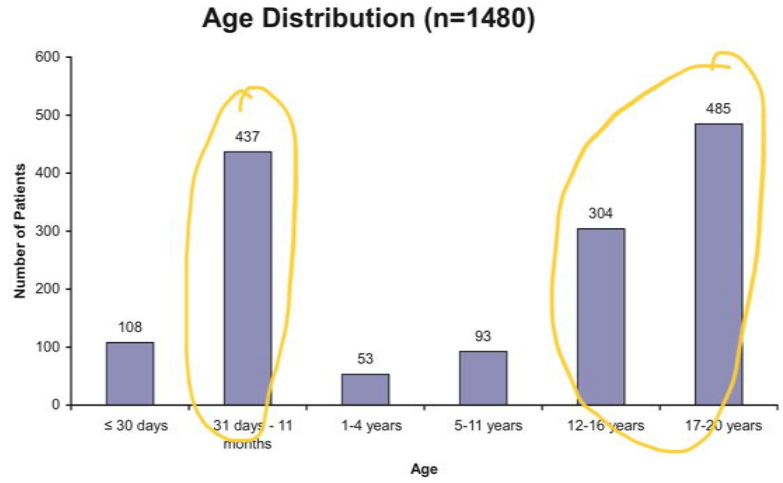
- 53.5% afectación cardiaca.
  - 81.4% cardiopatia congénita:
    - 32,2% comunicación interventricular.
    - 25% cardiopatía cianótica.

Guptaa S 2016

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Characteristics of Children Hospitalized With Infective Endocarditis

- 1588 ingresos por endocarditis en 2000 (667)y 2003 (891).
  - En 2784 y 3438 hospitales.



- 926 (58,3%) no cardiopatia.
  - Neoplasias 88 (9,5%).
  - Prematuridad 54 (54).
  - Alteraciones del tejido conectivo 52 (5,6%).
  - Diabetes mellitus 22 (2,4%).

Day et al. Circulation 2009

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Infective endocarditis in children without underlying heart disease

- Estudio retrospectivo endocarditis ≤ 18 años, 20 años.
- 48 episodios de endocarditis:
  - 11 (22,9%): adolescentes sanos **(>14 a).**

- Mayor duración de los síntomas antes del diagnóstico: 31 vs 18 días.
- Mayor edad 17 vs 6,8.
- Más frecuencia de tratamiento quirúrgico: 73% vs 29%.

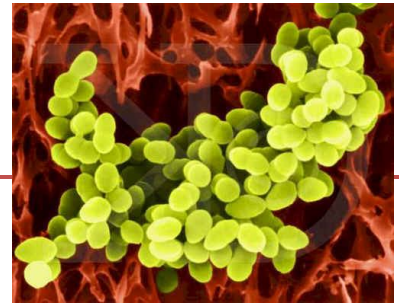
Lin YT et al. J Microbiol Immunol infect 2013

SEICAV
Sociedad Española de Infecciones Cardiovasculares

ETIOLOGÍA

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Etiología

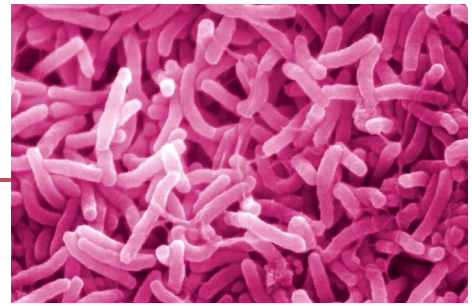


- La mayoría cocos *gram* positivos.
  - *Streptococcus* del grupo viridans, más frecuente:
    - Mayores 12 meses con cardiopatía.
  - *Staphylococcus* (catéteres y prótesis):
    - *S aureus* (segundo en frecuencia, sin cardiopatía).
    - *Staphylococcus* coagulasa negativos.
  - Estreptococo beta-hemolíticos.
  - Enterococo: mucho menos frecuentes que en adultos.

Dixon G. Curr Opin Infect Dis.2017
Baltimore RS. Circulation 2015

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Etiología



- Menos frecuentes.
  - Grupo HACEK.
  - Bacilos Gram negativos.
- 30% cultivo negativo.

Dixon G. Curr Opin Infect Dis.2017
Baltimore RS. Circulation 2015

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Etiología

TABLE 26.5 Etiologic Agents of Bacterial Endocarditis in Children

Organism	Average (%)	Range (%)
Streptococci		
Viridans	40.3	17–72
Enterococci	4.0	0–12
Pneumococci	3.3	0–21
β-Hemolytic	2.7	0–8
Other	1.1	0–16
Staphylococci		
Staphylococcus aureus	23.8	5–40
Coagulase-negative	4.7	0–15
Gram-negative aerobic bacilli	4.0	0–15
Fungi	1.1	0–12
Miscellaneous bacteria	2.4	0–10
Culture-negative	12.6	2–32

Data from references 57, 67, 100, 253, 255, 256, 291, 358, 475, 513, 546, and 571.

Kaplan S. Infective endocarditis.
Feigin and Cherry´s Textbook of Pediatrics infectious Diseases. Eightv Edition 2019.

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Received: 6 June 2016 | Revised: 20 September 2016 | Accepted: 3 October 2016
DOI: 10.1111/chd.12425

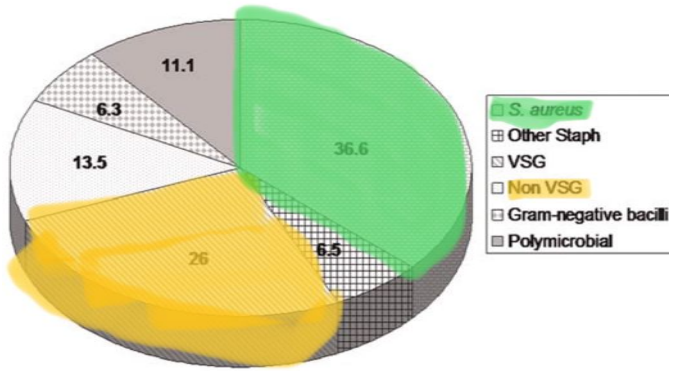
ORIGINAL ARTICLE

WILEY Congenital Heart Disease

Trends, microbiology, and outcomes of infective endocarditis in children during 2000–2010 in the United States

- Retrospectivo, base de datos pública USA, diagnósticos CIE-9.
- 3840 < 19 años con diagnóstico de endocarditis entre 2000-2010.

- 30.2% cultivo negativo.
- Cultivo positivo:
  - 43.1% Staphylococcus sp.
  - 39.5% Streptococcus ssp.
  - 36.6% *Staphylococcus aureus*.
  - 26% Streptococcus del grupo vididans



Guptaa S 2016

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Received: 6 June 2016 | Revised: 20 September 2016 | Accepted: 3 October 2016
DOI: 10.1111/chd.12425

ORIGINAL ARTICLE

WILEY Congenital Heart Disease

Trends, microbiology, and outcomes of infective endocarditis in children during 2000–2010 in the United States

- Retrospectivo, base de datos pública USA, diagnósticos CIE-9.
- 3840 < 19 años con diagnóstico de endocarditis entre 2000-2010.

TABLE 2 Causative organisms of infective endocarditis in US children with and without underlying cardiac condition (2000–2010)

Organism	Underlying cardiac conditions	No underlying cardiac conditions
S. aureus	28.1%	46.9%
Other Staph spp	6.6%	6.3%
Viridans Strep.	32.7%	17.9%
Other Strep	16.5%	9.9%
Gram-negative bacilli	5.3%	7.5%
Polymicrobial	10.9%	11.5%

Guptaa S 2016

SEICAV
Sociedad Española de Infecciones Cardiovasculares

DIAGNÓSTICO

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Criterios de Duke modificados.

European Heart Journal
doi:10.1093/eurheartj/ehv319

ESC GUIDELINES

2015 ESC Guidelines for the management of infective endocarditis

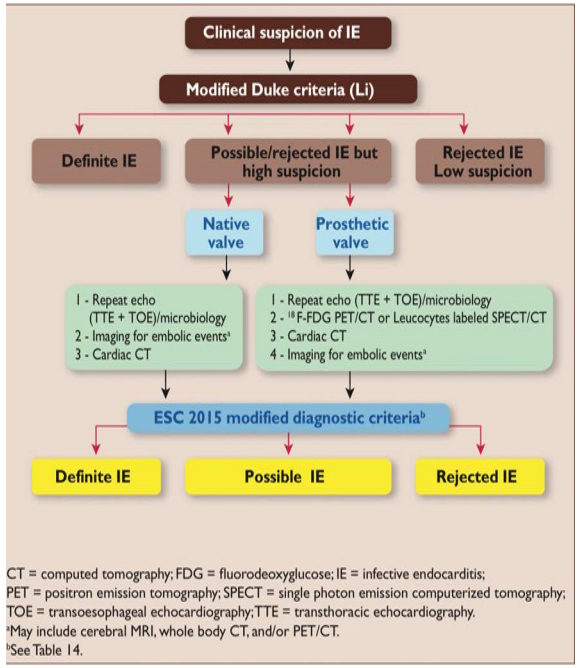
Table 13 Definition of infective endocarditis according to the modified Duke criteria (adapted from Li *et al.*[87])

Definite IE
Pathological criteria • Microorganisms demonstrated by culture or on histological examination of a vegetation, a vegetation that has embolized, or an intracardiac abscess specimen; or • Pathological lesions; vegetation or intracardiac abscess confirmed by histological examination showing active endocarditis **Clinical criteria** • 2 major criteria; or • 1 major criterion and 3 minor criteria; or • 5 minor criteria
Possible IE
• 1 major criterion and 1 minor criterion; or • 3 minor criteria
Rejected IE
• Firm alternate diagnosis; or • Resolution of symptoms suggesting IE with antibiotic therapy for ≤4 days; or • No pathological evidence of IE at surgery or autopsy, with antibiotic therapy for ≤4 days; or • Does not meet criteria for possible IE, as above

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 b. Microorganisms consistent with IE from persistently positive blood cultures: • ≥2 positive blood cultures of blood samples drawn >12 h apart; or • All of 3 or a majority of ≥4 separate cultures of blood (with first and last samples drawn ≥1 h apart); or c. Single positive blood culture for Coxiella burnetii or phase 1 IgG antibody titre >1:800
2. Imaging positive for IE a. Echocardiogram positive for IE: • Vegetation; • Abscess, pseudoaneurysm, intracardiac fistula; • Valvular perforation or aneurysm; • New partial dehiscence of prosthetic valve. b. Abnormal activity around the site of prosthetic valve implantation detected by ^{18}F-FDG PET/CT (only if the prosthesis was implanted for >3 months) or radiolabelled leukocytes SPECT/CT. c. Definite paravalvular lesions by cardiac CT.
Minor criteria
1. Predisposition such as predisposing heart condition, or injection drug use. 2. Fever defined as temperature >38°C. 3. Vascular phenomena (including those detected by imaging only): major arterial emboli, septic pulmonary infarcts, infectious (mycotic) aneurysm, intracranial haemorrhage, conjunctival haemorrhages, and Janeway's lesions. 4. Immunological phenomena: glomerulonephritis, Osler's nodes, Roth's spots, and rheumatoid factor. 5. Microbiological evidence: positive blood culture but does not meet a major criterion as noted above or serological evidence of active infection with organism consistent with IE.

CT = computed tomography; FDG = fluorodeoxyglucose; HACEK = Haemophilus parainfluenzae, H. aphrophilus, H. paraphrophilus, H. influenzae, Actinobacillus actinomycetemcomitans, Cardiobacterium hominis, Eikenella corrodens, Kingella kingae, and K. denitrificans; IE = infective endocarditis; Ig = immunoglobulin; PET = positron emission tomography; SPECT = single photon emission computerized tomography. Adapted from Li et al.[87]

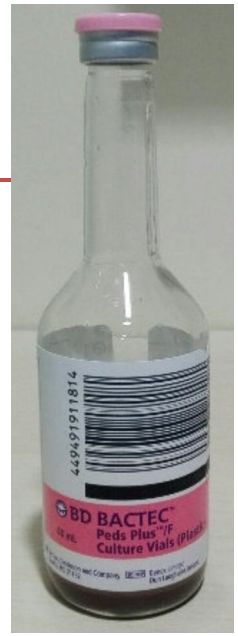


CT = computed tomography; FDG = fluorodeoxyglucose; IE = infective endocarditis; PET = positron emission tomography; SPECT = single photon emission computerized tomography; TOE = transoesophageal echocardiography; TTE = transthoracic echocardiography.
[a]May include cerebral MRI, whole body CT, and/or PET/CT.
[b]See Table 14.

Habib G European Heart journal .2015

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Hemocultivos

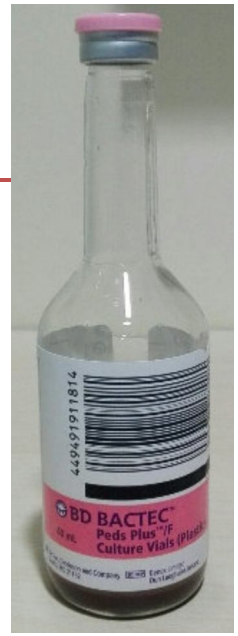


- Diagnóstico de elección.
- Técnica adecuada.
  - Volumen según edad.
    - Neonatos: Al menos 1 cc
    - Lactantes: Al menos 2 cc
    - Niños > 3 meses: Al menos 4 cc
  - Número:
    - Tres sets en venopunciones diferentes en 24 horas, separadas de 12 horas.
    - Inestable: dos sets inmediatos, otro una hora después.

Dixon G. Curr Opin Infect Dis.2017
Baltimore RS. Circulation 2015

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Hemocultivos



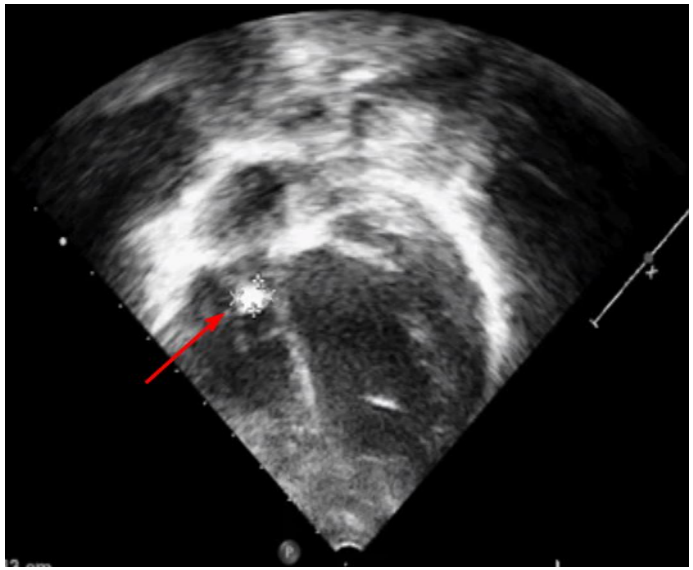
- No aislamiento al segundo día de la incubación.
  - 2 o 3 más maximo 5.
  - Más si antibioterapia en los 15 días previos.
- Niños estables:
  - Suspender antibióticos 48 horas.
  - Recoger nuevos cultivos.

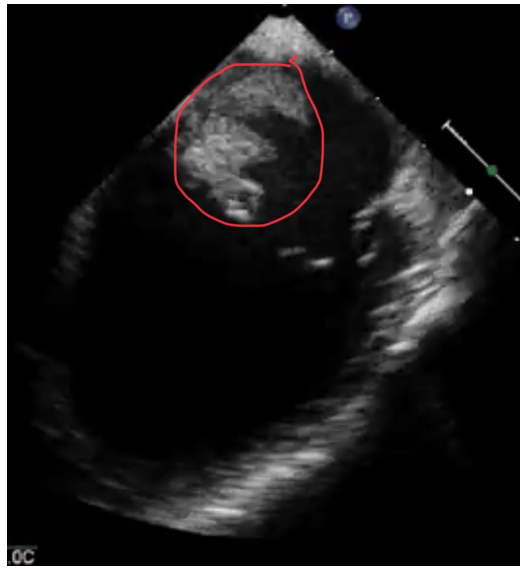
Dixon G. Curr Opin Infect Dis.2017
Baltimore RS. Circulation 2015

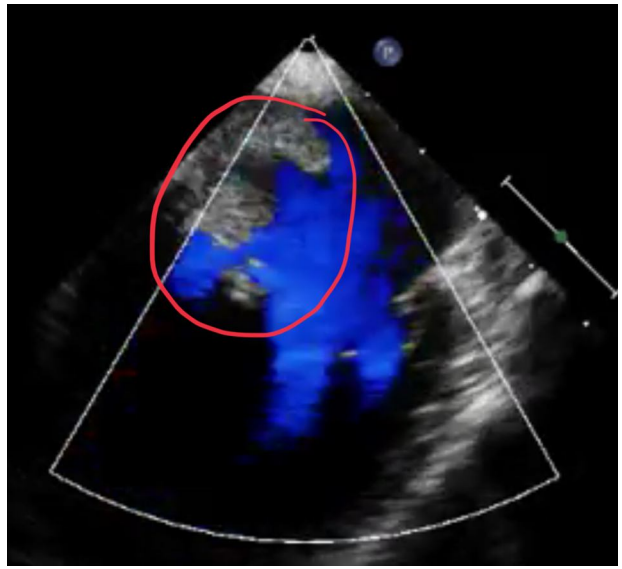
SEICAV
Sociedad Española de Infecciones Cardiovasculares

Pruebas de imagen: ecocardiografía

- TRANSTORÁCICO.
  - Alta calidad.
  - Diagnóstico en el 80%.







Baltimore Rs Circulation 2015

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Pruebas de imagen: ecocardiografía

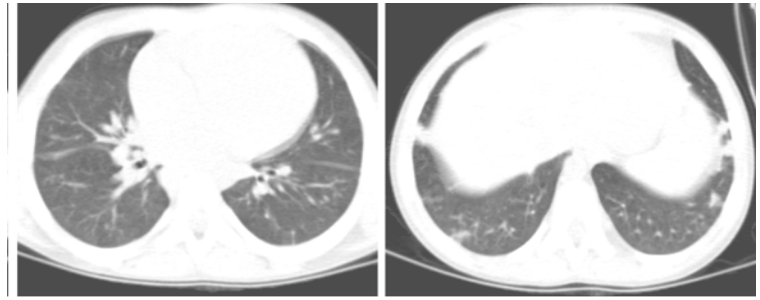
- Transesofágico:
  - Abscesos de la raíz aórtica.
  - Válvulas protésicas.
  - Deformidad de la pared torácica
  - Obesidad.
  - Alta sospecha y transtorácido sin lesiones.

Baltimore Rs Circulation 2015

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Pruebas de imagen: TC y PET-TC

- Nuevo criterio añadido en 2015.
- TC:
  - No existen datos en pediatría.
- PET-TC:
  - No hay estudios grandes en pediatría.



Dixon G. Curr Opin Infect Dis.2017

SEICAV
Sociedad Española de Infecciones Cardiovasculares

International Journal of Cardiology 220 (2016) 656–660

Contents lists available at ScienceDirect

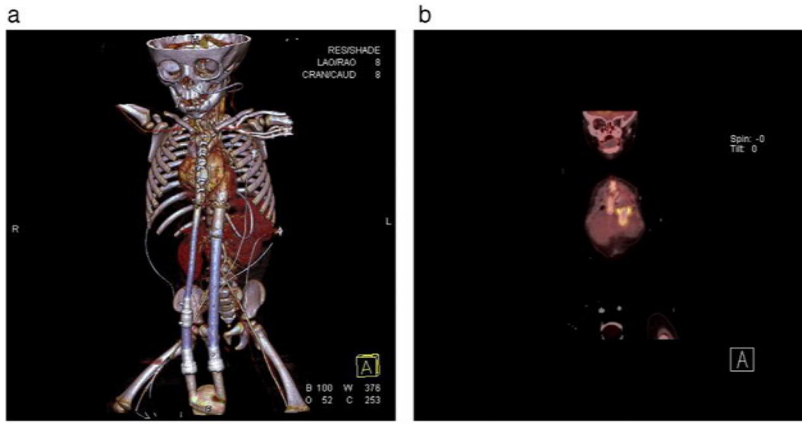
International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

The role of FDG-PET-CT in pediatric cardiac patients and patients with congenital heart defects

- Revisión de 30 pacientes con PET-TC.
- Edad media de 26 años.

- Endocarditis: 13 casos de ellos 7 entre 8 y 18 años.
- 6 infecciones de dispositivos de asistencia cardiaca: dos niños 1,8 años y 4.4 años.



Meyer Z International jornal of Cardiology 2016

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Cardiology in the Young

cambridge.org/cty

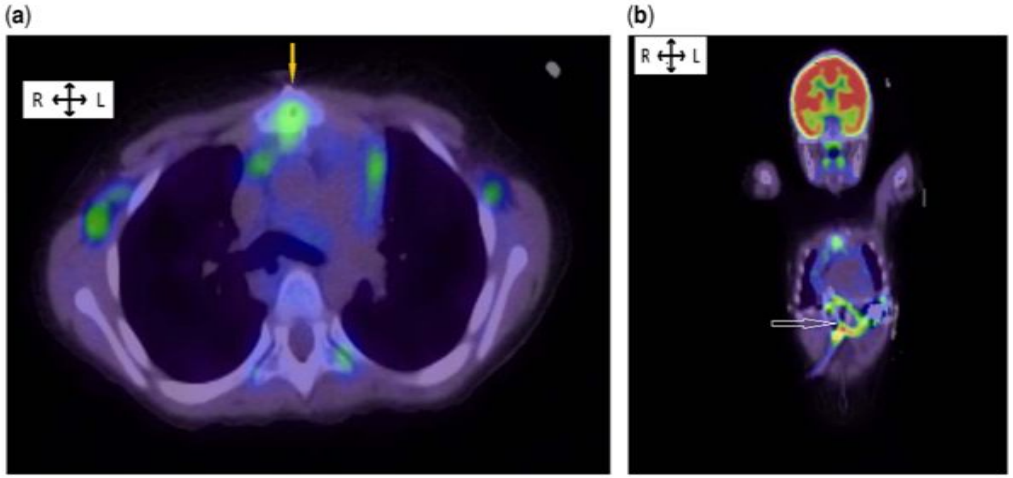
Images in Congenital Cardiac Disease

F-fluorodeoxyglucose-positive emission tomography/CT imaging for left ventricular assist device-associated infections in children

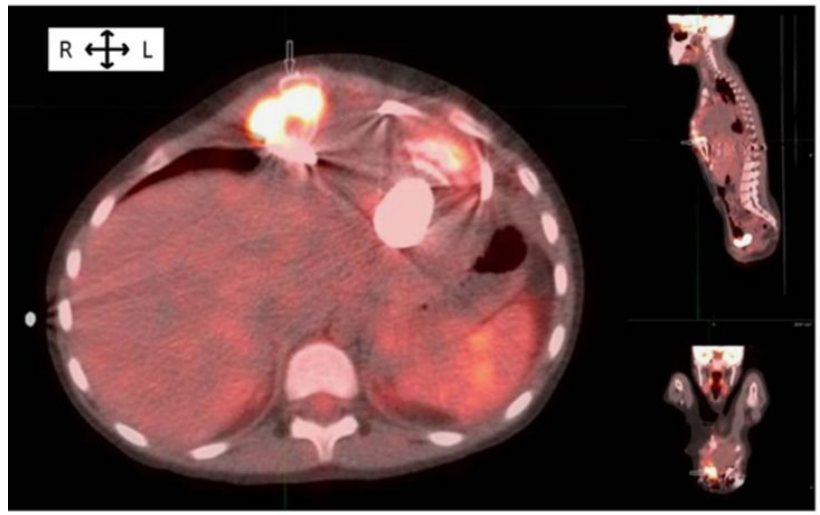
Mohammed Absi[1], Claire Bocchini[2], Jack F. Price[2] and Iki Adachi[2]

[1]Departments of Pediatric Cardiology and Cardiothoracic Surgery, LeBonheur Children's Medical Center, University

- Dos casos clínicos en dos niños uno de 5 y otro de 8 años.
- La prueba de imagen confirmó la presencia de infección en las cánulas.



CT shows increased FDG uptake which extends along the connector between the LVAD "and the aortic outflow graft (yellow arrow
axillary lymph nodes. (*b*) FDG PET/CT shows increased FDG uptake which extends along the connector between the LVAD and outflo



Brazil P. Plos Negledted Tropical Disease.2016

SEICAV
Sociedad Española de Infecciones Cardiovasculares

ABORDAJE

SEICAV
Sociedad Española de Infecciones Cardiovasculares

AHA Scientific Statement

Infective Endocarditis in Childhood: 2015 Update

A Scientific Statement From the American Heart Association

Robert S. Baltimore, MD, Chair; Michael Gewitz, MD, FAHA, Vice Chair;
Larry M. Baddour, MD, FAHA; Lee B. Beerman, MD; Mary Anne Jackson, MD;
Peter B. Lockhart, DDS; Elfriede Pahl, MD, FAHA; Gordon E. Schutze, MD;
Stanford T. Shulman, MD; Rodney Willoughby, Jr, MD; on behalf of the American Heart Association
Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee of the Council on Cardiovascular
Disease in the Young and the Council on Cardiovascular and Stroke Nursing

European Heart Journal
doi:10.1093/eurheartj/ehv319

ESC GUIDELINES

2015 ESC Guidelines for the management of infective endocarditis

The Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC)

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

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Endocarditis por estreptococos altamente sensibles a penicilina menor a 0.125 mg/L.

AHA Scientific Statement

Infective Endocarditis in Childhood: 2015 Update
A Scientific Statement From the American Heart Association

Penicillin G or ceftriaxone

Penicillin G 200 000–300 000 $U \cdot kg^{-1} \cdot d^{-1}$ IV divided every 4 h up to 12–24 million U daily

Ceftriaxone 100 $mg \cdot kg^{-1} \cdot d^{-1}$ IV divided every 12 h or 80 $mg \cdot kg^{-1} \cdot d^{-1}$ IV every 24 h up to 4 g daily (if over 2 g, divide BID)

European Heart Journal
doi:10.1093/eurheartj/ehv319

ESC GUIDELINES

2015 ESC Guidelines for the management of infective endocarditis

Standard treatment: 4-week duration	
Penicillin G *or* Amoxicillin[e] *or* Ceftriaxone[f]	12–18 million U/day i.v. either in 4–6 doses or continuously 100–200 mg/kg/day i.v. in 4–6 doses 2 g/day i.v. or i.m. in 1 dose **Paediatric doses:**[g] Penicillin G 200,000 U/kg/day i.v. in 4–6 divided doses Amoxicillin 300 mg/kg/day i.v. in 4–6 equally divided doses Ceftriaxone 100 mg/kg/day i.v. or i.m. in 1 dose
Standard treatment: 2-week duration	
Penicillin G *or* Amoxicillin[e] *or* Ceftriaxone[f] combined with Gentamicin[h] *or* Netilmicin	12–18 million U/day i.v. either in 4–6 doses or continuously 100–200 mg/kg/day i.v. in 4–6 doses 2 g/day i.v. or i.m. in 1 dose 3 mg/kg/day i.v. or i.m. in 1 dose 4–5 mg/kg/day i.v. in 1 dose **Paediatric doses:**[g] Penicillin G, amoxicillin, and ceftriaxone as above Gentamicin 3 mg/kg/day i.v. or i.m. in 1 dose or 3 equally divided doses
In beta-lactam allergic patients[i]	
Vancomycin[j]	30 mg/kg/day i.v. in 2 doses **Paediatric doses:**[g] Vancomycin 40 mg/kg/day i.v. in 2 or 3 equally divided doses

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Tratamiento

- Tratamiento secuencial oral:
  - No hay datos.
- Tratamiento parenteral ambulatorio:
  - Poca información.

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Tratamiento parenteral ambulatorio

European Heart Journal
doi:10.1093/eurheartj/ehv319

ESC GUIDELINES

2015 ESC Guidelines for the management of infective endocarditis

Phase of treatment	Guidelines for use
Critical phase (weeks 0–2)	• Complications occur during this phase • Preferred inpatient treatment during this phase • Consider OPAT if: oral streptococci or *Streptococcus bovis*,[a] native valve,[b] patient stable, no complications
Continuation phase (beyond week 2)	• Consider OPAT if medically stable • Do not consider OPAT if: HF, concerning echocardiographic features, neurological signs, or renal impairment
Essential for OPAT	• Educate patient and staff • Regular post-discharge evaluation (nurses 1/day, physician[c] in charge 1 or 2/week)[d] • Prefer physician-directed programme, not home-infusion model

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Clinical Infectious Diseases
IDSA GUIDELINE

2018 Infectious Diseases Society of America Clinical Practice Guideline for the Management of Outpatient Parenteral Antimicrobial Therapy[a]

Anne H. Norris,[1] Nabin K. Shrestha,[2] Genève M. Allison,[3] Sara C. Keller,[4] Kavita P. Bhavan,[5] John J. Zurlo,[6] Adam L. Hersh,[7] Lisa A. Gorski,[8] John A. Bosso,[9] Mobeen H. Rathore,[10] Antonio Arrieta,[11] Russell M. Petrak,[12] Akshay Shah,[13] Richard B. Brown,[14] Shandra L. Knight,[15] and Craig A. Umscheid[16]

- No recomendado en menores de un mes.
- Recomienda canalización de PIC.

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Outpatient parenteral antibiotic therapy for infective endocarditis: a review of 4 years' experience at a UK centre

David George Partridge, Emma O'Brien, Ann L N Chapman

Episodes (n)	36 (in 34 patients)
Mean age in years (range)	54.7 years (16–82)
Male	27 (79.4%)
Predisposing factors	No. of episodes
Any predisposing factor	23 (63.8%)

Partridge DG Postgrado Med J .2012

SEICAV
Sociedad Española de Infecciones Cardiovasculares

ELSEVIER MASSON

Disponible en ligne sur
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com

Médecine et maladies infectieuses 44 (2014) 327–330

Médecine et maladies infectieuses

Short communication

Outpatient parenteral antimicrobial therapy for infective endocarditis: A cost-effective strategy

Traitement parentéral ambulatoire des endocardites infectieuses : une stratégie coût-efficace

A. Lacroix [a], M. Revest [a,d], S. Patrat-Delon [a], F. Lemaître [b,d], E. Donal [c], A. Lorléac'h [a], C. Arvieux [a], C. Michelet [a,d], P. Tattevin [a,*,d,e]

	Endocarditis treated partially by outpatient parenteral antimicrobial therapy ($n = 18$)	Endocarditis treated completely in hospital ($n = 21$)	*P*
Mean age (range) in years	59.5 (17–86)	67.5 (44–85)	NS
Male gender	11 (61.1%)	14 (66.7%)	NS

SEICAV
Sociedad Española de Infecciones Cardiovasculares

European Journal of Internal Medicine 26 (2015) 131–136

Contents lists available at ScienceDirect

European Journal of Internal Medicine

journal homepage: www.elsevier.com/locate/ejim

Original Article

Self-administered outpatient parenteral antimicrobial therapy (S-OPAT) for infective endocarditis: A safe and effective model

Marcos Pajarón [a,*], Manuel F. Fernández-Miera [a], Iciar Allende [b], Ana M. Arnaiz [c], Manuel Gutiérrez-Cuadra [c], Manuel Cobo-Belaustegui [d], Carlos Armiñanzas [c], Jose R. de Berrazueta [e], Maria C. Fariñas [c], Pedro Sanroma [a], on behalf of the Hospital Valdecilla Endocarditis Study Group

Table 2

Baseline characteristics of the patients.

Characteristic	N
Age; years	
Range	14–98
Mean (SD)	63.1 (18.9)

SEICAV

Sociedad Española de Infecciones Cardiovasculares

Tratamiento quirúrgico

- Mismas indicaciones del tratamiento en adultos.
- Precoz.
- Los resultados son muchos mejores que en adultos.

Indications for surgery	Timing[a]
1. Heart failure	
Aortic or mitral NVE or PVE with severe acute regurgitation, obstruction or fistula causing refractory pulmonary oedema or cardiogenic shock	Emergency
Aortic or mitral NVE or PVE with severe regurgitation or obstruction causing symptoms of HF or echocardiographic signs of poor haemodynamic tolerance	Urgent
2. Uncontrolled infection	
Locally uncontrolled infection (abscess, false aneurysm, fistula, enlarging vegetation)	Urgent
Infection caused by fungi or multiresistant organisms	Urgent/ elective
Persisting positive blood cultures despite appropriate antibiotic therapy and adequate control of septic metastatic foci	Urgent
PVE caused by staphylococci or non-HACEK gram-negative bacteria	Urgent/ elective
3. Prevention of embolism	
Aortic or mitral NVE or PVE with persistent vegetations >10 mm after one or more embolic episode despite appropriate antibiotic therapy	Urgent
Aortic or mitral NVE with vegetations >10 mm, associated with severe valve stenosis or regurgitation, and low operative risk	Urgent
Aortic or mitral NVE or PVE with isolated very large vegetations (>30 mm)	Urgent
Aortic or mitral NVE or PVE with isolated large vegetations (>15 mm) and no other indication for surgery[c]	Urgent

Dixon G. Curr Opin Infect Dis.2017

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Early surgical therapy of infective endocarditis in children: A 15-year experience

- Estudio retrospectivo menores a 21 años desde 1996-2010..
- 76 pacientes: 46 (60,5%) cirugía.

- Indicacion: **insuficiencia valvular aguda grave** 48%.
- Mediana hasta la cirugía fue de **3 días** desde el diagnóstico.
  - 25 niños (54%), cirugía en los 3 primeros días.
  - FR: infección por **SA**.
- No diferencias en mortalidad ni en supervivencia.

Shamszad P. J Thorac Cardiovasc Surg 2013

SEICAV
Sociedad Española de Infecciones Cardiovasculares

Conclusiones

- Poco frecuente.
- Muy poca evidencia pediátrica.
- Importancia de la técnica de recogida de los hemocultivos.
- Mejor pronóstico.
- Dosificación y nuevas pautas en pediatría.
  - Introducción de fármacos o pautas nuevas más difícil.

SEICAV
Sociedad Española de Infecciones Cardiovasculares