



# Infective Endocarditis: Clinical and Epidemiological Features, (2010-2018). Buenos Aires, Argentina

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**Background:** The epidemiology of heart disease in children has changed during the past decades. Infective endocarditis (IE) is a relatively rare pathology in children, but it is associated with substantial morbidity and mortality.  
**Objective:** to describe and analyze clinical and epidemiological aspects of IE in pediatric patients.  
**Methods:** Retrospective study in a level three pediatric hospital. Clinical charts of patients < 18 years with diagnosis of IE at Hospital de Niños “R. Gutierrez” from 03/2010- 03/2018 were reviewed. IE diagnosis was based on modified Duke criteria.  
**Results:** The study included 49 IE, with definite Duke criteria in 71% and possible in 29%. Annual rate: 6.4/10000 admissions (95% CI 4.7-8.5). Of 49, 38 (78%) had congenital heart disease (CHD) and 11 (22%) were in healthy patients (HP) without structural heart disease. Median age: 7 years old (r: 7 days-17 yr). 15 (31%) were younger than 1 year. Male: 45%. Among 38 CHD, 25 (51%) had previous cardiac surgery. Septal defects (29%) and tetralogy of Fallot (16%) were the most frequent defects. Fever (91%) was the prevalent clinical sign. Blood cultures were positive in 45 (92%), *S aureus* 18 (40%) and *S viridans* 11(24%) were the most frequent pathogens. Comparing the IE caused by *S aureus* vs *viridans* group streptococci IE, *S aureus* was isolated in younger patients: 7.4 vs 137.3 months (p= 0.03); had more days of bacteremia: 7.41 vs 2.9 (p<0.001), had more association with sepsis: 72% vs 8% (p= 0.002) and it was more frequent in HP than in CHD: 82% vs 50% (p< 0.001). Patients with previous cardiac surgery were younger (Median age: 7.7 months -p=0.01) than the rest. Gram-negative bacilli and *S aureus* were the predominant pathogens in them. A decrease in age at diagnosis of IE in patients with CHD was observed, <2015: 9.7 y old vs > 2015: 0.6 y old (p= 0.03). Complications were detected in 29 (58%) of cases. The most frequent were embolic events (32%) and heart failure (22%); 20 (41%) required surgical treatment; 4 patients (8%) died.  
**Conclusions:**  
• *S. aureus* EI was predominant in healthy patients, occurred at a younger age and was associated with sepsis and more days of bacteremia.  
• *S viridans* prevailed in CHD.  
• A significant decrease in age at IE diagnosis in CHD patients was observed. In the last years, IE was more frequent in < 1 year old, related to neonatal surgeries increase.

## BACKGROUND

• Patients age with heart disease who underwent cardiac surgery have changed related to neonatal surgeries techniques.

• Infective endocarditis (IE) is an uncommon disease in children, however it is associated with substantial morbidity and mortality.

## OBJECTIVES

• To describe and analyze clinical and epidemiological features of IE in pediatric patients.

## MATERIAL AND METHODS

**Design:** Observational, analytical and retrospective study performed in a tertiary pediatric reference center (Hospital de Niños “Dr. R. Gutierrez”) with ~9,500 annual admissions at Buenos Aires, Argentina. Clinical charts of patients < 18 years with diagnosis of IE were reviewed, from March 2010 to March 2018.

### Definitions:

IE diagnosis was based on modified Duke criteria. IE definitive and possible categories were included. (Clin Infect Dis 2000;30:633-8)

Native IE: was defined when it occurred without a history of previous cardiovascular surgery.

Postoperative (PO) IE: when had previous cardiac surgery.

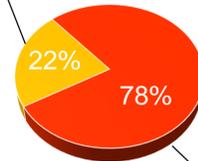
Early PO when diagnosis was within 12 months of cardiac surgery and late PO when presenting beyond that period. (Eur Heart J- 2004;25:267-76)

**Statistical analysis:** Descriptive analysis of the categorical and continuous variables were performed. Software: Stata v.13.

## RESULTS

- During the study period 49 IE were included, with definite Duke criteria in 71% and possible in 29% of them.
- IE annual rate: 6.4/10000 admissions (95% CI 4.7-8.5).
- Median age [ $M_e$ ]: 7 years [yrs] (range [r] 7 days – 17 yrs). Fifteen (31%) were younger than 1 year.
- Male/female ratio 0.8:1.

No heart disease  
n: 11



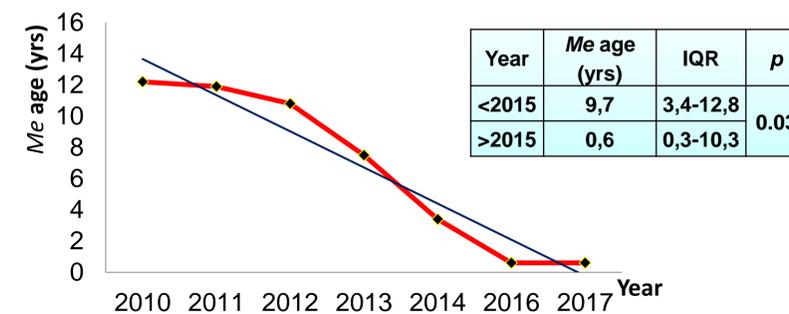
Congenital heart disease (CHD)  
n: 38

Congenital Heart Disease	n (%)
Ventricular septal defects	11 (29)
Tetralogy of Fallot	6 (16)
Aortic stenosis	5 (13)
Pulmonary valve defects	4 (10)
AV canal	4 (10)
Coarctation of the aorta	3 (8)
Transposition of great arteries	3 (8)
Patent ductus arteriosus	2 (5)

	Native without CHD n:11 (22%)	Native with CHD n: 13 (26%)	Postoperative	
			Early n:13 (26%)	Late n:12 (24%)
Age (months), $M_e$ (IQR)	41,7 (1,4-142,6)	142,5 (93,4-153,4)	7,7 (4,4-71,5) $p=0.01^*$	116,2 (45,6-148,6)

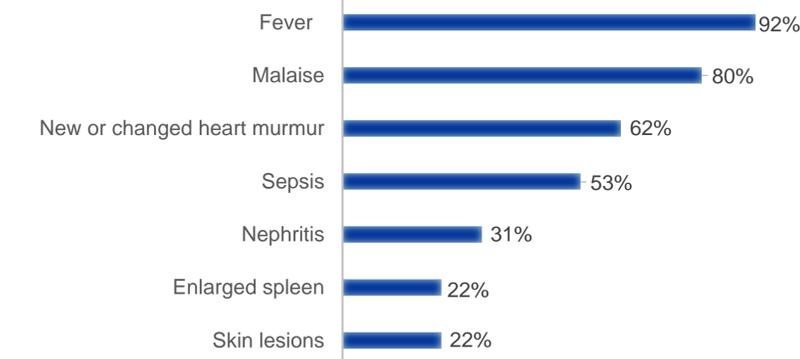
\* ANOVA test

Median age of IE patients with CHD by year



## CLINICAL PRESENTATION

### Clinical features



- Sepsis was more frequent in patients with native IE without CHD (81,8% vs 39,5% -  $p=0.02$ )

## DIAGNOSIS

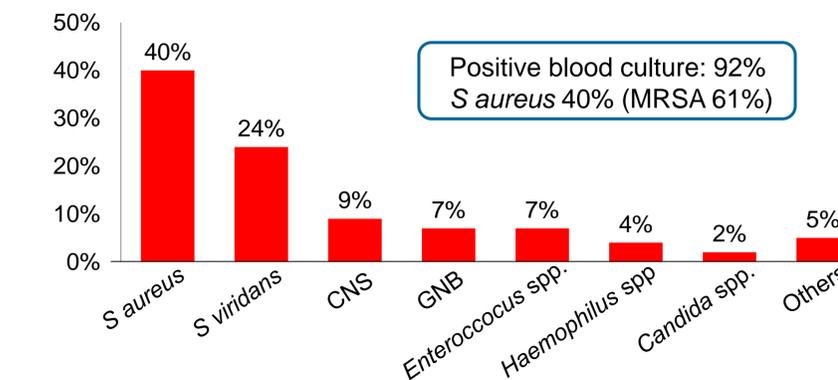
- Transthoracic echocardiogram was performed in all patients. Abnormal findings: 83%: vegetations (77%), valve perforation (12%), valve dehiscence (10%), valve abscess (7%).

### Laboratory findings

- WBC: median 11300/mm<sup>3</sup> (range: 9700-15500)
- Protein C Reactive value: median 77.5 mg/L (range: 36-131)

## ISOLATES

- *S aureus* was the leading organism in patients without CHD (81.8% vs 23.7% -  $p=0.001$ ).



## Characterization of IE caused by *S aureus* and *S viridans* \*

	<i>S aureus</i> n:18	<i>S viridans</i> n:11	p
Age (m), $M_e$ (IQR)	85 (1.7-142)	147 (106-179)	0.01
CHD, n (%)	9 (50)	12 (100)	0.003
Days of bacteremia, $M_e$ (IQR)	7 (3.5-11)	2 (1-4)	0.006
Sepsis, n (%)	13 (72)	1 (8)	0.002
Complications, n (%)	12 (66.6)	8 (66.6)	NS
Mortality, n (%)	0	2 (16)	---

\* No significative difference in sepsis and days of bacteremia between *S aureus* vs other organisms was observed

## OUTCOME

- Median length of hospitalization: 54 days (IQR 44- 82).
- Complications were detected in 29 (58%) of cases: embolism (32%), heart failure (22%), myocardial pseudoaneurism (17%), valve rupture (17%) and aneurism (7%). Twelve patients (24%) had more than one complication.
- Patients who underwent surgical treatment: 20 (41%).
- Death: 4 patients (8%).

## CONCLUSIONS

- A significant decrease in age at IE diagnosis in CHD patients was observed in the last years.
- IE was more frequent in < 1 year old, related to surgery procedures increased in neonates.
- *S. aureus* EI was predominant in healthy children, occurred at a younger age and was associated with sepsis and more days of bacteremia than *S viridans*.
- *S viridans* was isolated only in children with CHD.
- Complications rate was higher than described in the literature, however the mortality rate was lower than reported.