

Epidemiological and clinical features, microbiological findings and prognosis features of pediatric infective endocarditis in a teaching hospital in Tunisia

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Introduction:

Infective endocarditis (IE) is a serious disease secondary to fixation and multiplication of germs in the endocardium. In children, it is a disease on the rise for decades. Its prevalence varies between 0.42 and 1.35 ‰ admissions to pediatric services. Morbidity and mortality of this disease are still significant despite advances in microbiological diagnosis, medical and surgical treatment.

Objectives :

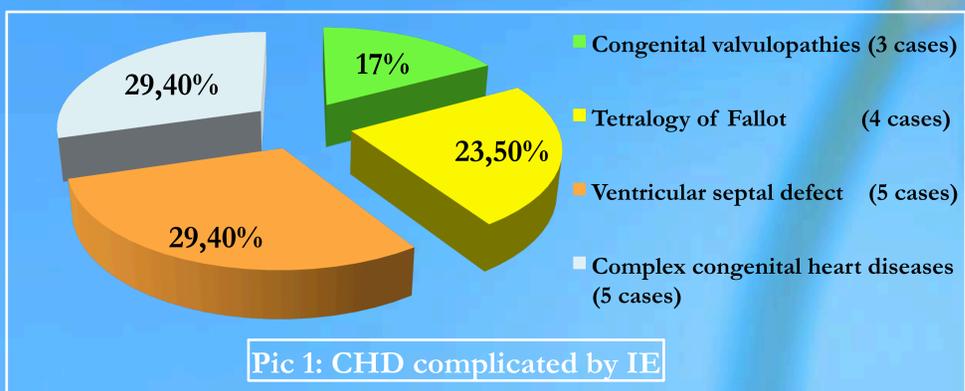
The aim of this work is to study clinical, microbiological, therapeutic and outcome features of IE in children.

Methods:

Retrospective study including 24 children with IE collected in the pediatric department of Sahloul Hospital (Sousse) over a period of 19 years (from 1995 to 2013). Duke criteria was used to establish the diagnosis of IE.

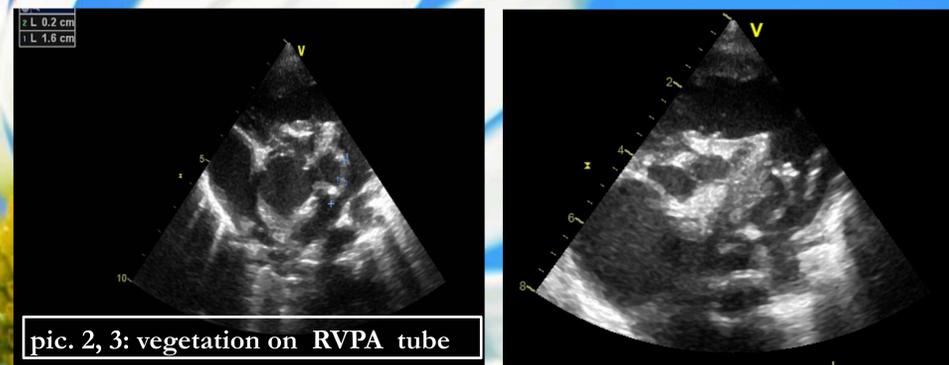
Results:

Most of patients were female (62,5%). The mean age at diagnosis was 5 years old (40 days-13 years). Children with IE had congenital heart diseases (CHD) in 17 cases (70%), rheumatic heart diseases in 2 cases (10%) and had a previously healthy heart in 5 cases (20%).



Cardiac ultra Sound profile :

Echocardiography showed vegetations in all cases (Fig. 2, 3), with predominance of mitral valve damages (table II).



Localisation of IE	Associated anomalies	Number of cases (%)
Mitral valve	Mitral regurgitation, mitral abscess, pericarditis	7 (29%)
Aortic valve	Aortic regurgitation, aortic dissection, pericarditis	4 (16,6%)
Tricuspid valve	tricuspid abscess	6 (25%)
Pulmonary valve	pericarditis	2 (8%)
Ventricular septal defect	-	5 (20%)
Ventricular wall	-	1 (4%)
RV-PA tube	-	1 (4%)
Ductus arteriosus	-	1 (4%)

Table II: echographic lesions of IE

Discussion:

IE is a serious illness that often complicate heart diseases in children. It still frequent all over the world. In France, approximatively 30 cases of IE are collected every year, 10% of these cases occurs on a plot of CHD. The diagnosis of IE is established after reference to the modified Duke criteria (TableIII).

Table III Modified Duke criteria for the diagnosis of infective endocarditis (adapted from Li et al. ²⁴)	
MAJOR CRITERIA	
Blood cultures positive for IE:	
<ul style="list-style-type: none"> Typical microorganisms consistent with IE from two separate blood cultures: Viridans streptococci, Streptococcus bovis, HACEK group, Staphylococcus aureus; or Community-acquired enterococci, in the absence of a primary focus; Microorganisms consistent with IE from persistently positive blood cultures: At least two positive blood cultures of blood samples drawn > 12 h apart; or All of three or a majority of ≥ 4 separate cultures of blood (with first and last sample drawn at least 1 h apart) Single positive blood culture for <i>Coxiella burnetii</i> or phase I IgG antibody titer > 1 : 800 	
Evidence of endocardial involvement:	
<ul style="list-style-type: none"> Echocardiography positive for IE: Vegetation - Abscess - New partial dehiscence of prosthetic valve New valvular regurgitation 	
MINOR CRITERIA	
<ul style="list-style-type: none"> Predisposition: predisposing heart condition, injection drug use Fever: temperature > 38°C Vascular phenomena: major arterial emboli, septic pulmonary infarcts, mycotic aneurysm, intracranial haemorrhages, conjunctival haemorrhages, Janeway lesions Immunologic phenomena: glomerulonephritis, Osler's nodes, Roth's spots, rheumatoid factor Microbiological evidence: positive blood culture but does not meet a major criterion or serological evidence of active infection with organism consistent with IE 	
Diagnosis of IE is definite in the presence of	Diagnosis of IE is possible in the presence of
2 major criteria, or	1 major and 1 minor criteria, or
1 major and 3 minor criteria, or	5 minor criteria
Adapted from Li JS, Sexton DJ, Mick N, Nettles R, Fowler VG, Jr., Ryan T, Bashore T, Corey GR. Proposed modifications to the Duke criteria for the diagnosis of infective endocarditis. Clin Infect Dis 2000;30:633-638.	

Tab III: Duke criteria

Many microorganisms, generally isolated by blood culture can produce infective endocarditis. In the littérature, streptococcus (>40%), staphylococcus (40%) and rarely negative-gram bacilli (10%) are the most common organisms responsible for IE. Blood culture can be negative in 5-10% of cases. In our study, staphylococcus is the most bacteria identified as a cause of IE.

Echocardiography is the gold standard for the diagnosis of IE. However, in some cases, even echocardiography can not show lesions of IE especially when valvular abnormalities are associated to shunts. This fact is explained by the difficulty of distinguishing between pre-existing anomalies and infectious damages (vegetations).

The treatment is a bi-germ appropriate antibiotics for 4 to 6weeks. Surgical treatment is indicated in cases of severe sepsis when not controlled by antibiotics, hemodynamic complications, vegetation > 10mm or abscess. The risk of recurrence of IE is difficult to assess, but probably rises to about 20%. Mortality of the disease remains high, varying from 10 to 25% in the literature.

Conclusion:

Despite major advances in diagnosis and surgical treatment, IE in children is a serious and severe disease. We hope to decrease its prevalence by applying the preventive measures in the assesment of patients with CHD and this through information and education of both patients and families.

Microbiological findings:

Microorganisms responsible for IE was identified in 14 cas (58%): Table I

Microorganisms cultured	Number of cases (%)
Staphylococcus	7 (50%)
Gram-negative bacilli	5 (35%)
Streptococcus	1 (7%)
Candida	1 (7%)

Treatment :

Antibiotics (Cefotaxim + Fosfomycin + Aminosid) were administrated in most cases. Only 3 patients (12,5%) were treated surgically.

Outcome:

Most of our patients had favorable outcome. However , 4 cases suffered from local complications of IE such as minimal pericarditis (1 case) and mycotic aneurysm complicated by aortic dissection (1 case). Eight children had vascular phenomena namely: stroke (7 cases) and pulmonary embolism (1 case). In 7 cases IE led to death.