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Clinical Case

An Experience in Management of Bacterial Infective Endocarditis in Paediatrics

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Abstract

Infective endocarditis (IE) is a microbial infection of the endocardium whose incidence and mortality have not decreased in the last 30 years. Its incidence in children is 0.43 per 100,000. We present this case report with the aim to deepening the knowledge and management of the most frequent clinical-epidemiological variables in the child population with episodes of IE, as well as motivating reflection on the measures and interventions that contribute to prevention, diagnosis and treatment of this disease in children.

Keywords: infective endocarditis; children infective endocarditis; agents in infective endocarditis

Introduction

Infective endocarditis (IE) is a microbial infection of the endocardium whose characteristic lesion is the vegetations that usually settle in the valvular endocardium, although it can affect the chordae tendineae, papillary muscles or extend to the myocardium and pericardium [1]. Its incidence and mortality have not decreased in the last 30 years [2]. It is not an uniform disease, but is presented in different forms that vary according to the initial clinical manifestation, the underlying heart disease, the microorganism involved, the presence or absence of complications and the characteristics of the patient [3].

IE is less common in children than in adults and it is associated with high morbidity and mortality due to prolonged treatment time and related complications [4]. The incidence of ilness in children is 0.43 per 100,000 children. In pediatrics the most frequently symptoms of IE and findings are fever, leukocytosis, splenomegaly, weight loss and new heart murmur [5]. In most cases of episodes in children, growth of the causative microorganisms in blood culture is observed. *Staphylococcus aureus, Streptococcus viridans* and coagulase-negative staphylococci are the most commonly isolated agents [6]. Microorganisms from the *Haemophilus* species, *Aggregatibacter* species, *Cardiobacterium hominis*, *Eikenella* and *Kingella* species (HACEK) group are also detected [2]. Fungal infection based on *Candida albicans* is unfrequently noticed [7].
It is considered that the diagnosis of IE must be established taking into account three fundamental criteria: clinical judgment, blood culture and echocardiographic examination [8].

The Paediatric Hospital "Octavio de la Concepción de la Pedraja" is the reference tertiary-level child care center in the province of Holguin in Cuba. The quality of the diagnosis and treatment services for children with this disease and the development of numerous studies in this field, have led it to achieve recognized national and international prestige. The compilation of descriptive data available in the institution's database allowed the realizing of this research.

We present this case report with the aim to deepening the knowledge and management of the most frequent clinical-epidemiological variables in the child population with episodes of IE, as well as motivating reflection on the measures and interventions that contribute to prevention, diagnosis and treatment of this disease in children.

Clinical case

This is a 15-year-old, female, white patient from Holguin, Cuba who had a health history related to 3 previous admissions for a febrile syndrome in the last 33 days. He was admitted due to headache, vomiting and fever (38.0-39 ºC) on March 27, 2020 at the Paediatric Hospital "Octavio de la Concepción de la Pedraja" in Holguin, Cuba. The results of cerebrospinal fluid studies are negative. 48 hours after admission, she continued to have headache, vomiting, fever and neurological symptoms (alterations in consciousness and meningeal signs). A repeat study of the cerebrospinal fluid showed changes in the cytochemical assessment that led to it being interpreted as bacterial meningoencephalitis, so antimicrobial treatment was started with third-generation cephalosporin and vancomycin.

Over a period of 72 hours later, there was evident clinical improvement and the results of the cerebrospinal fluid culture arrived, confirming the absence of bacterial growth. For this reason, it was decided to suspend the use of antimicrobials and the indication for blood culture. 48 hours later the fever reappeared, humorally with leukocytosis with predominance of polymorphonuclear cells and accelerated erythrocytes. The blood culture

reports 1 and 2 certify the isolation of *Staphylococcus aureus.* A III/VI systolic murmur, not previously described, is noted.
The results of a first echocardiogram indicate that no vegetations are observed. He continued to have a febrile condition and upon performing a second echocardiogram, vegetation was observed at the level of the mitral valve, so infective endocarditis was diagnosed, with the presence of 2 major criteria given by 2 blood cultures positive for *S. aureus* and ultrasonographic evidence of vegetation. in the mitral valve. Antimicrobial treatment is indicated for 42 days, after which the septic process maintains a favorable evolution.

The echocardiographic images of vegetations disappeared and he was discharged after a 45-day hospital stay; however, mitral insufficiency remained without surgical criteria. Follow-up consultation with internal medicine and cardiology is indicated.

Discussion

The study of the clinical case allowed us to identify headache, vomiting, fever and neurological symptoms (alterations in consciousness and meningeal signs) as the main symptoms and signs of IE. Such results are similar with those reported by some authors in recent studies (Williams, et al., 2021; Varela, et al., 2021), who refered to sustained fever and neurological alterations as the most frequent symptoms in cases of IE in children. On the other hand, experience in the management of the disease shows that the symptomatic neurological complications described are usually a consequence of embolizations from the vegetations [12].

Leukocytosis and systolic murmur were findings of this investigation. On the other hand, the observation of vegetation at the level of the mitral valve was appreciated as a powerful indicator of IE. In this sense, the investigators have founded that mitral valve apparatus is affected in a greater percentage of patients [13], followed by the involvement of both valves and in the minority of cases, aortic damage [14].

Blood culture and echocardiographic examination were fundamental criteria to establish the diagnosis of IE. Numerous researchers in this field show similar considerations and express such procedures play an important role in the diagnosis and management of the entity [8]. It is considered that transthoracic echocardiography is rapid, non-invasive, and has an excellent specificity of approximately 98% for vegetations [15].

The microorganism isolated was *Staphylococcus aureus*, which is the agent more commonly detected in positive blood cultures [17]. IE due to *S. aureus* is more frequently associated with neurological complications than IE caused by other bacteria. Prompt diagnosis and initiation of appropriate antibiotic treatment are essential to prevent a neurological complication [18]. It is important to emphasize the need to isolate the etiological agent in the first stages of disease, in order to establish the incidence of the different species. An essential aspect is the entrance door of the microorganism, although it is not determined in this study. In accordance to the reviewed literature, it is established the oral route, in most cases, mainly caused by poor oral hygiene and complex dental procedures prior to the disease without adequate prophylaxis.

This case report is based on the episode of IE in a 15-year-old female teenager. In all epidemiological studies of IE, the male-female ratio is 1.7 - 2:1 and a higher prevalence is noted in the range of 15-64 years old, corresponding to 59% of the total reported cases [19].

The latest research shows an accelerated growth in the prevalence rate for IE [20], which is an alarming aspect. The description of this case constitutes an alert for medical systems and emphasizes the need to make a greater report from health institutions and health promotion companies, in order to establish prevention, promotion and timely treatment strategies in the general population, specially on patients with risk factors and those recently diagnosed.
Current statistics of IE in children become a new challenge for health personnel, whose commitment must be based on offering a comprehensive medical care service to patients. That is why the value of this research is also reflection, since it is no less true, that nowadays society demands increasingly relevant performances that completely dismantle the vulnerability of our most precious possession: childhood.

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Competing Interest

The authors have declared that, no competing interest exists.

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