THE MULTIDISCIPLINARY TEAM APPROACH TO ORAL REHABILITATION OF PATIENTS WITH VALVULAR HEART DISEASE

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ABSTRACT

Introduction: Cardiovascular pathology is the main cause of death among the population. Infectious endocarditis remains a public health problem and a continuous challenge in daily practice, due to the diversity of the clinical presentations and the variability of the epidemiological profile. Material and method: Analyzing the data from the literature in recent years, infectious endocarditis associated with medical services has a high incidence, accounting for about 30% of the total number of cases, often being associated with a severe prognosis and high mortality. Results: The prophylaxis of infectious endocarditis of patients with cardiovascular disease remains a controversial topic. Current guidelines propose further limiting antibiotic prophylaxis in patients with an increased risk of endocarditis who are subjected to high-risk dental interventions, emphasizing the importance of oral and skin hygiene measures meant to be part of the routine patient care. Conclusions: The prophylaxis of infectious endocarditis is of vital importance, with an impact on the morbidity and mortality, requiring an individualized approach within a multidisciplinary team.

Key words: *infectious endocarditis, prophylaxis, dental procedures*

INTRODUCTION

Infectious endocarditis (IE) was first described in 1885 by Sir William Osler in the paper "The Gulstonian Lectures on Malignant Endocarditis" in British Medical Journal, stating that "a small number of diseases present more serious diagnostic difficulties than malignant endocarditis, difficulties that in many cases are unsurmountable".

IE is a rare, serious condition, mainly characterized by the infection of the heart valves, but also of the parietal endocardium and the subvalvular apparatus with vegetative and ulcerative-necrotic lesions, with millimetric or even centimetric, single or multiple dimensions. Significant valvular regurgitation as well as the clinical picture of congestive heart failure are frequently unresponsive to treatment being determined by intracardiac destructive consequences [1].

Despite the fact that it is considered a disease of young adults with previously diagnosed (especially rheumatic) valve

disease, it is currently affecting mainly elderly patients, as a result of the increased incidence of medical-surgical procedures performed. It can also be encountered in patients without known valvular pathology or in patients with valvular prostheses [2].

In the last 50 years, despite improvements in the methods of diagnosis, management and treatment, IE remains a pathology with a reserved prognosis and increased mortality (approximately 20-40% and 25% at 6 months after IE). The epidemiology of IE has changed with the modification of the spectrum of predisposing lesions and *Staphylococcus aures* remains the main germ involved [2].

The incidence of IE in the US is growing from 9.3/100,000 inhabitants/year in 1998 to about 15/100 000 inhabitants/year in 2011, with an increase in intravenous drug use and an increase of about 12% of hospitalizations associated with IE from 14 to 56% [3].

IE is more common in male patients, with a 2:1 sex ratio probably due to the increased prevalence of bicuspid aortic valve. The average age remains variable (between 47-70 years) depending on the incidence of rheumatic valvulopathies, degenerative valve lesions, congenital heart disease, various implantable materials or the use of venous catheters, hemodialysis, invasive procedures, nosocomial infections and among young users by the number of users of drugs injected intravenously [3].

The pathophysiological process in IE consists of three stages: bacteremia, the adhesion of microorganisms and the invasion of the vascular endocardium. The microorganisms adhering to the surface of the vegetation cause monocyte activation, produce growth factors, cytokines, which together with platelets and fibrin deposits also cause a progressive growth of the vegetation, being difficult to access by the neutrophil attack. The vegetation can cause the aggravation of heart defects and heart failure by preventing coaptation, cord breakage or valve perforation. [4].

The symptomatology is often polymorphic and a thorough clinical and anamnestic examination guides the diagnosis. The onset of IE can be sudden, with fever (39-40 degrees Celsius), chills, perspiration or insidious expressed by a state of sub-febrility, loss of appetite, myalgia, physical asthenia or the progression of the pre-existing cardiovascular pathology. There are also exceptions in which the onset of IE is expressed through systemic complications: cerebral, retinal, renal and splenic emboli. The incubation period is approximately 2 weeks or even less depending on the germs involved [5].

Although fever and new-onset cardiac murmurs are key elements in the diagnosis of IE, at the clinical examination it is possible to consider petechia (most common on the extremities and oral mucosa, Osler nodules - subcutaneous, firm and painful nodules in the pulp of the fingers; Roth stains, Janeway lesions, sub-ungual hemorrhages, "café au lait" skin pallor and splenomegaly, as well as neuropsychiatric manifestations (drowsiness, delirium, state of confusion, motor deficiency), requiring a differential diagnosis to exclude a specialized emergency [5].

In the case of any febrile syndrome of unspecified etiology or of any febrile heart failure, the diagnosis of IE should be excluded.

The main paraclinical examinations performed for a patient with suspected IE are the laboratory tests (when non-specific inflammatory syndrome, normocytic normochromic mild anemia, leukocytosis are detected; immunologically, the detection of circulating immune complexes and FR support the diagnosis of IE, and the key element is the presence of positive

blood cultures). Imaging tests complete the diagnostic process.

Current imaging techniques have an important role both in the diagnosis and in the dynamic monitoring of patients with IE. The electrocardiogram may highlight cardiac rhythm disorders, ischemic changes or other atrial or ventricular arrhythmias as a result of myocardial distress. The transthoracic echocardiography is the method of choice for diagnosing IE, by identifying the vegetation, the abscess and the prosthetic valve dehiscence, major criteria in the diagnosis of endocarditis. The transesophageal echocardiography (ETE) is indicated in all patients with high clinical suspicion and the transthoracic echocardiography is negative or is not diagnosed. Cardiac computer tomography (CT) has a similar diagnostic accuracy as ETE and nuclear medicine techniques such as positron emission tomography (PET) and single photon emission computed tomography (SPECT) can be used as additional diagnostic methods in the most difficult cases [6,7].

Given the complexity and mortality of this pathology, the diagnosis of IE is based on the presence of positive blood cultures and vegetation observed with the help of echocardiography. Over time there have been different diagnostic schemes combining different clinical, microbiological and echocardiographic criteria (Reyn criteria, Duke criteria and modified Duke criteria), these being epidemiologically useful and the standardization of the diagnosis, but cannot completely exclude or confirm the diagnosis of endocarditis [8].

The modified Duke criteria incorporate the three domains into major and minor criteria, being useful for establishing the diagnosis and for the subsequent therapeutic decision. The treatment of IE should be initiated promptly and involves a multidisciplinary approach consisting of a cardiologist, a cardiovascular surgeon, the intensive care unit, an infectionist and a radiologist aimed at microbial eradication, the treatment of complications, as well as the prevention of infections. Antibiotic therapy should be instituted as early as possible, according to the antibiogram and the patient's status, opting for an antibiotic with bactericidal action, immediately after collecting the blood cultures. The duration of treatment will be approximately 4-6 weeks, in large doses, in a single or double therapy depending on the microorganisms involved, according to current guidelines. Surgery is required in approximately 40-50% of patients, in the case of patients with endocarditis, for whom the cure is considered improbable only with drug therapy not associating comorbidities or complications. Surgical treatment has 3 indications: heart failure, uncontrolled infection and the prevention of embolism. It is also recommended in patients with fungal endocarditis and increased embolic risk [8].

Studies carried out until now show that anticoagulant treatment does not prevent embolic complications among patients with infectious endocarditis and is accompanied by an increased risk of bleeding. Parenteral anticoagulant treatment is recommended only for massive embolism. In the case of patients with mechanical valve prostheses, oral anticoagulant treatment will be administered with the monitoring of the INR and its maintenance during the therapeutic interval; thrombolytic treatment is not recommended in patients with IE [9,10]. Infectious endocarditis can determine cardiac complications due to the spread of infection in the nodal tissue, the most important of which are the embolic

complications frequently located at the renal, splenic, coronary and cerebral arteries. Neurological complications occur in approximately 15-39% of patients following the embolization of some vegetation fragments in the cerebral circulation [11].

In the case of patients with IE, a risk stratification will be established based on clinical, microbiological and imaging parameters so that the surgical intervention remains a priority for high risk patients [12]. The prognosis is reserved, influenced by the patient's characteristics as well as by the complications of the infectious endocarditis, the microorganisms involved (gram-negative bacilli, fungi, *Staphylococcus aureus*), the echocardiographic aspect and not least of the associated comorbidities[12]. S. aureus is the most common species of the genus Staphylococcus that causes staphylococcal infections in humans. The carriage of S. aureus is an important source of nosocomial infections, community acquired infections and antibiotic resistant infections due to the organisms including but not limited to methicillin resistant S. aureus (MRSA) [13].

Intra-hospital mortality was estimated in approximately 18% of patients diagnosed with endocarditis [14]. The main factors associated with the increase in mortality were: old age, endocarditis on valvular prosthesis, heart failure, stroke, paravalvular complications, *S. aureus* infection and coagulase-negative staphylococcus. Also, at the cardiac level, bacterial insemination occurs frequently on immunosuppressed background, in patients with prolonged hospitalization, in intravenous drug users or in the case of immunosuppressive treatment [15]. Another reserved prognostic factor is acute renal failure, having multiple etiology (autoimmune glomerulonephritis, renal infarction, renal hypoperfusion due to hemodynamic instability, the nephrotoxic effect of antibiotic therapy or the contrast agent used in imaging) [16].

DISCUSSIONS

IE is a worldwide public health problem due to the high hospitalization costs and has a significant impact on the patients' quality of life, often requiring prolonged hospitalization and surgery. Although improvements over the diagnosis and treatment of IE have been made over time, mortality among patients remains at approximately 20%. In addition, increased antibiotic resistance is a real challenge for clinicians in both Europe and the US [17, 24].

For more than 50 years, prophylactic treatment with antibiotics has been the main target for the prevention of IE especially before dental procedures because streptococci have long been the main cause of bacterial endocarditis [18].

Over time, there have been controversial discussions regarding the prophylaxis of IE. In March 2008, the National Institute for Health and Care Excellence (NICE) published the NICE Guide where it recommends stopping the prophylaxis of IE in case of dental or surgical interventions in the UK, in high risk patients, thus leading to a 78% reduction in the prescription of antibiotic, in only 2 years, but this recommendation was accompanied by an increased incidence of IE [19]. In contrast, guidelines in Europe, the USA and Australia continue to recommend IE prophylaxis in view of increased mortality and severe complications [20].

The European guideline on the management of IE has restricted the indications of antibiotic prophylaxis, since

2009, only in the case of certain cardiac lesions considered to be at increased risk of endocarditis.

However, in the case of dental interventions, in particular, from tartar removal to surgical intervention of neoplastic pathology, this is still an important risk factor for the development of IE in predisposed patients. The prophylaxis in high risk patients can be achieved, on the one hand, with careful patient assessment and rational use of antibiotics and, on the other, with rigorous and professional oral hygiene, associated with the main recommendation of clinical practice, well known since ancient times: empathy towards the patients [20].

The best approach to avoid complications is to apply preventive strategies [21].

The prophylactic treatment in cases of bacteremia risk procedures, such as dental procedures, is recommended periprocedural only if it involves manipulation of the gingival region, perforation of the oral or periapical mucosa of the tooth in patients with predisposing factors [22].

Studies have shown that bacterial risk procedures in the respiratory tract (bronchoscopy, laryngoscopy), gastrointestinal (colonoscopy, upper digestive endoscopy) and genitourinary (vaginal birth or caesarean section) have a lower risk of bacteremia compared to dental procedures [23].

A recent study shows that guidelines and opinions are contradictory and confusing, leading to significant heterogeneity in the implementation of IE prophylaxis in the oral and maxillofacial surgery wards. This diversity was influenced by the associated cardiovascular pathology, the type of dental procedures performed that required antibiotic prophylaxis in high risk patients and the period of antibiotic use. Also, in patients with cardiovascular pathology and high risk of IE, the excessive use of antibiotic prophylaxis was observed, thus emphasizing the need to improve current standards and to classify high risk procedures among these patients [24].

Although the discussions are controversial because of the lack of clear evidence, of antibiotic resistance and adverse reactions, the findings of another recent study that looked at the risk-benefit ratio for prophylaxis, especially in high-risk patients, clearly supported prophylactic treatment for this group of patients. At the same time, in the last years, several studies have reported an increased potential of developing IE in patients with poor oral hygiene. Thus, proper oral hygiene and periodic dental check-ups should be considered as part of the prophylactic regimen and as important as prophylaxis [25].

Infectious endocarditis remains a fatal disease, associated with severe complications and increased mortality despite improved management. Hospitalizations related to IE have increased since 2010 in both high and moderate risk patients.

In addition, current guidelines emphasize the importance of the "Endocarditis team" term through the collaboration among various specialties within a multidisciplinary team consisting of cardiologists, infectionists, microbiologists, all with the same purpose: reducing mortality. The quality of life is a important task to be supported by prophylaxis programs rigorously coordinated [26]

CONCLUSIONS

A good oral hygiene and reducing or eliminating gingivitis, which should diminish the incidence of bacteremia after tooth-brushing and the need to extract teeth owing to periodontal disease and caries can be used to prevent cases of IE that originate from oral bacteria.

Infectious endocarditis remains a public health problem, with devastating implications and high mortality requiring an approach within a multidisciplinary team.

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