



Original Research Article

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CRITERIA FOR DIFFERENTIATION BETWEEN COAGULASE NEGATIVE *STAPHYLOCOCCAL ENDOCARDITIS* AND CONTAMINATION

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ABSTRACT: *Staphylococcus hominis* is a coagulase negative staphylococcus that is ubiquitous commensals of the body. It is a bacterium that is rarely responsible for infectious endocarditis on a native valve. It is usually responsible for endocarditis on prosthetic valve. In this article, using a literature review, we tried to specify the criteria to differentiate between a true infection and a blood contamination since this bacteria normally exists on human skin. **Keywords:** Endocarditis, Coagulase-negative staphylococci, *Staphylococcus hominis*, Contamination.

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1. INTRODUCTION

Infective endocarditis is the localization and proliferation of blood-borne germs in the endocardium. His clinical presentation is often insidious and polymorphic. The entryway is cutaneous in 20% of cases [1]. The normal cutaneous bacterial flora consists of 63% coagulase-negative *Staphylococci* and 30% *Staphylococcus aureus* [2]. They are ubiquitous commensals of the body, including the mouth and the throat. Coagulase-negative staphylococci (CNS) are rarely responsible for infectious endocarditis on native valves. Nevertheless, the rate of endocarditis to CNS is increasing [3], emphasizing the need to improve our knowledge on this type of germs and to be able to specify if it is an infection or a contamination.

2. MATERIELS AND METHODS

We report a case about 37-year-old patient with history of taking chewing tobacco and dental care 3 months before his admission, admitted for a prolonged fever that had been evolving for a month

and a half, associated with asthenia and pains of the left hypochondrium. The clinical examination at admission found a conscious patient, feverish at 38.2 ° C, his heart rate was 95 beats per minute, his blood pressure was 120/60 mmhg and his respiratory rate was 18 cycles per minute, the abdominal examination showed splenomegaly, Osler's paronychia and purpuric tasks in the right arm. Three blood cultures were performed at admission, two of which returned positive to *Staphylococcus hominis* sensitive to Ampicillin, Amoxicillin and Clavulanic acid, Gentamicin and Teicoplanin. Transthoracic echocardiography revealed a movable element on the atrial aspect of the large mitral valve measuring 6 mm and a movable element on the small mitral valve measuring 7 mm with moderate mitral insufficiency. Transesophageal echocardiography revealed two vegetations, one on the large mitral valve, filamentous, measuring 2 mm and the other on the small mitral valve measuring 9 mm. Cerebral angioscanner showed small intraparenchymal hematomas above tentorial and left parietal mycotic aneurysm. The thoraco-abdomino-pelvic CT showed splenomegaly with foci of infarction and a splenic collection most probably abscessed as well as a focus of right renal infarction. The patient was initially on antibiotic therapy combining Amoxicillin and Gentamycin, complicated by allergic cutaneous reaction requiring the stopping of the two antibiotics and the relay by Teicoplanin as well as an enlarged caudal splenectomy to the stomach with good evolution on the clinical, biological and ultrasound plan.

3. RESULTS AND DISCUSSION

The skin, as a physical barrier and interface with the outside environment, is physiologically colonized by a multitude of diverse microorganisms [4]. *CNS* represent a regular part of the microbiota of the skin and mucous membranes of humans and animals. Infectious endocarditis with *CNS* is becoming more frequent [3,5], this is due to health care exposure (long-term hemodialysis, pacemaker, implantable defibrillator, invasive procedure). At St. Thomas Hospital in London, the prevalence increased from 1% before 1980 to 10% after that date. [6] *CNS* causing infectious endocarditis have been identified as *S. epidermidis* (71.4%), followed, with a considerable gap, by *S. lugdunensis* (8.8%), *S. hominis*, *S. capitis*, *S. haemolyticus*, and others. [7] *CNS* is the most commonly implicated organism in prosthetic valve endocarditis. They are rarely responsible for native valve endocarditis. [8] In series reported before valve replacement surgery became available *coagulase negative staphylococcal* infection was responsible for about 1 % of cases. [9] The advent of mitral valvotomy and later of prosthetic valve replacement saw the emergence of *coagulase negative staphylococci* as major pathogens in post-cardiotomy endocarditis. [10,11] *CNS* is responsible for 9% of native valve infectious endocarditis in three major American series: 11/118 observed in the Richardson and al. study [12], 10/113 in Weinstein and al. study [13], 6/70 at George Washington Hospital and 4% in Wilson and al. study at the Mayo Clinic between 1970 and 1979 and in the Ohio State University Hospitals study [14]. In Paris, at Claude - Bernard Hospital, 2% of cases were observed between 1978 and 1988. In the ICE-MD study (International Collaboration on

Endocarditis Merged Database) 6.6% of infectious endocarditis were due to *CNS*. [15] The most challenging problem in *CNS* diagnostics is the assessment of their clinical relevance. The recognition of the infection is hampered by the difficulty of distinguishing between the infecting strain and the normal flora. Indeed, *CNS* have long been considered as contaminants in culture because they are commonly found in the normal flora of human skin and mucous membranes. [16] The old major series in the United States on septicemia, took little account of the pathogenic role of the *CNS*. In the Mac Gowan study published in 1975 [17], *Staphylococcus epidermidis*, as well as others, was considered a contaminant and was excluded from the analysis. In Weinstein's study, published in 1983 [18], the role of this germ was barely important. The isolation of *CNS* from multiple blood cultures in a patient with valvular or congenital heart disease suggests, in the absence of an intravascular foreign body, the diagnosis of infectious endocarditis. The presumption of infection is further enhanced when cultures represent the same strain. [19-20] A high rate of positivity for *CNS* among all blood cultures collected during the episode of the disease clearly indicates bacteremia and detection of growth in less than 48 hours may also be an indicator of *CNS* sepsis. [21] At least two blood cultures positive for *CNS* within 5 days or one single positive blood culture plus clinical evidence of infection, should be considered clinically relevant. [22,23] Another tool in discriminating between contamination and infection is differential time to positivity (TTP): TTP > 16 h [24, 25] or TTP > 36 h [26] has been associated with contamination in *CNS*. In our patient, two blood cultures among the three performed at admission were positive for *Staphylococcus hominis*. He was treated well, with a good evolution. This case demonstrates the need to be cautious in performing blood cultures with strict adherence to aseptic rules and in the interpretation of *CNS*-positive blood cultures and not to consider any positive blood culture to *CNS* as a simple contamination by skin flora.

4. CONCLUSION

CNS is the most commonly implicated organism in prosthetic valve endocarditis, they are rarely involved in infectious endocarditis on a native valve. Currently this germ is more and more involved in this infection. There are some criteria to differentiate between true infection and contamination but it is necessary to take the necessary precautions during the performance of blood culture to avoid a false diagnosis. This cardinal diagnostic and clinical dilemma can be solved only with close cooperation between clinicians and microbiology laboratory specialists.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

No Animals/Humans were used for studies that are base of this research.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

The authors confirm that the data supporting the findings of this research are available within the article.

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CONFLICT OF INTERES

The author declares no conflict of interest.

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