LETTER TO THE EDITOR

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Endotoxins and the importance of procalcitonin

Endotoxinas y la importancia de la procalcitonina

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Dear editor:

Gram-negative bacilli and cocci bacteria produce and release endotoxins, which are lipopolysaccharides found in the outer membrane of the cell wall. These endotoxins are responsible for releasing a series of inflammatory mediators such as IL1, TNFα and proteases, as well as lipid mediators such as prostaglandins, leukotrienes, thromboxanes and platelet-activating factor, ultimately activitating immune response cells like leukocytes, macrophages and platelets. These cells amplify the response to shock, generate a procoagulant state and produce alterations at the cellular level, for example, damage to the endothelium, which in the end benefit and worsen the state of septic shock (Figure 1).

MANIFESTATIONS OF ENDOTOXINS

Gram-negative bacilli and cocci bacteria release endotoxins that activate a series of inflammatory mediators. They activate immune response cells and produce a procoagulant state, causing damage to the endothelium and increasing the basal levels of procalcitonin. Finally, it leads to a immune response that benefits a state of septic shock, which is a leading cause of morbidity and mortality.

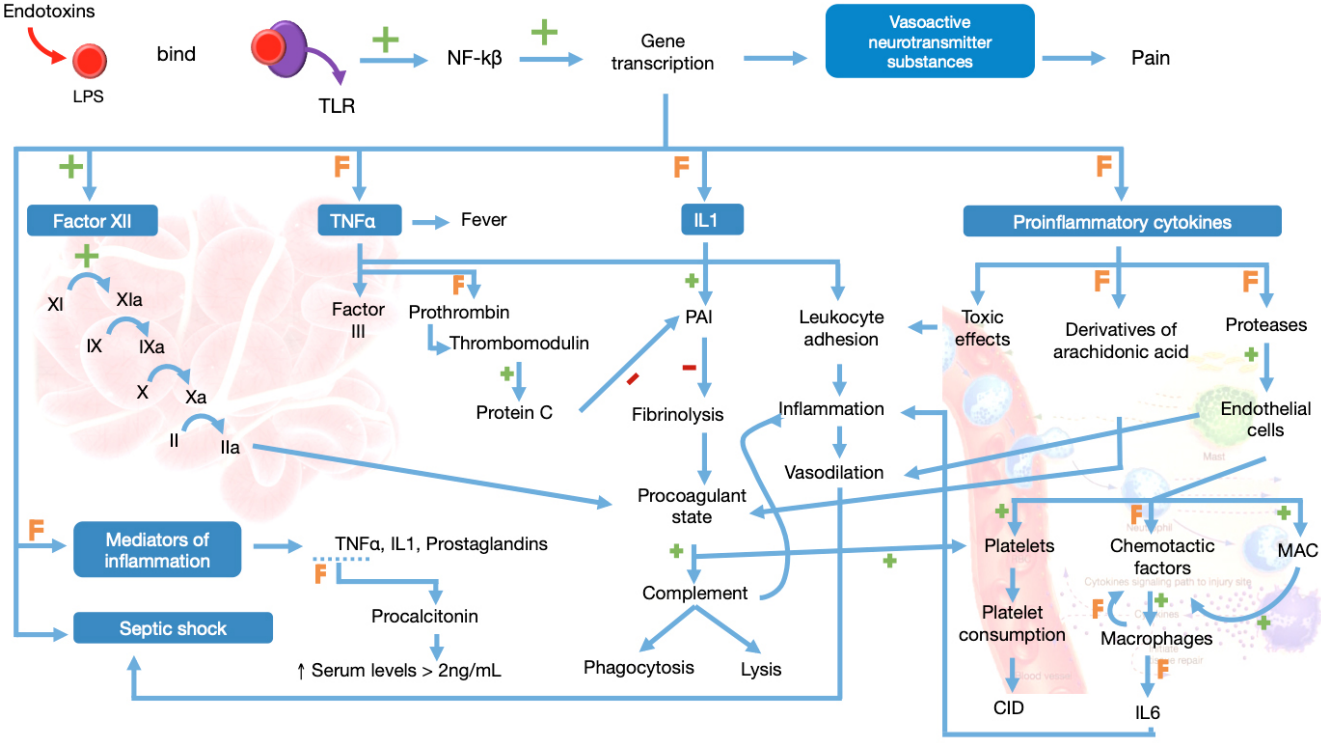

Figure 1. Manifestations of endotoxins.
LPS: Lipopolysaccharides; TLR: Toll-like receptors; NF-kβ: Nuclear factor kβ; TNFα: tumor necrosis factor alpha; IL: Interleukin; PAI: Plasminogen activator inhibitor; MAC: Membrane attack complex; CID: Disseminated intravascular coagulation; F: Free; +:Active; −:Inhibit.
Source: Own elaboration.

It is necessary to emphasize that shock is a leading cause of morbidity and mortality, despite the use of antibiotics. (1) Therefore, having available a marker that serves as a predictor of bacteremia and septic shock that is easy to obtain and perform, and that has specificity and sensitivity higher than 80% is necessary. This is the case of serum procalcitonin, an acute phase reactant that is usually found in plasma in minimum amounts that increase as the infection sets in and usually decrease with its resolution, thus confirming bacteremia. (2) This marker has a sensitivity of 83%, specificity of 93% and a positive predictive value greater than C-reactive protein (CRP) (3), which is why it should be used to diagnose and monitor the treatment of sepsis.

The multiple uses of markers for diseases of infectious origin such as meningitis and urinary tract infections should be considered, as it allows discerning an etiology of bacterial origin from other types of etiologies. Similarly, procalcitonin is useful for diagnosis of bacterial sepsis in adults, children (4), newborns and even in immunodeficient patients; it also acts as a guide to establish the efficacy of antibiotics during the treatment. (5)

In this regard, endotoxins imply a systemic compromise that, in the worst case, can lead to death by septic shock. In this way, it is important to have paraclinical tools at hand to achieve a timely diagnosis and determine the etiology of the clinical picture, and one of those tools is procalcitonin as a biomarker, since it is more specific and sensitive than other markers. (5)

The use of procalcitonin is relevant, but it should not be considered as the only and definitive option for the diagnosis of sepsis; it should be interpreted in the clinical context of each patient. Moreover, it is a biomarker that serves to monitor the infection, so re-evaluations should be made during the course of the disease. (6)

It is expected that its use will generate more efficient therapeutic strategies, so that it contributes to reducing mortality rates due to sepsis.

Conflict of interest

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To Universidad del Cauca.

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