



Procalcitonin cannot be used as a biomarker of infection in heart surgery patients with acute kidney injury



María Heredia-Rodríguez, M.D., Ph.D. ^{a,b}, Juan Bustamante-Munguira, M.D., Ph.D. ^{c,*}, Inmaculada Fierro, Ph.D. ^d, Mario Lorenzo, M.D., Ph.D. ^{a,b}, Pablo Jorge-Monjas, M.D., Ph.D. ^b, Esther Gómez-Sánchez, M.D., Ph.D. ^{a,b}, Francisco J. Álvarez, M.D., Ph.D. ^c, Sergio D. Bergese, M.D. ^e, José María Eiros, M.D., Ph.D. ^{a,g}, Jesús F. Bermejo-Martin, M.D., Ph.D. ^{a,f}, José I. Gómez-Herrerías, M.D., Ph.D. ^{a,b}, Eduardo Tamayo, M.D., Ph.D. ^{a,b}

^a BioCritik. Group for biomedical Research in Critical care Medicine, Valladolid, Spain

^b Department of Anesthesiology and Reanimation, Hospital Clínico Universitario de Valladolid, Valladolid, Spain

^c Department of Cardiovascular Surgery, Hospital Universitario de La Princesa, Madrid, Spain

^d Department of Pharmacology and Therapeutics, Valladolid University Physicians College, Valladolid, Spain

^e Department of Anesthesiology, The Ohio State University, Wexner Medical Center, Columbus, OH

^f Infection & Immunity Medical Investigation group, Hospital Clínico Universitario-IECSCYL, Valladolid, Spain

^g Department of Microbiology, Valladolid University Physicians College, Valladolid, Spain

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ABSTRACT

Purpose: We intended to assess how acute kidney injury impacts on procalcitonin levels in cardiac surgery patients, with or without infection, and whether procalcitonin might be used as a biomarker of infection in acute kidney injury.

Material and Methods: A case–control study was designed which included patients that had had cardiac surgery between January 2011 and January 2015. Every patient developing severe sepsis or septic shock ($n = 122$; 5.5%) was enrolled. In addition, consecutive cardiac surgery patients during 2013 developing systemic inflammatory response syndrome ($n = 318$) were enrolled. Those recruited 440 patients were divided into 2 groups, according to renal function.

Results: Median procalcitonin levels were significantly higher during the 10 postoperative days in the acute kidney injury patients. Regression analysis showed that postoperative day, creatinine, white blood cells and infection were significantly ($P < .0001$) associated to serum procalcitonin level. In patients with creatinine ≥ 2 , median procalcitonin levels were similar in infected and non-infected patients. Only when creatinine was less than 2 mg/L, the median procalcitonin levels were significantly higher in patients with infection, as compared to those with no infection.

Conclusions: In acute kidney injury patients, high procalcitonin levels are a marker of acute kidney injury but will not be able to differentiate infected from non-infected patients.

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1. Introduction

Cardiac surgery is an extended procedure in the developed world, with coronary artery bypass graft (CABG) and valve surgeries being the most common cardiac surgeries performed [1]. In Europe, 348,523 patients underwent cardiac surgery over a 2-year period (2006–2008) [1], with different proportions of CABG and valve surgeries depending

on the specific country. In Spain, isolated CABG represents 30% of all cardiac surgeries and isolated valve procedures constitutes 32% [1].

Postoperative sepsis is one of the major complications following cardiac surgery, and an independent predictor of mortality [2,3]. Hospital-acquired infections are common, especially ventilator-associated pneumonia and surgical site infections, with both infections being associated to high morbidity and mortality, and also to longer hospital stay [4,5].

Procalcitonin (PCT) is used as a biomarker of infection [6] and has been successfully used as guidance for the initiation and duration of antibiotic therapy in patients with respiratory infections and to discontinue antibiotic therapy in intensive care unit (ICU) patients, being able to reduce antibiotic use as compared with standard therapy [7,8].

One major limitation of interpreting PCT levels in cardiac surgery patients is that PCT is also one of the inflammatory mediators involved in the inflammatory response elicited by this type of intervention [9,10],

Abbreviations: CABG, coronary artery bypass graft; PCT, procalcitonin; ICU, intensive care unit; CPB, cardiopulmonary bypass; AKI, acute kidney injury; NAKI, no acute kidney injury; CRP, C-reactive protein; WBC, white blood cells.

* Corresponding author. Tel.: +34 915202268; fax: +34 915202201.

E-mail addresses: jbustamantemunguira@gmail.com, bustamj@hotmail.com (J. Bustamante-Munguira).

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