

Interrelation between arterial inflammation in acute coronary syndrome and circadian variation

Alberto Dominguez-Rodriguez, Maria Carrillo-Perez Tome, Pedro Abreu-Gonzalez

Alberto Dominguez-Rodriguez, Maria Carrillo-Perez Tome, Department of Cardiology, Hospital Universitario de Canarias, Tenerife, E-38320, Spain

Pedro Abreu-Gonzalez, Department of Physiology, Universidad de La Laguna, Tenerife E-38320, Spain

Author contributions: Dominguez-Rodriguez A, Carrillo Perez-Tome M and Abreu-Gonzalez P contributed equally to the conception, design, drafting and final approval of the manuscript.

Correspondence to: Alberto Dominguez-Rodriguez, MD, PhD, FESC, Department of Cardiology, Hospital Universitario de Canarias, Ofra s/n La Cuesta E-38320, Tenerife E-38320, Spain. adrvdg@hotmail.com

Telephone: +34-922-679040 Fax: +34-922-362716

Received: December 14, 2010 Revised: January 11, 2011

Accepted: January 17, 2011

Published online: February 26, 2011

strate their reliability, stability, and lack of variability and standardise the methodology of their measurement.

© 2011 Baishideng. All rights reserved.

Key words: Inflammatory markers; Acute coronary syndrome; Circadian rhythm

Peer reviewer: Hiroyasu Ueda, MD, PhD, Department of Cardiology, Sumitomo Hospital, 5-3-20, Nakanoshima, Kita-ku, Osaka 530-0005, Japan

Dominguez-Rodriguez A, Carrillo-Perez Tome M, Abreu-Gonzalez P. Interrelation between arterial inflammation in acute coronary syndrome and circadian variation. *World J Cardiol* 2011; 3(2): 57-58 Available from: URL: <http://www.wjgnet.com/1949-8462/full/v3/i2/57.htm> DOI: <http://dx.doi.org/10.4330/wjc.v3.i2.57>

Abstract

At present, the study into inflammatory markers has become a new tool which is most useful for establishing the prognosis of patients with acute coronary syndrome. The inflammatory substrate involved in acute coronary syndrome is extremely complex, with a large number of factors involved both in its activation and its modulation. It is known that C-reactive protein play a key role in the physiopathology of the atherosclerosis. Furthermore, scientific literature reports that the existence of a circadian rhythm in the triggering of cardiovascular accidents can suggest the implication of, or association with these physiological rhythms that show activity peaks at particular times of the day or night. Keeping in mind the potential association between inflammation and circadian rhythm, a better understanding of the kinetics of said markers could lead to improvements in their use in cardiovascular diseases. Considering the diversity of the diurnal variations in the intrinsic properties of the cardiovascular system, these should be kept in mind during the design of in vivo experimental studies. As such, the information available reinforces our opinion when suitably validating the biomarkers and the need to demon-

TO THE EDITOR

In his scholarly article, Fay^[1] reviewed the effects of C-reactive protein (CRP) on hemostasis, platelet function, and fibrinolysis. However, we would like to point out an important aspect of the significance of light-dark variations in CRP in acute coronary syndrome (ACS).

Cardiovascular parameters such as heart rate, blood pressure, endothelial function and fibrinolytic activity exhibit variations consistent with a circadian rhythm^[2]. Likewise, circulating biomarkers are subjected to variability arising from sampling procedures and biologic variation, which must be determined and adjusted for the interpretation of laboratory results^[3]. Diurnal variation may be an important source of heterogeneity or bias, and standardization for sampling time may be important in population-based studies, as well as in using these variables for additional coronary heart disease risk prediction in individuals^[3].

CRP represents the most extensively studied proinflammatory molecule, but additional effort is required

on the part of investigators to manage standardization of methodology, to establish cut-off points that separate populations with different risks, and to determine cost-effective timing and frequency of measurements^[3]. Conflicting clinical data exist with respect to its prognostic value, probably a reflection of the different times when samples were taken and the wide variation in the results obtained^[4]. Sánchez *et al*^[5] have demonstrated a variation in CRP kinetics in patients with ACS. The scientific literature has described circadian variations in the circulating concentrations of some cytokines and acute phase reactants^[3]. In a recent report, Rudnicka *et al*^[6] described one of the largest cross-sectional studies on seasonal and diurnal fluctuations in fibrinogen, CRP, fibrin d-dimer, tissue plasminogen activator antigen, and von Willebrand factor in 9377 men and women aged 45 years. These investigators demonstrated that diurnal variations exist for these biomarkers. Likewise, work by our group among patients with ACS has shown daytime variations in serum CRP concentrations, which displayed that the serum CRP values are significantly higher in the light phase (9:00 am) than in the dark phase (2:00 am)^[7,8].

Several lines of evidence suggest that an understanding of the chronobiological implications for cardiovascular therapy may prove fruitful. The kinetics of CRP is interesting, since a variation in the inflammatory functions during the 24-h period may hypothetically allow identification moments of the day or the night in which “inflammatory bursts” are most likely to occur and, accordingly, increase the incidence of cardiovascular events. Thus, the timing of drug administration can be altered to improve

therapeutic efficacy^[3].

In conclusion, preanalytic conditions, such as diurnal variation on CRP levels, are of paramount importance.

REFERENCES

- 1 **Fay WP.** Linking inflammation and thrombosis: Role of C-reactive protein. *World J Cardiol* 2010; **2**: 365-369
- 2 **Dominguez-Rodriguez A,** Abreu-Gonzalez P, Kaski JC. Disruption of normal circadian rhythms and cardiovascular events. *Heart Metab* 2009; **44**: 11-15
- 3 **Dominguez-Rodriguez A,** Abreu-Gonzalez P, Kaski JC. Inflammatory systemic biomarkers in setting acute coronary syndromes--effects of the diurnal variation. *Curr Drug Targets* 2009; **10**: 1001-1008
- 4 **Kaski JC.** C-reactive protein improves risk prediction in patients with acute coronary syndrome, or does it? *Eur Heart J* 2010; **31**: 274-277
- 5 **Sánchez PL,** Rodríguez MV, Villacorta E, Albarrán C, Cruz I, Moreiras JM, Martín F, Pabón P, Fernández-Avilés F, Martín-Luengo C. [Kinetics of C-reactive protein release in different forms of acute coronary syndrome]. *Rev Esp Cardiol* 2006; **59**: 441-447
- 6 **Rudnicka AR,** Rumley A, Lowe GD, Strachan DP. Diurnal, seasonal, and blood-processing patterns in levels of circulating fibrinogen, fibrin D-dimer, C-reactive protein, tissue plasminogen activator, and von Willebrand factor in a 45-year-old population. *Circulation* 2007; **115**: 996-1003
- 7 **Dominguez-Rodriguez A,** Garcia-Gonzalez M, Abreu-Gonzalez P, Ferrer J, Kaski JC. Relation of nocturnal melatonin levels to C-reactive protein concentration in patients with ST-segment elevation myocardial infarction. *Am J Cardiol* 2006; **97**: 10-12
- 8 **Dominguez-Rodriguez A,** Kaski JC, Abreu-González P, García-González MJ. [C-reactive protein kinetics: significance of light/dark variations in C-reactive protein in acute coronary syndrome]. *Rev Esp Cardiol* 2006; **59**: 1204-1205

S- Editor Cheng JX L- Editor Wang XL E- Editor Zheng XM