The use of USCOM device for hemodynamic evaluation of patients with acute heart failure and iron deficiency

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Abstract

INTRODUCTION:

Iron deficiency (ID) is one of the major causes of anaemia and it is estimated that more than 80% of patients with acute heart failure (AHF) has this condition. For this reason, the latest ESC (European Society of Cardiology) guidelines underline the need to evaluate periodically the state of anaemia and ID in patients with HF.

In this population, an appropriate hemodynamic evaluation is necessary. USCOM (UltraSound Cardiac Output Monitor) is a new non-invasive monitoring system, and it allows to assess cardiac output (CO) and parameters of preload, afterload, cardiac inotropism and systemic perfusion.

METHODS:

The adopted methodology consists of two steps: a first one for validating the USCOM device, and a second one aiming to assess a possible correlation between the USCOM parameters and the value of transferrin saturation (TSAT), the main parameter to define the ID condition. For this purpose, two populations were enrolled: fifteen left-ventricular-assist device (LVAD) patients for validating the USCOM device, and further fourteen AHF patients for testing the correlation between their ID condition and hemodynamic status.

RESULTS:

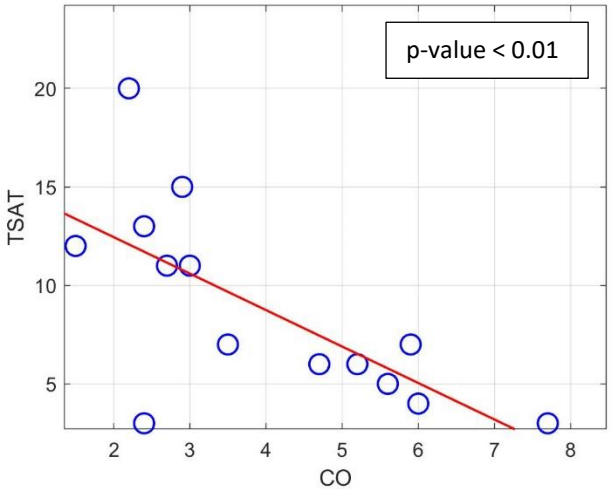
The hemodynamic monitoring performed via USCOM revealed that most patients had a reduction of preload values, cardiac inotropism indices and cardiac index compared to the average. Conversely, afterload indices were increased.

Analysing the possible relation among USCOM parameters and TSAT, a significant correlation emerged with a p-value < 0.05, and for some parameters (i.e. CO) also < 0.01.

CONCLUSION:

These preliminary evaluations appear to be promising for a TSAT prediction in function of some USCOM parameters. This is important because TSAT value is not always available in emergency department, pushing sometimes the physician to prefer blood transfusion than iron supplementation. However, more data and further analyses are needed.

Image



Recent Publications

1. Loncar G, Obradovic D, Thiele H, von Haehling S, Lainscak M. (2021) Iron deficiency in heart failure. ESC Heart Fail. 8(4):2368-2379.
2. McDonagh TA, Metra M, Adamo M, et Al (2021) 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. Eur Heart J. 21;42(36):3599-3726.
3. van Lelyveld-Haas LE, van Zanten AR, Borm GF, Tjan DH. (2008) Clinical validation of the non-invasive cardiac output monitor USCOM-1A in critically ill patients. Eur J Anaesthesiol. 25(11):917-24.
4. Jankowska EA, Kirwan BA, Kosiborod M, et Al (2021) The effect of intravenous ferric carboxymaltose on health-related quality of life in iron-deficient patients with acute heart failure: the results of the AFFIRM-AHF study. Eur Heart J. 17;42(31):3011-3020.
5. Vaidya Y et Al. (2022) Left Ventricular Assist Devices. StatPearls Publishing.

Biography

Dr Claudia Carelli is an Emergency Resident at University of Naples “Federico II” and she is training in the emergency department of C.T.O. Hospital of Naples. Dr Claudia Carelli has her expertise in hemodynamic monitoring and in the using of non-invasive device.

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Notes/Comments: