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LETTER TO THE EDITOR

Lack of correlation between the left ventricular outflow tract velocity–time integral and the stroke volume index: Should we be worried about that?

Ausencia de correlación entre la integral velocidad-tiempo en el tracto de salida del ventrículo izquierdo y el índice de volumen sistólico: ¿deberíamos preocuparnos?

Dear Editor,

We read the article of Blancas et al. regarding the lack of correlation between the left ventricular outflow tract velocity–time integral (LVOT VTI) obtained by transthoracic echocardiography (TTE) and the stroke volume (SV) index measured with the pulmonary artery catheter (PAC) or PiCCO® monitor.[1] Given that the LVOT VTI is independent of the body surface area,[2] these results are a bit surprising, since a strong correlation between the LVOT VTI and the SV index was intuitively expected. This study is one more among other investigations that question the interchangeability between echocardiography and PAC or cardiac output (CO) monitors for estimating the SV or CO.[3] By contrast, other studies showed good correlation between these methods.[4]

Interchangeable or not for determining absolute values of the SV or CO, TTE has shown to be useful to track directional changes of these parameters, and thus for assessing the response to interventions, such as fluid challenges or inotropic stimulation as well as for ongoing assessment of the hemodynamic status of the patients.[5] For example, a significant LVOT VTI change after a treatment indicates a response to this therapy, such as a mini-fluid challenge or an inotropic agent; to know if the SV or CO improved or worsened on repeated patient assessment, the LVOT VTI (and the minute distance, i.e., LVOT VTI $\times$ heart rate[2]) gives the answer. As noted, to reply these real-life questions there is no need to have a PAC, a central venous catheter or an arterial line or to expose patients to any risks. In addition to estimating the CO status, there are other very important data provided by the TTE for hemodynamic optimization such as the assessment of filling pressures and/or the extravascular lung water (just observing for the presence and amount of B lines on lung ultrasound), as well as evaluating the size and function of both ventricles, valvular problems, pericardial fluid, or the impaction of positive pressure ventilation on the right ventricle, among other variables. This is in our opinion the smartest way to use TTE and therefore the first-line (and often the single) method that intensivists have in many austere intensive care units for hemodynamic management.

Given that neither the TTE nor CO monitors should be used in isolation in the decision-making process, is there a real need for a PAC or a PiCCO®, although not interchangeable with the TTE for estimating the SVI or CO in absolute terms? The answer is probably that a one-size-fits-all method for hemodynamic monitoring does not exist and that both techniques are complementary, instead of mutually exclusive. However, in practice, it seems that most patients can be successfully managed without a PAC or a CO monitor, and that the latter should be carefully indicated for patients in whom an estimation of the SV or CO by TTE is not feasible or reliable, when performing a TTE is not possible or when the information provided by this method is not enough to help in decision-making.

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