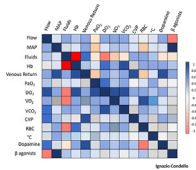


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## MACHINE LEARNING AND GOAL DIRECT PERFUSION

### To the Editor:



Metabolism management plays an essential role during cardiopulmonary bypass (CPB). There are different metabolic-management devices integrated to heart–lung machines; the most commonly used and accepted metabolic target is indexed oxygen delivery ( $280 \text{ mL/min/m}^2$ ) and cardiac index ( $2.4 \text{ L/min/m}^2$ ), which can be managed independently or according to other metabolic parameters.<sup>1</sup> During CPB, the realization of goal-directed perfusion involves the integration of different parameters that have a direct and indirect linear correlation.<sup>2</sup> We reported our experience in a graphical presentation of the central pictures with the interactions of the metabolic parameters on a case series of 500 CPBs. The blue color code shows a positive correlation and the red code a negative correlation between the related parameters. Machine learning has experienced a revolutionary

decade, with advances across many disciplines. There has been enormous interest in applying machine learning and artificial intelligence to health care and, in particular, to cardiovascular perfusion and cardiac surgery. During CPB, the fluids in the goal-directed perfusion have an effect in increasing the flow rate and venous return but have a negative effect on the oxygen delivery, predisposing to the consumption of blood products.<sup>3</sup> We think that integrating these graphs across multiple numbers will help in the future to understand the cause-and-effect relationships on various rehabilitation programs.

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