The aim of this study is to make a first step towards a model predictive clinical decision support system for fluid administration, by extending the current fluid exchange models with a regulated cardiovascular circulation, to allow prediction of these indices” Rosalina et al (2019).

Abstract:

The optimal fluid administration protocol for critically ill perioperative patients is hard to estimate due to the lack of tools to directly measure the patient fluid status. This results in the suboptimal clinical outcome of interventions. Previously developed predictive mathematical models focus on describing the fluid exchange over time but they lack clinical applicability, since they do not allow prediction of clinically measurable indices. The aim of this study is to make a first step towards a model predictive clinical decision support system for fluid administration, by extending the current fluid exchange models with a regulated cardiovascular circulation, to allow prediction of these indices. The parameters of the model were tuned to correctly reproduce experimentally measured changes in arterial pressure and heart rate, observed during infusion of normal saline in healthy volunteers. With the resulting tuned model, a different experiment including blood loss and infusion could be reproduced as well. These results show the potential of using this model as a basis for a decision support tool in a clinical setting.
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