

Effects and Impact of Fluid Creep in Intensive Care Unit Patients Receiving Intravenous Fluid Therapy after One Week

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The management of fluids plays a crucial role in the ICU and requires specific customization for each patient, primarily aiming to restore cardiovascular stability. However, we know that excessive fluid administration is associated with increased mortality among hospitalized patients. In this context, we can define the term "fluid creep" as the amount of intravenous fluids used to dilute medications and to maintain catheter patency. Our study focused on fluid creep conducting a retrospective analysis at a single center using data from the MargheritaTre database.

Aims: The aim was to identify variables associated with changes in fluid creep distribution through a linear model and to implement a classification model to identify patients at risk of receiving a high quantity of creep after one week of ICU admission.

Methods: The study included 4786 patients who received an average of 1.6 liters of fluids within the first 24 hours and an average of 2.4 liters during the first week of hospitalization.

Results: Results show a significant association with sodium (P-value 0.032), bicarbonate (P-value 0.028), respiratory failure (P-value < 0.001), brain coma (P-value 0.039), antiplatelet therapy (P-value 0.02), surgery (P-value 0.044), septic shock (P-value < 0.001), intensive treatment (P-value < 0.01), creep within the first 24 hours (P-value < 0.001), heart rate (P-value 0.028), respiratory abnormalities (P-value < 0.01), mixed shock (P-value 0.003), COPD (P-value 0.025), AKI with non-conservative diuresis (P-value 0.029), hypovolemic shock (P-value 0.027), mild chronic pulmonary disease (P-value 0.045), and cerebral vasculopathy (P-value 0.048). The best machine learning prediction results showed an accuracy of 0.80 on the hidden test set in predicting patients at risk of receiving high fluid creep.

Conclusion: In conclusion, this study investigates the role of various variables associated with fluid creep and it constructs a model to identify patients at risk of high creep.