Comparison of Goal-Directed Fluid Therapy using LiDCOrapid System with Regular Fluid Therapy in Patients Undergoing Spine Surgery as a Randomised Clinical Trial

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Background: Goal-directed fluid therapy (GDFT) is a new concept to describe the cardiac output (CO) and stroke volume variation to guide intravenous fluid administration during surgery. LiDCOrapid (LiDCO, Cardiac Sensor System, UK Company Regd 2736561, VAT Regd 672475708) is a minimally invasive monitor that estimates the responsiveness of CO versus fluid infusion. We intend to find whether GDFT using the LiDCOrapid system can decrease the volume of intraoperative fluid therapy and facilitate recovery in patients undergoing posterior fusion spine surgeries in comparison to regular fluid therapy.

Methods: This study is a randomised clinical trial, and the design was parallel. Inclusion criteria for participants in this study were patients with comorbidities such as diabetes mellitus, hypertension, and ischemic heart disease undergoing spine surgery; exclusion criteria were patients with irregular heart rhythm or severe valvular heart disease. Forty patients with a previous history of medical comorbidities undergoing spine surgery were randomly and evenly assigned to receive either LiDCOrapid guided fluid therapy or regular fluid therapy. The volume of infused fluid was the primary outcome. The amount of bleeding, number of patients who needed packed red blood cell transfusion, base deficit, urine output, days of hospital length of stay and intensive care unit (ICU) admission, and time needed to start eating solids were monitored as secondary outcomes.

Results: The volume of infused crystalloid and urinary output in the LiDCO group was significantly lower than that of the control group ($p = .001$). Base deficit at the end of surgery was significantly better in the LiDCO group ($p < .001$). The duration of hospital length of stay in the LiDCO group was significantly shorter ($p = .027$), but the duration of ICU admission was not significantly different between the two groups.

Conclusion: Goal-directed fluid therapy using the LiDCOrapid system reduced the volume of intraoperative fluid therapy.