Intraoperative Fluid Management for Patients Undergoing Renal Transplantation: SVV versus CVP

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Background and Goal of Study:

Optimizing intravascular volume is crucial for early graft function after renal transplantation (RT). Central venous pressure (CVP) represents a standard decision-making tool in fluid management in RT, despite the various potential complications and limitations. Stroke volume variation (SVV) is a simple and less invasive hemodynamic variable for evaluating fluid responsiveness and preload status and its use was associated with improved outcomes in patients undergoing high-risk surgery. The aim of this study was to evaluate the effectiveness of SVV versus CVP in guiding fluid administration during RT.

Materials and Methods: We retrospectively analyzed two groups of RT recipients who underwent RT under general anesthesia and volume control ventilation: standard CVV-guided (Group A, n=16) vs. SVV-guided (Group B, n=16) fluid administration. The SVV was derived from the FloTrac/Vigileo system and the protocol consisted of a baseline sodium saline administration rate of 2 ml/kg/hr and any additional bolus if $SVV > 12\%$. Vasopressors, mannitol and furosemide were used in both groups according to the institution protocol. We examined the differences in intraoperative fluid volumes, graft dysfunction on 7th postoperative day as assessed by the need for renal replacement therapy (RRT), length of hospital stay (LOS) and 30-day survival rates between the two groups.

Results and Discussion: The average volume of total fluids administered (calculated as total crystalloid over patient's weight and surgical time) was 14.6 ± 8.3 ml/kg/hr for the CVP group and 12.4 ± 6.6 ml/kg/hr for SVV group ($p=0.04$). The total intraoperative fluid balance for the CVV group was 3630 ± 1460 ml and for the SVV group was 3010 ± 850 ml ($p<0.001$). The median LOS was 6 [5, 9.5] days for the CVP group and 5 [4, 7] days for the SVV group ($p=0.025$). 30-day survival rates and graft dysfunction rates did not differ between the two groups.

Conclusion(s): These results suggest that SVV may be a useful tool for optimizing intravascular volume during RT and it could also lead to shorter LOS. Future studies should examine the effect of SVV-guided fluid management on parameters of graft function postoperatively.