Assessment of the Pleth Variability Index (PVI) to Guide Fluid Therapy during Renal Transplantation

Follin A., Le Guen M., Fischler M. *Eur J Anaesthesiol.* 2013; 30 (Supplement 51)

Background and Goal of Study

Perioperative fluid management has a major impact on early graft function in kidney transplantation and a direct relationship with morbidity and mortality, especially in high-risk patients, has been previously demonstrated. Pleth Variability Index (PVI) is a non-invasive dynamic index derived from plethysmographic variability induced by mechanical ventilation in anesthetized patients. It has been currently used in major surgery to predict fluid responsiveness 1. The goal of the study was to determine whether PVI accurately predicted fluid responsiveness in patients undergoing kidney transplantation.

Materials and Methods

After written consent, 46 anesthetized patients were included and studied during renal transplantation. Hemodynamic parameters from esophageal Doppler (stroke volume, SV) as gold standard and from PVI were recorded before and after fluid challenges (250 ml of crystalloids). Fluid responsiveness was defined as an increase in SV (ΔSV) of 10% or greater. Subgroup analyses were performed for the first fluid challenge.

Results and Discussion

194 fluid challenges were realized. 3 patients were excluded for unavailable data for PVI or SV, and 43 challenges due to a Perfusion Index (PI) < 4%2. 64 challenges (42%) were considered as responders to fluid challenge. Fluid challenge was associated with a significant decrease in PVI in overall cases (11 [7-16] vs 8 [6-14], p< 0.001), but PVI at baseline was not able to discriminate responders (11[8-15] vs 9 [5-15] , p=0.33) and non-responders (10 [6-16] vs 8 [5-14], p=0.07). Area under the ROC (Receiver Operating Characteristic) curve for PVI was not different from 0.5 for overall challenges and for the first fluid challenges. A baseline PVI value of 13 had 62% sensitivity and 36% specificity for predicting a 10% SV increase.

Conclusion

PVI was not an accurate predictor of fluid responsiveness during renal transplantation. Goal directed fluid therapy in that context can better rely on esophageal Doppler.

References

1. Cannesson et al. Br J Anaesth 2008;101(2):200-206
2. Broch et al. Acta Anaesthesiol Scand 2011;55(6):686-93