



Assisted Fluid Management Improves Sublingual Microvascular Flow during High-Risk Abdominal Surgery: A Randomized Controlled Trial

Sean Coeckelenbergh MD, Marguerite Entzeroth MD, Maxim Soucy-Proulx MD, Joseph Rinehart, MD, Jacques Duranteau MD PhD, Alexandre Joosten MD PhD

Background:

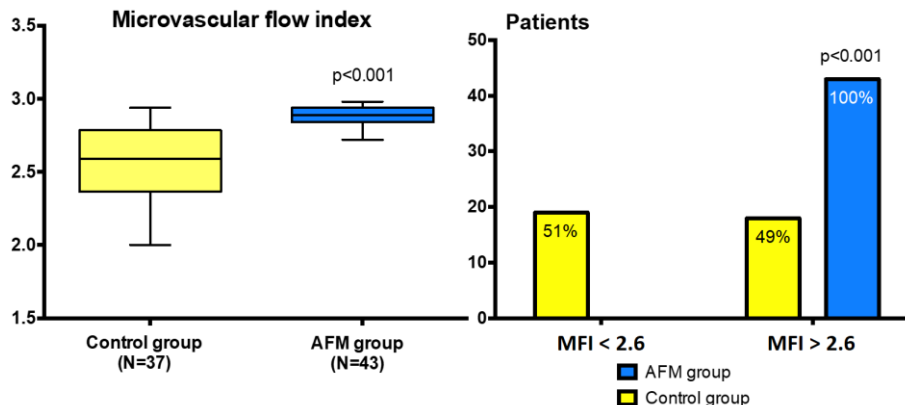
Compliance with goal-directed fluid therapy (GDFT) protocols among anesthesiologists remains low because of the high workload and attention required. The assisted fluid management (AFM) system is a novel decision support tool designed to help clinicians apply GDFT protocols. This system predicts fluid responsiveness better than anesthesia practitioners and achieves higher stroke volume (SV) and cardiac index (CI) values during surgery. We tested the hypothesis that an AFM-guided GDFT strategy would also be associated with better sublingual microvascular flow compared to a standard GDFT strategy.

Methods:

This two-arm, prospective, randomized controlled, single blinded, superiority study considered for inclusion consecutive patients undergoing high-risk abdominal surgery who required an arterial catheter and advanced uncalibrated SV monitoring (ClinicalTrials.gov: NCT03965702). It was accepted by the Paris Ouest Ethical Committee. All patients gave written informed consent. In the standard GDFT group (control group), the fluid strategy consisted of manual titration of fluid challenges to optimize SV. In the AFM-guided GDFT group (AFM group), the fluid strategy was based on fluid challenge recommendations from the AFM system. In both groups, vasopressors were administered to maintain mean arterial pressure >70 mmHg. The primary outcome was mean microvascular flow index (MFI), measured intraoperatively at four time points. Secondary outcomes included SV, CI, and postoperative lactate.

Results:

A total of 86 patients were enrolled. MFI was higher in the AFM group than in the control group (median [IQR₂₅₋₇₅]: 2.88 [2.84-2.93] vs. 2.60 [2.40-2.80] points, difference -0.29; 95% CI (-0.39 to -0.19) P<0.001). CI and SVI were higher and arterial lactate concentration lower at the end of surgery in the AFM group. Patients in the AFM group received a higher fluid volume but three times less norepinephrine than those in the control group (P<0.001).



Conclusion Use of an AFM-guided GDFT strategy resulted in higher sublingual microvascular flow during surgery compared to use of a standard GDFT strategy.