Hémodynamique

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Assisted Fluid Management System Improves Microcirculation during High-Risk Abdominal Surgery: A Randomized Controlled Trial

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Position du problème et objectif(s) de l'étude:
The assisted-fluid management (AFM) system aims to maintain high compliance to GDFT protocols. Itpredicts fluid responsiveness and achieves higher stroke volume (SV) and cardiac index (CI) during surgery than anesthesia practitioners(1). However, its effect on sublingual microcirculation is unknown.We hypothesized that patients randomized to an AFM-guided goal-directed fluid therapy (GDFT) strategy would have better sublingual microcirculation when compared to patients receiving standard GDFT.

Matériel et méthodes:
This bicenter, parallel, prospective randomized controlled single blinded superiority study (ClinicalTrials.gov: NCT03965702) included patients undergoing high-risk abdominal surgery. It was accepted by the Paris Ouest Ethical Committee. All patients gave written informed consent. Patients had a radial arterial catheter connected to an advanced SV monitoring device. In the standard GDFT group, manual titration of fluid challenges aimed to optimize SV and minimize preload dependence (SV variation over 12%). In the AFM-guided GDFT group, fluid boluses were guided by AFM software. In both groups, patients received 250 ml fluid challenges and vasopressors were titrated to maintain mean arterial pressure over 70 mmHg. The primary outcome was mean microvascular flow index (MFI), measured intraoperatively at four different time points. Secondary outcomes included other microvascular variables, indicators of tissue perfusion, SV, CI, and postoperative outcome.

Résultats & Discussion:
A total of 86 patients were enrolled (Figure 1). MFI was higher in the AFM-guided GDFT group than 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 less than 0.001) (Figure 2). Patients in the AFM-guided GDFT group received a higher total volume of fluid but three times less norepinephrine than those in the control group (P less than 0.001). CI and SVI were higher (3.2 ± 0.5 vs 2.7 ± 0.7 l.min-1.m-2; p = 0.001 and 42 [35-47] vs 36 [32-43] ml.m-2; p =0.018) and arterial lactate concentration was lower at the end of the surgery in the AFM-guided GDFT (2.1 [1.5-3.1] vs 2.9 [2.1-3.9] mmol.l-1; p = 0.026) compared to the control group.

Conclusion:
An AFM-guided GDFT strategy resulted in higher sublingual microcirculation during surgery when compared to a standard GDFT strategy. Although median MFI values are relatively high in both groups(2.88 vs 2.60), it is important to note that values in the AFM-guided GDFT group are consistently near maximum values (Figure 2). SVI, CO, and lactate values reinforce the observation that AFM-guided fluid therapy improves CO and tissue perfusion when compared to standard GDFT.

Références bibliographiques:
1) Anesthesiology 2021; 135: 273-283

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FIGURE 1

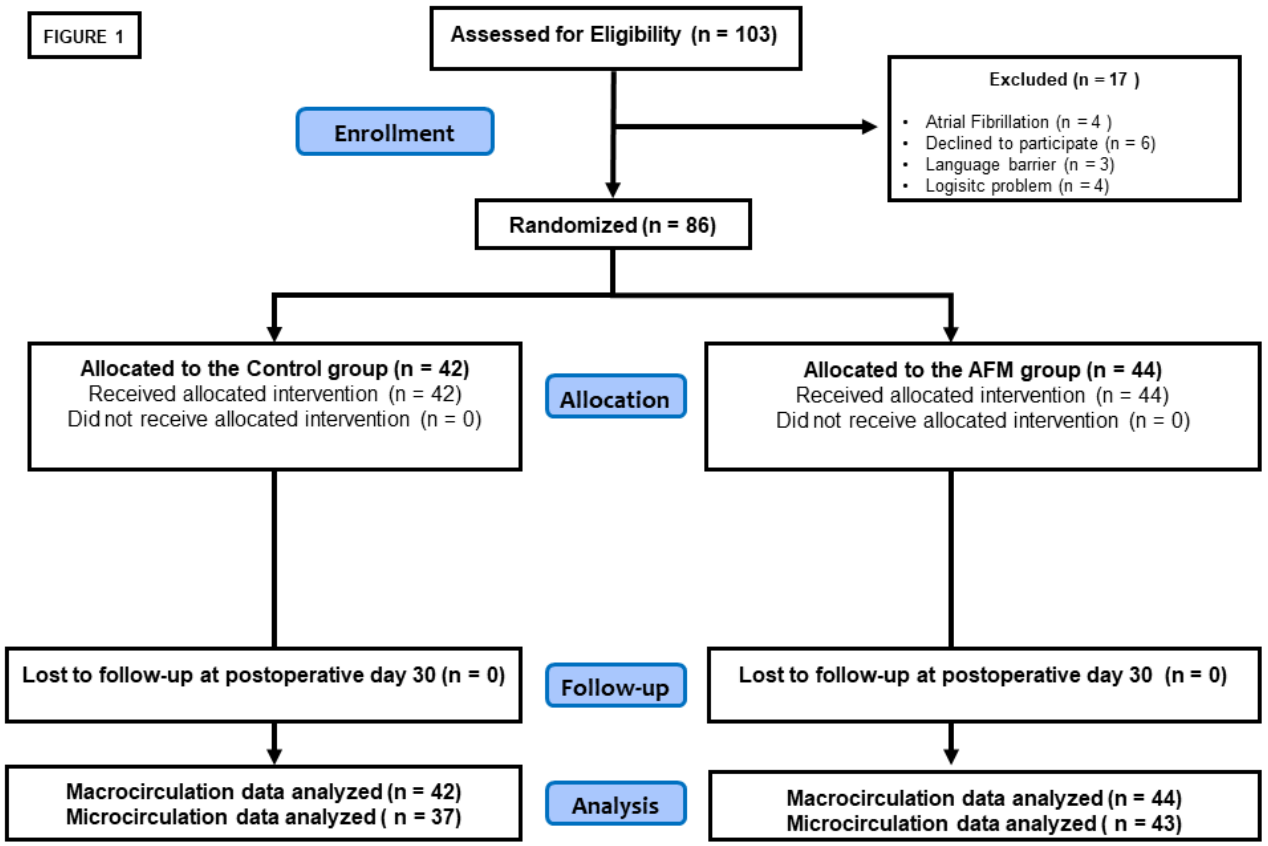
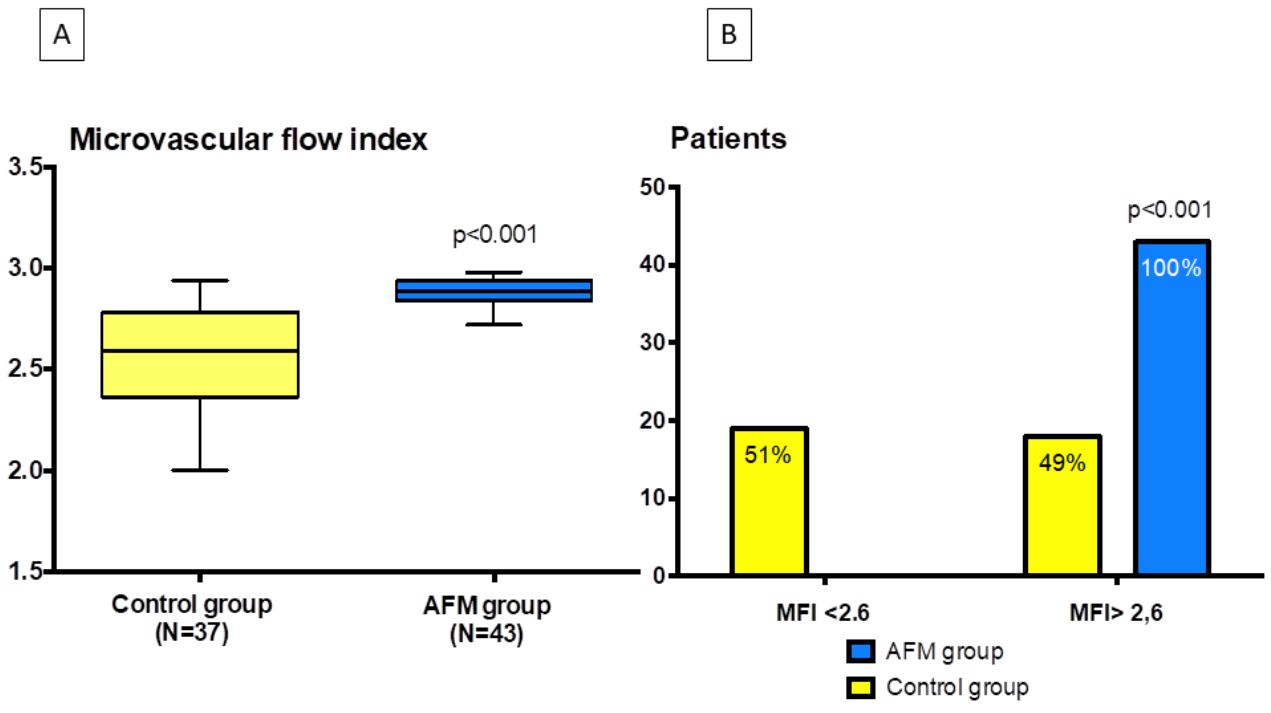


FIGURE 2



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