Measuring Vascular Access Flow: the Accuracy of Different Methods

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BACKGROUND
Vascular access flow surveillance is widely recommended, but its real benefits are still under discussion. Moreover, the accuracy of surveillance methods are still being questioned.

OBJECTIVE
To assess the accuracy of three vascular access flow measurement techniques, ultrasound dilution (UD), ionic dilution (AFM) and thermodilution (BTM).

STUDY
• Open, prospective, cross-sectional, single-centre, observational trial;
• 63 patients (52 AV fistulas, 11 PTFE grafts);
• In two midweek dialysis treatments in two consecutive weeks, patients had in the first 90 minutes of their treatments two Qa measurements per dialysis by ultrasound dilution (TS), the gold standard, and ionic dilution (AFM), followed by one measurement by thermodilution (BTM), the standard routine measurement technique of our dialysis unit.

RESULTS
• Average Qa measured by ultrasound dilution was 1354.6±658 ml/min.
• Transonic ultrasound dilution proved to have the higher accuracy and reproducibility (r between measurements >0.99).
• AFM results showed higher correlation with Transonic values in the same patients (0.81) than BTM (0.72).
• The average Qa between the AFM and Transonic measurement was 283±237ml/min. These methods were identical in native AVF or PTFE grafts.
• The average difference between the two measurements was 107 ± 387 ml/min (mean ± SD)

STUDY’S CONCLUSION
• Qa measurements by different methods showed significant variability; therefore their results cannot be compared among themselves.
• Ultrasound dilution is the most accurate technique.
• Threshold Qa values for intervention cannot be universal; they have to be calibrated according to the technique in use.

TAKE HOME
In the study the performance of the Transonic ultrasound dilution technology proved to be the most accurate, reproducible, provided higher values of Qa than BTM or ionic dilution.

REFERENCE: