



Association of Vascular Access Flow and Volume Status on Fistula Arm by Bio-impedance Analysis in Hemodialysis Patients



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Introduction and objectives

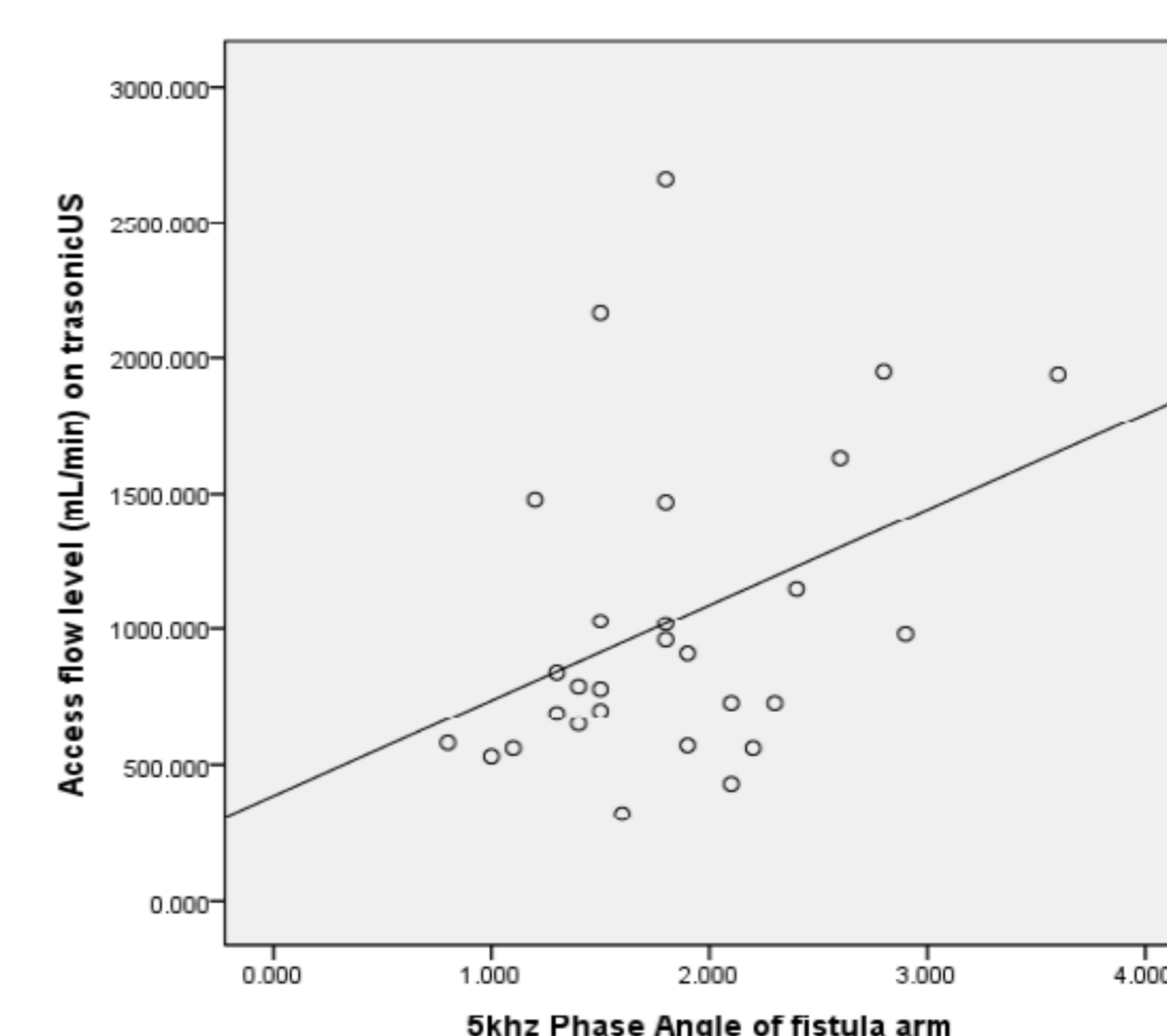
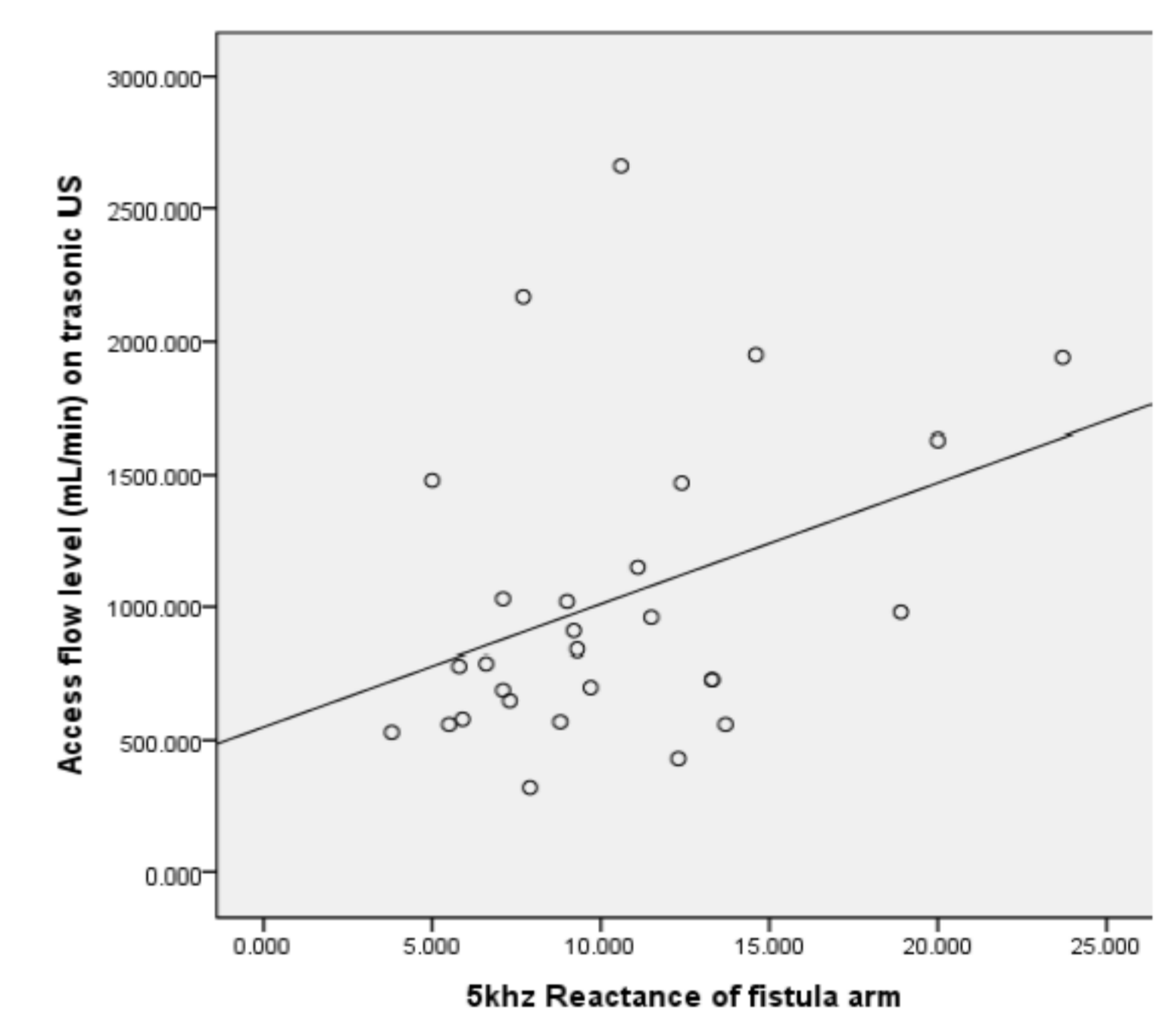
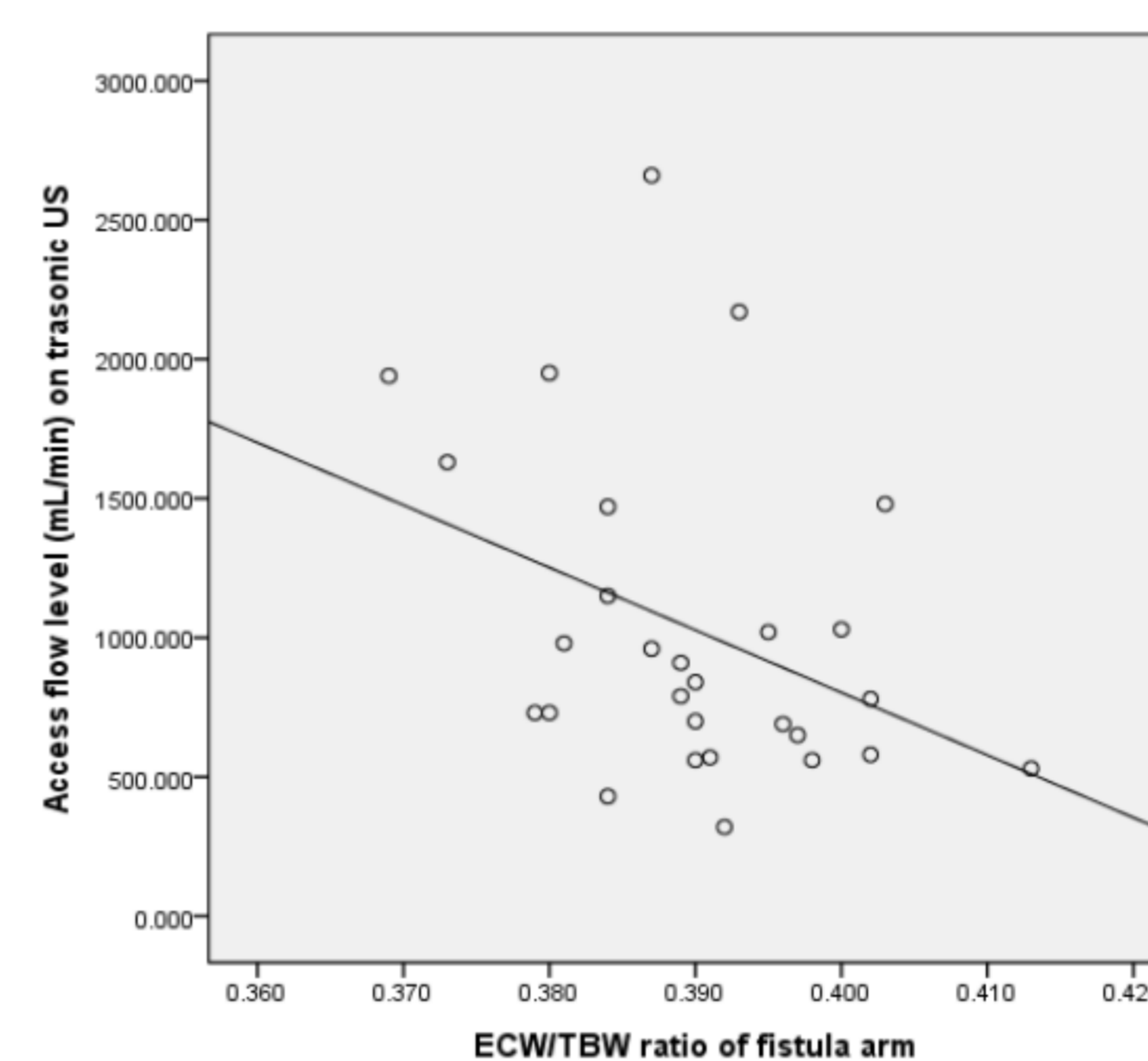
- Multi-frequency bio-impedance is a tool of body composition measure and can monitor changes in extracellular volume during dialysis.
- Arterio-venous fistulae (AVF) could potentially affect fluid retention in the arm.
- We investigated whether multi-frequency bio-impedance could detect AVF stenosis or association of AVF with fluid retention in the AVF arm.

Methods

- We measured the extracellular water (ECF) and total body water (TBW) in AVF arm following hemodialysis by multi-frequency bio-impedance (Inbody S10[®]) using an eight-electrode contact technique.
- We measured AVF or AVG flow by transonic ultrasonography using an ultrasound dilution technology (HD 03[®]) in hemodialysis.

Results

- Total 77 patients (male 39 patients) were enrolled.
- Cause of ESRD => DM : non-DM = 42 : 35
- The mean age of patients was 58.20 ± 13.74 years.
- The ECW/TBW ratio of fistula arm was a significantly higher than the ECW/TBW ratio of non-fistula arm (0.387 ± 0.01 vs. 0.379 ± 0.01; p<0.05).
- The ECW/TBW ratio of fistula arm was a significantly negative correlation with access flow level (mL/min) on fistula (p<0.05).
- The 5kHz reactance of fistula arm was a significantly positive correlation with access flow level (mL/min) on fistula (p<0.05)
- The 5kHz Phase Angle of fistula arm was a significantly positive correlation with access flow level (mL/min) on fistula (p<0.05)



Conclusions

- Absolute and also relative extracellular fluid volumes are increased in the fistula arm of hemodialysis.
- We thought that extracellular fluid volumes in the fistula arm were associated with access flow level (mL/min) and/or relative fistula stenosis.
- We suggest that multi-frequency bio-impedance can be a useful assistant tool of vascular access flow measure.

References

- Booth J, Pinney J, Davenport A. The effect of vascular access modality on changes in fluid content in the arms as determined by multifrequency bioimpedance. *Nephrol Dial Transplant* 26:227-231, 2001.
- Zhu F, Leonard EF, Levin NW. Extracellular fluid redistribution during haemodialysis: bioimpedance measurement and model. *Physiol Measure* 2008; 29: S491-S501
- Van der Kerkhof J, Hermans M, Beerenhout C et al. Reference values for multifrequency bioimpedance analysis in dialysis patients. *Blood Purif* 2004; 22: 301-306
- Bedogni G, Malavolti M, Severi S et al. Accuracy of an eight-point tactile-electrode impedance method in the assessment of total body water. *Eur J Clin Nutr* 2002; 56: 1143-1148

