

## Maximizing native arteriovenous fistulae rates in patients with diabetes mellitus. Is routine color Doppler vascular mapping in preoperative planning of value?

Dear Editor,

Currently, solid data supporting the significance of routine preoperative color Doppler ultrasonographic (CDUS) vascular mapping is limited and conflicting<sup>1</sup>. We aimed to compare the type of preoperative assessment (physical examination alone vs. combined CDUS vascular mapping and physical examination) in terms of patency at 12 months from performed vascular access (VA).

Diabetic patients with first time permanent VA, native arteriovenous fistula (AVF) or arteriovenous grafts (AVG) were included in the analysis. Patients were assigned into two groups: in Group A selection of VA relied upon physical examination and medical history, during preoperative surgical assessment while Group B patients underwent CDUS vascular mapping in addition. Eligibility criteria were: threshold arterial luminal diameter 2 mm and venous diameter 2.5 mm and 4 mm for native AVF and AVG creation, respectively. The total number of native AVF eventually created and access primary patency rates at 12 months were compared.

We studied 136 diabetic patients, aged  $71 \pm 13$  years, 92 males and 44 females. In total 102 patients received AVF (75 %) and 34 (25 %) AVG. Group A included 68 patients (48 males, 20 females, aged  $69 \pm 9$  years), of whom 46 (68 %) received native AVF while in 22 (32 %) grafts were implanted. Group B consisted of 68 patients (44 males, 24 females, aged  $65 \pm 12$  years), in whom 56 (82 %) native AVF and 12 (18 %) AVG were recorded. Performance of CDUS mapping seemed to significantly increase the rate of successfully created native AVF from 68 % ( $n=46$ ) in group A to 82 % ( $n=56$ ) in group B ( $p < 0.01$ ). Patency rate at 12 months was significantly higher in Group B patients compared to Group A patients (88 % vs. 71 %,  $p < 0.01$ ).

Despite the conflicting data, a summary of the evidence in this field supports the clinical value and usability of CDUS mapping in primary native AVF creation<sup>2</sup>. In a retrospective analysis, vascular mapping resulted in significant decrease in native AVF creation. On the other hand, favorable patency was demonstrated when surgery was preceded by physical examination alone. Three randomized trials compared routine CDUS mapping to clinical examination, regarding AVF creation and patency rate, reporting however inconsistent results<sup>3</sup>.

Several studies support the consideration that pre-operative CDUS results in an increase in proximal and distal AVF creation rates, not improving though maturation of the former, or even demonstrating a reduction in native AVF maturation rate. However, most reported studies are not randomized, and their primary end-point is the creation number rather than the maturity and VA primary patency.

In conclusion, pre-operative CDUS vascular mapping facilitates proper site selection, maximizes the number and maturation of native AVF, and ensures high primary patency rates in diabetic patients.

### References

1. Wong CS, McNicholas N, Healy D, Clarke-Moloney M, Coffey JC, Grace PA, et al. A systematic review of preoperative duplex ultrasonography and arteriovenous fistula formation. *J Vasc Surg.* 2013; 57: 1129-1133.
2. Schinstock CA, Albright RC, Williams AW, Dillon JJ, Bergstralh EJ, Jenson BM, et al. Outcomes of arteriovenous fistula creation after the Fistula First Initiative. *Clin J Am Soc Nephrol.* 2011; 6: 1996-2002.
3. Ferring M, Claridge M, Smith SA, Wilmink T. Routine preoperative vascular ultrasound improves patency and use of arteriovenous fistulas for hemodialysis: a randomized trial. *Clin J Am Soc Nephrol.* 2010; 5: 2236-2244.

### Conflicts of interest

None declared by authors.

**Keywords:** Arteriovenous fistula, color Doppler, physical examination, renal dialysis

### Acknowledgement

ClinicalTrials.gov Identifier: NCT02705417.

Giannikouris IE<sup>1,2</sup>, Bacchini GM<sup>1</sup>

<sup>1</sup>Department of Nephrology, Dialysis and Transplantation, Alessandro Manzoni Hospital, Lecco, Italy

<sup>2</sup>Medifil AE, Hemodialysis Center, Peristeri, Attiki, Greece