

## Percutaneous arteriovenous dialysis fistula



Alexandros Mallios, MD, Hortence Fonkoua, MD, Mahmoud Allouache, MD, and Benoit Boura, MD,  
Paris, France

A 56-year-old woman with end-stage renal disease had creation of a percutaneous arteriovenous fistula (pAVF) at the level of the proximal forearm between the proximal radial artery (PRA) and the deep communicating vein. The Ellipsys Vascular Access System (Avenu Medical, San Juan Capistrano, Calif), Food and Drug Administration approved for pAVF creation, uses thermal energy and pressure to fuse a permanent arteriovenous anastomosis between sufficiently adjacent vessels.<sup>1</sup> The anatomic location is similar to the one described by Jennings et al<sup>2</sup> for surgical AVF with PRA inflow. Nonetheless, the pAVF is physiologically different as no afferent or efferent branches are ligated during creation, contrary to surgical fistula creation. Therefore, venous flow is maintained in case of anastomosis occlusion, which prevents complete fistula thrombosis. Furthermore, arterial inflow through the anastomosis is divided through multiple branches, reducing the pressure- and shear stress-related wear and tear long-term complications that are often observed with surgical AVF.<sup>3,4</sup>

Nineteen months after creation of this pAVF, no additional interventions have been required, whereas two needle cannulation and dialysis treatments were performed without problems. Computed tomography scan was performed 14 months after creation of the pAVF.

A/Cover and B (lateral view) show a three-dimensional reconstruction of the patient's vasculature, illustrating a high bifurcation of the brachial artery to the radial artery (*green arrow*) and ulnar artery (*purple arrow*). There is a distinct anastomosis (*red arrow*) between the PRA and the deep communicating vein that drains primarily to the cephalic (*blue arrow*) and basilic (*yellow arrow*) veins. No significant flow is detected in deep veins of this patient. C and D are the artist's drawings of the device operating in open and closed position, respectively. The patient's informed consent was obtained before submission of this manuscript. A live case of pAVF creation performed for the Controversies in Dialysis Access meeting on November 2018 is available online.<sup>5</sup>

### REFERENCES

1. Hull JE, Elizondo-Riojas G, Bishop W, Voneida-Reyna YL. Thermal resistance anastomosis device for the percutaneous creation of arteriovenous fistulae for hemodialysis. *J Vasc Interv Radiol* 2017;28:380.
2. Jennings W, Mallios A, Mushtaq. Proximal radial artery arteriovenous fistula for hemodialysis vascular access. *J Vasc Surg* 2018;67:244-53.
3. Hull JE, Jennings WC, Cooper RI, Waheed U, Schaefer ME, Narayan R. The pivotal multicenter trial of ultrasound-guided percutaneous arteriovenous fistula creation for hemodialysis access. *J Vasc Interv Radiol* 2018;29:149-58.
4. Mallios A, Jennings WC, Boura B, Costanzo A, Bourquelot P, Combes M. Early results of percutaneous arteriovenous fistula creation with the Ellipsys Vascular Access System. *J Vasc Surg* 2018;68:1150-6.
5. CiDA live case. Available at: <https://www.youtube.com/watch?v=4yi5VMNjsG8>. Accessed August 19, 2019.

Submitted Nov 26, 2019; accepted Jan 6, 2020.

From the Department of Vascular Surgery, Institut Mutualiste Montsouris.

Author conflict of interest: A.M. has been paid a consulting fee by Avenu Medical; he is on their speakers bureau and has shares in the company.

E-mail: [alexandrosmallios@gmail.com](mailto:alexandrosmallios@gmail.com).

The editors and reviewers of this article have no relevant financial relationships to disclose per the JVS policy that requires reviewers to decline review of any manuscript for which they may have a conflict of interest.

*J Vasc Surg* 2020;71:1395

0741-5214

Copyright © 2020 The Authors. Published by Elsevier Inc. on behalf of the Society for Vascular Surgery. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.jvs.2020.01.034>

