Medical Affairs Corner

Dialysis Highway: Paving the Way to Maturation of Percutaneous Arteriovenous Fistulas

Physicians share their approaches to pAVF maturation, highlighting key considerations for technical success and patient satisfaction.

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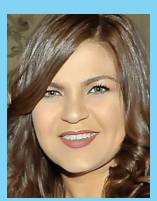

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The creation of a percutaneous arteriovenous fistula (pAVF) for hemodialysis access with the Ellipsys™ vascular access system (Medtronic) has several advantages over surgery. These include improved cumulative and functional patency, reduced secondary procedures, and, as a result, cost savings.[1,2] This is also an appealing alternative for patients who are unwilling or unable to have surgery.[3] The ability of dialysis centers to have a comprehensive strategy around the maturation and cannulation phases of the process is essential. Physiologic maturation is characterized by vein thickening, postoperative increase in vessel diameter, and increase in blood flow, generally occurring by 3 weeks.[4] Clinical maturation means the AVF can be reproducibly cannulated with two large-bore needles and provide sufficient blood flow for adequate hemodialysis. Rapid maturation of pAVFs has been demonstrated when maturation procedures are performed as necessary in a timely manner.[5] Today, two leaders in the field share their approach to maturation that ensures pAVF success and patient satisfaction.

Dr. Rashid Sharaf and his team, including Timoteo Cabrera, MD, and Jemma Reinhardt, RPA, have created > 1,000 pAVFs and believe that creating the fistula is the easiest part of the process. According to Dr. Sharaf, the focus needs to be shifted to the maturation process and cannulation; over time, he and his team have created an algorithm for this (see bullets and Figure 1). Patients return to the office 1 week after pAVF creation to check blood flow and waveforms using ultrasound. If brachial artery flow is ≥ 900 mL/min, waveforms are good, and target vein flow is > 500 mL/min, the patient is cleared for cannulation by week 3. If blood flow is not sufficient and/or waveforms demonstrate resistance, other steps are taken to facilitate maturation (Figure 1).

- **If brachial artery flow is < 1,000 mL/min,** perform an inflow angioplasty. Notably, Dr. Sharaf has found that good waveform and a flow of approximately 900 mL/min is sufficient, and no intervention is needed.
- **If the target vein flow is < 500 mL/min, determine where the blood is going:**

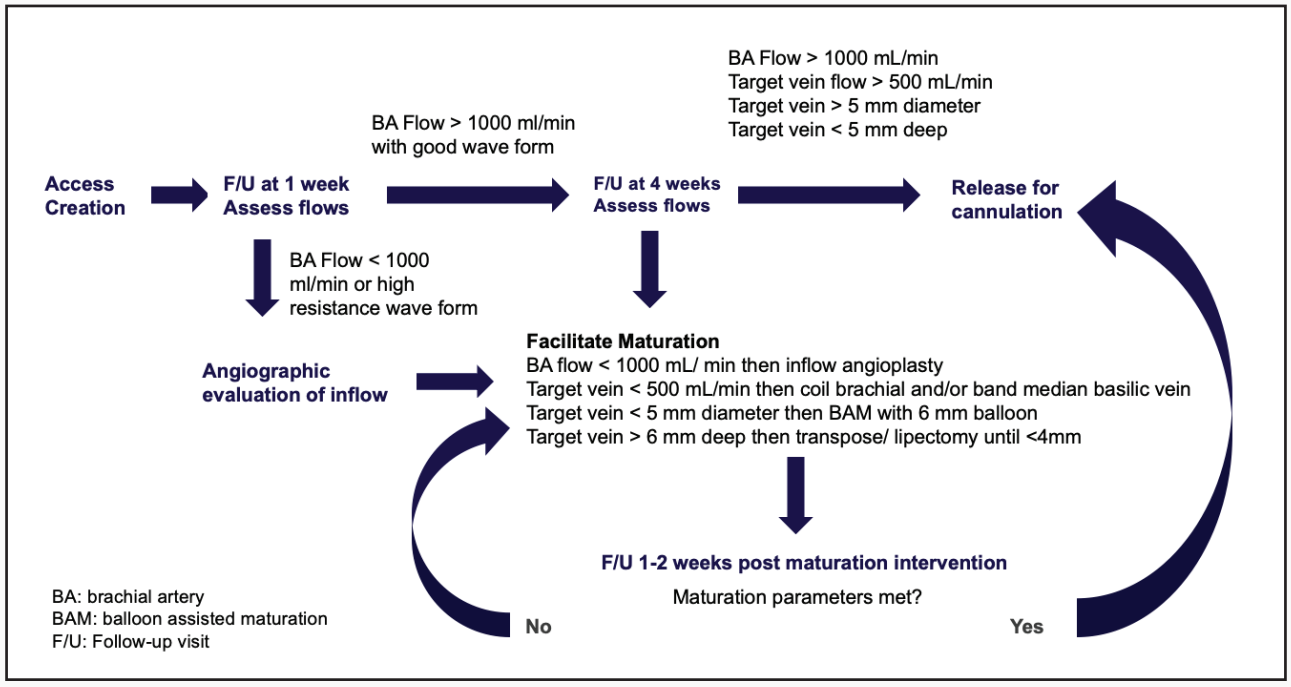

Figure 1. Follow-up algorithm for pAVF patients at Star Vascular Access Center.

- If flow is shunting to the deep veins, coil the brachial and ulnar veins.
- If the cephalic is the target vein and flow is shunting through the basilic vein, check if split cannulation is possible. If so, map it that way. If not, ligate the basilic vein.
- If the basilic is the target vein, check if cannulation is possible. If so, map it that way. If not, send the patient for transposition.

- **If the target vein is < 5 mm in diameter,** perform angioplasty in the target vein with a 6-mm balloon to ease cannulation.
- **If the target vein is > 6 mm deep,** wait until 3 to 5 weeks postcreation and then perform liposuction to make it more superficial (within 4 mm). If liposuction is inadequate, send the patient for superficialization. It is essential that the fistula is palpable.

MANAGING EXPECTATIONS

Dr. Sharaf approaches his patients with full transparency. He tells them to prepare for several procedures (perhaps surgery) to prepare the fistula and expect it will take 2 to 3 months. Often, it takes less time than that, and patients are pleasantly surprised.

Cannulators have become more familiar with endovascular fistulas; the field is becoming more experienced and sharing knowledge across centers. Although cannulation can be a challenge, successful cannulation rates are about the same as surgical fistulas.

New users should expect a learning curve of 15 to 20 cases and remember they are not creating a surgical fistula—pAVFs will look different. It is essential that operators understand that the process to create a functional pAVF extends beyond the initial procedure. Monitoring and assisting with maturation are critical parts of the process. With experience and their algorithm, Dr. Sharaf's center has decreased the typical number of interventions to achieve maturation from approximately three to one per patient, freeing up valuable cath lab time and resources.

A NEW USER'S PERSPECTIVE

Dr. Dawoud, also an interventional nephrologist, has been particularly focused on adding a pAVF option for her patients for the last 2 years. She's found a few factors that were particularly helpful in making this program a success.

Education and Outreach

Dr. Dawoud has taken the time to visit local dialysis centers and educate on them on pAVFs and good cannulation techniques. She will even bring a portable ultrasound machine so cannulators can see how close the vessel is to the surface. She also welcomes dialysis center staff to come see pAVF creation and/or maturation procedures.

In addition, twice per year she hosts a symposium for administrators and access care coordinators at the surrounding dialysis centers and provides education on access care and pAVFs.

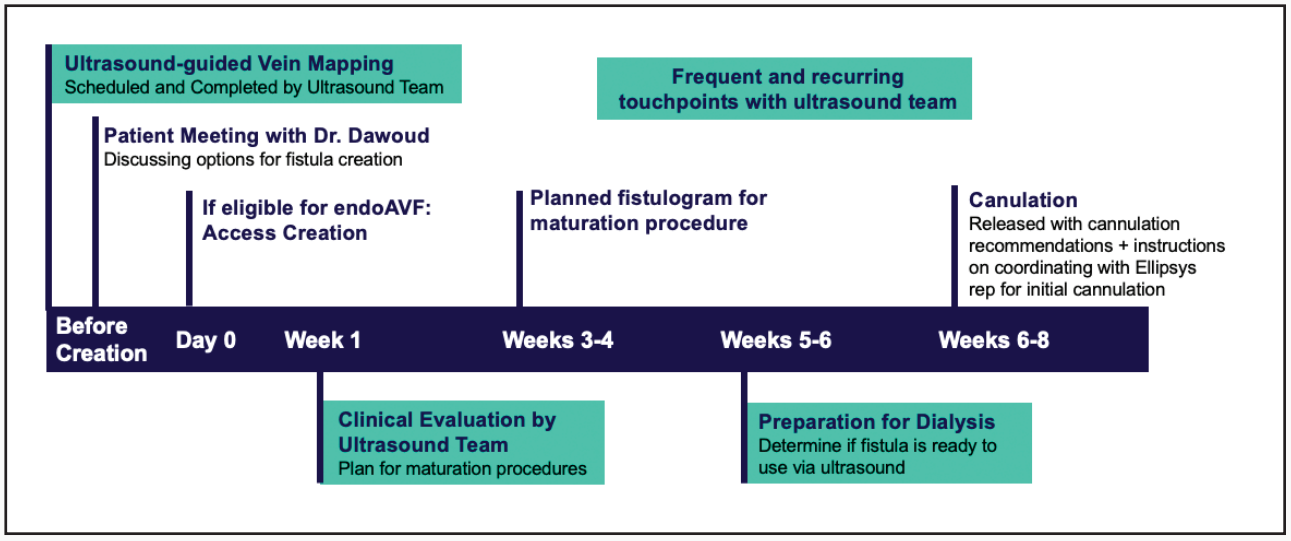

Figure 2. Follow-up schedule for end-stage kidney disease patients at Dr. Dawoud's center.

Leveraging Ultrasound

Dr. Dawoud's team has two full-time sonographers. This has increased the quality of the images, which enables careful and accurate patient selection. Her patients also build a relationship with their sonographer, who becomes a familiar face and partner through the process (Figure 2).

Building Relationships

Personalized care and building a relationship with each patient and, ideally, a family member/caregiver really matters. The patients trust Dr. Dawoud and her team, and this improves their adherence and follow-up.

SIGNS OF SUCCESS

Patients are provided with helpful postoperative instructions, including clopidogrel, daily exercises, and fistula care instructions. They have very few issues once maturation is achieved, and this makes everyone from the patients to the nephrologists and dialysis center staff happy. The cannulation rate is approximately 90% for patients who adhere to the follow-up schedule and their fistula care. ■

1. Hull JE, Jennings WC, Cooper RI, et al. Long-term results from the pivotal multicenter trial of ultrasound-guided percutaneous arteriovenous fistula creation for hemodialysis access. J Vasc Interv Radiol. 2022;33:1143-1150. doi: 10.1016/j.jvir.2022.05.016
2. Yang S, Lok C, Arnold R, et al. Comparison of post-creation procedures and costs between surgical and an endovascular approach to arteriovenous fistula creation. J Vasc Access. 2017;18(suppl 2):8-14. doi: 10.5301/jva.5000723
3. Pisoni RL, Zepel L, Port FK, Robinson BM. Trends in US vascular access use, patient preferences, and related practices: an update from the US DOPPS practice monitor with international comparisons. Am J Kidney Dis. 2015;65:905-15. doi: 10.1053/j.ajkd.2014.12.014
4. Langer S, Heiss C, Paulus N, et al. Functional and structural response of arterialized femoral veins in a rodent AV fistula model. Nephrol Dial Transplant; 2009;24:2201-2206. doi: 10.1093/ndt/gfp033
5. Hull J, Deitrick J, Groome K. Maturation for hemodialysis in the Ellipsys post-market registry. J Vasc Interv Radiol. 2020;31:1373-1381. doi: 10.1016/j.jvir.2020.03.001

Disclosures
Dr. Sharaf: Consultant to Medtronic.
Dr. Dawoud: Consultant to Medtronic.

Ellipsys™ Vascular Access System Percutaneous Arteriovenous Fistula Creation CPT® Coding Tips

An overview of coding guidance for creation of an arteriovenous fistula performed using Medtronic's Ellipsys™ vascular access system and associated procedures.

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In 2023, Centers for Medicare & Medicaid Services created two new codes, 36836 and 36837, to describe the percutaneous creation of an arteriovenous fistula (pAVF) graft in the upper extremity for hemodialysis access. By definition, the code choice depends on the number of arterial and venous access sites used to perform the pAVF procedure.[1] The Ellipsys™ vascular access system (Medtronic) uses a single site to access both the artery and the vein, and thus 36836 is reported.

> **36836** Percutaneous arteriovenous fistula creation, upper extremity, single access of both the peripheral artery and peripheral vein, including fistula maturation procedures (eg, transluminal balloon angioplasty, coil embolization), when performed, including all vascular access, imaging guidance and radiologic supervision and interpretation

What are the procedure requirements to report CPT® code 36836 for AVF creation?

Use of code 36836 requires three elements[2]:

1. The AVF must be created percutaneously rather than via an open approach.
2. It must be in the arm.
3. All work in the artery and vein must be performed through a *single* vascular access.

What are the typical features of a procedure to create a single-access pAVF?

In a single vascular access, a needle punctures the vein, and the same needle is advanced into an adjacent artery. A specialized catheter follows the needle and approximates the vein and artery, bringing them together and creating a connection between them. The catheter then delivers energy to the opening, creating and sealing the permanent anastomosis.[3,4]

Typically, this is between the radial vein and the radial artery in the forearm.

There are other devices that percutaneously create an AVF; however, these involve, for example, a vein puncture and a separate artery puncture, with a separate catheter in each. Code 36836 is not assigned for this type of procedure.

Does pAVF creation code 36836 bundle in other CPT® codes when performed during the same procedural encounter?

pAVF code 36836 is inclusive of multiple other services that may not be coded or reported separately when performed during the same encounter:

- Fistula maturation procedures such as transluminal balloon angioplasty (37246, 37248) and coil embolization other than for hemorrhage (37241, 37242, 75894, 75898)[2,5]
- Vascular access (36005, 36140, 36215, 36216, 36217, 36218, 36245, 36246, 36247)[2,5]
- Imaging guidance, radiologic supervision and interpretation, and angiography and venography of extremities (75710, 75716, 75820, 75822)[2,5]
- Dilation of the anastomosis and penetrating vein immediately after fistula creation[3,4]

- Ultrasound guidance (76937, 77001)[3-5]
- In addition, code 36836 should not be reported in conjunction with codes for the following services:
  - Other pAVF creation procedures (36837)[5]
  - Dialysis circuit procedures (36901, 36902, 36903, 36904, 36905, 36906, 36907, 36908, 36909)[5]
  - Intravascular stenting (37236, 37238)[5]
  - Intravascular ultrasound (37252)[5]

Can you bill for future fistula maturation procedures performed at a subsequent encounter after the pAVF creation procedure?

Code 36836 has a zero-day global period, and so procedures performed the day after the pAVF creation procedure or later can generally be billed separately.

However, for percutaneous transluminal angioplasty (PTA) to be billed as part of later pAVF maturation procedures, the following criteria must be met:

- In general, PTA of a nonstenotic vein (ie, < 50% stenosis) should not be coded as an angioplasty.
- However, professional societies differentiate when treating a nonmaturing AVF, indicating that physicians could appropriately document stenosis of a nonmaturing fistula if the vein is smaller than would normally be expected for that stage.[6]
- When stenosis is not documented, 36902 is not recommended. If desired, code 37799 may be used instead for ballooning the fistula, as use of the unlisted code alerts payers to review.
- When stenosis is documented, the appropriate CPT® code depends on where the angioplasty was performed:
  - 36902: Peripheral dialysis segment angioplasty, when the AVF is not maturing because of perianastomotic stenosis (ie, at the arterial anastomosis and nearby portions of the inflow artery and dialysis vein)
  - +36907: Central dialysis segment angioplasty, when the AVF is not maturing because of subclavian vein stenosis
  - 37246: Upper extremity arterial angioplasty plus a catheterization code, when the AVF is not maturing because of stenosis in the inflow artery beyond the area of the arterial anastomosis (ie, further up in the inflow artery)[7] ■

1. Krol K. Coding Updates for 2023. Endovasc Today. 2023;22:87-92. https://evtoday.com/articles/2023-jan/coding-updates-for-2023
2. American Medical Association. CPT Professional 2024. Amer Medical Assn; 2024: prefatory notes to 36836.
3. American Medical Association. CPT Assistant. October 2022.
4. American Medical Association. CPT Assistant. March 2023.
5. American Medical Association. CPT Professional 2024. Amer Medical Assn; 2024: parenthetical notes to 36836.
6. American Society of Diagnostic and Interventional Nephrology and Renal Physicians Association. Coding of Procedures in Interventional Nephrology 2018. Chapter 2.1.2 and 2.1.2.1. https://cdn.ymaws.com/www.renalmd.org/resource/resmgr/coding_and_documentation_tools/coding_of_procedures_in_inte.pdf
7. Krol K. New 2017 CPT codes for dialysis access maintenance and intervention. Case 14. Endovasc Today. 2017;16:74-81. https://evtoday.com/articles/2017-june/new-2017-cpt-codes-for-dialysis-access-maintenance-and-intervention

Disclosures
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