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CASE REPORT

Extending the Range of Vascular Access in Anatomically Challenging Patients With the GORE® Hybrid Vascular Graft

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The GORE® Hybrid Vascular Graft (HVG) was approved for use in the United States in 2010[1] and was first used in 2011. One year later, the HVG with the 10 cm Nitinol Reinforced Section (NRS) was introduced in the United States. The device uses a deployable stent to achieve a percutaneous and sutureless venous anastomosis. This has provided many novel ways to maintain vascular access in some of the most challenging patients.[1-4] The HVG with 10 cm NRS has further extended the reach of the access surgeon to a landing zone at the border of or even within the thorax.

We present two cases of patients with poor axillary veins of small caliber and previously failed upper extremity accesses who underwent successful dialysis graft placement using the HVG with 10 cm NRS with the tip of the nitinol-reinforced stent graft within the distal axillary/proximal subclavian vein.

CASE 1

A 73-year-old right-hand-dominant woman with a history of hypertension, diabetes mellitus, morbid obesity, and end-stage renal disease presented for access placement. The patient had previously failed peritoneal dialysis. In addition, the patient also had a previous attempt at a percutaneous and open hybrid graft placement by another surgeon. Vein mapping showed no suitable veins for fistula creation, but did show a patent axillary vein on the left upper extremity. The patient was therefore scheduled for an axillary venogram and possible hybrid graft placement.

The patient was taken to the operating room, and a venogram showed that the axillary vein was small in caliber and did not open into a suitable vein to support a graft until close to the thoracic wall (Figure 1). Because the suitable vein was so high in the axilla and close to the chest wall, a HVG with 5 cm NRS would not have reached the appropriate landing zone within the outflow vein.

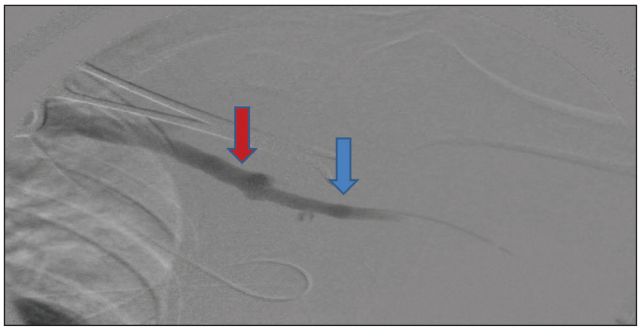

Figure 1. Venogram showing a small-caliber vein (blue arrow) and larger vein near the thoracic cage margin (red arrow).

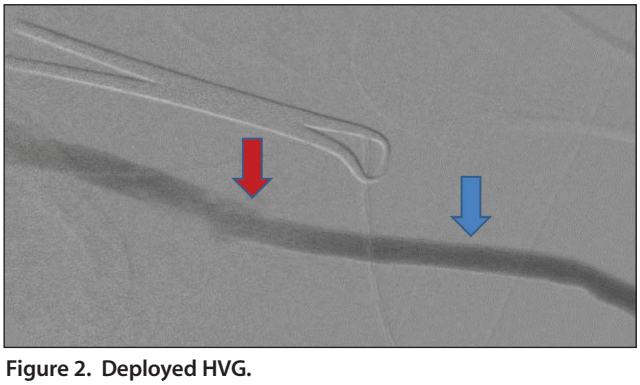

Figure 2. Deployed HVG.

Therefore, a graft with 10 cm x 8 mm NRS was placed with a landing zone that was in a vein of a suitable caliber (Figure 2). The patient was seen 2 weeks postoperatively, and the graft had a palpable thrill and audible bruit. The graft was used shortly after the postoperative visit without difficulty.

CASE 2

A 41-year-old right-hand-dominant woman with a history of hypertension, diabetes mellitus, obesity, and end-stage renal disease presented for access placement. The

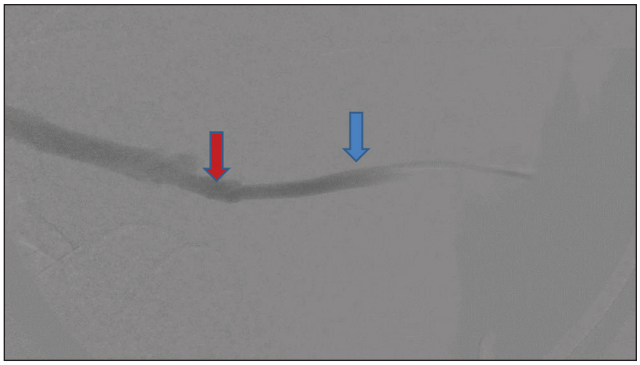

Figure 3. Venogram showing small-caliber vein (blue arrow) and larger vein near the thoracic cage margin (red arrow).

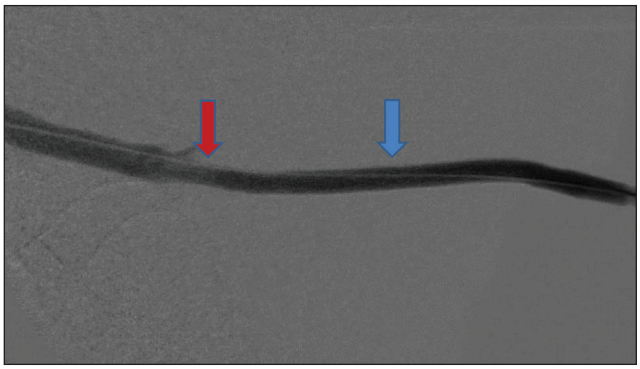

Figure 4. Deployed HVG.

patient had previously had a peritoneal dialysis catheter and a left upper extremity brachial-to-cephalic vein fistula that failed to mature. Because of the patient's obesity, she was scheduled for a left arm venogram and hybrid graft placement.

The patient was taken to the operating room, and a venogram again showed a poor outflow vein that was small in caliber and opened into an appropriate vein near the chest wall (Figure 3). In this case, a HVG with 10 cm x 7 mm NRS was placed, again to reach a more proximal suitable landing zone for the end of the stent portion of the graft (Figure 4).

The patient was seen postoperatively and had an audible bruit and a palpable thrill. The graft was used shortly after the postoperative visit.

DISCUSSION

The HVG is an important tool for all access surgeons to have in their toolbox. As seen in the previously described clinical scenarios, which support other published literature regarding the use of the HVG, this device allows for the preservation of upper arm access in patients with failing or failed upper arm grafts, morbid obesity, or previously stented venous outflow.[4] This graft can avoid morbidity in obese patients (due to a smaller axillary incision) who present difficult access challenges with a secondary patency of over 60% at 1 year.[5] The HVG allows for the creation of a sutureless anastomosis in cases where a standard graft could not be successfully placed. In these cases, the newer graft with the extended 10 cm stent portion allows for the creation of a graft with adequate outflow in a patient with a small-caliber or diseased axillary vein that does not open into a good outflow vein until very close to the thorax, where the vein becomes the subclavian.

Surgeons who develop the required skills to create access options using the HVG will become essential members of their access team and provide life-preserving care for patients with end-stage renal disease. As we all know, it is not the first access placed that is the most important; maintaining access in patients with decreasing options is the challenge. Access numbers four, five, six, seven, and beyond are the ones that sustain a patient's life line. The HVG with 10 cm NRS has an important role to play in the ongoing access challenge. ■

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