A simplified method of pre-emptive perigraft aortic sac embolization to prevent type II endoleak using the Excluder endograft

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ABSTRACT

Pre-emptive, nonselective perigraft embolization of abdominal aortic aneurysm sac to reduce the risk of type II endoleak has been previously reported with a percutaneous technique using contralateral access with resheathing for coiling. The approach has been modified to simplify the procedure and to eliminate unnecessary sheath exchanges. (J Vasc Surg Cases and Innovative Techniques 2019;5:509-11.)

Keywords: Endovascular aneurysm repair; Endoleak; Embolization

Pre-emptive, nonselective perigraft embolization of abdominal aortic aneurysm sac to reduce the risk of type II endoleak in patients with high risk for development of persistent type II endoleaks has been proposed. Our inclusion criteria for those at higher risk include a patent inferior mesenteric artery (IMA) ≥3 mm, two pairs of lumbar arteries, and a ≥3-cm aneurysm flow lumen. Other factors, including sac pressure and aneurysm diameter, may play a role but have not been evaluated in our practice to this point. Techniques that have been described include open femoral and percutaneous access with either a second 5F puncture in the contralateral site or upsizing of the contralateral sheath to accommodate the additional wire and catheter in the sac.[1-3] We previously reported our experience with the percutaneous technique using contralateral access with resheathing for the coiling.[4] As of April 2019, our approach has been modified with the use of the Excluder (W. L. Gore & Associates, Flagstaff, Ariz) endograft to simplify the procedure further and to eliminate unnecessary sheath exchanges. The patient described has consented to the publication of this manuscript.

METHODS

Bilateral common femoral artery access is obtained percutaneously by the standard preclose technique using Perclose ProGlide (Abbott Vascular, Redwood City, Calif), and the ipsilateral (18F or 16F) and contralateral (12F) sheaths are placed. Typically, a DrySeal Flex Introducer Sheath (W. L. Gore & Associates) is employed; however, any similarly sized sheath may be used. After the main body and contralateral limb are deployed and with the ipsilateral iliac limb remaining constrained, a 0.035-inch wire is advanced through the ipsilateral sheath in a buddy wire fashion alongside the main body delivery catheter and into the aneurysm sac (Fig 1). The main body deployment is completed by removing the constraining mechanism and releasing the ipsilateral iliac limb. A molding balloon is introduced through the contralateral (12F) limb, and the proximal graft and the contralateral limb are molded. A 5F × 45-cm sheath is advanced over the 0.035-inch perigraft aneurysm sac wire (Fig 2). Angiography is performed within the sac to confirm location as well as to document flow in the lumbars and IMA (Fig 3). If there is stagnant or no flow in the sac, we do not place coils. If flow is observed, large coils are placed and distributed throughout the sac, with no attempt to selectively catheterize the branches. We aim to evenly distribute coils in the sac, typically requiring four or five large-diameter coils. We use Interlock (Boston Scientific, Marlborough, Mass) or Nester coils (Cook Medical, Bloomington, Ind). The added cost is dependent on the type and number of coils and the use of an additional 5F sheath. Complete packing is unnecessary; it is difficult to achieve a no-flow state with therapeutic heparinization, and trying to do so adds unnecessary cost related to coils. This procedure takes approximately 5 to 7 minutes. The completion saccogram typically shows more stagnant flow, but because of heparinization, clotting is not observed (Fig 4).

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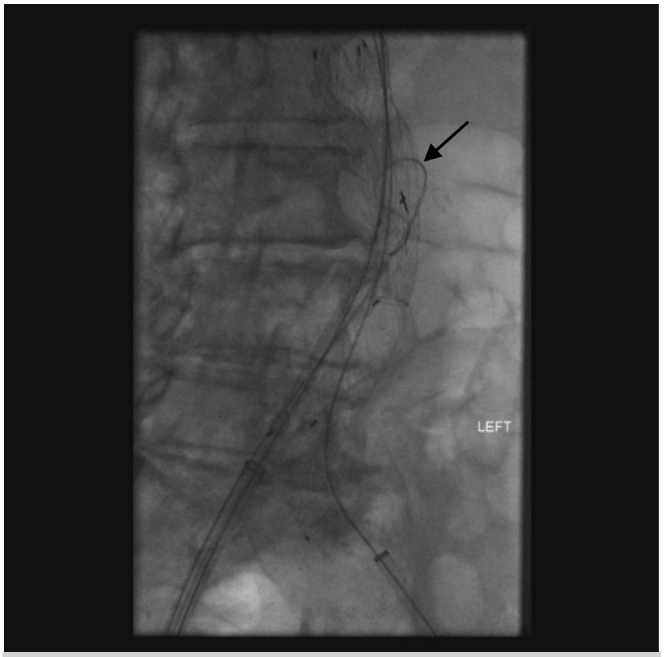

Fig 1. Aneurysm sac wire access. After the main body and contralateral limb are deployed and with the ipsilateral iliac limb remaining constrained, a 0.035-inch buddy wire (*arrow*) is advanced through the ipsilateral sheath and into the aneurysm sac.

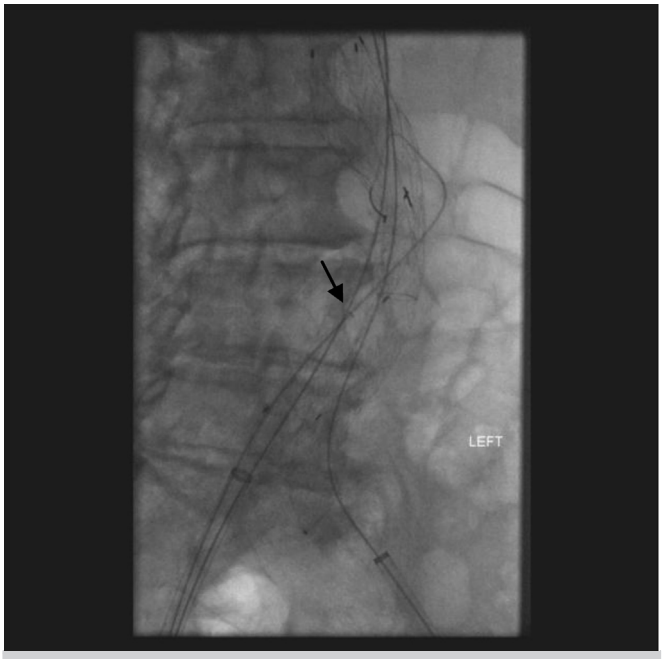

Fig 2. Sheath access. After complete deployment of the endograft and ballooning of the proximal graft and overlap but not the distal seal zone, a 5F × 45-cm sheath (*arrow*) is placed over the wire into the aneurysm sac.

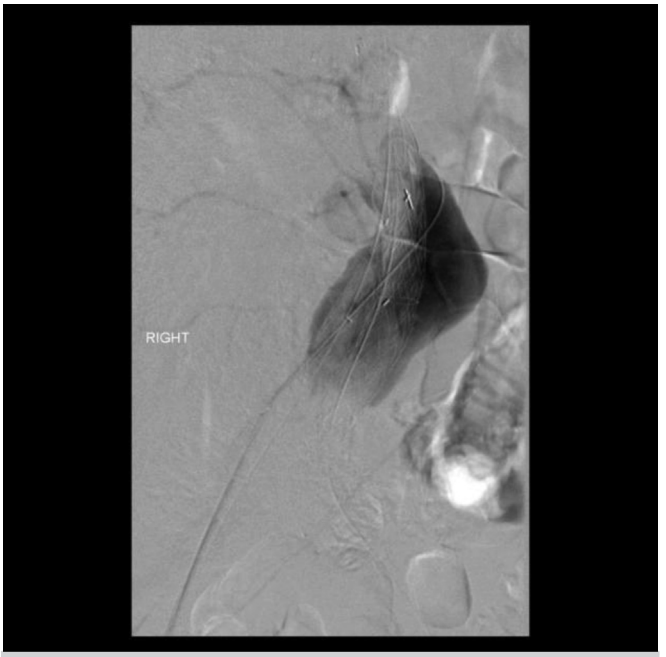

Fig 3. Saccogram. Through the 5F × 45-cm sheath, angiography is performed within the sac to confirm location as well as to document flow in the lumbars and inferior mesenteric artery (IMA).

Fig 4. Completion aortogram. The completion run shows more stagnant flow. Because of heparinization, clotting is not always observed.

The entire system is removed from the ipsilateral sheath. The endovascular aneurysm repair (EVAR) is then completed with balloon molding of the seal zones and completion aortography. Iliac extension of the ipsilateral limb is performed before this only if it is otherwise necessary. The percutaneous arteriotomies are then

closed by tightening the previously placed sutures in the usual fashion.

DISCUSSION

Percutaneous pre-emptive perigraft aneurysm sac embolization has been previously described.[1-4] The presented technique differs in that the embolization system is built through the ipsilateral sheath rather than the contralateral sheath. This is possible because the 18F or 16F sheath with a main body delivery catheter in it permits the passage of a buddy 0.035-inch wire into the sac, whereas a 12F sheath with its associated iliac limb will not. Similar techniques are described by Ferretto and Irsara[2] using a contralateral 16F sheath and a buddy catheter and by our group using a double wire and resheathing technique. This modified technique lessens potential blood loss and arterial damage that may be caused by multiple sheath exchanges, upsizing the contralateral sheath, and externalizing wires to the sheath. It also helps simplify the procedure and avoid back table confusion. Experience is limited, but to this point, there have been no technical failures, instances of iliac injury, or graft damage. We have not seen an increase in type IB endoleaks related to the sac access, probably because similar to the previously described technique, balloon molding is performed on completion of embolization. We find that adding glue or sealant is not necessary to achieve the desired result. It adds cost, and although its safety has been reported, there is concern for spillage causing thrombosis of lumbars and the IMA, which may lead to spinal or colonic ischemia.[1,3,5]

The technique described is intended for use with the Excluder system, which makes up approximately 38% of our infrarenal EVAR experience. For other endograft systems including Zenith (Cook Medical) and Endurant (Medtronic, Minneapolis, Minn), we recommend continued practice of the previously described technique as differences in device deployment prohibit this simplified technique.[4]

CONCLUSIONS

We present a simplified and potentially safer percutaneous technique of pre-emptive sac coil embolization at the time of EVAR with the Excluder device, which allows no additional punctures, sheath changes, or upsizing.

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