

CASE REPORT

Embolization of Transarterial Type II Endoleak Using Interlock™ Detachable Coils

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An 85-year-old man presented to outpatient consultation with a persistent type II endoleak 4 years after endovascular aneurysm repair for an infrarenal abdominal aortic aneurysm. Previous medical history included coronary artery disease, pulmonary hypertension, and stage 3 chronic kidney disease. CTA revealed a type II endoleak originating from the inferior mesenteric artery (IMA). There was significant enlargement of the aneurysm sac, which measured up to 6.5 cm in the maximal transverse diameter, compared to 6.2 cm and 5.1 cm 1 and 2 years prior to presentation, respectively. The presence of the type II endoleak was confirmed by contrast-enhanced ultrasound (CEUS), which revealed retrograde filling from the IMA (Figure 1).

PROCEDURE

Under general endotracheal anesthesia, the patient was positioned supine, and right percutaneous femoral access was achieved. The superior mesenteric artery (SMA) was selectively catheterized, and contrast injection revealed flow into the IMA via collaterals, confirming the presence of a large type II endoleak originating from the IMA (Figure 2). Using a Renegade® STC Microcatheter (Boston Scientific Corporation) and a Glidewire® Gold hydrophilic guidewire (Terumo Interventional Systems), the middle colic artery and IMA were selectively catheterized. The microcatheter was then advanced into the aneurysm sac, which was

excluded using numerous Interlock™-18 Detachable Coils (Boston Scientific Corporation). The proximal IMA was also embolized using Interlock™-18 Detachable Coils. Completion angiography revealed successful exclusion of the IMA with no evidence of residual endoleak (Figure 3). The postoperative course was uneventful, and the patient was discharged home on postoperative day 1.

DISCUSSION

Endoleaks are the most common event after endovascular aneurysm repair; lifelong surveillance is recommended because their persistence may lead to aneurysm sac expansion and aortic rupture.¹ Treatment of type II endoleak has been a topic of significant controversy. Support for conservative management derives from the estimated low risk of late rupture secondary to isolated type II endoleak.² However, although some authors have argued that prophylactic embolization in selected patients can decrease the risk of persistent type II endoleak and aneurysm sac growth,³ most would use a strategy of selective secondary intervention in the presence of significant aneurysm sac expansion, which is supported by current guidelines.⁴

Access to the aneurysm sac can be achieved via multiple approaches depending on type II endoleak location and delineation based on preoperative imaging. The transarterial approach usually represents the first-line option.⁵ When the IMA is involved, an SMA-to-IMA access (via the arc of Rioloan or marginal artery of Drummond) may be chosen. Once stable access is achieved and an introducer sheath can be advanced in the proximal SMA, a floppy system composed of a microcatheter and microwire (similar to the combination utilized in the presented case) is preferred to navigate through the collateral into the IMA and the aortic aneurysm sac. Alternatively, the authors have found the 0.014-inch Fathom™ Steerable Guidewire (Boston Scientific Corporation) to have excellent steerability.

Complete obliteration of the endoleak nidus with elimination of all inflow and outflow vessels is required

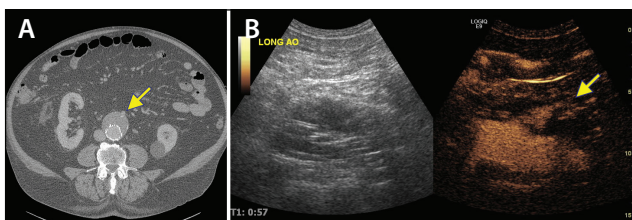


Figure 1. Preoperative CTA (A) and CEUS (B) demonstrated the presence of type II endoleak with retrograde flow from a patent IMA (arrows).

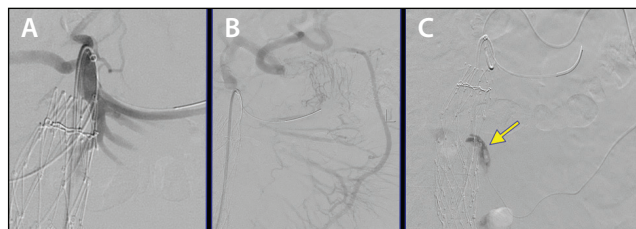


Figure 2. Intraoperative angiography showed placement of a coaxial system within the SMA (A) and identified the large SMA-IMA collateral (B). Successful retrograde navigation through the middle colic artery down to the IMA (C) with confirmation of retrograde flow within the aneurysm sac (arrow).

to prevent recurrence and can be achieved with different materials, typically a combination of plugs, coils, and/or Onyx™ liquid embolic (Medtronic). One benefit of Onyx™ is its ability to advance beyond the site of delivery and disperse through the endoleak nidus to fill the ingress and egress vessels. Being radiopaque, it can be closely followed under fluoroscopic guidance, and injection may be stopped if there is inadvertent nontarget delivery. Coils represent a feasible alternative, allowing for easy trackability during the procedure and quick placement within small vessels. In the case described in this article, the choice of coils was based on their accurate deployment and control because of the detachable mechanism and polyethylene terephthalate fibered structure, which is highly thrombogenic and provides a uniquely stable, permanent platform for blood stasis, thrombus organization, and neointima formation. To avoid persistent flow through the coils, care must be taken to ensure they are properly packaged within the endoleak nidus. Finally, plugs can safely and effectively occlude the target vessel right at the ostium, preserving any anastomosis that remains patent.

Although generally safe, secondary interventions for type II endoleak are often unsatisfactory because persistence/recurrence are commonly encountered.⁶ Therefore, follow-up imaging is key to evaluate technical and clinical success. Type II endoleak persistence/recurrence may be difficult

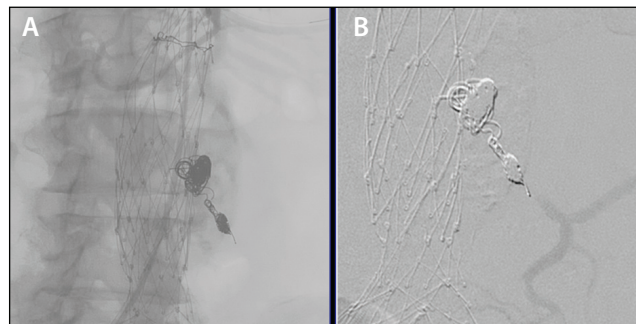


Figure 3. Completion angiography showed a widely patent SMA (A) and IMA distally to the placed coils with absence of residual sac filling (B).

to identify in the presence of Onyx™ or coils, because both cause significant scatter artifact on CTA. However, sac diameter measurements are usually not inhibited by the artifact and, when combined with duplex ultrasound and/or CEUS, recurrent flow within the sac can still be estimated with reasonable certainty.

CONCLUSION

Treatment of type II endoleak can be performed safely and effectively utilizing several approaches. When a transarterial route is performed, appropriate utilization of a support system into the SMA or internal iliac artery is recommended, followed by use of a microcatheter and a steerable microwire. Treatment is usually accomplished with a combination of plugs, coils, and/or Onyx™. Continued imaging follow-up after type II endoleak treatment is required to identify persistence/recurrence as well as stabilization or regression of the aneurysm sac. ■

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