# Endovascular Management of Complex Iliac Artery Occlusive Disease

Percutaneous therapy may be considered as a first-line treatment option for complex lesions in properly selected patients.

BY NICHOLAS J. MORRISSEY, MD, FACS

The iliac arteries represent one of the earliest vascular beds to be successfully addressed with percutaneous techniques. Endovascular treatment is considered standard of care for simpler lesions, and many clinicians prefer to treat even the most complex lesions with an initial percutaneous attempt. Success and long-term durability appear to be greater in the iliac arteries when compared to the superficial femoral or tibial arteries. The issues that face clinicians who treat iliac artery occlusive disease include the decision to choose endovascular therapy for more complex lesions as well as the choice of specific therapy given the patient's anatomy and symptoms.

## TASC GUIDELINES

The Transatlantic Inter-Society Guidelines (TASC) suggest that for simpler lesions (TASC A and B) endovascular therapy is preferred, whereas for more complex lesions (TASC C and D) open surgery is preferred (Figure 1).[1] In a series of 276 patients and 394 TASC A and B lesions, the assisted patency rate was 71% at 10 years.[2] In addition, there is evidence that primary stenting results in better immediate and long-term success when compared to angioplasty alone. In a meta-analysis of more than 1,300 patients, there appeared to be a 39% decreased risk of failure in stented patients compared to those undergoing percutaneous transluminal angioplasty alone.[3]

Although these guidelines are based on extensive review of the literature, it must be remembered that the patient's physiology as well as his or her anatomy needs to be considered during the decision-making process. The key to success is always to determine therapy based on consideration for patient's anatomy, physiology, and goals of treatment.

Treatment options must be considered first based on symptoms. Patients with severe comorbidities and claudication may not be appropriately treated with open surgery, and therefore an endovascular approach for more complex anatomic disease may be warranted.

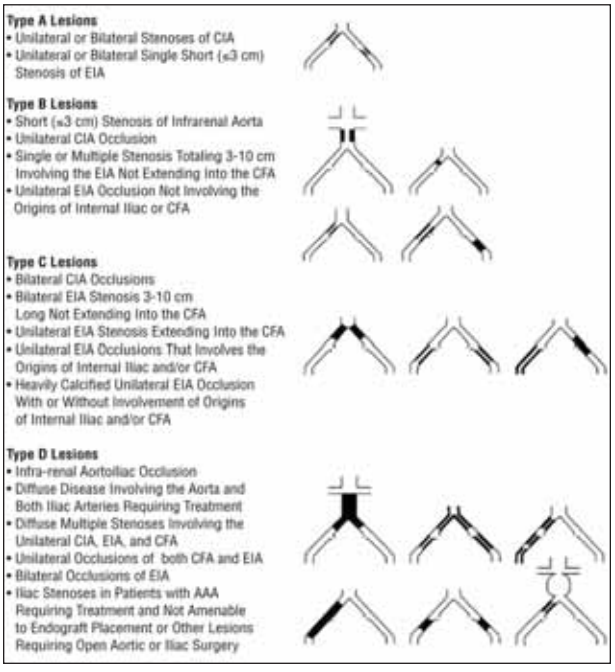


**Figure 1. TASC classification for aortoiliac occlusive disease. Reprinted from J Vasc Surg, 2007/45, Norgren L, Hiatt WR, Dormandy JA, et al. Inter-Society Consensus for the Management of Peripheral Arterial Disease (TASC II). S5-67, Copyright (2007), with permission from Elsevier.[1]**

## CASE 1

The case outlined in Figures 2 through 4 shows a patient with severe claudication but also a history of significant coronary artery disease and extensive abdominal surgery. A decision was made to attempt endovascular treatment. As seen in Figures 2 and 3, the aorta and entire iliac segments were totally occluded with reconstitution at the distal common femoral arteries.

Although the disease was severe and extensive, the surgical options were limited by the patient's health and previous

Figure 2. Aortogram showing aortoiliac disease in Case 1.

Figure 3. Reconstitution of distal common femoral arteries in patient described in Case 1.

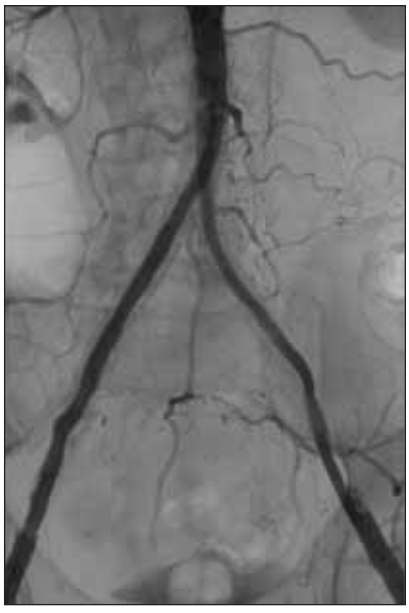

Figure 4. Aortogram showing final result after recanalization and stenting of aortoiliac segment in Case 1.

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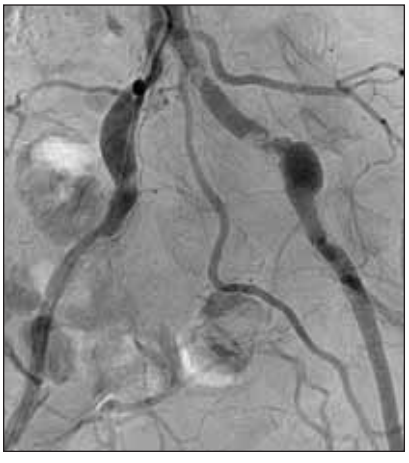

Figure 5. Aortogram demonstrating disease pattern in Case 2.

Figure 6. Completion angiogram after repair of right common iliac occlusion in Case 2.

Figure 7. Completion angiogram after bilateral common iliac repair in Case 2.

surgeries, so a more aggressive endovascular approach was taken. Recanalization of the aortoiliac segment was successful, and the reconstruction of the vessels was accomplished with the use of balloon-expandable stents at the aortoiliac bifurcation and covered stents distally to reline the external iliac arteries (Figure 4). The patient has had no claudication, and the reconstructed segment remains patent by duplex evaluation at 16 months. This case shows that in situations where patient physiology may be poor, aggressive endovascular intervention may be warranted.

Although endovascular intervention is recommended mainly for TASC A and B lesions, its success in more advanced lesions has been demonstrated.[4] An important principle to follow is the concept of not causing trauma that would make the potential open surgical option more difficult. Aggressive wire manipulation and extensive arterial dissection can result in loss of branch vessels and propagation of obstruction to more distal points in the arterial tree, making surgical revascularization more difficult.

The choice of stent is based to some extent on location and operator choice. We prefer to use balloon-expandable stents at the origin of the iliac arteries and in the proximal common iliac in order to have precise deployment and maximum radial force. In the distal more tortuous seg-

ments of the iliac vessels, self-expanding stents and stent grafts may provide better apposition due to their flexibility.

## CASE 2

In the second case, outlined in Figures 5 through 7, a patient who had undergone heart transplantation 5 years previously presented with severe bilateral buttock, thigh, and calf claudication. Angiography revealed total occlusion of the right common iliac artery and severe stenosis of the left common iliac (Figure 5). She was treated in two separate sessions via retrograde access with placement of a balloon-expandable stent on the right (Figure 6) and a self-expanding stent on the left (Figure 7). The stent choice on the left was based on our desire to maximize the stent conformation to the curve of the distal common iliac artery.

Recurrence is fortunately less common than in the earlier history of endovascular intervention. In order to maintain patency of an intervention, patients must be subjected to lifelong routine surveillance. Return of symptoms should prompt immediate evaluation with noninvasive testing such as flow studies and duplex ultrasound. In patients who remain asymptomatic, routine duplex ultrasound evaluation should be performed in order to detect restenosis before the development of complete occlusion. We prefer to evaluate patients with duplex ultrasound 2 to 3 times during the first year after intervention, twice during the second year, and yearly thereafter.

## CASE 3

Case 3 (Figures 8 and 9) is a woman who developed severe buttock and thigh claudication after an endovascular cerebral intervention. Our initial treatment included thrombectomy of the iliac artery followed by angioplasty and stent of a chronically diseased common iliac artery (Figure 8). The patient was an avid walker and had immediate relief. She presented 4 months later with recurrent buttock claudication in spite of a normal duplex ultrasound earlier. Repeat angiography showed loss of the internal iliac artery and significant progression of disease beyond the original treated segment. We performed angioplasty and placed stents in the entire common and external iliac arteries, which resulted in complete resolution of symptoms (Figure 9).

Interestingly, in spite of loss of the internal iliac artery, revascularization of the entire iliac segment provided increased inflow to collaterals, which allowed her symptoms to improve. This case demonstrates that surveillance, although necessary, can sometimes be incomplete especially in the iliac vessels where body habitus may limit adequate visualization. In addition, deeper vessels such as the internal iliac artery may not be adequately visualized by duplex ultrasound alone.

**Figure 8. Angiogram after initial treatment of patient in Case 3 showing patent common, external, and internal iliac arteries.**

**Figure 9. Completion angiogram after reintervention in Case 3. Note the entire iliac segment is now stented and the internal iliac artery has since occluded.**

(All images courtesy of Nicholas J. Morrissey, MD.)

## CONCLUSION

It is clear that endovascular intervention has become standard therapy for simpler aortoiliac lesions. The aggressive use of percutaneous techniques for more complex disease has demonstrated acceptable results in patients whose physiology may not permit major open revascularization. The further evolution of balloons, stents, and other devices should lead to further improvements in long-term patency rates and clinical success and allow endovascular therapy to be considered first in essentially all lesions. Patient and device selection are of paramount importance in determining the choice of therapy, while strict surveillance is a major factor in achieving long-term success. Importantly, the interventionist needs to keep in mind the anatomy required for open revascularization in order to avoid damaging target vessels and making them unsuitable for open surgery. Patients with complex lesions treated with proper endovascular techniques can expect good to excellent results and less morbidity than with open surgery. ■

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