

ENDOVASCULAR AND SURGICAL TECHNIQUES

Venous Stents in Chronic Iliac Vein Occlusions

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Introduction

Stents in the venous circulation have been used to relieve malignant obstructions of the superior vena cava with rapid relief of acute symptoms. The experience with stents in iliac vein obstruction is limited.^{1–4} To relieve outflow obstruction following chronic iliofemoral vein occlusion femoral cross-over bypasses have mostly been used.⁵ Iliac vein thromboses often extend into the leg, with destruction of valves and concomitant reflux. Hopefully, recanalisation by a stent will result in disappearance of obstructive symptoms without increased reflux and with long-term patency. This report describes three patients with severe post-thrombotic symptoms, where iliac vein stenting successfully reduced the outflow obstruction.

Case 1

An 18-year-old male had an iliac vein thrombosis with phlegmasia cerulea dolens. Therapy-resistant ulcers developed 1 year later and after 15 years venous claudication appeared. Colour Doppler ultrasonography and videophlebography demonstrated occlusion of the left common and external iliac (CIV and EIV) and the common femoral veins (CFV). The left deep femoral vein (DFV) was patent while the superficial femoral vein (SFV) was recanalised but without any valves. Ambulatory foot venous pressure (AVP) measurement was 105 mmHg (normal <40 mmHg). Venous strain-gauge foot volumetry showed increased

reflux with a short reflux time (T90) of 6.4 s (normal > 18 s).

Recanalization was attempted using percutaneous access under ultrasound guidance through both the right internal jugular and the left DFV. A 5 French fully reinforced catheter was used to achieve sufficient rigidity to push a hydrophilic guidewire (Terumo Corp., Tokyo, Japan) through the fibrotic remnants of the iliac vein, which was dilated with a 10 mm balloon catheter (Opta 5, Cordis Europe, Roden, The Netherlands). Three 12 mm diameter Wallstents (Schneider AG, Bülach, Switzerland) were then placed from the CFV below the inguinal ligament to the CIV. A Palmaz stent (P 308, Johnson and Johnson, Warren, NJ, U.S.A.) was added in the most central part of the CIV and all stents were dilated to 10 mm. Post-procedural thrombus was lysed using recombinant tissue plasminogen activator (Actilyse, Boeringer Ingelheim International, Ingelheim am Rhein, Germany). An additional stenosis was revealed at the most proximal part of the CIV which was dilated with a Palmaz stent accomplishing unrestricted flow. Following the procedure Warfarin was instituted (Fig. 1).

Follow-up colour Doppler ultrasonography at 2, 7, 12 and 15 months demonstrated patency of the stented iliofemoral vein, confirmed with phlebography at 19 months. The claudication disappeared and the ulcers decreased to minimal size at 7 and 12 months and remained healed after 15 months. The AVP at 7 months decreased to 84 mmHg, but the reflux time remained pathologically short, 6.3 s.

Case 2

A 43-year-old male had a left iliac vein thrombosis and developed pain, oedema and venous ulcers with

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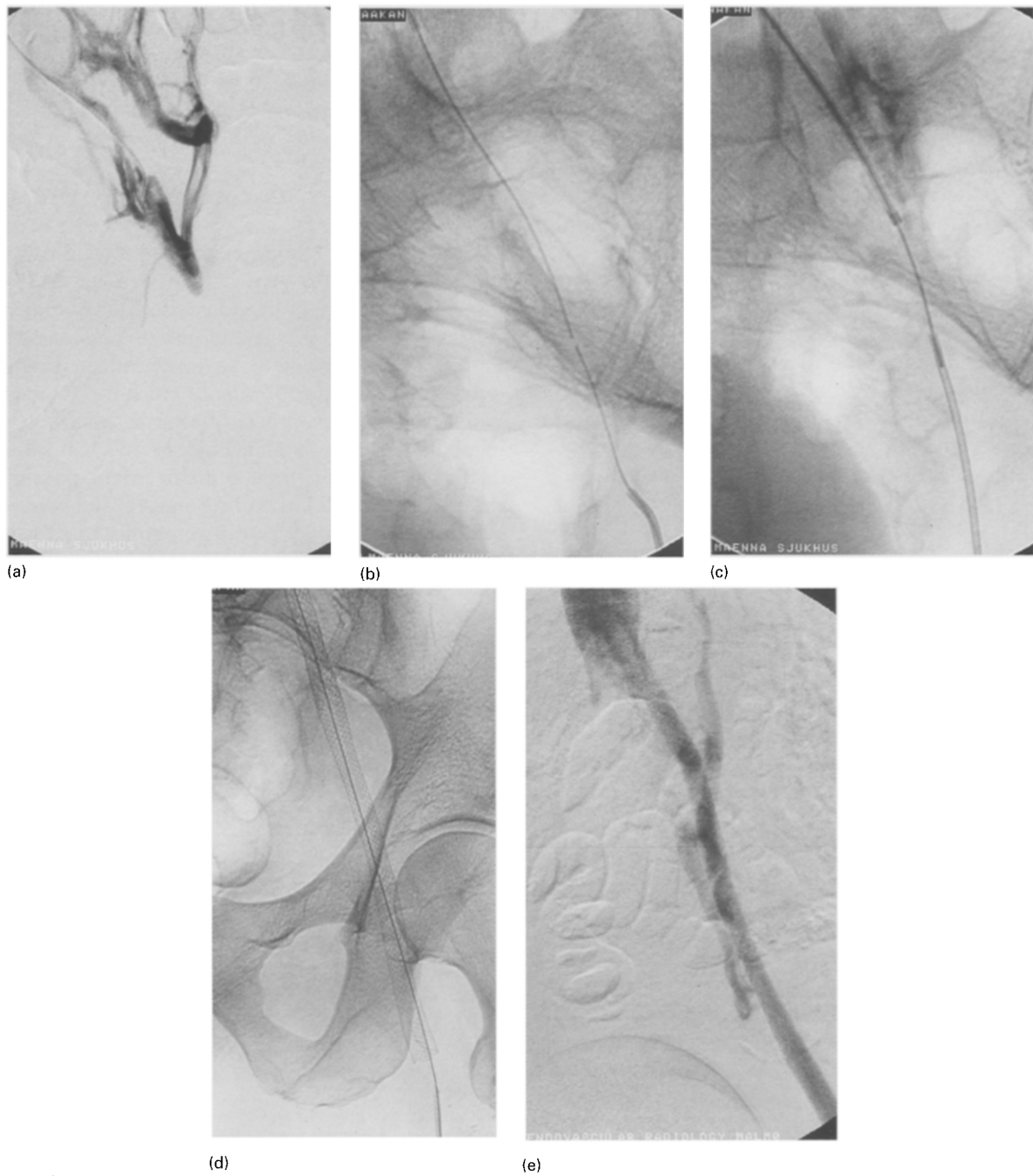


Fig. 1. Case 1: (a) Common iliac vein occlusion and paravertebral collaterals. (b) Guide-wire from the groin and the jugular vein passed to the fibrotic occlusion in the iliac vein. (c) Catheters from above and below establishing “through-and-through” passage. (d) Three wallstents in place, the most distal one passing the inguinal ligament. (e) Follow-up at 19 months.

massive fluid discharge 5 years later. He had venous claudication after 10–15 m. Compression therapy and skin graft transplantation failed and amputation was considered. Ten years after the thrombosis video-plebography showed occlusion of the left EIV and CFV along with a patent DFV, occlusion of the SFV and only one patent calf vein. There were incompetent perforating, varicose long saphenous, and multiple

prepubic veins. The AVP was 148 mmHg, and the reflux time 2.5 s (normal > 15 s).

The left iliac system was catheterized through the right internal jugular vein. The CIV was patent without any stenoses. The occluded left EIV could be passed with a hydrophilic guidewire, but not with the catheter. Under fluoroscopic guidance the DFV was punctured, a sheath was introduced and the guidewire in the DFV

could be manoeuvred out through the sheath. With control of both ends of the guidewire a 7 mm balloon catheter could be advanced through the occlusion and predilatation performed. Two 12 mm diameter Wallstents were placed from the DFV under the inguinal ligament into the proximal part of the CIV and dilated to 10 mm. Post-procedural phlebography showed unlimited flow without stenoses. Warfarin was instituted.

After reconstruction the ulcers could be transplanted with initial success, but at 12 months the ulcers were back to the same size as before treatment. Walking was restricted due to the ulcers but claudication was not a problem. The AVP at 4 months was 88 mmHg, and the reflux time was 17.5 s. Colour Doppler ultrasonography at 8 and 12 months and phlebography at 21 months demonstrated a patent reconstruction.

Case 3

A 19-year-old male body builder had a thrombosis extending from the popliteal and into the EIV. Three and a half years later he had an extremely swollen leg with restricted daily activity. Colour Doppler ultrasonography and phlebography showed the right EIV to be severely stenosed with patent CFV and DFV. The SFV was occluded and there were multiple prepubic collaterals. The AVP was 67 mmHg (normal < 40 mmHg) and the reflux time 15 s (normal > 20 s).

Attempting to traverse the occluded right EIV with a hydrophilic guidewire from the contralateral femoral vein failed, but was successful through a puncture of the right DFV establishing a through-and-through connection from the right to the left groin. Predilatation with a 6 mm balloon catheter was followed by placement of a 10 mm diameter Wallstent from the distal part of the CFV to the proximal EIV. That stent was dilated to 8 mm. Completion phlebography showed an unrestricted flow, and Warfarin treatment was instituted.

Follow-up phlebography at 6 and 13 months showed an open reconstruction. However, prepubic collaterals

remained, which may indicate residual outflow stenosis. The AVP at 13 months decreased to 30 mmHg and the reflux time increased to 50 s, but the swelling has only decreased marginally.

Discussion

The stenting of benign iliac vein occlusions is an unproven technique. However, in patients with symptoms such as venous claudication, ulcers and severe swelling, it could be an alternative to bypass.¹⁻⁵ This report of three cases with severe incapacitating symptoms favours an optimistic attitude. Remarkably, Wallstents have even been placed across the inguinal ligament. Although subjected to mechanical injury during movement, they remain patent possibly because of their self-expanding nature. Reopening and stenting of chronic post-thrombotic iliac vein occlusions is feasible even in occlusions more than 10 years old. In short-term the treatment leads to reduction of obstructive symptoms but we still do not know enough about long-term patency. The persistent reflux in the leg is probably deleterious and may explain why the patients in this series did not improve as much as we had hoped.

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