Femoral Endovenectomy and Iliac Vein Stent Placement: Indications Technique and Results

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Conflict of Interest

None
Guidelines 4.17.0 and 4.18.0 of the American Venous Forum on Endovascular Reconstruction for Primary and Post-thrombotic Iliac Vein Obstruction

<table>
<thead>
<tr>
<th>Guideline No.</th>
<th>GRADE of recommendation</th>
<th>Level of evidence</th>
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<tbody>
<tr>
<td>4.17.1</td>
<td>We recommend endovenous stenting as the current “method-of-choice,” for treatment of symptomatic primary and post-thrombotic iliac vein obstruction</td>
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Patient Selection for Stenting

- Good inflow to common femoral vein or
  - Endovenectomy with patch angioplasty
  - Stenting of the proximal profunda femoris or femoral vein vein
Patency Rates After Stenting Across the Inguinal Ligament for Treatment of Post-Thrombotic Syndrome Using Nitinol Venous Stents


Table. Patency rates after nitinol venous stenting above and below the inguinal ligament

<table>
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<tr>
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<th>Primary patency</th>
<th>Primary assisted patency</th>
<th>Secondary patency</th>
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<tbody>
<tr>
<td>Above the ligament (n = 23), %</td>
<td>72</td>
<td>100</td>
<td>100</td>
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<tr>
<td>Across the ligament (n = 71), %</td>
<td>52</td>
<td>80</td>
<td>82</td>
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Hybrid Procedure for Extensive Venous Thrombosis
Chapter 160

Surgical Treatment of Chronic Occlusions of the Iliac Veins and the Inferior Vena Cava

PETER GLOVICKI, MD
JAE-SUNG CHO, MD

Valvular incompetence is the most common cause of chronic venous insufficiency (CVI) of the lower extremities; deep venous obstruction is responsible for signs and symptoms of venous congestion in less than 10% of patients.1 Although the first successful venous reconstruction in a patient was reported more than 50 years ago by Warren and Thayer,2 results of open surgical treatment for venous obstructions have been less than satisfactory for many years. Only in the past two decades have improvements in diagnosis, patient selection, and surgical technique and the availability of better graft materials resulted in more frequent successful implantation of venous bypasses in patients.3 Results of venous grafting are, however, still

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**Figure 160-16** Combined endovascular and open reconstruction of chronic iliofemoral venous occlusion. A, Note old recanalized thrombus (arrow) in the common femoral vein. B, The old thrombus was excised and the iliofemoral vein was stented with Wallstents. C, The femoral vein was closed with bovine pericardial patch.
Common femoral endovenectomy in conjunction with iliac vein stenting to improve venous inflow in severe post-thrombotic obstruction

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Post-thrombotic syndrome secondary to iliofemoral deep venous thrombotic syndrome is common. Venous insufficiency and iliac vein stenting is a standard procedure for the treatment of obstruction extending across the groin. Venous inflow for an iliac vein stenting is improved. Treatment options include extension of stents across the iliac vein to improve inflow only from the one vessel. Endovenectomy is performed without iliac vein stenting to provide outflow to the profunda vein. We describe a technique of endovenectomy with profunda vein and femoral vein endovenectomy that will help viewers understand more technical aspects. (Lym Dis 2017;5:138-42.)
Cumulative Patency of 64 Venous Reconstructions
Cumulative Secondary Patency

- Femoro-iliac/ilio-caval: 86%
- Palma vein: 78%
- Femorocaval: 76%

Number at risk:
- Palma vein: 10 (4 at risk)
- Short bypass: 4 (1 at risk)
- Femorocaval: 9 (2 at risk)

Time (months):

0 12 24 36 48 60 72 84 96 108 120
Cumulative Patency of 12 Hybrid Reconstructions

- Primary patency: 8%
- Secondary patency: 30%
- Cumulative patency at 24 months: 74%

Number at risk:
- 0 months: 12
- 3 months: 5
- 6 months: 4
- 9 months: 3
- 12 months: 3
- 15 months: 3
- 18 months: 2
- 21 months: 2
- 24 months: 2
• 41 patients
• 17 – no av fistula
  • 53% complications
    • 4 iliofemoral thrombosis, 3 hematoma, 2 infections
• 24 - with av fistula + local heparin infusion
  • 8% complications
    • 1 seroma, 1 wound infection
Minimally invasive treatment of chronic iliofemoral venous occlusive disease

Mark Antonius Friedrich de Wolf, MD, a,b Carsten Willem Arnoldussen, MD, c Jochen Grommes, MD, d Shu Gi Hsien, BSc, a Patricia Joan Nelemans, MD, PhD, e Michiel Willem de Haan, MD, PhD, e Rick de Graaf, MD, PhD, e and Cees Hendrikus Wittens, MD, PhD, d a,d Maastricht, The Netherlands; and Aachen, Germany

Background: As one of the primary etiologies of the post-thrombotic syndrome, chronic venous occlusion is a huge burden on patient quality of life and medical costs. In this study, we evaluate the short-term and midterm results of endovenous recanalization by angioplasty and stenting in chronic iliofemoral deep venous occlusions.

Methods: This is a retrospective observational study set in a tertiary medical referral center. Patients with venous claudication or C4-6 venous disease combined with duplex and magnetic resonance-confirmed iliofemoral or caval occlusion were included. Patients with recent deep vein thrombosis (<1 year) were excluded. The intervention was endovascular deep venous recanalization, followed by endovenous recanalization. Safety and feasibility were clinically assessed in each procedure and during follow-up. Thirty-day treatment failures were evaluated. Results: Seventy-four patients (average age, 51 years) had 86% had a history of deep vein thrombosis. Between the initial deep venous thrombosis and treatment with PTA and stenting was 12 years (maximum, 31 years). May-Thurner syndrome was present in 57%. Forty-two procedures were performed in the left, six in the right, and 11 in both lower extremities. The vena cava inferior was partially stented in 25 patients. An average of 2.6 stents (median, 2) were used per procedure. Primary patency was 74% after 1 year. Assisted primary and secondary patency rates were 81% and 96%, respectively, at 1 year. Secondary procedures included restenting, catheter-directed thrombolysis, endophlebectomy of the common femoral vein, and creation of an arteriovenous fistula. No clinically evident pulmonary emboli were noted. A bleeding complication occurred after six procedures and was deemed major in two.

4 of 8 endophlebectomies and iliac vein stents required AV fistula
Arteriovenous fistula geometry in hybrid recanalisation of post-thrombotic venous obstruction

RLM Kurstjens¹,², R de Graaf³, ME Barbati⁴, MAF de Wolf¹,², JHH van Laanen¹, CHA Wittens¹,²,⁴ and H Jalaie⁴

Abstract

Introduction: Post-thrombotic obstruction can be adequately treated by percutaneous transluminal angioplasty and stenting. When post-thrombotic trabeculations extend below the femoral confluence, proper inflow can be facilitated by endophlebotomy and creation of an arteriovenous fistula. The aim of this study was to investigate whether it is more favourable to place the arteriovenous fistula at the cranial or caudal end of the endophlebotomy to prevent stenosis or occlusion.

Methodology: We retrospectively analysed the clinical data of all patients who underwent a hybrid procedure in our two centres. Demographics, interventional details and post-operative imaging were collected.

Results: Data on 42 limbs with cranially and 23 limbs with caudally placed arteriovenous fistulas were collected. Post-thrombotic disease of the profunda femoral vein alone or in combination with the femoral vein was observed more often in the cranial group. The caudal group more often received a smaller sized and straight polytetrafluoroethylene fistula, while the cranial group comprised a significantly higher amount of stented segments. Logistic regression showed that only reduced femoral inflow (hazard ratio 2.934 (95%CI, 1.148–7.494)) was a significant predictor of stent stenosis and/or occlusion. Logistic regression for risk of occlusion showed a significant influence of stent-related complications (hazard ratio 4.691 (95%CI, 1.205–18.260)) and a tendency towards influence of arteriovenous fistula geometry in favour of the cranially placed fistula.

Conclusion: Placement of the arteriovenous fistula in the cranial part of the endophlebotomy during hybrid recanalisation may result in a more favourable outcome, yet this tendency was not statistically significant. Moreover, femoral inflow is pivotal in maintaining patency and should thus be adequately assessed pre-operatively.
Arteriovenous fistula geometry in hybrid recanalisation of post-thrombotic venous obstruction

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Abstract
Introduction: Post-thrombotic obstruction can be treated by stenting. When post-thrombotic trabeculations extend to the common femoral vein, endophlebectomy and creation of an arteriovenous fistula at the level of the common femoral vein may be a more favourable approach. We report our results in this group of patients.

Methodology: We retrospectively analysed the clinical outcomes in 42 patients (mean age 56 years) with post-thrombotic disease of the profunda femoral vein who underwent endophlebectomy at two centres. Demographics, intervention outcomes and complications were obtained from patient records. Follow-up was obtained for a mean period of 180 days.

Results: Data on 42 limbs with cranially and caudally directed endophlebectomy were available. The cranial group comprised 23 limbs (mean age 56 years) and the caudal group comprised 19 limbs (mean age 56 years). The cranial group had a significantly higher incidence of post-procedural complications (13.0%) compared to the caudal group (3.7%) (p = 0.03). Logistic regression for risk of occlusion showed significant differences for the cranial group (crude hazard ratio 2.934, 95% CI: 1.881–4.691; p = 0.002). The cranial group had a significantly higher number of percutaneous punctures (1.72 ± 0.69) compared to the caudal group (1.37 ± 0.50) (p = 0.02). At 180-day follow-up, the cranial group had a significantly higher number of recanalised limbs (91.3%) compared to the caudal group (73.7%) (p = 0.03).

Conclusion: Placement of the arteriovenous fistula cranially may result in a more favourable outcome, yet the choice of femoral vein approach is pivotal in maintaining patency and should thus be considered when planning the surgical approach.
Conclusions

• In patients with poor in-flow due to extensive post-thrombotic disease consider endovenectomy and iliofemoral stenting

• Use vein or bovine pericardial patch

• Add an arteriovenous fistula

• Start early anticoagulation