08:54 – Extending the stent into the IVC during iliac venous reconstruction is frequently needed and it does not increase thrombotic complications – PRO

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This is actually 2 arguments:

1- Extending the stent into the IVC during iliac venous reconstruction is frequently needed

2- it does not increase thrombotic complications

Why would we want to extend stent into IVC when performing iliac vein stenting?

- Raju
  - J CARDIOVASC SURG 2008 49 27 33
- Technique of iliac venous stenting:
- “The upper landing site is the IVC usually about 3-4 cm above the common iliac confluence or even higher in the case of IVC involvement Extension of the stent into IVC is necessary as the iliac IVC junction is a choke point and will otherwise tend to squeeze the stent distally over time and result in recurrence Contralateral iliac vein flow is seldom affected”

Wallstents (Boston Scientific)

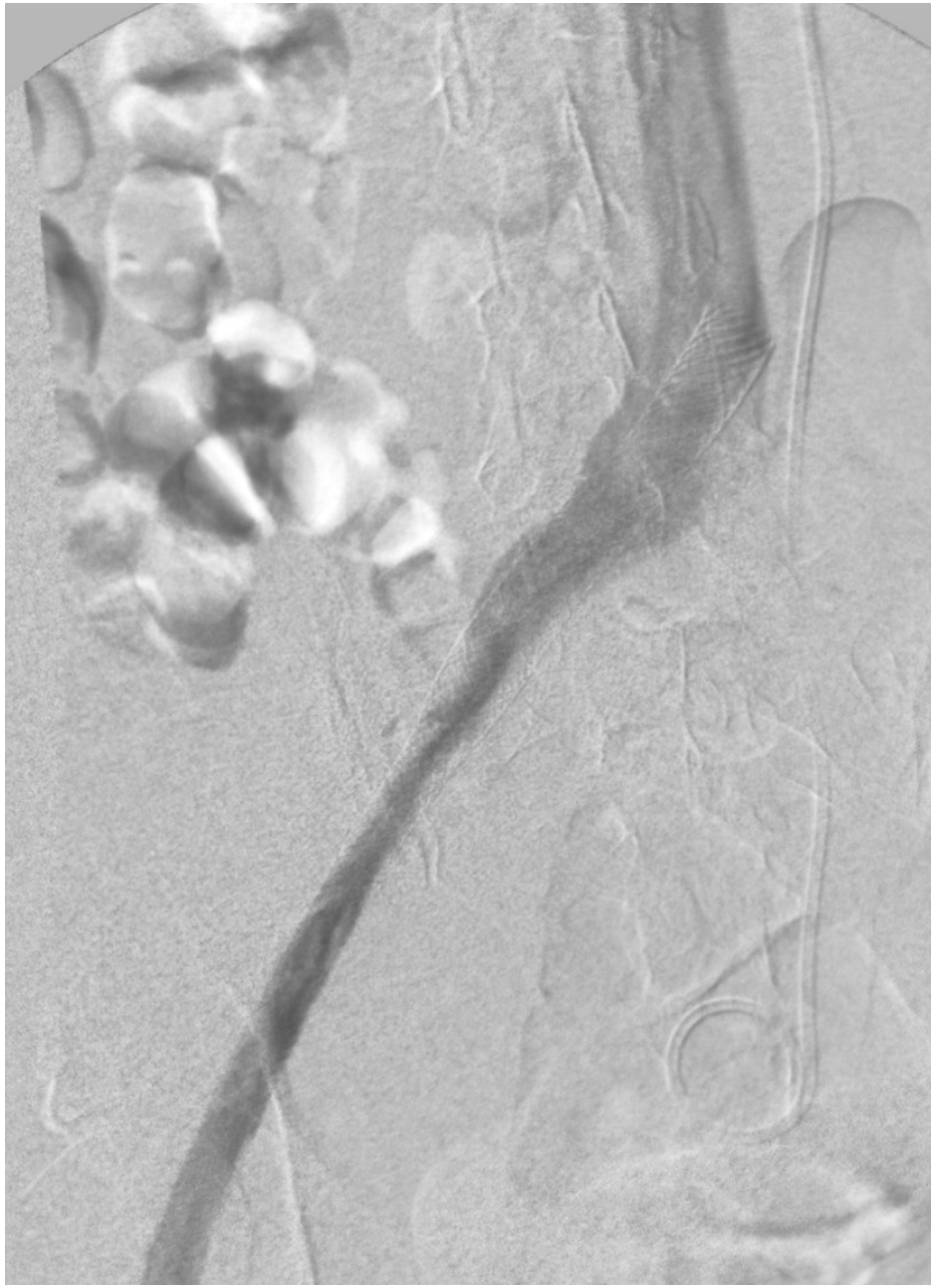
- Main stent used in USA (and worldwide) for venous stenting
- Braided stainless steel design
- Significant foreshortening on deployment
- Further foreshortening on balloon dilatation
- Maximum chronic outward force if ends closely apposed to vein wall

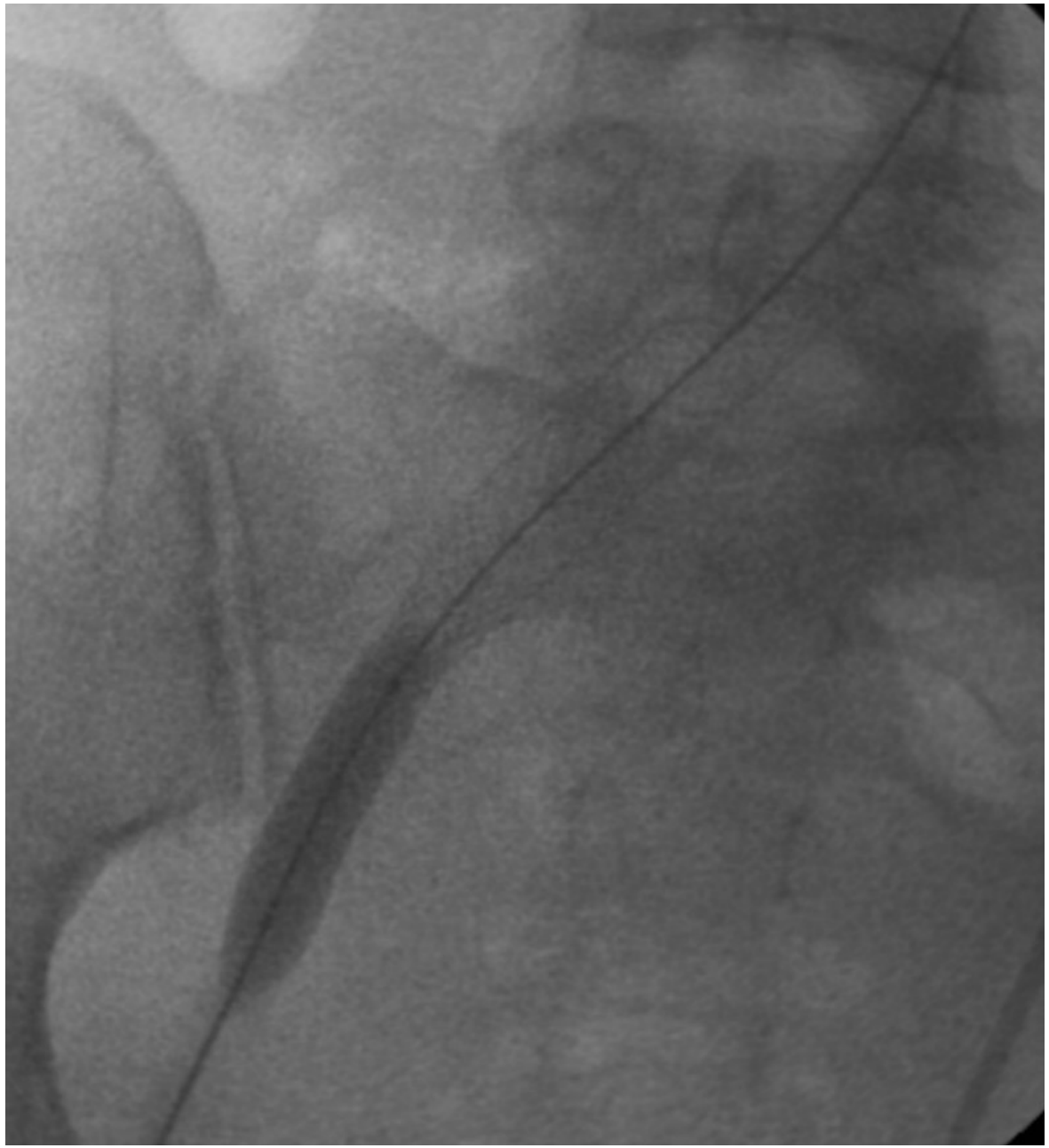
- EXCELLENT long term patency!!

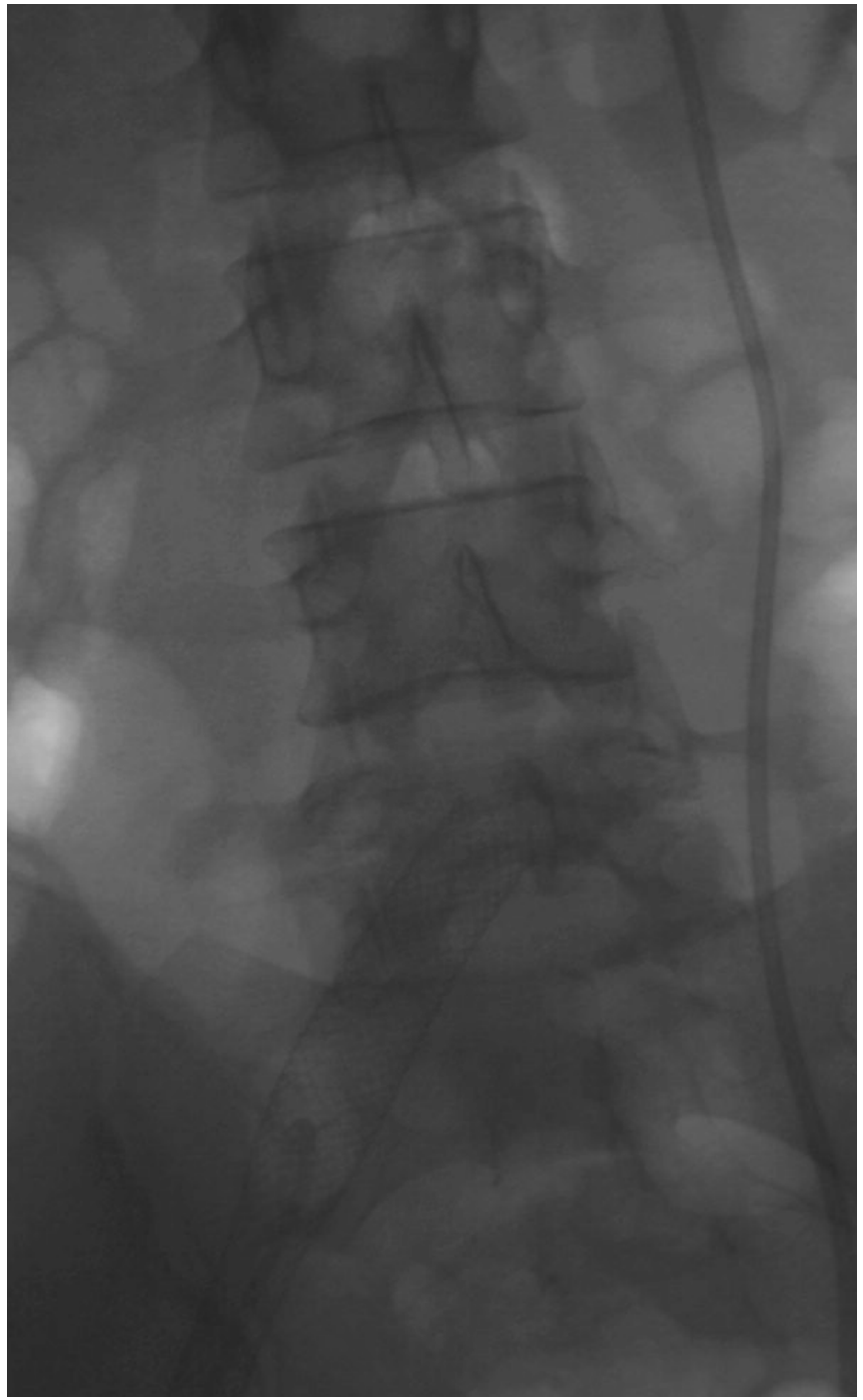
“Raju technique”

- Land stent well up into IVC
- Use a big long stent (e.g. 18mm diameter, 90 mm long)
- Balloon it aggressively say to 16mm
- This turns stent into an (approx) 16mm diameter 125mm long stent

- The trick is how high to land it in IVC so as
  - A) to cover as little of contra-lateral common iliac vein as possible
  - B) to make sure it doesn’t shorten so that R CIA can roll over L CIV and re thrombose it







Note
1- stent has shortened to the right of the spinous process
2- cigar shape at the upper end of the Wallstent

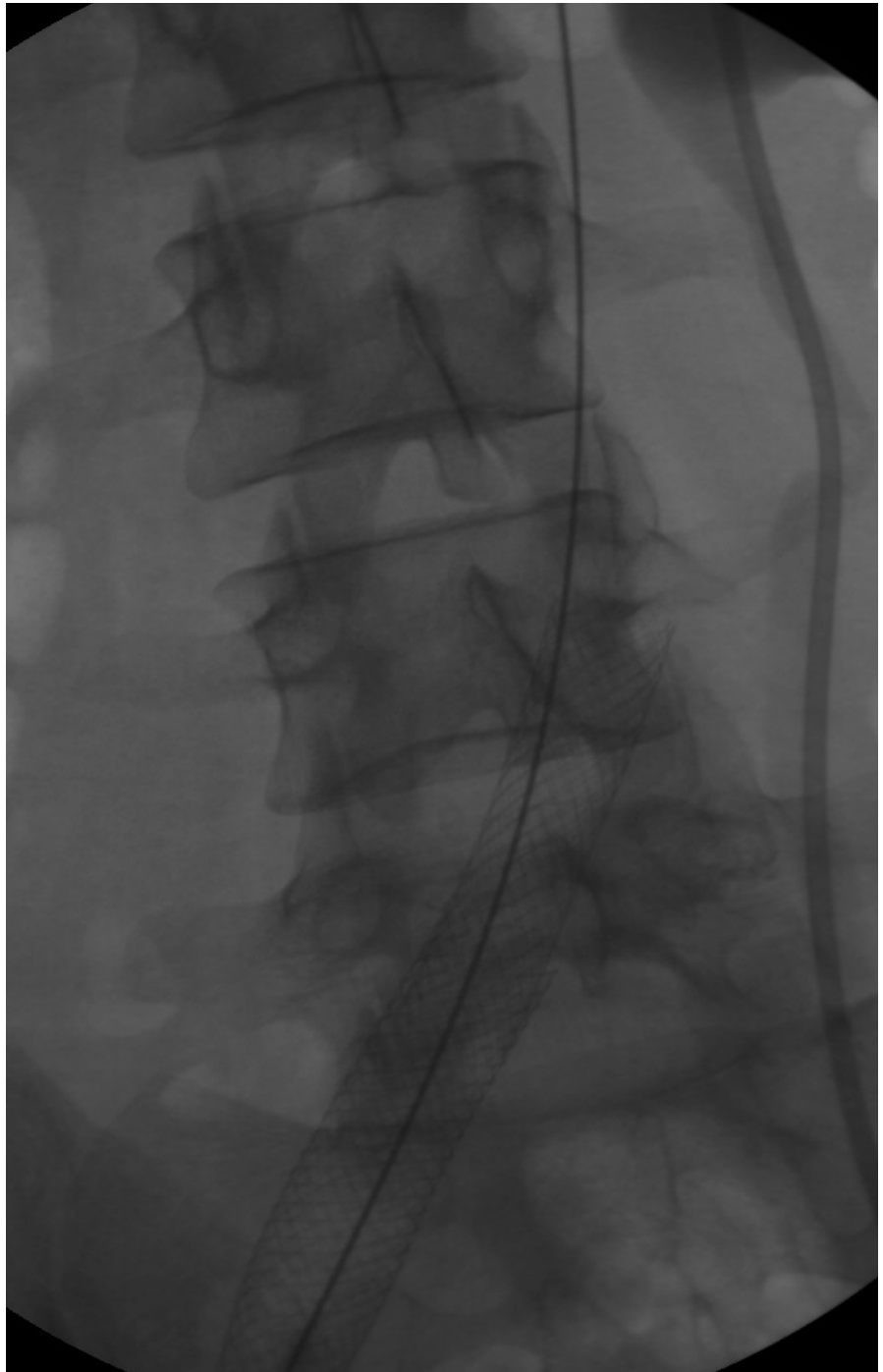
This led to thrombosis overnight

Thrombectomy performed

New 16/40 stent added

Re-opened L CIV

Definitely crosses R CIV



Most operators would therefore agree that stent DOES need to extend into IVC……

- But does it increase risk of thrombotic complications?

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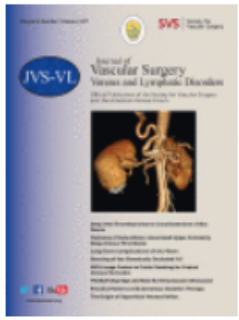

Clinical research study

Acute venous thromboembolism

Deep venous thrombosis associated with caval extension of iliac stents

Presented at the Plenary Session of the Twenty-eighth Annual Meeting of the American Venous Forum, Orlando, Fla, February 24-26, 2016.

Erin H. Murphy MD, Blake Johns BS, Elliot Varney BS, William Buck BBA, MS, Arjun Jayaraj MD, MPH, RPVI, Seshadri Raju MD, FACS

J Vasc Interv Radiol. 2018 Jun;29(6):774-780. doi: 10.1016/j.jvir.2018.01.771. Epub 2018 Apr 25.

Contralateral Deep Vein Thrombosis after Iliac Vein Stent Placement in Patients with May-Thurner Syndrome.

Le TB[1], Lee TK[2], Park KM[3], Jeon YS[4], Hong KC[3], Cho SG[2].

Author information

Abstract

PURPOSE: To investigate the incidence and potential causes of contralateral deep vein thrombosis (DVT) after common iliac vein (CIV) stent placement in patients with May-Thurner syndrome (MTS).

MATERIALS AND METHODS: Data of 111 patients (women: 73%) who had CIV stent implantation for symptomatic MTS at a single center were retrospectively analyzed. Mean patient age was 63.1 ± 15.2 years. Median follow-up was 36 months (range, 1-142 months). Stent location was determined by venogram and classified as extended to the inferior vena cava (IVC), covered the confluence, or confined to the iliac vein. Potential causes of contralateral DVT were presumed based on venographic findings. The relationship between stent location and contralateral DVT was analyzed.

RESULTS: Ten patients (9%, men/women: 4/6) exhibited contralateral DVT at a median timing of 40 months (range, 6-98 months). Median age was 69 years (range, 42-85 years). Median follow-up was 73.5 months (range, 20-134 months). Potential causes were venous intimal hyperplasia (VIH) (n = 7), "jailing" (n = 2), and indeterminate (n = 1). All patients with VIH had previous CIV stents overextended to the IVC. Overextension of CIV stent was associated with contralateral DVT ($P < .001$). The primary patency rate of the contralateral CIV stent was 70% at 20 months.

CONCLUSIONS: Contralateral DVT after CIV stent implantation has a relatively high incidence and often occurs late during follow-up. Overextension of the CIV stent to the IVC is associated with development of contralateral DVT, and VIH should be considered a potential cause.

J Vasc Surg Venous Lymphat Disord. 2014 Jul;2(3):253-9. doi: 10.1016/j.jvsv.2013.12.007. Epub 2014 Feb 7.

The incidence of contralateral iliac venous thrombosis after stenting across the iliocaval confluence in patients with acute or chronic venous outflow obstruction.

Caliste XA[1], Clark AL[1], Doyle AJ[1], Cullen JP[1], Gillespie DL[2].

RESULTS: In 65 patients (median age, 48 years; range, 15-80 years), 200 iliocaval stents were placed. Of these patients, 41 received ipsilateral stents that extended into the IVC and completely across the contralateral common iliac vein orifice; 39 (95%) of these had venous outflow obstruction as a result of thrombotic disease. In 22 patients (54%), post-thrombotic disease involved the IVC. All patients had stents that extended into the IVC, crossing the normal contralateral iliac vein orifice completely. Most patients (97.5%) were maintained by full anticoagulation with warfarin or low-molecular-weight heparin. Four patients (9.7%) suffered new thrombosis of the nonstented contralateral iliofemoral vein; two patients had initial involvement of the IVC, and three were totally noncompliant with their postoperative anticoagulation. Thus, 2.4% of compliant patients had new contralateral thrombosis after stenting across a normal contralateral common iliac vein and into the vena caval wall. In this select patient population, univariate analysis of patient compliance with the postoperative anticoagulation strategy showed a strong correlation with postoperative contralateral iliofemoral venous thrombosis (P = .0004).

Open surgical removal of iliac vein Wallstents with excision of pseudointima obstructing the contralateral iliac vein

Animesh Rathore, MD, Peter Gloviczki, MD, *and* Haraldur Bjarnason, MD, *Rochester, Minn*

Persistent pain after iliac vein stenting is rare. Surgical removal of two oversized (20-mm) iliac vein stents was performed in a 36-year-old woman because of severe back pain of 2½ years' duration. Clamping or venotomy were not required for stent removal, which was done by extraction of each wire of the stent through small puncture wounds in the vein wall. Duplex scanning confirmed residual pseudointima obstructing the orifice of the right common iliac vein. The pseudointima was surgically removed. The patient recovered without complications, and her pain completely resolved. (J Vasc Surg: Venous and Lym Dis 2016;4:525-9.)

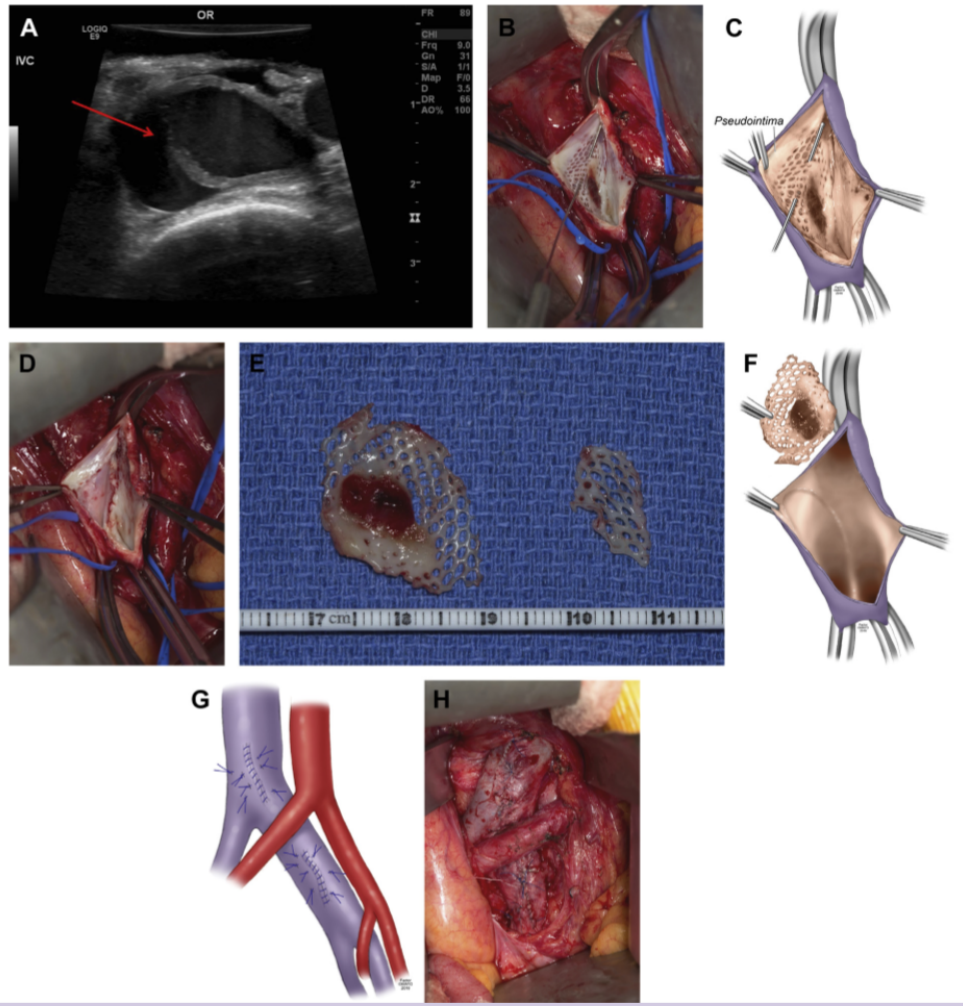

Fig 3. A, Intraoperative ultrasound imaging after stent removal. The *arrow* points at the pseudointimal flap that obstructs the outflow from the right common iliac vein (CIV). **B,** Intraoperative photograph and **(C)** artist's depiction of the pseudointimal flap formed at the ostium of the right CIV around the stent wires. Note the thrombus that formed in the center of the flap. **D,** Intraoperative photograph after excision of the flap. **E,** Excised flap with thrombus and partial occlusion of the lumen by the coalescing pseudointima. **F,** Artist's depiction of the iliocaval bifurcation and the excised flap. **G,** Closure of the venotomies and **(H)** suture closure of the sites of wire removal. (Panels **C**, **F**, and **G** are used with permission of the Mayo Foundation for Medical Education and Research. All rights reserved.)

Eur J Vasc Endovasc Surg (2017) 54, 745–751

Factors Associated with Contralateral Deep Venous Thrombosis after Iliocaval Venous Stenting

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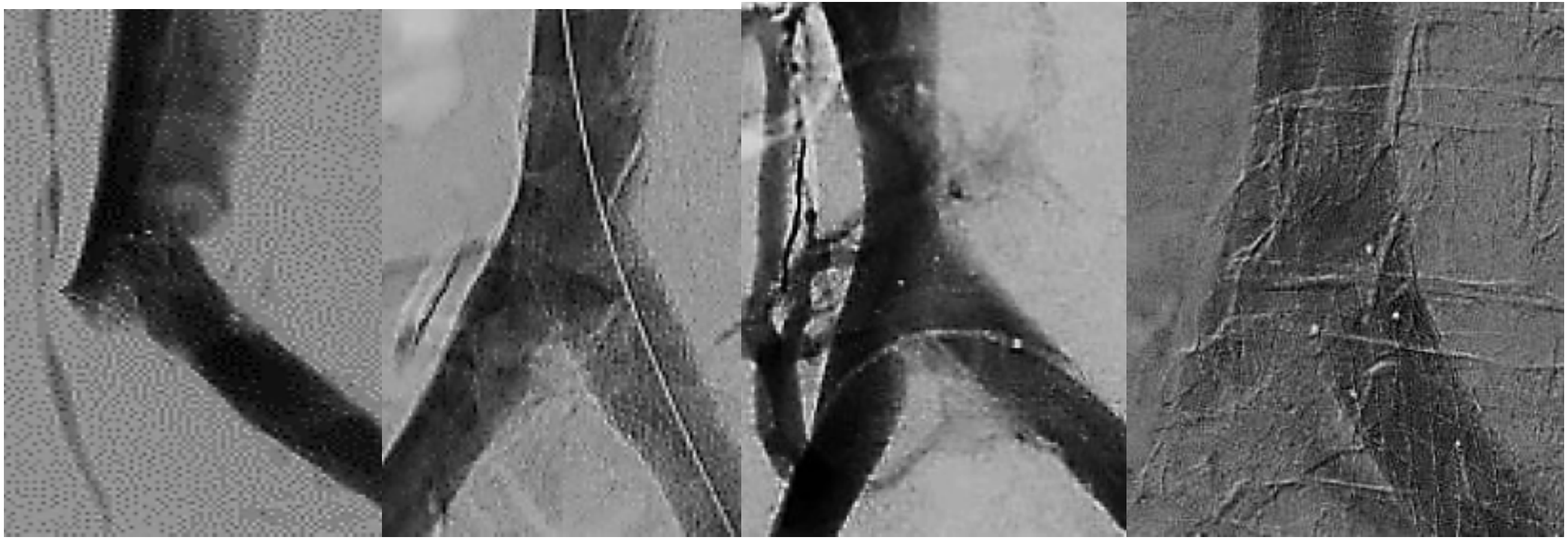
[b] Department of Angiology and Vascular Surgery and Department of Biomedical Sciences, Hospital São João, EPE, Porto, Portugal
[c] Department of Vascular Surgery, CHU Nord, Marseille, France
[d] Department of Interventional Radiology, University College Hospital of Galway, National University of Ireland, Galway, Ireland

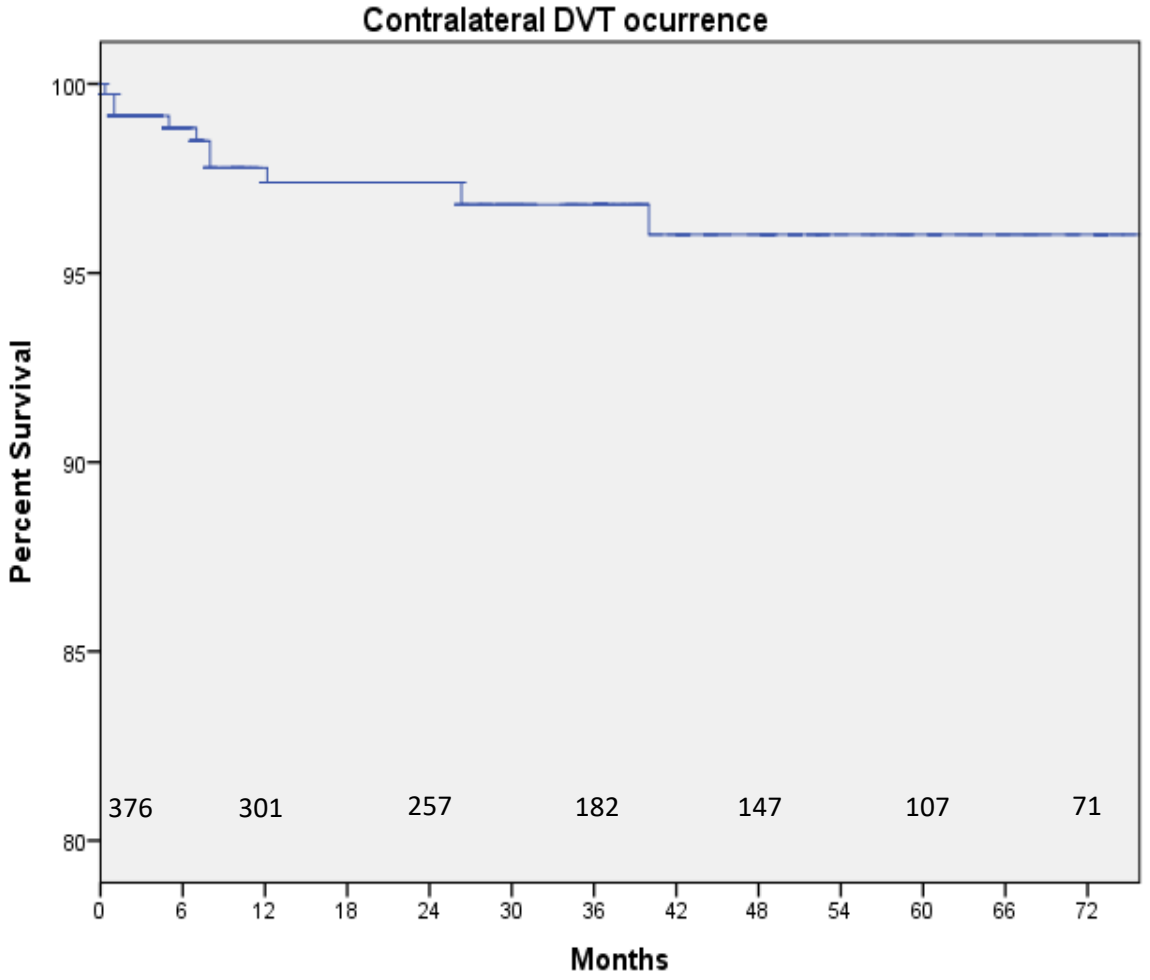
WHAT THIS PAPER ADDS

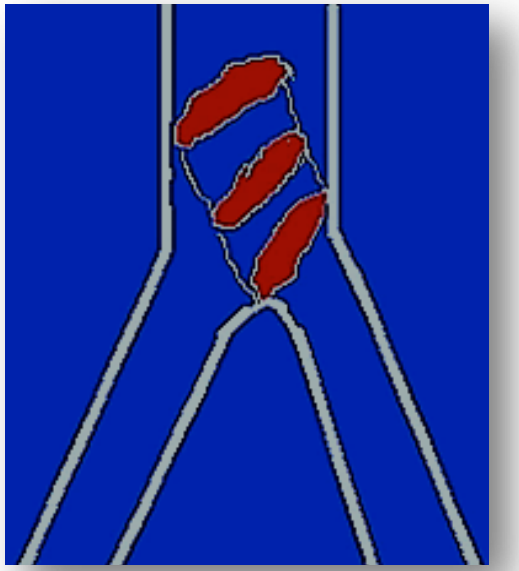
This study suggests that placement of iliac venous stents across the iliocaval confluence is a safe procedure. It is associated with a low incidence of contralateral iliac DVT, and if this occurs, early clot removal may be performed with good results. Acute DVT, pre-operative contralateral IIV thrombosis, pre-existing IVC filters, anticoagulation non-compliance, and malignant compression are significant factors that may increase the risk of subsequent contralateral DVT.



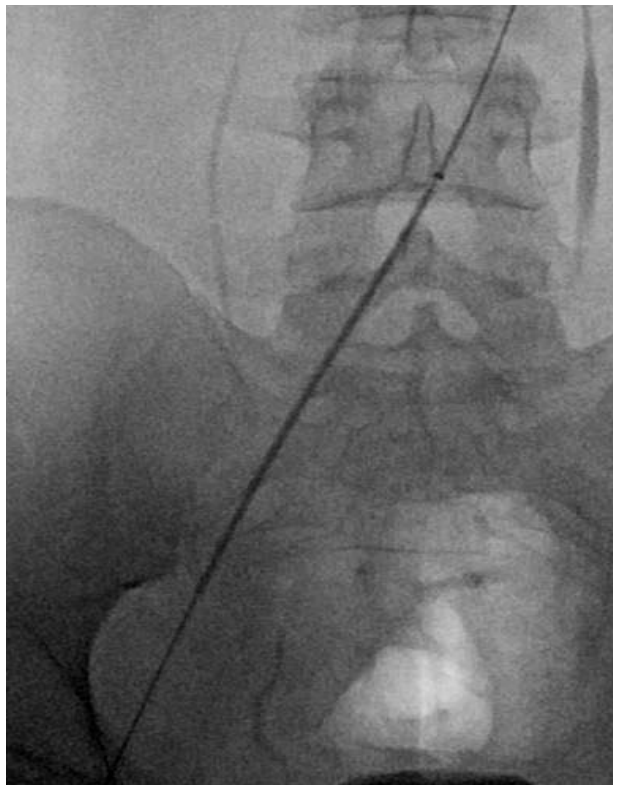
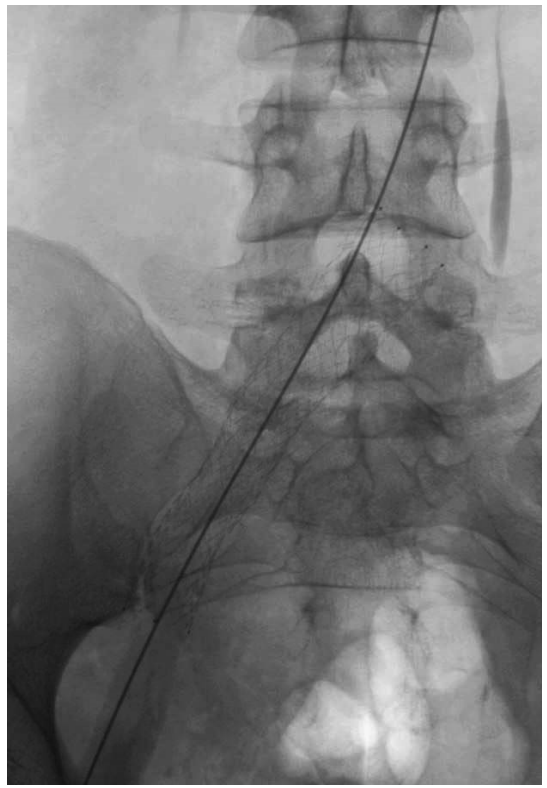
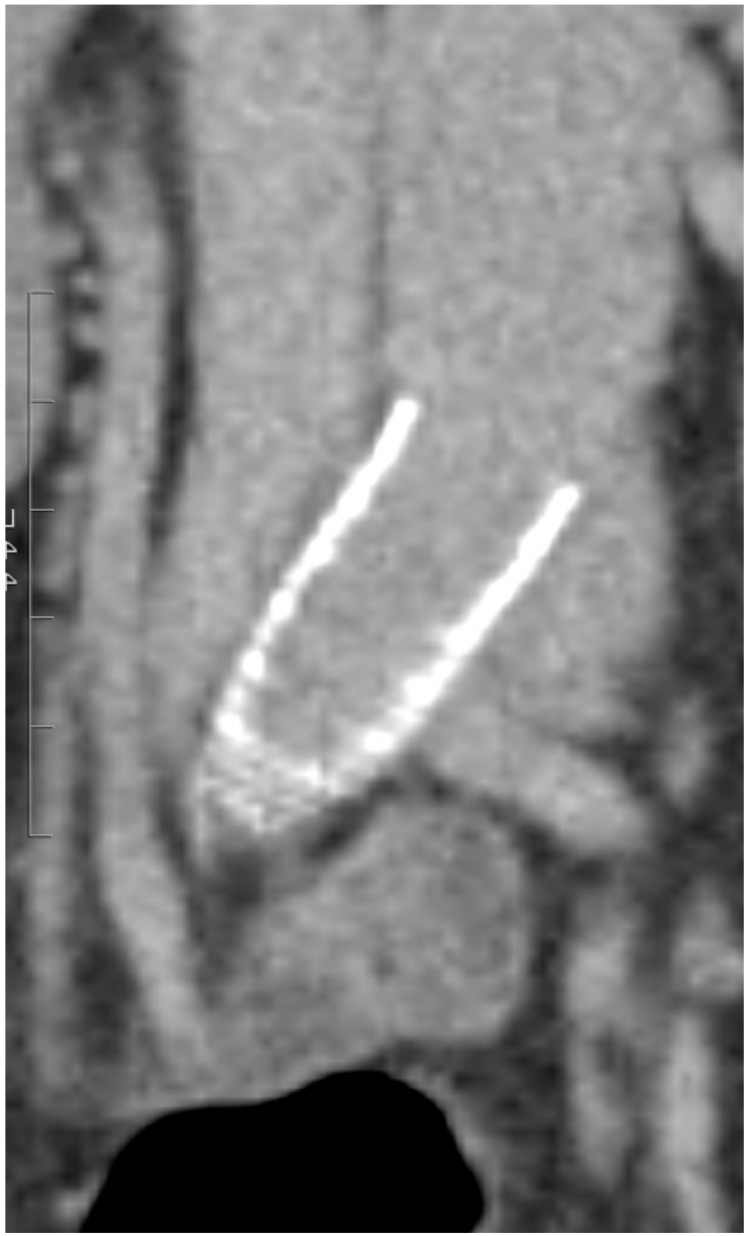
(A) Complete coverage. (B) Partial 75-100% coverage (C) 50-75% coverage (D) At the iliocaval confluence,

Stent type	Frequency	Diameter, mm
Wallstent	(315, 84%)	12-18
Cook Zilver Vena stent	(40, 10%)	14-16
Optimed Sinus venous	(10, 3%)	14-16
VENITI VICI stent	(7, 2%)	14-16
Bard Luminex	(2, 0.5)	14-16
Sinus Obliquus	(2, 0.5)	14-16
Total	376 patients	





Venogram images showing the three categories of left iliocaval stent extension inside the IVC.
(A) Complete >2cm, 100% coverage.
(B) (B) Partial 1-2cm, 75-100% coverage and
(C) (C) 50-75% coverage.
(D) (D) At the iliocaval confluence,
0% coverage (E)
A diagram showing the three categories of IVC stent extension;(1) complete, (2) partial, (3) flush with the iliocaval confluence.

To summarise:

- Iliac stents must extend into IVC
- But only just!!!!
- The further they extend into IVC, the greater the risk of thrombosis
- But it is not the only factor which increases risk:
  - Poor anticoagulation
  - Post thrombotic initial presentation
  - Malignancy
  - Contra-lateral Internal Iliac Vein Thrombosis

1. With newer dedicated venous stents the level of precision is much higher

2. The stent CAN be landed into the IVC

3. The stent can clearly AVOID covering contra-lateral CIV

4. This is the way forward