

Laser Recanalization of Occluded Venous Stents

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INTRODUCTION

- Placement of iliac and subclavian vein stents is a common treatment for symptomatic venous stenosis/occlusion.
- Chronic stent thrombosis can be difficult to cross.
- Several methods of recanalization have been described for when wire/catheter approaches fail, including sharp needle recanalization.
- **Laser-assisted stent recanalization** is a little-described technique which can be appropriate for difficult-to-treat cases

PURPOSE

Conventional management of iliac and subclavian vein stent stenosis includes the above techniques, including wire and catheter access and sharp needle recanalization. We demonstrate the technique of laser-assistant stent recanalization for venous in-stent stenosis.

MATERIALS & METHODS

Two cases of laser-assisted crossing of a chronic venous stent occlusion were identified to treat iliac and subclavian vein in-stent stenosis. These cases used a single or multi-vessel access approach and attempted use of standard Glidewire and catheters and other methods prior to application of laser recanalization.

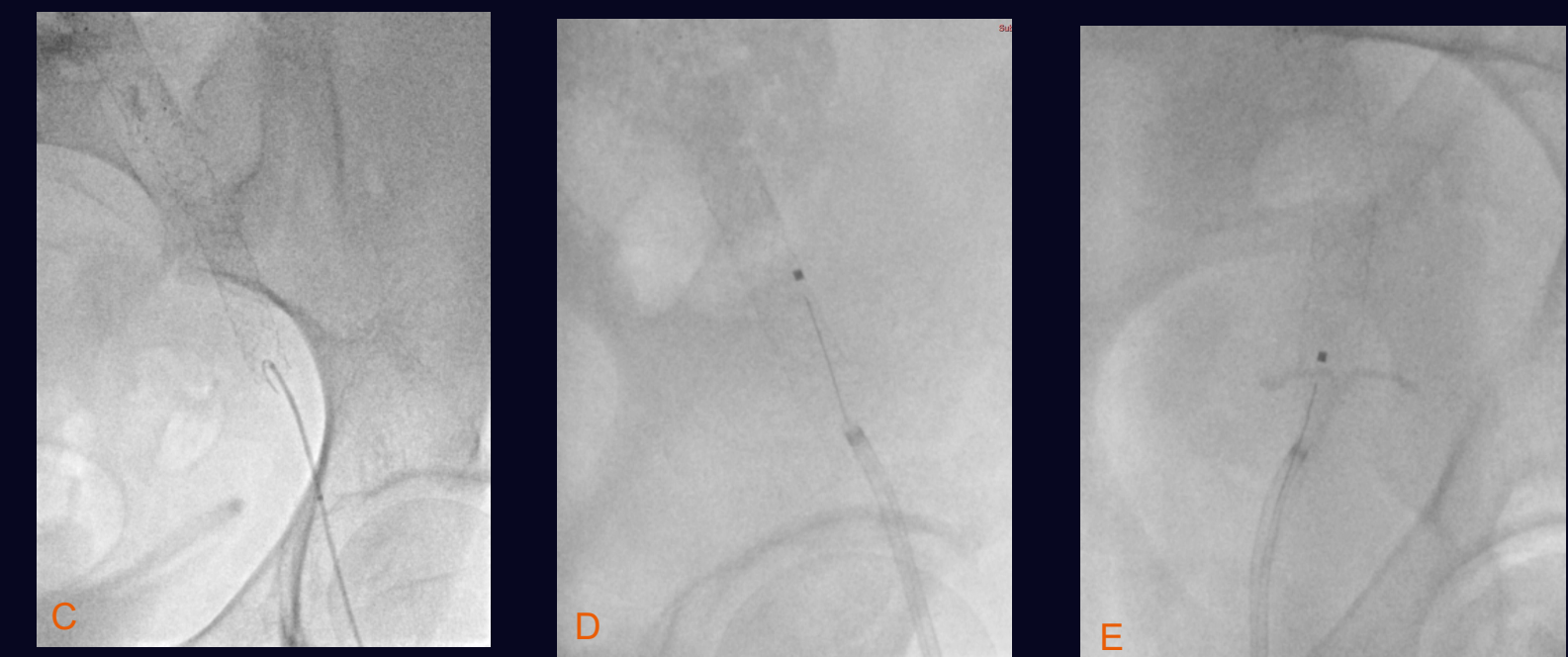
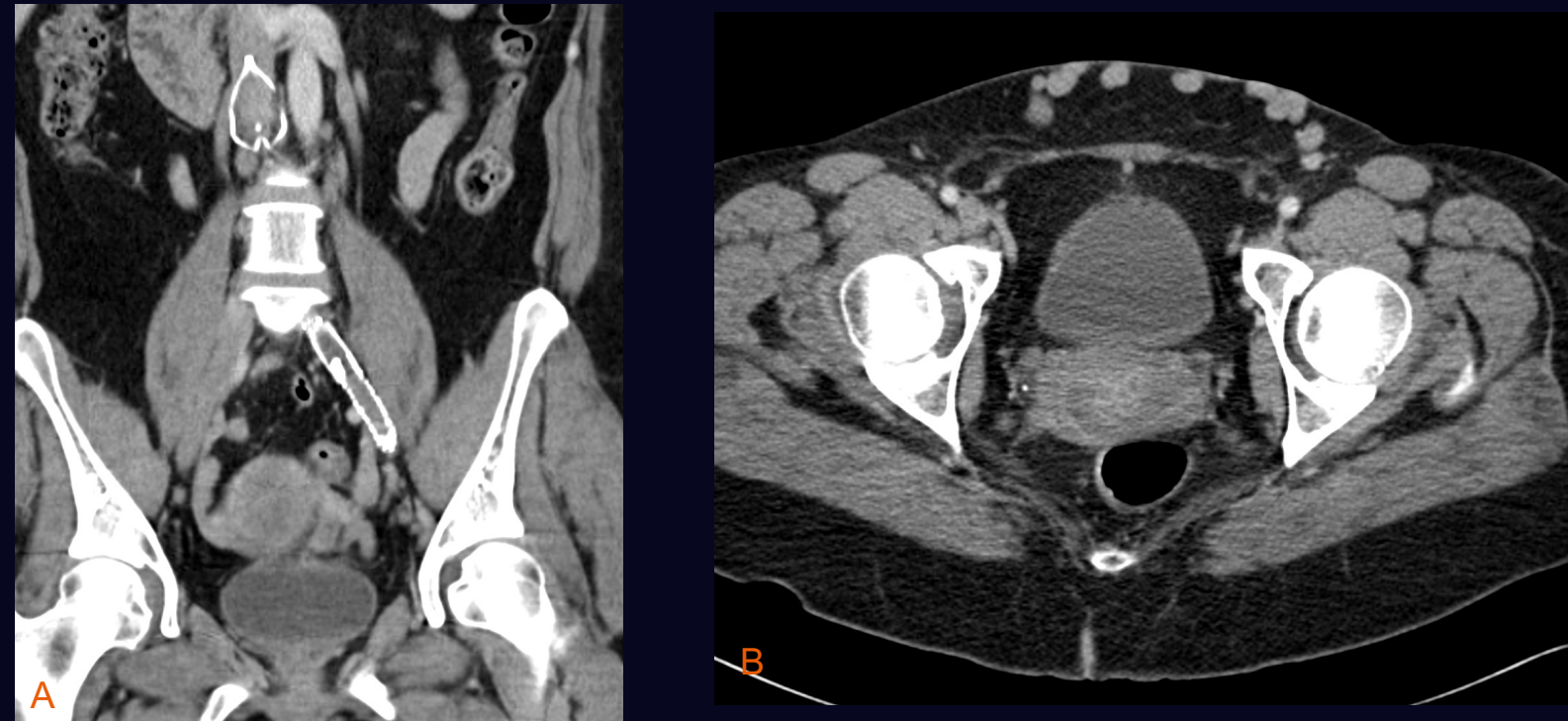


Figure 1. Laser Recanalization of a chronically occluded iliac vein stent.
A 45 year old woman with recurrent left lower extremity DVT and PE on anticoagulation requiring Optease filter presents 6 weeks after a CT showed re-occluded left iliac vein stents. A) Coronal CTV shows chronically occluded left iliac vein stent. B) Axial CTV shows diminutive left iliofemoral veins and extensive subcutaneous collaterals. C) Standard wire/catheter access through the stent from popliteal approach is unsuccessful. D) Laser catheter over V14 guidewire through Oscope sheath is slowly advanced while continuously viewing in steep LAO and E) RAO views. F) Through-and-through access is obtained with a loop snare from jugular access and 4F Navicross with Glidewire from popliteal access. G) Final angiogram after re-lining stents and multistation balloon angioplasty shows patent left iliac vein stents and IVC.

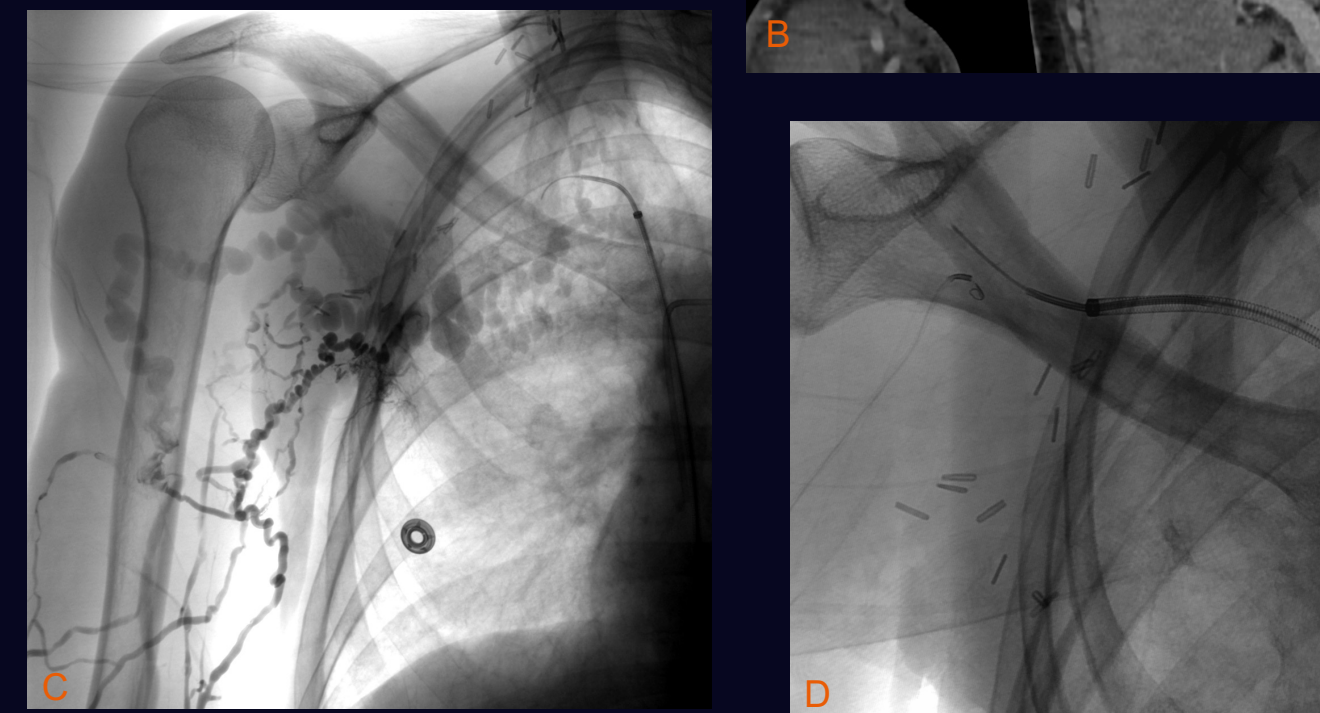
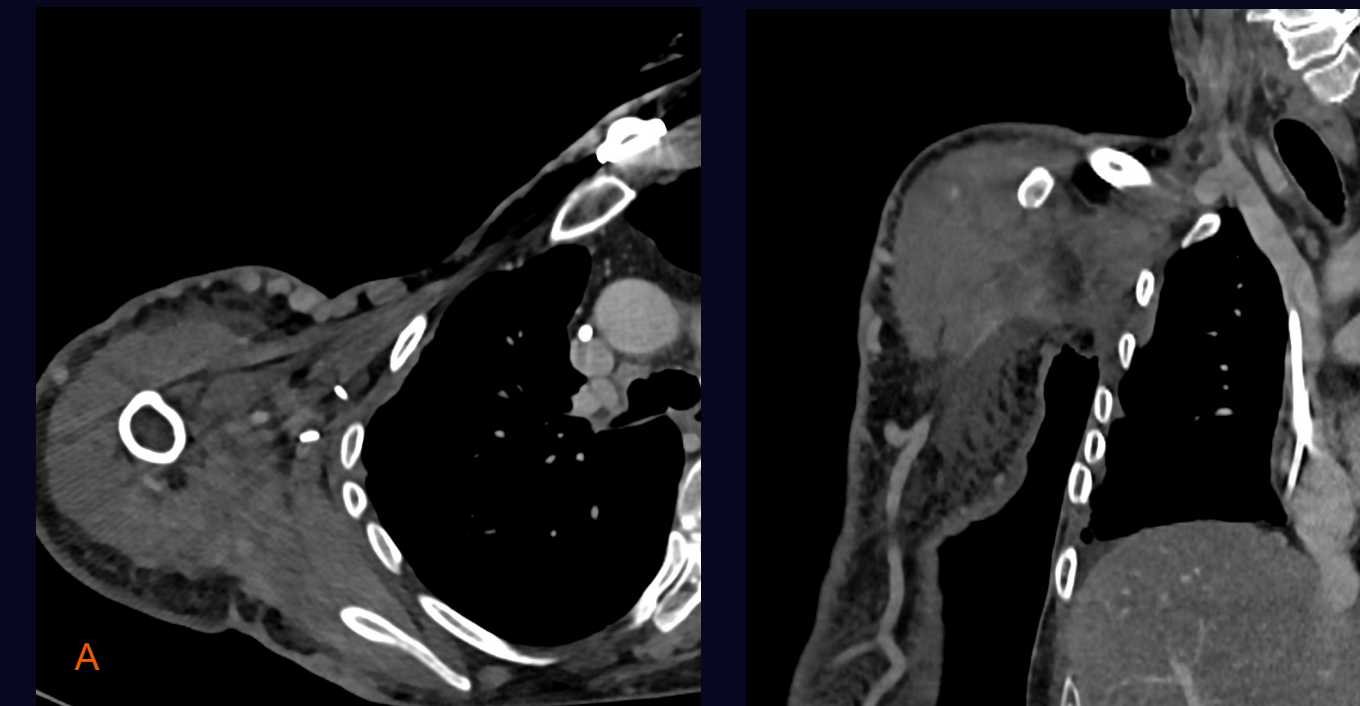
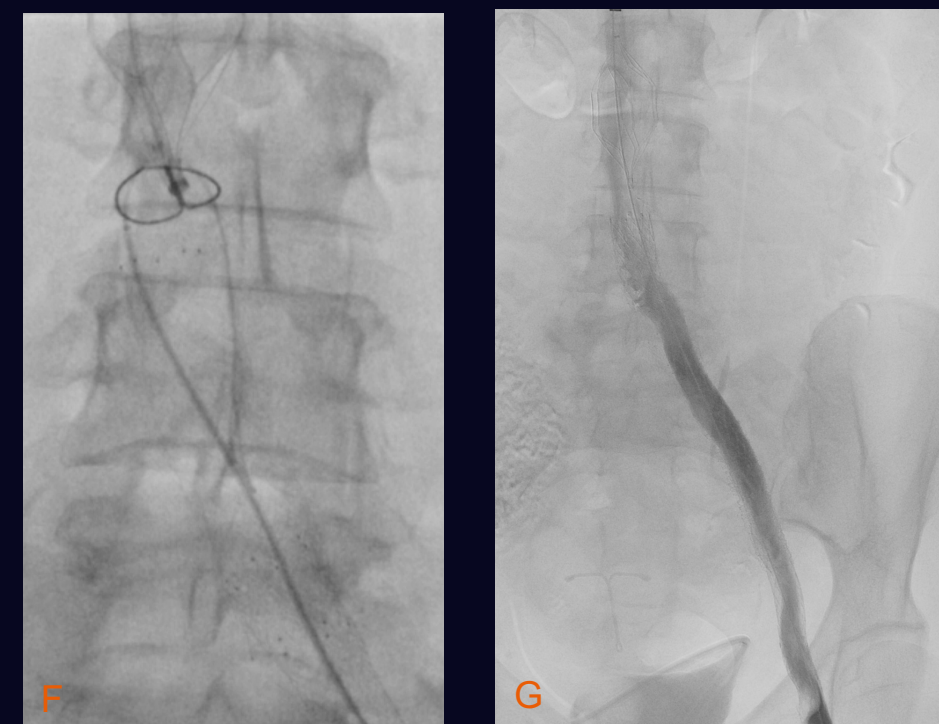
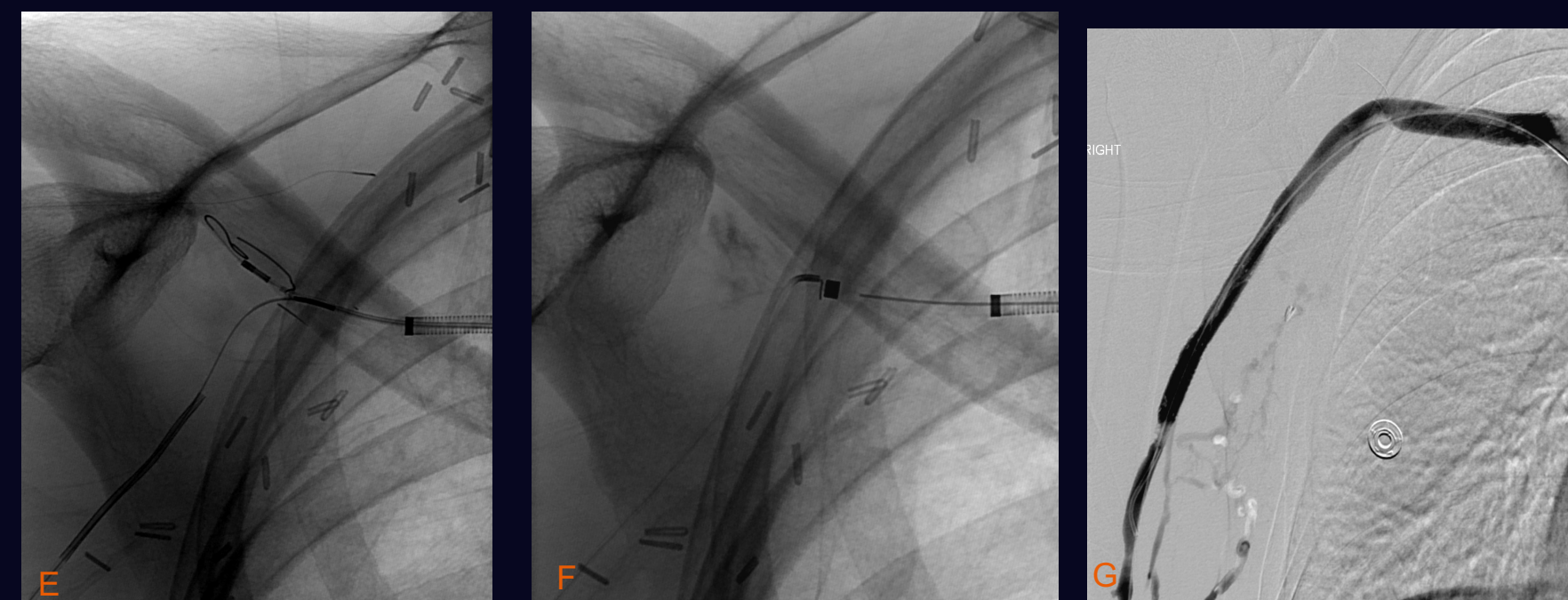


Figure 2. 51 year old woman with right breast cancer and end-stage lymphedema of the right upper extremity after multiple surgeries and radiation.

A) Axial and B) Coronal CT show chronic occlusion of the right upper extremity brachial, axillary, and subclavian veins with extensive venous collaterals of the upper arm and shoulder, and subcutaneous edema. C) Angiography from right forearm shows occluded subclavian vein with extensive pectoral collateral flow. D) Multiple combinations of catheters and wires are unsuccessfully used to cross the occlusion. E) Turbo Elite laser used after confirming alignment in multiple obliquities. F) Ultimately Pioneer IVUS re-entry catheter was used to obtain through-and-through access. G) Balloon angioplasty and overlapping stents of the brachial, axillary, and subclavian veins with successful recanalization.



RESULTS

An iliac and a subclavian venous stent occlusions were successfully crossed with application of a laser atherectomy device after standard revascularization techniques had failed.

The occluded stents were then successfully relined with no significant residual stenosis. Laser was used in combination with other techniques.

CONCLUSION

Laser photoablation is a potentially valuable adjunct in crossing chronically occluded iliac and subclavian vein stents when conventional techniques fail.

Appropriate selection of patients and occlusion characteristics is crucial for safe and successful outcomes.

Use of multiple obliquities while advancing atherectomy device confirms positioning and reduces risk of vessel injury.

Cone beam CT also can be helpful at crucial points in the procedure.

Appropriate, safe, and prompt use of laser may shorten procedural time, increase procedural success and provide a theoretical improvement in patency due to the mechanism of breakage of fibrous bands.