



## Bilateral Iliac Vein Stenting without Contrast in a Patient with Venous Ulcer

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### Abstract

Chronic Venous Insufficiency is caused by ambulatory venous hypertension of the lower extremities due to vein reflux, venous obstruction, or both. Venous outflow obstruction may play a role in patients with chronic venous ulceration who fail to improve despite conventional modalities of treatment including wound care and compression therapy. Modern imaging techniques, particularly intravascular ultrasound and percutaneous venous stenting using venography provide the ability to treat the obstructive component of the disease. We here describe an interesting case of a seventy one year-old female with chronic kidney disease stage 5 who underwent bilateral iliac vein stenting for severe obstruction for symptoms of non-healing left medial malleolus ulcer utilizing intravascular ultrasound and no contrast.

### Introduction

Chronic Venous Insufficiency (CVI) is caused by ambulatory venous hypertension of the lower extremities due to vein reflux, venous obstruction, or both. The prevalence of patients with severe CVI (active or healed venous ulcer) is estimated to be around 1-2% [1]. Venous ulceration is more common in patients with combination of reflux and obstruction compared to those with less advanced stages of CVI [2]. The standard therapy for venous ulcers is compression therapy. However, its effectiveness can be limited in cases and compliance can be poor. Percutaneous iliac venous stenting is a safe and efficient method to correct venous outflow obstruction and to improve venous ulcer healing in many cases.

### Case Presentation

A 71-year-old female with extensive medical history, including diabetes mellitus, hypertension, chronic kidney disease stage 5, LV diastolic dysfunction, pulmonary hypertension, status post gastric bypass surgery was referred to our clinic for evaluation of varicose veins and a non-healing left medial malleolus ulcer. She had no history of deep venous thrombosis but had noted hyperpigmentation of both legs for years. For the past year, she had developed a medial malleolus ulcer which has been slow to heal despite using compression stockings and wound care. On physical examination she had lipodermatosclerosis of the right lower leg and lipodermatosclerosis and medial malleolar ulceration of the left leg. Pedal pulses were not palpable, but biphasic by Doppler. The remainder of the physical examination was unremarkable. Venous duplex examination ruled out significant superficial venous reflux but there was common femoral vein reflux particularly of the left leg and no evidence of deep venous thrombosis. Arterial duplex studies showed patent bilateral superficial femoral and popliteal arteries with mild infrapopliteal disease. Laboratory data was significant for anemia with hemoglobin of 11.9 mg/dl and chronic kidney disease with creatinine of 3.9 mg/dl (GFR <30ml/min). After discussions with nephrology it was apparent that even minimal intravenous iodinated contrast use might result in dialysis dependence.

### Intervention

There was a high index of suspicion for venous outflow obstruction. To concomitantly diagnose and treat it, the patient was brought to the catheterization laboratory and positioned prone. The entire procedure was performed with fluoroscopy and ultrasound-based technology. Using ultrasound guidance, the popliteal veins were accessed. Bilateral intravascular ultrasound (IVUS) was performed from the inferior vena cava to the popliteal veins.

IVUS showed extrinsic compression of the right external iliac vein with 85% reduction in the area compared to reference vessel. On the left there was focal compression at the origin of the common iliac vein (reduction of area 55%) and more severe compression distally in the mid external

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Received Date: 22 May 2016

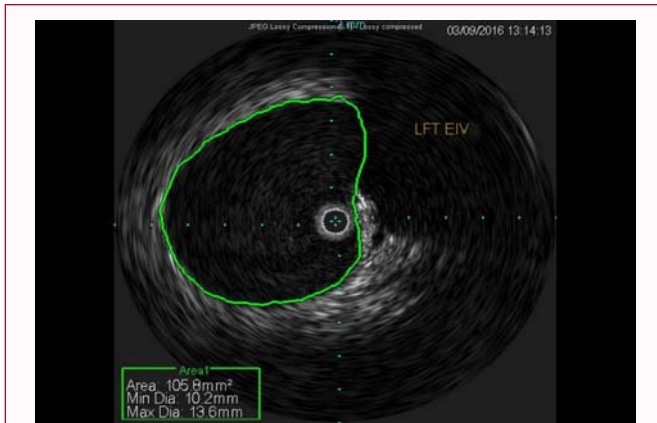
Accepted Date: 20 Jun 2016

Published Date: 25 Jun 2016

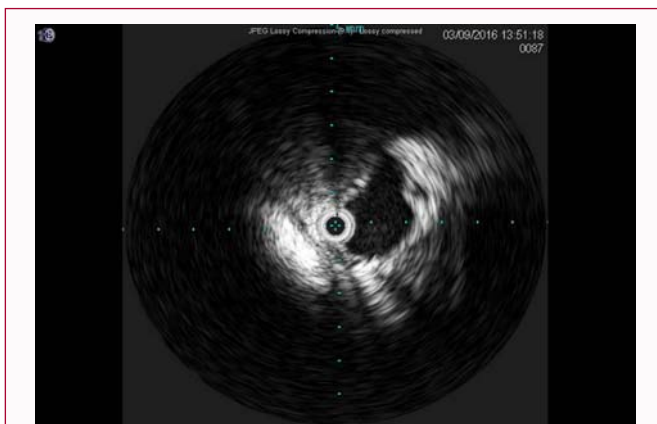
#### Citation:

Singla A, Hurtado CM, Attaran R. Bilateral Iliac Vein Stenting without Contrast in a Patient with Venous Ulcer. Clin Surg. 2016; 1: 1033.

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**Figure 1:** IVUS image showing reference vessel size of Left External Iliac Vein.



**Figure 2:** IVUS image depicting severe stenosis of Left External Iliac Vein.

iliac vein (reduction in area 75%) (Figure 1 and 2). No evidence of thrombosis or synechiae was seen.

Given these findings we proceeded with bilateral iliac venoplasty and stenting. We pre-dilated the iliac veins with a 14 mm balloon. Next, we deployed a 16mm x 60 mm self expanding stent (Wallstent, Boston Scientific) in the right iliac vein and overlapping 16mm x 90mm and 16mm x 60 mm self expanding stents (Wallstent, Boston Scientific) on the left (Figure 3 and 4). Both sides were post-dilated with a 16 mm balloon.

The patient tolerated the procedure well and was discharged on an oral anti-coagulant.

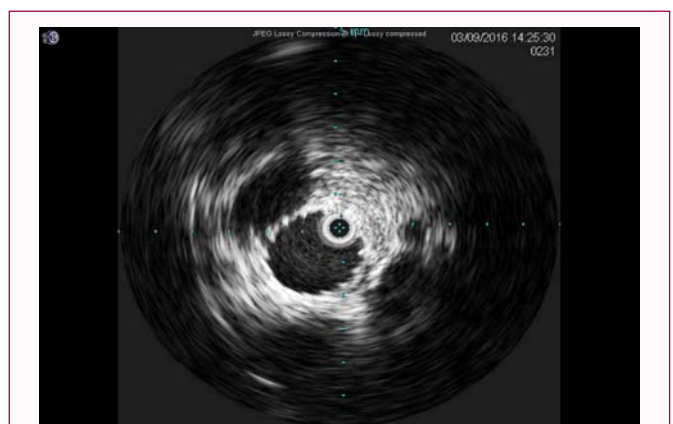
Within a week of the procedure there was less swelling and induration in her legs and by 4 weeks her medial malleolar ulcer had healed.

## Discussion

Endovenous stenting is the current method of choice in the treatment of CVI secondary to obstruction. Venography and stenting typically utilizes contrast dye, which can be detrimental in patients with poor renal function. IVUS is highly accurate modality and can be used to measure vessel lumen, degree of stenosis and to size a stent. IVUS better identifies obstructive lesions than venography, which can fail to detect even severe obstruction [3,4]. Neglén et al. [5] compared IVUS and venography on suspicion of chronic iliac vein obstruction and found the median stenosis on venography was 50%, compared with 80% by IVUS. Similarly, the stenotic area was significantly more



**Figure 3:** Fluoroscopic image showing Bilateral Iliac Vein stents and IVUS catheter.



**Figure 4:** IVUS image depicting well apposed Left Iliac Vein Stent.

severe when measured with IVUS compared with venography. An alternative approach would have been to utilize CO<sub>2</sub> as a contrast agent [6,7]. However, it could not replace IVUS in accuracy and vessel sizing. Instead, it may have served a supplementary role.

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