

Detecting stent geometry changes after venous recanalization using duplex ultrasound

M.E. Barbati, A. Gombert, I.M. Toonder, K. Schleimer, J. Grommes, C.H.A. Wittens, H. Jalaie
 Department of Vascular and Endovascular Surgery, University Hospital RWTH Aachen

BACKGROUND

Chronic obstruction of the deep venous system can lead to clinical symptoms as a result of a post-thrombotic syndrome (PTS). Endovenous revascularization has become established as the contemporary therapy of choice in these patients. Close monitoring after venous recanalization is crucial to detect the stent geometry changes and its effects on patency. The aim of this study is to investigate the efficiency of duplex ultrasound (DUS) as follow-up diagnostic tool.

METHODS

We retrospectively assessed all prospectively recorded data of patients treated by venous angioplasty and stenting from June 2013 to December 2016. Proximal, distal and mid stent segments, iliac vein compression as described by May-Thurner, the stent segment beneath the inguinal ligament and overlapping stent segments were the points of interest. We measured stent area and the diameter at the point of maximum compression according to DUS findings before patient discharge and at the last follow-up just before re-intervention. The degree of compression was calculated as nominal area of stent (cm²) – measured area of stent (cm²) X 100 (%).

PATIENT CHARACTERISTICS

Age	(mean ± SD)	40.6 ± 14.5
Gender		
Male	(n, %)	47 (38.8)
Female	(n, %)	74 (61.2)
BMI	(mean ± SD)	27.1 ± 4.0
Side of pathology		
Left	(n, %)	82 (67.8)
Right	(n, %)	23 (19.0)
Bilateral	(n, %)	16 (13.2)

RESULTS

Longitudinal (a) and transverse (b) view of ultrasound images in a patient with May-Thurner syndrome treated using a stent with a diameter of 16 mm. External compression due to overriding right common iliac artery results a decrease in intraluminal area (measured: 1.07 cm², expected: 2.01 cm²).

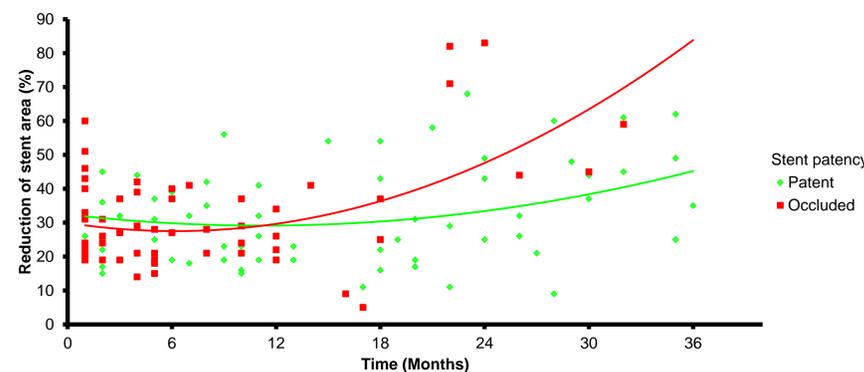
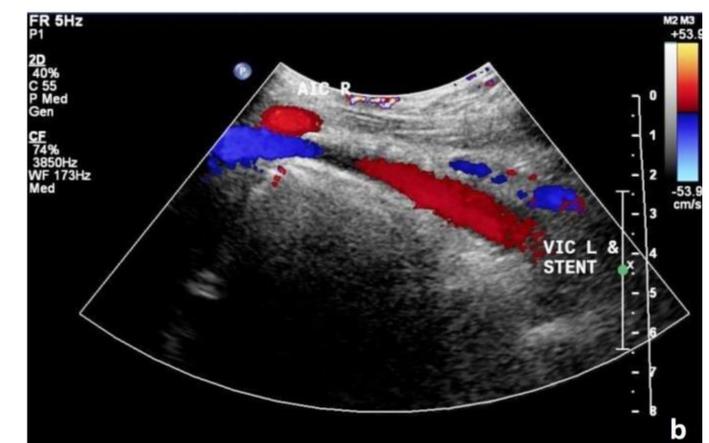


Longitudinal ultrasound images of the stent in common iliac vein.



(a) Sufficient stenting of the May-Thurner point with proper stent coverage.

(b) corresponding DUS demonstrating patency.



Reduction of stent area over the time and rate of primary patency (OR: 0.910; 95% CI: 0.832–0.997; p-value: 0.042).

CONCLUSION

DUS has sufficient accuracy in detection of stent changes and its patency. There is a discrepancy between diameters of the stent lumen in vitro and after deployment in all patients. Consistent reduction of stent lumen over the time, regardless of the absolute percent of stenosis, is a predictive factor for stent patency.

Correspondence to:
 Mohammad E. Barbati, MD
 mbarbati@ukaachen.de

University Hospital RWTH Aachen
 Pauwelsstraße 30
 52074 Aachen