AMERICAN JOURNAL OF DIAGNOSTIC IMAGING, 2024
VOL 10, NO. 1
10.5455/ajdi.20231119115719

TECHNICAL NOTE

Open Access

A case of winching technique: a practical approach for insuperable chronicaly occluded indwelling iliac venous stents

Çelebioğlu Emre Can[1], Özçınar Evren[2], Emmanouil Blevrakis[3], Diğdem Kuru Öz[4], Levent Yazıcıoğlu[2], Sadık Bilgiç[5]

[1]Department of Radiology/Vascular Interventional Radiolgy, Faculty of Medicine, Ankara University, Ankara, Turkey

[2]Department of Cardiovascular Surgery, Faculty of Medicine, Ankara University, Ankara, Turkey

[3]NHS United Lincolnshire Hospitals, Pilgrim Hospital Boston, Boston, UK

[4]Department of Radiology, Faculty of Medicine, Ankara University, Ankara, Turkey

[5]Department of Radiology/Vascular Interventional Radiolgy, School of Medicine, Ankara University, Ankara, Turkey

ABSTRACT

Chronic iliac vein occlusions and post-thrombotic syndrome (PTS) are the major sources of life affecting symptomatic iliocaval venous obstruction contributing to the morbidity of chronic venous insufficiency and venous hypertension. Venous stenting is a treatment option for the management of PTS. Despite dedicated venous recanalization technologies, long-term patency rates of venous stents are still a matter of debate. Beside that, salvage of an occluded stent could be problematic or even impossible. It may be challenging to advance the balloon catheter distally to the occlusion, even after the lesion has been crossed with a guide wire. Here we describe a new technique for overcoming such difficult bottlenecks. In a supine patient, despite successful wire-recanalization of the vena cava, achieved after a popliteal access, the balloon catheter could not be passed through an occluded iliac vein stent and towards the vena cava. Consequently, the tip of the 260 cm wire, was retrieved with a snare from the vena cava and externalized through sheath inserted in the right jugular vein. Two separate balloon catheters were loaded over the two ends of the through and through guide wire and torque devices were used to lock at their exit ports. Occluded segments were afterwards crossed with the novel "Winching technique" by pulling the balloon catheter instead of pushing it. We believe that this technique can speed up and facilitate the procedure for the occlusions that can be laborious to reanalyze by conventional methods.

ARTICLE HISTORY

Received November 19, 2023
Accepted February 07, 2024
Published February 16, 2024

KEYWORDS

Occluded venous stent; venous recanalization; endovascular innovations; winching; ırgat

Introduction

Venous stenting has emerged as an alternative to surgery for symptomatic venous occlusions and widely used for symptom relief [1]. Although different trials considered short term primary patency rates acceptable for iliac venous stenting, long term patency rates were still a matter of debate [2]. In addition, recanalization of an occluded stent may be extremely difficult to salvage or even impossible, due to difficult passage of the material, despite an initial successful wire recanalization. Different adjunctive aggressive recanalization techniques have been described for long segment dense fibrous venous occlusions. However, devices used for these approaches could not be always accessible [3]. Through-through wiring of a lesion could be achievable in many interventional settings and snaring of the wire could be a procedure salvaging and time sparing option in some cases.

Here, we describe the novel "Winching technique" that can be used for crossing through these dense fibrous chronic occlusions with a balloon catheter over a through-through wire access.

Case Description

Winching technique

A 35 years old obese female patient with an occluded iliac venous stent has admitted to our

Contact Çelebioğlu Emre Can emrecelebioglu@yahoo.com.tr Department of Radiology/Vascular Interventional Radiolgy, Faculty of Medicine, Ankara University, Ankara, Turkey.

© The Author(s) 2024. Open Access. This article is licensed under a Creative Commons Attribution 4.0 International License (CC BY). http://creativecommons.org/licenses/by/4.0/.

clinic. The stent was implanted 2 years prior and eventually occluded 1 year later due to suboptimal length. Patient was followed up for a year with anticoagulation regimen but due to worsening of the symptoms, an attempt for recanalization was decided at multidisciplinary vascular meeting. Treatment of the was planned patient was prepared for the intervention according to the CIRSE standards [4]. Right popliteal vein was punctured while patient in supine position with a 21G micro puncture kit (MAK set, Merit Medical Systems, South Jordan, UT) under ultrasound guidance (SonoSite, Bothell, WA), and a 10 F sheath (Terumo Corp, Tokyo, Japan) was introduced to the vein. 7,500 IU (75 units/kg) heparin (Koparin vial 25,000 IU/5 ml, Koçak Pharmaceuticals, Turkey) was administered to the patient initially after venous sheath insertion. The use of sharp recanalization techniques were used for wire crossing of the inferior vena cava, which was achieved with an exchange length 0.035" guide wire (Radio Focus Guide Wire, Terumo, Tokyo) through the popliteal sheath. Despite many efforts, lesion crossing maneuvers were failed with the balloon catheter and catheterization beyond the occlusion was failed due to insufficient stiffness and low resistance force of the wire. Therefore, patients' right neck area was prepared and a 6 F introducer sheath (Terumo Corp, Tokyo, Japan) was inserted to the jugular vein and, the 260 cm wire that is coming from the popliteal vein was snared with a 20 mm Amplatz Goose neck snare kit (ev3, Plymouth, MN, USA) and externalized from the jugular side (Fig. 1). Following that, two balloon catheters were loaded over the wire, one through the jugular (10 × 40 mm, 135 cm shaft length, Mustang, Boston scientific, USA) and one over the popliteal (16 × 40 mm, 75 cm shaft length, XXL, Boston Scientific, USA) sheaths, at the same time. Both balloons were locked with torque devices at their exit ports. The loaded system was pulled from the jugular side to cross and to dilate the occluded iliac venous segment and then pulled from the popliteal side to dilate the stenosis at the femoral vein segment (Fig. 2). Afterwards self-expandable stent (16 × 100 mm, Wallstent, Boston scientific, USA) was introduced from the popliteal access to extend the previously stented segment up to the inferior vena cava. Control venography demonstrated successful recanalization of the

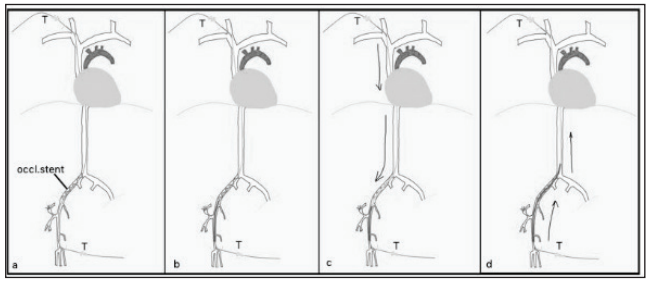

Figure 1. Images that show the through-through access from the popliteal vein to the jugular vein sheaths on a supine position of the patient. Torque device and balloon catheters were shown with arrows.

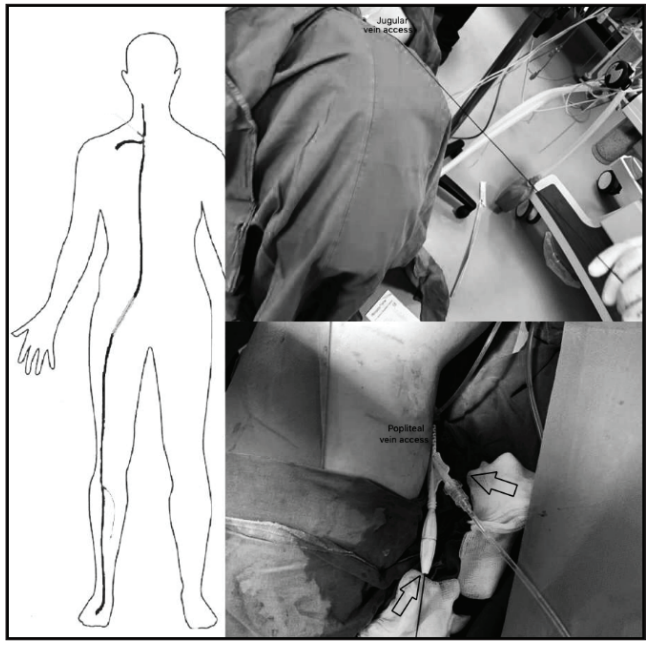

Figure 2. (a and b) Illustration of the occluded segment and the procedure. (c and d) Illustrations that demonstrates the "Winching technique." Torque devices at the exit ports of the balloon catheters were shown with the letter "T."

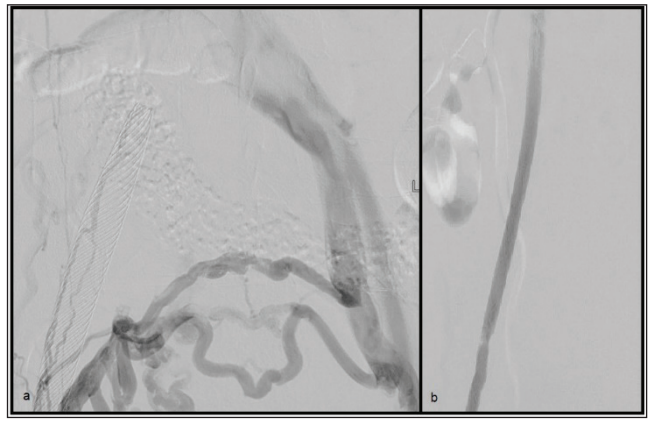

Figure 3. (a) Digital substraction venography image obtained before recanalization of the occluded stent. (b) Digital substraction venography image demonstrating recanalized iliac venous stent with an acceptable flow.

vein with an acceptable flow rate and the venous collaterals, predominantly located at the pelvic region prior to the recanalization, were also disappeared after successful stent implantation (Fig. 3). The antiplatelet protocol in our institution is low molecular heparin plus aspirin (100 mg) for 1–3 months followed by non-vitamin K antagonist oral anticoagulants (NOACs) plus aspirin for another 1–3 months followed by life-long NOACs.

Discussion

We have described the novel "Winching technique" to surpass insuperable venous in-stent occlusions when a balloon catheter will not follow a snared wire by tightening and pulling the balloon catheter over a through-through wire system, instead of attempting to push it through. The balloon catheter was pulled from the opposite side of the through-through access which was created between the jugular and popliteal veins (body floss technique) with the novel "Winching technique" to surpass the insuperable venous in-stent occlusion.

Even in the dedicated stent era, the short term primary patency rates after iliac venous stenting has shown to be as low as 68% [5]. Despite some promising results, long term patency rates of venous stents and their status is still uncertain [2,5]. Re-intervention should be planned, after occlusion or critical stenosis and when the patient becomes symptomatic [6]. Physicians involved in the treatment of venous disease are still searching for different methods and adjunctive techniques in order to recanalize the iliac venous axis. Many dedicated devices and techniques are used for this intent [7]. The main obstacle for occluded venous anatomy is the presence of transmural fibrosis with webs and membranes and the "Winching technique" may be an option to surpass the balloon catheter through these chronically occluded segments. Furthermore, loading the balloon catheters from both ends of the wire channel could lower the procedure time, and, help the operator catheterize the occlusion.

In conclusion, the novel "Winching technique" could lower the procedure, and, fluoroscopy times corresponding to crossing of insuperable chronic occluded iliac vein stents with a balloon catheter. Additionally, it is very useful at chronic insuperable lesions while, crossing the occluded segments and preparing the vessel, with a balloon catheter, prior to a further stenting procedure.

References

1. Taha MAH, Busuttil A, Bootun R, Thabet BAH, Badawy AEH, Hassan HA, et al. A clinical guide to deep venous stenting for chronic iliofemoral venous obstruction. J Vasc Surg Venous Lymphat Disord. 2022 Jan;10(1):258–66.e1.
2. Salem AM, AbdelAzeem AboElNeel H, Fakhr ME. Long-term outcome of dedicated venous stents in management of chronic iliofemoral obstruction. J Vasc Surg Venous Lymphat Disord. 2022 Jan;10(1):52–9.
3. Gallo CJR, Ronald J, Pabon-Ramos WM, Suhocki PV, Sag AA, Martin JG, et al. Sharp recanalization of chronic central venous occlusions of the thorax using a steerable coaxial needle technique from a supraclavicular approach. Cardiovasc Intervent Radiol. 2021 May;44(5):784–8.
4. Mahnken AH, Thomson K, de Haan M, O'Sullivan GJ. CIRSE standards of practice guidelines on iliocaval stenting. Cardiovasc Intervent Radiol. 2014 Aug;37(4):889–97.
5. van Vuuren TMAJ, Doganci S, Wittens CHA. Patency rates and clinical outcomes in a cohort of 200 patients treated with a dedicated venous stent. J Vasc Surg Venous Lymphat Disord. 2018 May;6(3):321–9.
6. Raju S. Best management options for chronic iliac vein stenosis and occlusion. J Vasc Surg. 2013 Apr;57(4):1163–9.
7. Raju S, Tackett P Jr, Neglen P. Reinterventions for nonocclusive iliofemoral venous stent malfunctions. J Vasc Surg. 2009 Feb;49(2):511–8; doi: 10.1016/j.jvs.2008.08.003