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Nonthermal invasive endovenous Procedures For VaricoseVeinsLatest Innovations in the Treatment of Venous Disease

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ABSTRACT
N-butylcyanoacrylate ablation, along with mechanochemical ablation, is one of the best-known non-thermal ablation treatment methods for varicose vein. N-butyl cyanoacrylate ablation is comparable to thermal ablation in terms of efficacy and safety, and offers the benefit of not requiring tumescent injections and the use of compression stockings. N-butyl cyanoacrylate (NBCA) is a liquid monomer that undergoes an exothermic polymerization reaction to form a solid upon initiation with hydroxyl anions. A new technique for venous insufficiency is non-thermal ablation with vein sealing system which comprises the endovenous delivery of cyanoacrylate tissue adhesive to the vein causing fibrosis.

Keywords: Varicose vein, N-butyl cyanoacrylate, endovenous ablation

I. INTRODUCTION

Treatment of incompetent saphenous veins has undergone wide changes during the past decade. Previously, surgical stripping was the primary choice of treatment. However, it has been largely replaced by endothermal ablation, either with radiofrequency or laser energy [1].

Recently, a new concept of treatment, N-butyl cyanoacrylate closure (NBCA), has been approved for the treatment of incompetent saphenous veins. The Vena-Seal Closure System (Medtronic, Minneapolis, MN, USA), a new techniqueusing NBCA, received the ConformitéEuropéene (CE) mark in September 2011 and was approved by the U.S. Food and Drug Administration for closure of lower extremity superficial truncal veins in February 2015 [2]. In Korea, NBCA for treatment of incompetent saphenous veins was approved in November 2016 as a new technology and announced by the Ministry of Health and Welfare in December 2016.

The VenaSeal™ adhesive, an n-butyl-2-cyanoacrylate (NBCA) based formulation, is a clear, free-flowing liquid that is provided sterilize following exposure to dry heat. The VenaSeal adhesive polymerizes in the vessel via an anionic mechanism (i.e., VenaSeal adhesive begins to polymerize into a solid material upon contact with body fluids or tissue). This acute coaptation halts blood flow through the insufficient vein until the implanted adhesive becomes fibrotically encapsulated to establish a durable, chronic occlusion of the treated vein. The VenaSeal™ delivery system components facilitate the placement and delivery of VenaSeal adhesive within the target vessel. The VenaSeal delivery system components include a catheter, introducer, dilator, dispenser gun, dispenser tips, 3-cc syringes, and 0.035" J-wire guidewire. The VenaSeal™ system kit is provided sterile by exposure to ethylene oxide (EtO).

The VenaSeal™ closure system (VenaSeal™ system) is indicated for use in the permanent closure of lower extremity superficial truncal veins, such as the great saphenous vein (GSV), through endovascular embolization with coaptation. The VenaSeal system is intended for use in adults with clinically symptomatic venous reflux as diagnosed by duplex ultrasound (DUS).

The use of the VenaSeal™ system is contraindicated when any of the following conditions exist:

- previous hypersensitivity reactions to the VenaSeal™ adhesive or cyanoacrylates;
- acute superficial thrombophlebitis;
- thrombophlebitis migrans;
- acute sepsis exists.

Several previous studies have demonstrated the safety and effectiveness of the Vena-Seal system for the treatment of incompetent saphenous veins [3,4,5,6,7].
However, all previous studies reported treatment of saphenous veins with diameters less than 2 cm.

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II. CASE REPORT

A 26-year-old male visited Marengo QRG Hospital OPD(Faridabad, Haryana) in November, 2022. He complained of intermittent night cramps, heaviness, itching, and swelling in his left leg. He had undergone Vena Seal closure system using N-butyl cyanoacrylate closure (NBCA) for left GSV. The clinical, etiologic, anatomic, pathophysiologic classification was C_3. He had pigmentation around the left leg (Figure 1,2). A written informed consent was obtained.

Fig.1
A photo of patient's leg before procedure.

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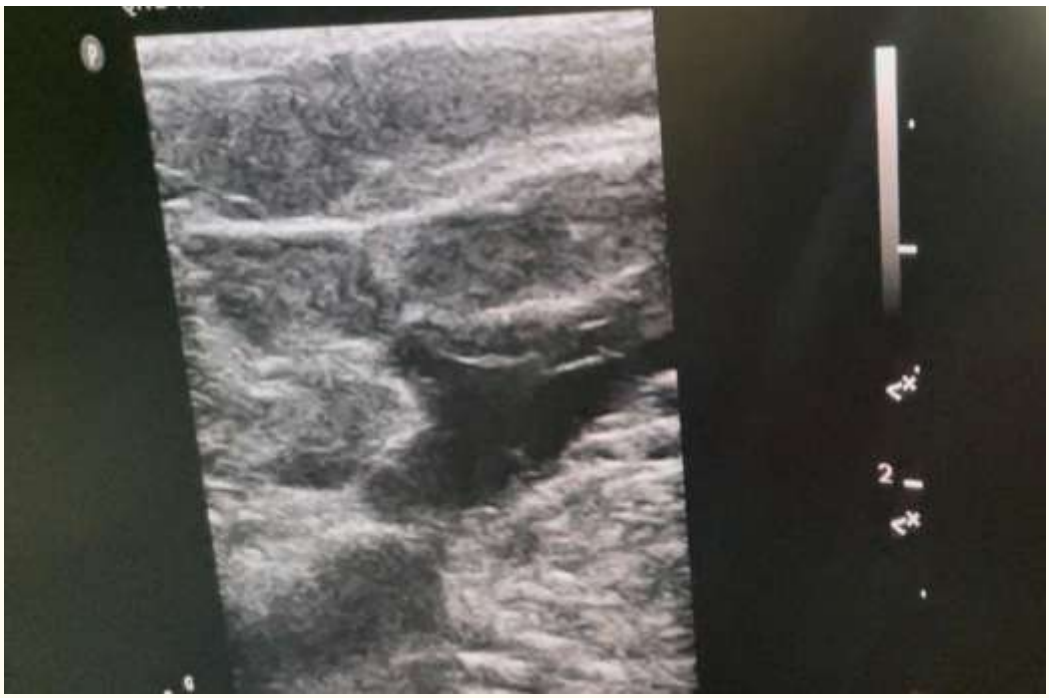

Figure 2
Ultrasopund duplex showing SFJ reflux

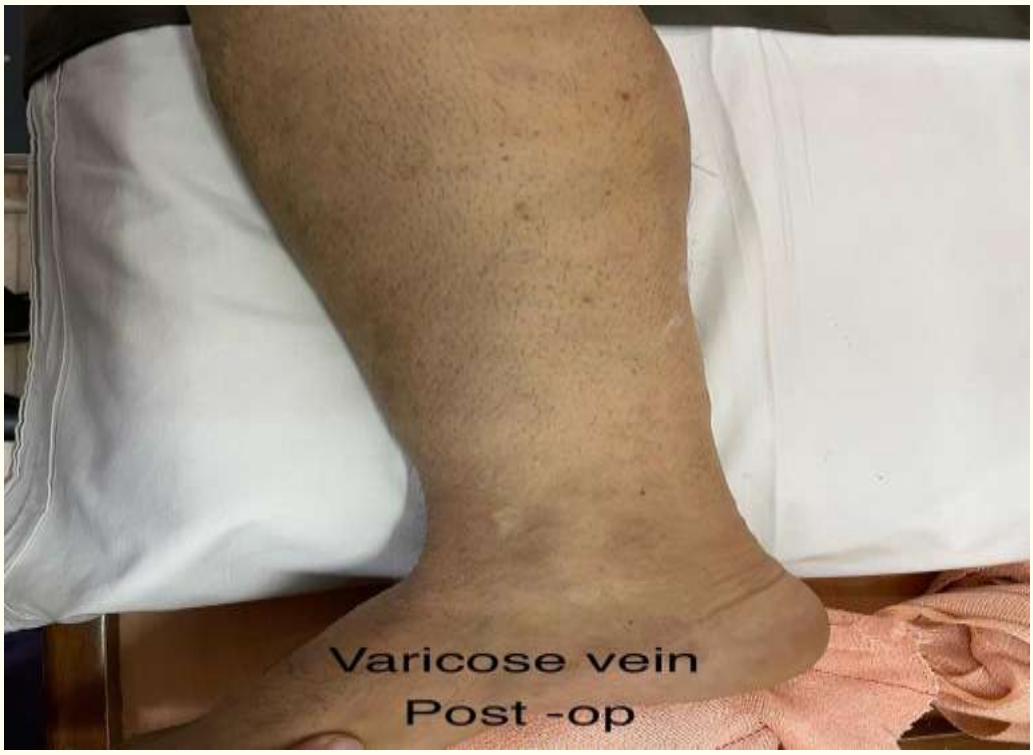

Fig 3
A photo of patient's leg after 48 hr post procedure

With ultrasound guidance, a 5F. delivery catheter in 7F. introducer sheath was advanced to the inguinal area. Delivery catheter tip was positioned 5.0 cm distal to the proximal end of GSV. The proximal end of the saphenous vein was compressed thoroughly by the ultrasound probe with the left hand, at 2 cm proximal to the delivery catheter tip. Two injections of approximately 0.10-

mL cyanoacrylate glue were each given 1 cm apart at this location, followed by a 3-minute period of local compression with the right hand. Then, repeated single injections and 30 seconds of compression for every 3 cm distally. Additional glue injection was allowed by the author's discretion for areas with large diameter, areas with communicating vein, or with a perforating vein.

Finally, the sheath/catheter was removed and compression was applied to the entry site until hemostasis was achieved. A small bandage was applied, and occlusion was confirmed by ultrasound.

No concomitant phlebectomy was done, but concomitant sclerotherapy with sodium tetradecyl sulfate was carried out after the above sequences were finished. Liquid type solution (0.2%) was used for the treatment of telangiectasia in the medial thigh area while foam type solution (1.0%) was used for the treatment of 2 perforating veins in the lateral calf and posterior calf area.

The patient was recommended to wear a thigh high compressive stocking for 1 week due to the concomitant sclerotherapy. Due to the patient's request for sedation, the procedure was performed under intravenous sedation in the presence of an anesthetist.

Upon 1-month follow-up, we checked the duplex sonogram. The largest area of GSV was confirmed to be properly sealed.No blood flow was detected in the sealed area nor in the proximal area

III. DISCUSSION

This is the first report to describe the NBCA, VenaSeal system, for the treatment of large recurrent varicose vein.

One of good aspect of NBCA is that it doesn't cause any mechanical or thermal damage with the additional glue injections.According to our previous experiences, this manner showed satisfactory outcomes.

However, NBCA, VenaSeal system, is a new technique and a definite maneuver has not been established yet, especially for treatment of large tortuous or recurrent varicose veins.

More investigation and experiences should be carried out to support the treatment for large veins or recurrent varicose veins.

REFERENCES

[1]. US markets for varicose vein treatment devices 2013: Medtech 360. Toronto (Canada): Millennium Research Group Inc.; 2013.

[2]. U.S. Food and Drug Administration. Approval Order: Venaseal Closure System-P140018 [Internet] Silver Spring (MD): U.S. Food and Drug Administration; 2015. Feb 20, [updated 2018 Feb 23]. [cited 2017 Mar 28].

[3]. Almeida JI, Javier JJ, Mackay EG, Bautista C, Cher DJ, Proebstle TM. Two-year follow-up of first human use of cyanoacrylate adhesive for treatment of saphenous vein incompetence. Phlebology. 2015;30:397–404.

[4]. Proebstle TM, Alm J, Dimitri S, Rasmussen L, Whiteley M, Lawson J, et al. The European multicenter cohort study on cyanoacrylate embolization of refluxing great saphenous veins. J VascSurg Venous LymphatDisord. 2015;3:2–7.

[5]. Morrison N, Gibson K, McEnroe S, Goldman M, King T, Weiss R, et al. Randomized trial comparing cyanoacrylate embolization and radiofrequency ablation for incompetent great saphenous veins (VeClose) J Vasc Surg. 2015;61:985–994.

[6]. Gibson K, Ferris B. Cyanoacrylate closure of incompetent great, small and accessory saphenous veins without the use of post-procedure compression: Initial outcomes of a post-market evaluation of the VenaSeal System (the WAVES Study) Vascular. 2017;25:149–156.

[7]. Chan YC, Law Y, Cheung GC, Ting AC, Cheng SW. Cyanoacrylate glue used to treat great saphenous reflux: measures of outcome. Phlebology. 2017;32:99–106.