A 76-year-old woman was referred by her gynecologist for suspected left deep vein thrombosis (DVT). For 3 days, she suffered from severe left leg swelling and pain. On physical examination, the patient was obese (body mass index, 40.4 kg/m$^2$) and had a painful and swollen left leg with no ulcerations.

**DIAGNOSTIC EVALUATION**

CT venography was performed, confirming the patient’s swollen left leg (Figure 1A) with an enlarged unenhanced femoral vein (Figure 1B). In order to secure the diagnosis of DVT, an ultrasound was performed, which showed hyperechoic acute thrombus in the left common femoral vein (Figure 1C). A multidisciplinary group decided to treat with pharmacomechanical thrombolysis for fast symptomatic relief and prevention of sequelae. Because only a small amount of thrombus extended into the inferior vena cava, no filter was implanted.

**TREATMENT APPROACH**

The procedure was performed under conscious sedation, and 5,000 units of heparin were administered intravenously at the beginning of the intervention. The patient was placed in a prone position on the angiographic table. Ultrasound-guided access into the popliteal vein was performed, and an 8-F sheath was inserted. The AngioJet” ZelanteDVT™ thrombectomy catheter (Boston Scientific Corporation) was advanced into the thrombus, and 200,000 units of urokinase were injected into the thrombus using the Power Pulse™ spray technique. Because of the large vein diameter, the steerable option of the ZelanteDVT catheter was used to deliver the urokinase into the entire thrombus. After a dwell time of 20 minutes, the ZelanteDVT catheter was switched into thrombectomy mode, and the thrombus was aspirated for a total of 180 seconds. The rotation option of the ZelanteDVT catheter tip was used to direct the removal of the clot.
Clearing the Clot

Results from case studies are not necessarily predictive of results in other cases. Results in other cases may vary.

After the procedure, the leg was wrapped with compression bandages, and rivaroxaban was started the next morning. A control duplex examination the next day showed a widely patent common femoral vein with no residual thrombus and good venous flow with respiratory modulation (Figure 3). Clinically, the pain improved within 24 hours after the procedure, and the leg swelling resolved over the following week.

CONCLUSION

The removal of thrombus in a large vein was successful using the ZelanteDVT catheter with the Power Pulse spray technique followed by the thrombectomy mode using the Venturi-Bernoulli effect. AngioJet offers a variety of catheters for different venous and arterial thrombus applications. The newest addition, the ZelanteDVT catheter, offers the opportunity to remove thrombus from large venous vessels with a directional tip. It will be interesting to see if this new directional catheter will allow for consistent removal of thrombus from large vessels.

Eric G. Schoch, MD, is Senior Consultant of Interventional Radiology, Institute of Radiology and Nuclear Medicine, Kantonsspital in Winterthur, Switzerland. He has stated that he has no financial interests related to this article. Dr. Schoch may be reached at eric.schoch@ksw.ch.

Christoph A. Binkert, MD, MBA, is Director, Institute of Radiology and Nuclear Medicine, Kantonsspital in Winterthur, Switzerland. He has disclosed that he is a consultant to Boston Scientific Corporation. Dr. Binkert may be reached at christoph.binkert@ksw.ch.

ZELANTE DVT THROMBECTOMY SET

CAUTION: Federal law (USA) restricts this device to sale by or on the order of a physician. Rx only. Prior to use, please see the “Instructions for Use” for more information on Indications, Contraindications, Warnings, Precautions, Adverse Events, and Operator’s Instructions.

INDICATIONS AND USAGE

The Zelante DVT Thrombectomy Set is intended for use with the AngioJet Ultrasound Thrombectomy Set to break apart and remove thrombus, including deep vein thrombus (DVT), from:

• Femoral and lower extremity veins ≥ 6.8 mm in diameter
• Upper extremity peripheral veins ≥ 3.0mm in diameter

The Zelante DVT Thrombectomy Set is also intended for use with the AngioJet Ultra Power Pulse technique for the control and selective infusion of physician specified fluids, including thrombolytic agents, into the peripheral vascular system.

CONTRAINdications

- Do not use the catheter in patients:
  - Who are contraindicated for endovascular procedures
  - Who cannot tolerate contrast media
  - In whom the lesion cannot be accessed with the guide wire

WARNINGS and PRECAUTIONS

The Zelante DVT Thrombectomy Set has not been evaluated for treatment of pulmonary embolism. There are reports of serious adverse events, including death, associated with cases where other thrombectomy catheters were used during treatment of pulmonary embolism.

- Do not use the Zelante DVT Thrombectomy Set in vessels not suitable for use as described in Table 1 of the IFU; such use may increase risk of vessel injury.

- Systemic heparinization is advisable to avoid pericatheterization thrombus and acute thrombosis. This is in addition to the heparin added to the saline supply bag. Physician discretion with regard to the use of heparin should be exercised.

- Do not pull the catheter against abnormal resistance. If increased resistance is felt when removing the catheter from a lesion site, do not force or torque the catheter excessively as this may result in deformation of tip components and thereby degrade catheter performance.

- The potential for pulmonary thromboembolism should be carefully considered when the Zelante DVT Thrombectomy Set is used to break up and remove peripheral venous thrombus.

ADVERSE EVENTS

Potential adverse events which may be associated with use of the AngioJet Ultrasound Thrombectomy System are similar to those associated with other interventional procedures and include, but are not limited to:

- Abnormal cardiovascular event
- Death
- Dissection
- Embolization
- Hematoma
- Hemolysis
- Hypotension
- Hypothermia
- Hypotension/vertigo
- Hypertension
- Hypothermia
- Hypotension
- Hypotension
- Hypoxia
- Infarction
- Ischemia
- Infection
- Infusion
- Injection
- Intravascular catheterization
- Intravascular injection
- Intraocular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection
- Intravascular
- Intravascular injection
- Intravascular
- Intravenous
- Intravascular injection