

Informed Consent Form

Cover Page

- **Official Title:** A Multicenter, Prospective, Observational Study of the Vflower Self-Expanding Nitinol Stent for Symptomatic Iliofemoral Vein Stenosis or Occlusion
 - **NCT Number:** NCT Number: To be assigned
 - **Document Date:** July 2, 2026
 - **Document Type:** Informed Consent Form (ICF)
 - **Version:** V2.2
-

INFORMED CONSENT FORM

Protocol Title: A Multicenter, Real-World Study of the Vflower Venous Stent System for the Treatment of Iliofemoral Vein Stenosis or Occlusion

Principal Investigator at this Site: Zhiwei Zhang

Study Site: Shanghai General Hospital

Study Sponsor/Coordinator: Zhiwei Zhang

Introduction

Dear Patient,

You are being invited to participate in a multicenter, real-world observational study evaluating the Vflower venous stent system for the treatment of iliofemoral vein stenosis or occlusion. Please read this Informed Consent Form (ICF) carefully and consider your decision to participate thoughtfully. Participation in this study is entirely voluntary. However, you may only consider signing this ICF after your treating physician has determined your treatment plan and you have signed the surgical informed consent form.

When the study team discusses this document with you, you are encouraged to ask them to explain anything you do not understand. We encourage you to discuss participation with your family and friends before making your decision. You have the right to refuse to participate in this observational study and may request to stop data collection at any time without penalty or loss of any benefits to which you are otherwise entitled. If you are currently participating in another study, please inform the study team.

The background, objectives, procedures, and other important information regarding this study are outlined below.

1. Study Background

Iliofemoral vein stenosis or occlusive disease is one of the most prevalent conditions in venous surgery, encompassing non-thrombotic iliac vein compression syndrome (NIVCS), deep vein thrombosis (DVT), and post-thrombotic syndrome (PTS).

According to the Report on Cardiovascular Health and Diseases in China 2020, the prevalence of lower extremity venous disease is 8.89%, affecting nearly 100 million patients, with numbers increasing annually. The prevalence of iliac vein compression syndrome in China ranges from 14% to 32%, also showing an upward

trend. These conditions not only significantly impair patients' quality of life but also impose a substantial burden on the workforce and healthcare expenditures [1-2].

With the rapid advancement of endovascular techniques, interventional therapy has become the primary treatment for iliofemoral vein stenosis or occlusion. The pathophysiology, anatomy, biomechanics, and hemodynamics of iliofemoral venous disease are complex. Depending on the lesion characteristics, venous stents must possess the following features: (1) Strong radial force to continuously support the lesion and ensure long-term patency; (2) High flexibility to accommodate the tortuous anatomy of the iliac vein; (3) Precise positioning to guarantee complete lesion coverage, thereby maintaining long-term patency.

Leading global medical device companies, such as Bard and Boston Scientific, have introduced dedicated venous stents for iliac vein compression syndrome. These stents typically utilize laser-cut technology, offering good radial support and precise positioning capabilities [3-4]. A meta-analysis by Mahmood K. Razavi et al. [5] on the safety and effectiveness of stent placement for iliofemoral venous outflow obstruction included 37 studies with 2,869 patients (1,122 non-thrombotic, 629 acute thrombosis, and 1,118 post-thrombotic syndrome). The 1-year primary patency rates were 96% for the non-thrombotic group, 87% for the acute thrombosis group, and 79% for the post-thrombotic syndrome group. Clinical follow-up data from similar products indicate that long-term patency rates after venous stent implantation exceed 90%. Thus, venous stent implantation is considered a safe and effective treatment for iliofemoral vein stenosis or occlusion with durable long-term patency.

In recent years, domestic manufacturers have developed various iliac vein stents, such as Grency (Weiqiang) and ZYLOX Penguin (Guichuang). However, gaps remain compared to international products in terms of design innovation and product applicability. Specifically, addressing the complex biomechanical characteristics of the iliofemoral vein requires a stent that balances compression resistance with physiological flexibility while maintaining low chronic outward force.

Shanghai Lanmai Medical Technology Co., Ltd. has developed the Vflower venous stent system based on clinical needs. It features an integrated design combining dense and sparse mesh patterns to balance radial force and flexibility. The delivery system utilizes a reverse co-axial thread compensation design to achieve precise positioning of the braided stent. The biomimetic variable-diameter design reduces chronic outward force on the vessel wall, adapts to varying vessel diameters, and provides sustained support to prevent iliofemoral vein stenosis, ensuring vessel patency. The Vflower venous stent system has received approval from the National Medical Products Administration (NMPA) (Registration Certificate No.: Guo Xie Zhu Zhun 20243131528), is included in the National Reimbursement Drug List, and has been clinically applied in multiple medical institutions, including Shanghai General Hospital.

References: [1] Javad Salimi, et al. A comprehensive study on venous endovascular management and stenting in deep veins occlusion and stenosis: A review study. *Surg Open Sci.* 2024, 19:131-140. [2] Hao Qingzhi, et al. Progress in the treatment of chronic iliac vein occlusion. *Chinese Journal of Clinicians (Electronic Edition).* 2013,

7(24): 11611-11613. [3] J Stephen Jenkins. Endovascular therapies to treat iliofemoral deep venous thrombosis. *Prog Cardiovasc Dis.* 2011, 54(1): 70-6. [4] Thomas Powell, et al. Comparison between a dedicated venous stent and standard composite Wallstent-Z stent approach to iliofemoral venous stenting: Intermediate-term outcomes. *J Vasc Surg Venous Lymphat Disord.* 2023, 11(1): 82-90.e2. [5] Razavi MK, et al. Safety and Effectiveness of Stent Placement for Iliofemoral Venous Outflow Obstruction: Systematic Review and Meta-Analysis. *Circ Cardiovasc Interv.* 2015, 8(10):e002772.

2. Study Objectives

To evaluate the effectiveness of the Vflower venous stent system in the real-world treatment of iliofemoral vein stenosis or occlusion via balloon angioplasty and stent implantation.

3. Study Procedures

3.1 How many people will participate?

Approximately 310 participants will be enrolled across 5 different study sites, with 70 participants enrolled at this site.

3.2 Study Groups

This is a single-arm study with no concurrent control group. An “external control” approach will be used, comparing results with historical data or findings from other studies.

3.3 Eligibility Criteria

Inclusion Criteria (All must be met): 1. Patients who have received the Vflower venous stent for retrospective/prospective observation; 2. Age ≥ 18 years, any gender, not pregnant or lactating; 3. Presence of symptoms and signs of chronic venous disease of the lower extremities; 4. CEAP classification $\geq C3$; 5. Imaging confirmation (Ultrasound/CTV/MRA/IVUS) of iliofemoral vein stenosis or occlusion (target vessel stenosis $\geq 75\%$); 6. Treatment plan determined by the treating physician, confirming the use of the Vflower venous stent system, and surgical informed consent signed; 7. Ability to understand the study objectives, voluntary participation, signed informed consent, and willingness to undergo follow-up.

Exclusion Criteria (Any of the following disqualifies participation): 1. Iliac vein occlusion extending into the inferior vena cava; 2. Previous stent implantation in the target lesion; 3. Fatal pulmonary embolism within 6 months prior to signing informed consent; 4. Failure of vital organs (liver, kidney, etc.); 5. Known allergy to nitinol alloy materials or contrast agents; 6. History of active bleeding, coagulopathy, or refusal of blood transfusion; 7. Life expectancy < 12 months (e.g., advanced malignancy); 8. Pregnancy, lactation, or planning to become pregnant during the study; 9. Participation in other drug or device clinical trials without having reached the primary endpoint; 10. Poor compliance, with anticipated inability to attend scheduled follow-ups.

3.4 Study Procedures

This study consists of three phases: Screening, Treatment, and Follow-up.

Screening Phase: After signing the ICF, you will undergo screening assessments, including medical history inquiry (demographics, past medical history), physical examination, vital signs, 12-lead ECG, infectious disease screening, laboratory tests, and imaging.

Treatment Phase: This is an observational study; your routine clinical care will not be altered. Your treating physician will independently determine your treatment plan based on clinical needs, including the decision to use the Vflow venous stent system, timing of surgery, and surgical approach. The study team will not participate in any treatment decisions or surgical procedures. Clinical data will be collected solely for research analysis after you receive routine treatment.

Important Note: You must first sign the surgical informed consent form and have your treatment plan confirmed by your physician before considering signing this study ICF.

Follow-up Phase (Pre-discharge / Post-op Months 1, 6, 12, 24):

(1) Visit 1: Screening (-15 to -1 day) For ethical considerations, interventional examinations performed before ICF signing may be used as study data. Imaging within 1 month and laboratory results within 15 days may be utilized without repeat testing. You must be fully informed and sign the ICF during this visit. Baseline data will be collected. Eligibility will be assessed based on inclusion/exclusion criteria. Qualified participants will be enrolled. Surgery timing is determined solely by your treating physician. Screen failures will be documented with reasons.

Data Collected: - Demographics: Age, gender - Physical Exam: Height, weight, upper/lower extremity arterial pulses - Vital Signs: Blood pressure, respiration, heart rate, temperature - Medical History: Family history, surgical history, concomitant diseases, medications - Baseline CEAP Classification: - C0: Symptoms without signs - C1: Telangiectasia/reticular veins - C2: Varicose veins - C3: Edema - C4: Skin changes (pigmentation, eczema, lipodermatosclerosis) - C5: Healed venous ulcer - C6: Active venous ulcer - Baseline VCSS (Venous Clinical Severity Score): Pain, varicose veins, edema, pigmentation, inflammation, induration, number of active ulcers, ulcer size, duration, compression therapy (0-3 scale per item). - Laboratory Tests: CBC (RBC, WBC, PLT, HB), Urinalysis (pH, WBC, RBC, protein), Biochemistry (sCr, BUN, ALT, AST, TBIL, DBIL, IBIL, GLU, ALB), Coagulation (APTT, PT, INR, FIB, TT, D-Dimer), Pregnancy test (women of childbearing potential, blood test preferred). - 12-lead ECG - DSA / Doppler Ultrasound / CTV - Chest X-ray - Concomitant medications

(2) Visit 2: Intraoperative (Day 0) Surgical process documentation. Data Collected: - Physical exam - DSA imaging - Surgical records: Date, duration, contrast volume, venous access, procedure type, blood loss - Target lesion details: Location, length, stenosis degree, proximal/distal diameter, thrombus presence, debulking method/device (PMT), pre/post-dilation, stent size/model, thrombus removal rate, subsequent catheter-directed thrombolysis - Adverse events (AEs) - Device deficiencies

(3) Visit 3: Pre-discharge or Post-op Day 30 Data Collected: - Labs: CBC, Biochemistry, Coagulation (PT, APTT, FIB, D-Dimer) - Adverse events - Secondary interventions - Clinical symptoms: Lower extremity swelling, thigh/calf

circumference - Concomitant medications: Rivaroxaban, Edoxaban, Warfarin, etc. - Hospitalization: Length of stay, costs

(4) Visit 4: Post-op Month 6 Data Collected: Labs, AEs, Secondary interventions, Clinical symptoms (swelling, circumference), CEAP, VCSS, Imaging (DSA/CTV/ Ultrasound), Concomitant medications.

(5) Visit 5: Post-op Year 1 Data Collected: Labs, AEs, Mortality, Secondary interventions, Clinical symptoms, CEAP, VCSS, Imaging, Concomitant medications.

(6) Visit 6: Post-op Year 2 Data Collected: Labs, AEs, Mortality, Secondary interventions, Clinical symptoms, CEAP, VCSS, Imaging, Concomitant medications.

3.5 Duration of the Study

The overall study is planned to last 3 years. Your individual participation will last approximately 24 months.

You have the right to request cessation of further personal data collection at any time without affecting your routine medical care. Upon request, new data collection will stop, but previously collected data may continue to be used as necessary for the study.

Important Note: This is a purely observational study recording data generated during routine care. No extra tests or treatments are arranged. Therefore, there is no concept of “withdrawal from the study,” only “cessation of data collection.”

4. Risks and Benefits

4.1 Risks

As this is an observational study collecting data from routine care, no additional risks are imposed. All treatments are determined by your physician based on clinical needs.

4.2 Benefits

- **Direct Benefit:** Participation allows for a more systematic assessment of your condition, potentially aiding in early identification of clinical outcomes and guiding future treatment.
- **Potential Benefit:** Information gathered may benefit you or other patients with similar conditions in the future.

5. Alternative Treatments

In addition to participating in this study, you may receive standard care from your physician, including: - Conservative pharmacological therapy.

Please discuss these and other options with your doctor.

6. Confidentiality of Personal Information

The study team may access your medical history and collect necessary past medical records to fulfill study objectives. By signing this ICF, you authorize the team to contact other healthcare providers to obtain relevant medical information. Only authorized study team members will have access to identifiable information.

Regulatory authorities and the Ethics Committee may review original records for data verification in compliance with confidentiality regulations.

To protect privacy, direct identifiers (name, contact info) will be coded. Study results published or presented will not disclose identifiable information.

You may revoke permission for data use at any time by contacting the study team. Revocation will stop future data collection but previously collected coded data may still be used. You may request access to your collected health data after the study concludes and report any errors. Data will be stored in coded form at Shanghai General Hospital.

Future Use of Data: For future scientific research in the field of surgery, your coded data may be reused after Ethics Committee approval. ☐ I agree to my data being used for future scientific research; ☐ I agree ONLY to the use of my data for this study and not for future research. (Please handwrite the text of your chosen option)

7. Feedback of Study Results

Study results will not be fed back to you as they do not directly assist in your clinical management.

8. Costs and Compensation

8.1 Costs

The Vflower stent is covered by medical insurance. Routine examination costs are reimbursed per standard policy. No additional costs will be incurred for study participation.

8.2 Compensation for Participation

No financial compensation or travel reimbursement is provided for this observational study.

8.3 Compensation for Injury

If you suffer injury directly related to the study device, Shanghai Lanmai Medical Technology Co., Ltd. will cover reasonable medical expenses and provide economic compensation in accordance with the Basic Medical Hygiene and Health Promotion Law of the PRC, GCP, and relevant regulations.

Clinical trial insurance has been purchased. Claims will be processed by China Pacific Property Insurance Co., Ltd. per the policy terms. Compensation covers necessary medical treatment and appropriate economic relief based on injury severity.

Your Responsibility: Promptly report discomfort and provide diagnostic/treatment documentation.

Note: Compensation does not apply to unrelated conditions or injuries resulting from protocol non-compliance. Provision of compensation does not constitute admission of liability and does not waive your legal rights.

For questions or concerns regarding compensation, contact Dr. Zhiwei Zhang at 15001800717 or the Ethics Committee at 021-36126254.

9. Participant Rights and Responsibilities

9.1 Your Rights

Participation is voluntary. Refusal or withdrawal will not affect your standard medical care. You may stop data collection at any time without discrimination. If new relevant information arises, you will be asked to sign an updated ICF.

9.2 Responsibilities

- Provide accurate medical history and current health status.
- Report any discomfort during the study.
- Adhere to restricted medication/food guidelines.
- Disclose participation in other studies.
- Comply with follow-up schedules.

10. Contact Information

If new information arises that may affect your willingness to continue, you will be notified. For questions about your data or study findings, contact Dr. Zhiwei Zhang at 15001800717.

For concerns regarding your rights, difficulties, or suggestions, contact the Medical Ethics Committee of Shanghai General Hospital at 021-36126254.

Patient Signature Page

Statement of Informed Consent

I have been informed of the purpose, background, procedures, risks, and benefits of this study. I have had sufficient time and opportunity to ask questions and am satisfied with the answers. I agree to participate in this observational study.

I have been informed of whom to contact for questions, concerns, or further information.

I understand that I may request cessation of data collection at any time without affecting my medical care. I understand this is an observational study and “withdrawal” equates to stopping data collection.

I understand that my physician may stop data collection if my condition worsens, a serious adverse event occurs, or if continued participation is not in my best interest. The sponsor or regulator may also terminate the study. I will be notified and alternative options discussed.

I will receive a copy of this signed ICF.

I understand that my personal information is necessary for this study and consent to its processing as described.

☐ Agree ☐ Disagree (Cannot participate)

Patient Signature: _____ **Date:** _____

Legal Representative/Guardian Signature: _____ **Relationship:**
(_____) **Date:** _____ (Required if patient lacks capacity)

Impartial Witness Signature: _____ **Date:**
_____ (Required if patient cannot read; witness confirms all information
was explained and consent was given)

Investigator Signature: _____ **Date:**
