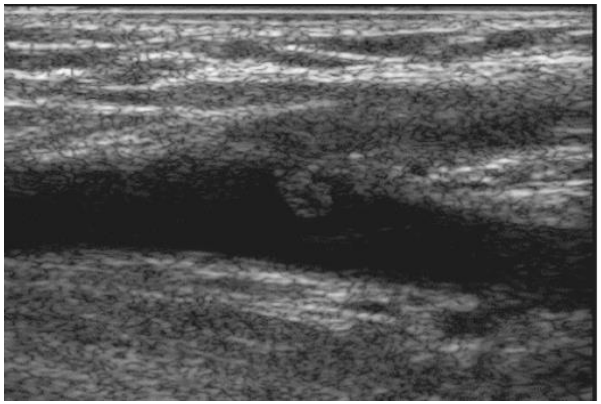
I have no conflicts with this talk

Consultant to

Angiodynamics,

BTG, Amsel, Veniti, Vascular Insights

EHIT depending of the learning curve?



NYU SCHOOL OF MEDICINE

Lowell S. Kabnick, MD
Division, Vascular and Endovascular Surgery
Director, NYU Vein Center

We will look at the Following Studies

CONTROVERSES ET ACTUALITÉS EN CHIRURGIE VASCULAIRE
CONTROVERSIES & UPDATES IN VASCULAR SURGERY
JANUARY 23-25 2014
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Endothermal Heat Induced Thrombosis: Is the Incidence Related to the Form of Ablation?

Mikel Sadek, Lowell Kabnick, Todd Berland, Cara Chasin, Nung Rudarakanchana, Caron Rockman, Thomas Maldonado, Neal Cayne, Glenn Jacobowitz, Patrick Lamparello, Firas Mussa, Mark Adelman

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Increasing Ablation Distance Peripheral to the Saphenofemoral Junction May Result in a Diminished Rate of EHITs

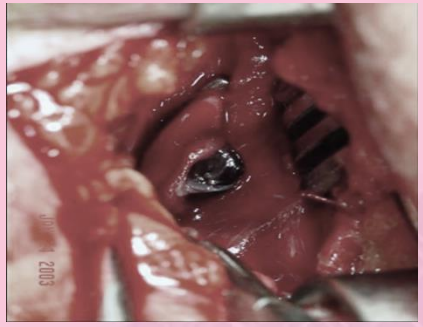
Mikel Sadek, Lowell S Kabnick, David Dexter, Todd Berland, Liza E Giammaria, Neal S Cayne, Thomas Maldonado, Caron B Rockman, Glenn R Jacobowitz, Patrick J Lamparello, Mark A Adelman

NYU Langone Medical Center

With Recent Advances in Technology

- **Ultrasound**

- **Endothermal ablation of the GSV**
  - Radiofrequency
  - Laser
- **With better or equivalent outcomes than**
  - **L&S***
    - *EVOLVeS Study Lurie, Kabnick, etc



- **Isolated reports concerning thrombus extension into the CFV started appearing. DVT**

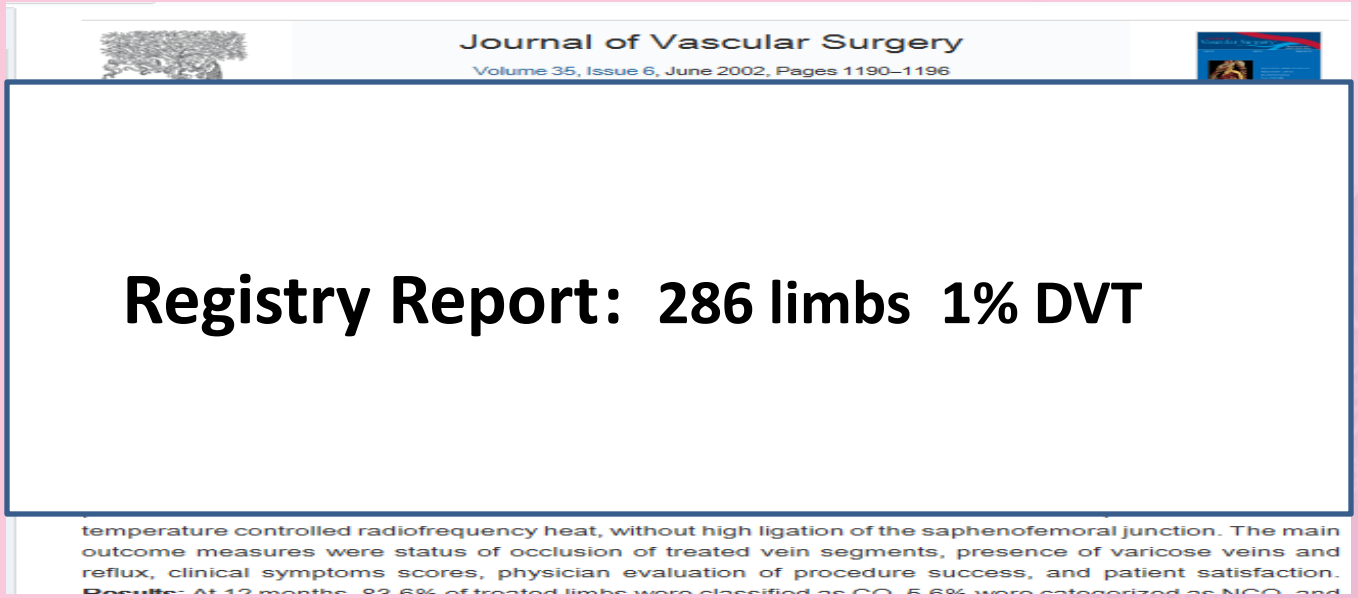
There were Mounting Concerns about

- The incidence of DVT with Endothermal Ablation
- Is it truly a DVT?
- How to Treat what we see?

Review of the Literature

Is there an increase risk of DVT with the Vnus Closure Procedure
Merchant DePalma, Kabnick

Journal of Vascular Surgery



J Vasc Surg. 2002 Jun;35(6):1190-6

Is there an increase risk of DVT with the Vnus Closure Procedure (letter)

Journal of Vascular Surgery

J Vasc Surg. 2003 38(3):628

Letter to the editor

Regarding "is there an increased risk for DVT with the VNUS closure procedure?" ☆

Robert F Merchant Jr, MD

The Reno Vein Clinic, Reno, Nev, USA

Robert L Kistner, MD

Straub Clinic and Hospital, Honolulu, Hawaii, USA

Lowell S Kabnick, MD

The Vein Institute of New Jersey, Morristown, NJ, USA

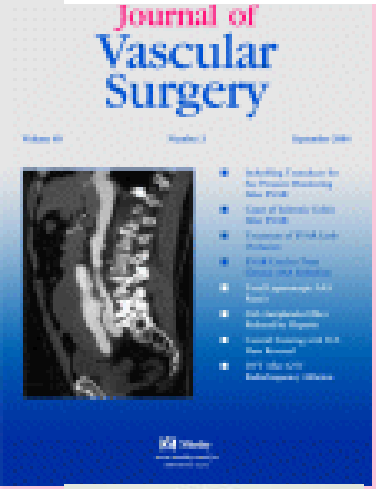
http:

1150 limbs 0.4% DVT

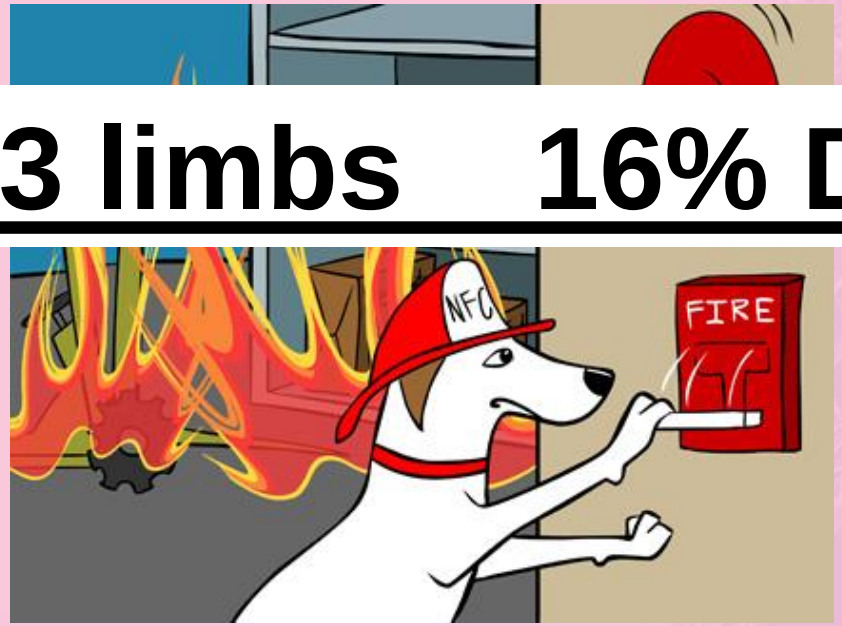
The d two observations of deep venous thrombosis (DVT), which occurred 1 and 6 weeks, respectively, after ipsilateral limb treatment with the VNUS Closure system (VNUS Medical Technologies) radiofrequency catheter to obliterate reflux in the greater saphenous vein. We previously reported the results of the first 286 limbs treated with the VNUS Closure system without high ligation, and found an incidence of DVT of 1.0%.1 Incidence of DVT after traditional stripping and ligation ranges from 0.15% to 1.8%. [2] and [3] At the Reno Vein Clinic, more than 325 limbs have been successfully treated with the VNUS Closure system, and DVT developed in only 1 limb, ie, a partially occlusive common femoral vein thrombus, successfully treated with operative thrombectomy. Experience at the Straub Clinic in Honolulu reveals 3 instances of common femoral vein partial thrombosis in 400 limbs treated with the VNUS Closure system. These thromboses were identified on 24-hour postoperative duplex ultrasound (US) scans, and were managed

DVT after RF ablation of GSV: A word of caution

A. Higorani, MD

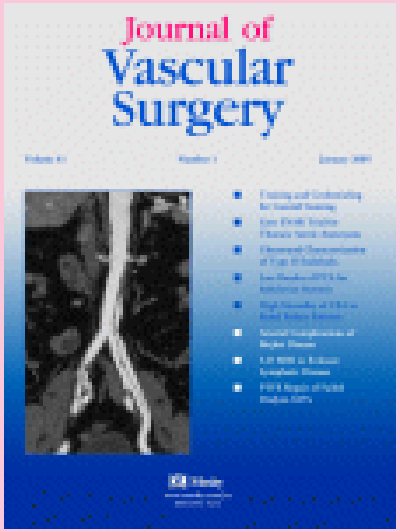


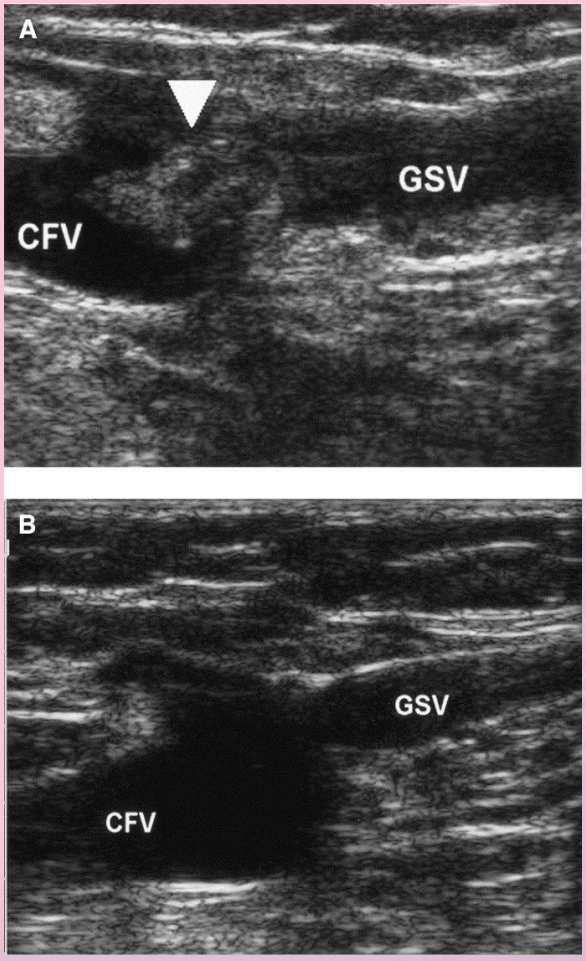
73 limbs 16% DVT



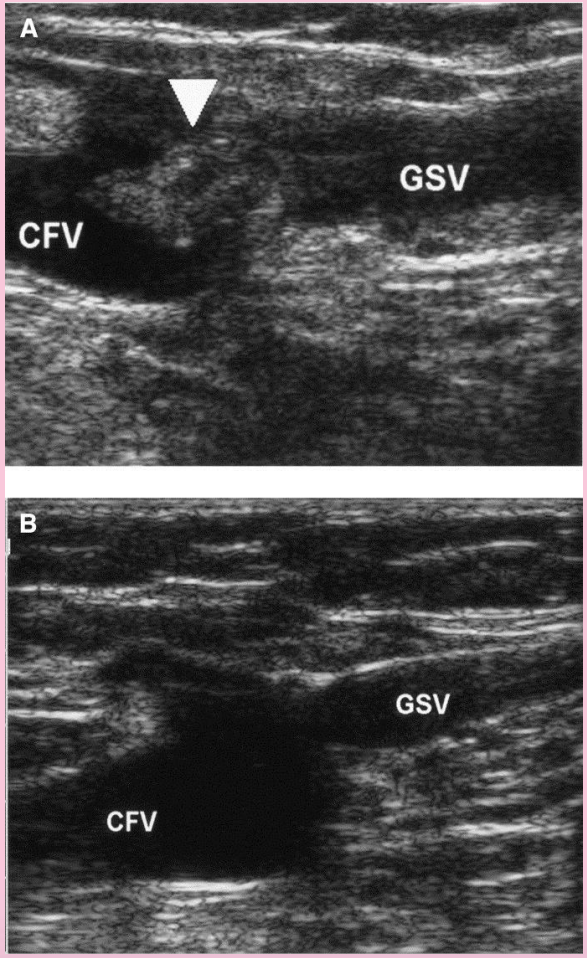
J Vasc Surg 2004 Sep;40(3):500-4

Extension of saphenous thrombus into the femoral vein: A potential complication of new endovenous ablation techniques





J Vasc Surg 2005;41:130-5



- During our initial experience with ELT in 56 limbs of 41 patients, 39 underwent postoperative duplex scanning. We encountered three cases (7.7%) with thrombus extension into the common femoral vein. All three patients were anticoagulated, and a temporary inferior vena cava filter was placed in one. All remained asymptomatic. The thrombus resolved by 1 month in all three patients.

There is no agreement regarding whether the first 1 to 2 cm of the GSV should be treated during endovenous laser ablation.

Deep Vein Thrombosis (DVT) after Venous Thermoablation Techniques: Rates of Endovenous Heat-induced Thrombosis (EHIT) and Classical DVT after Radiofrequency and Endovenous Laser Ablation in a Single Centre☆

P. Marsh, B.A. Price, J. Holdstock, C. Harrison, M.S. Whiteley*

2470 RFA 350 EVLA
RFA DVT (17) 4 were EHIT (0.2%).
EVLA DVT (4) 3 were EHIT (0.9%).

EHIT was similar with RFA and EVLA.

DVT rates compare favourably with those published for saphenous vein stripping

23 July 2010

Vein Mapping Prior to Endovenous Catheter Ablation of the Great Saphenous Vein Predicts Risk of Endovenous Heat-Induced Thrombosis

Judith C. Lin, MD, FACS, RVT, RPVI[1], Edward L. Peterson, PhD[2], Melinda L. Rivera, RVT[1], Jennifer J. Smith, MD, PharmD[1], and Mitchell R. Weaver, MD, FACS, RVT[1]

valvular insufficiency of the SFJ and a large proximal GSV diameter **had a significantly higher risk of developing EHIT**

2012 Jul;46(5):378

EHIT Classification

Lowell S. Kabnick, MD

American Venous Forum

Florida, Feb 2006

Multicenter Study

- Vein Institute of New Jersey — Morristown, NJ
  - L.Kabnick, MD, FACS — Andover, NJ
  - M.Ombrellino, MD, FACS — Branchburg ,NJ
  - H. Agis, MD, FACS — Princeton, NJ
  - M. Moritz, MD, FACS — West Orange, NJ
- Miami Vein Center — Miami, Florida
  - J. Almeida, MD, FACS
- Day Surgery Center — Padua, Italy
  - U. Baccaglini, MD
  - G. Spreafico, MD

Analysis of DATA

- Analysis of our data at the Vein Institute of New Jersey and other participating centers

- Allowed us to sort data according to the following classification

Endovenous Heat Induced Thrombosis (EHIT) Classification

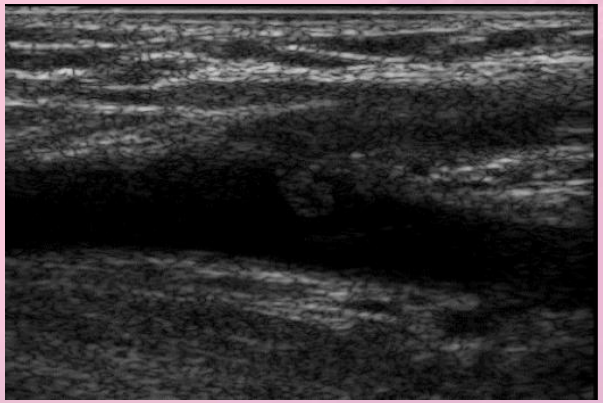
Class 1

- Venous thrombosis to the superficial – deep junction (ie. Sapheno-femoral junction or the sapheno-popliteal junction

- Not extending into the deep system

Class 2

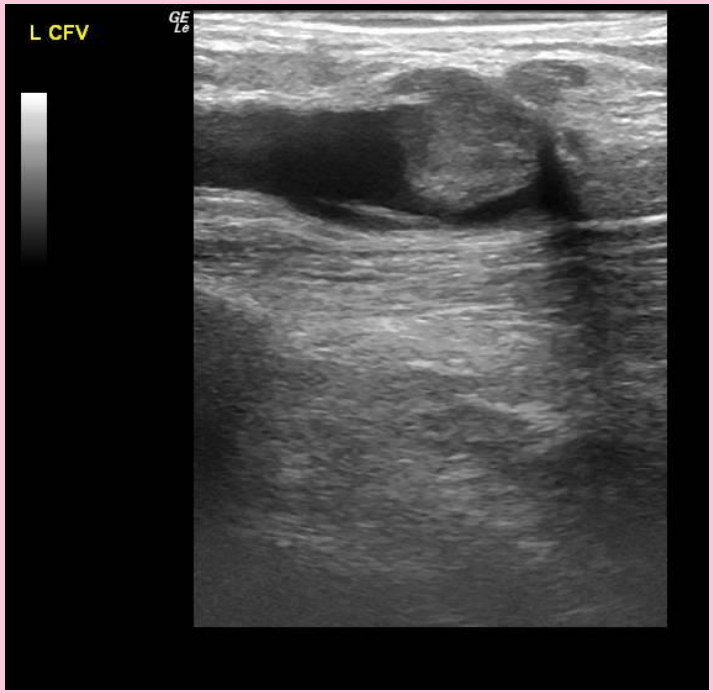
- Into the deep venous system
- Non-occlusive
- Thrombus with a cross sectional diameter of less than 50%

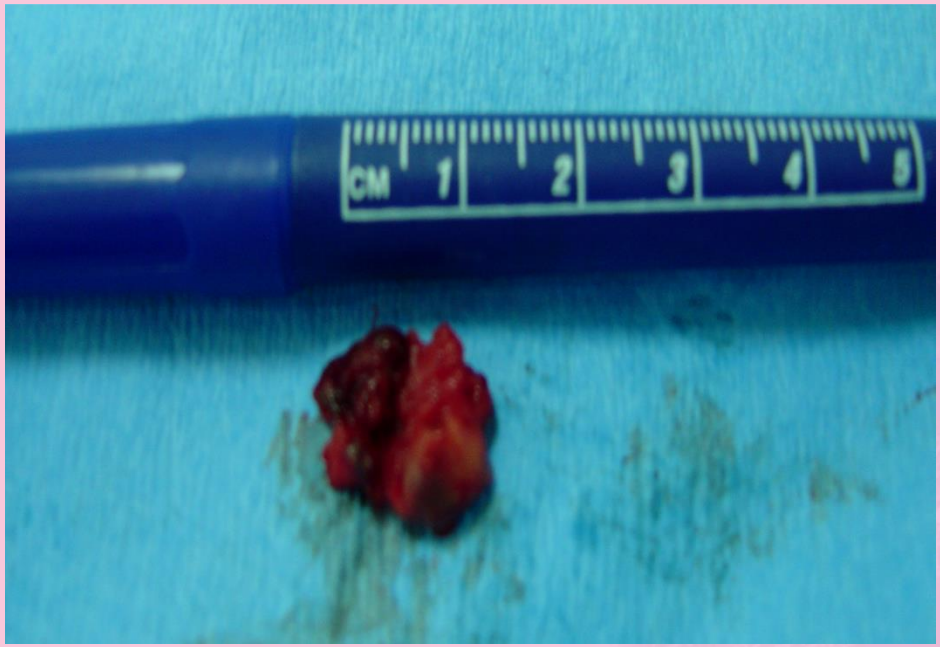


Class 3

- Into the deep venous system
  - Non-occlusive thrombus
  - Cross sectional diameter of
    > 50%

EHIT 3





Courtesy of JIAlmeida,MD

Class 4

- Total occlusion of the involved vein

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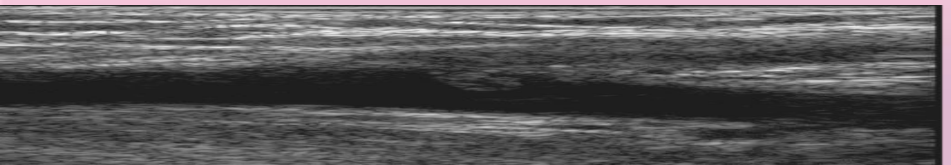


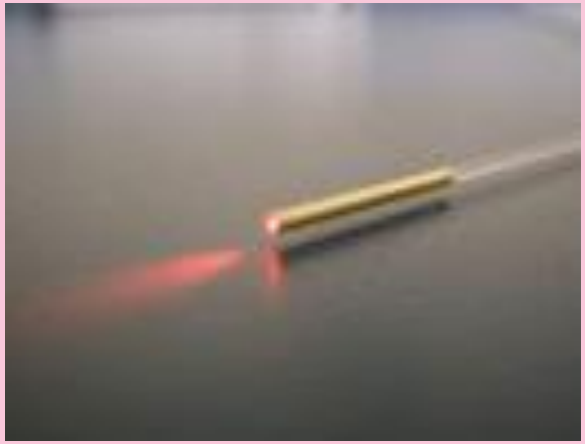
NYU Langone Medical Center

Methods

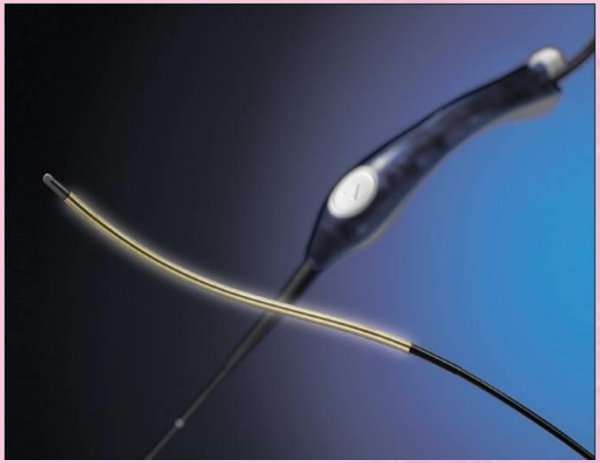
- Retrospective review (4/07 – 4/10)
- Vein Center at NYU
- 2,276 procedures (EVLA 507, RFA 1769)
- 52 EHIT II (EVLA 18, RFA 34)
- Inclusion
  - **Treatment of GSV and SSV**
- Primary Outcome
  - **Rate of EHIT II**
- Secondary Outcomes
  - **Anticoagulation, hematoma, thrombophlebitis**

Objective

- **Evaluation of EHIT II**



vs



Results (10/07 – 12/10)

2,672 procedures (EVLA 662, RFA 2010)

78 EHIT II (EVLA 21, RFA 57) 2.9%

Treatment of GSV (92%) and SSV (8%)

Results

- **EHIT II**
  - **EVLA vs RFA (2.57% vs 2.84%, P=0.79)**

- **Diminishing trend of EHIT II**
  - **1st year 5.2%**
  - **2nd year 1.8%**
  - **3rd year 0.4%**

Conclusions

- **EHIT II rates may differ in patients treated using EVLA as compared to RFA.**
- **Frequency of EHIT II may diminish with increasing institutional experience.**

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Purpose

- EHIT-II rate at NYU
  - 2.9%
  - EVLA ≈ RFA
  - SSV ≈ GSV
- Corrective measure?
  - Prospective evaluation

Objective

- This study sought to assess the effect of increasing ablation distance peripheral to the deep venous system on the incidence of EHIT II.

- (Increase ablation distance peripheral to the SFJ or SPJ from 2 → > 2.5cm)

Results

- Total of 3,526 procedures
  - Group I (N=2,672) vs Group II (N=854)

- Age, CEAP classification, and ratio of GSV/SSV did not differ significantly between the two groups.

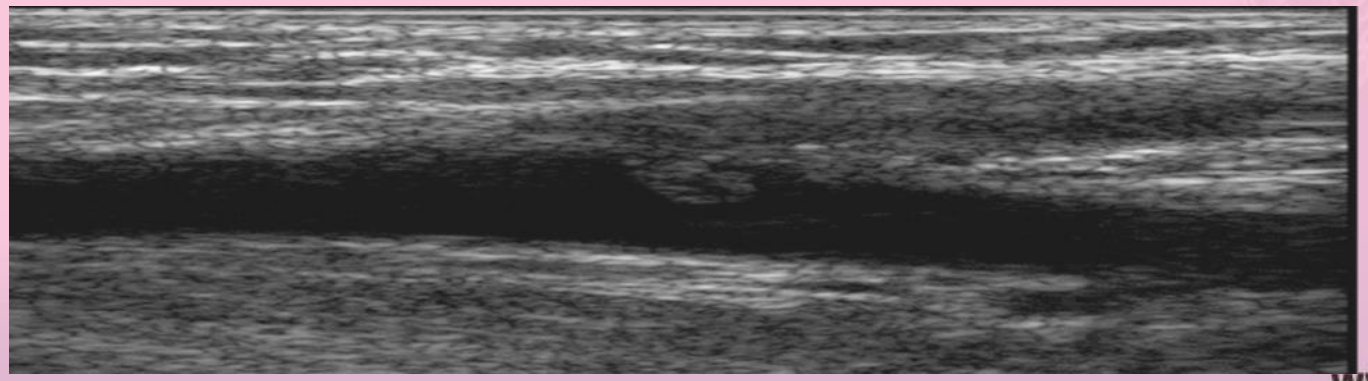
Results – Primary Outcomes

- EHIT II demonstrated a trend towards diminished frequency in Group II as compared to Group I
  - Group I: 2.8% vs Group II: 1.6%, P=0.077
- There were no reported cases of EHIT III or IV

Conclusions

- **Changing the treatment distance from 2cm → 2.5cm peripheral to the deep venous junction may result in a diminished rate of EHIT-II.**

What, Me Worry?



NYU Langone
MEDICAL CENTER

What Happens to the Thrombus?

- Retract?
- Dissolve?
- PE?

NYU: Study of the Disappearing EHIT

- Enrollment 7 patients

- 6/7 Rx with LMWH until EHIT 2 disappeared

  1/7 observed until EHIT 2 disappeared

  Spiral CT scan obtained ASAP

- Results of CT Scan No PE 5/7
  PE 2/7*
  (29%)

* asymptomatic

Future ?

- EHIT 2 is a
  - DUS finding
  - ? Significance

OR

Are we a Victim Of Medical Image Testing ?

In closing: Consider

- 1. If there is approximately a 1% incidence of EHIT 2….
  - What is the incidence of symptomatic PEs
  - What is the incidence of fatal PEs
- 2. What is the incidence of post ablation failure?

- Why do Routine Postoperative Duplex?
  - Looking for EHIT
  - Looking for ablation failure

Are we wasting healthcare dollars?

Statistics

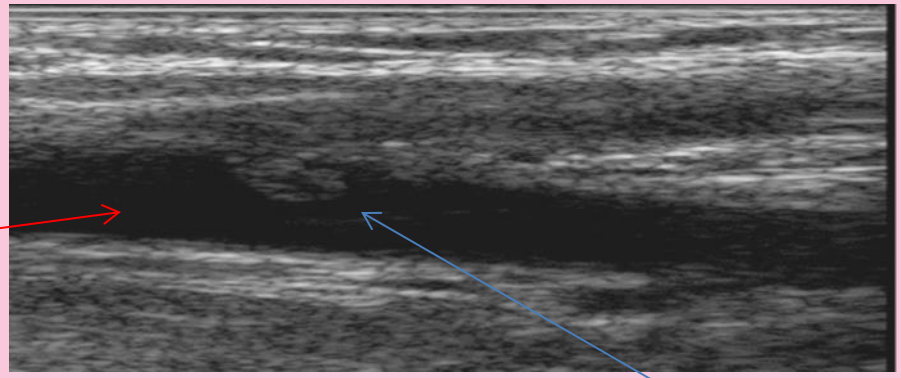
- Assumptions
  - EHIT 2 1-2%
  - Number of ablations/yr (USA) 300,000
  - EHIT 2 risk 6,000
  - Clinically significant PE .01%
  - Total number ~60
  - PNT for 1 PE 5,000
  - Avg DUS charge $500

Kabnick L. Forum, Miami, Florida, 2006.
Dexter D, Kabnick L Phlebology 2012; 27 Suppl 1:40-45
Marsh P,Whitely. Eur J Vasc Endovasc Surg. 2010; 40: 521-527.

- physicians are collectively in order to detect, and potentially treat acharging **$2,500,000** n EHIT 2 to prevent 1 symptomatic- post-operative PE.
- By forgoing duplex ultrasound in the immediate post-operative period, we can save greater than $150,000,000 per annum in unnecessary healthcare costs.

But First
Question: 1

Postop Duplex



CFV

Endothermal Heat Induced Thrombosis

What is the Diagnosis

a EHIT 1

b EHIT 2

c EHIT 3

d EHIT 4

Do We Anticoagulate?

Patient with EHIT 2 should be treated by

a. lmwh 3 months
b. lmwh 6 weeks
c. lmwh until EHIT disappears
d. does not need to be treated

4

New York University