Disclosure

• Research grant: Diagnostica Stago Inc
• Educational consultant: Tactile
• Steering committee: CTRACT

Outline

• Definitions: EHIT, EFIT
• Anatomy
• Classification
• Visualization
• Timing
• Risk factors
• Treatment and follow up
• Cost effectiveness
Definitions

• EHIT  Endovenous Heat Induced Thrombosis

GSV
SSV

• EFIT  Endovenous Foam Induced Thrombosis

EHIT Classification

Level 0
Level 1
Level 2
Level 3
Level 4
Outcomes of a single-center experience with classification and treatment of endothermal heat-induced thrombosis after endovenous ablation

Results: From 2006 to 2014, 4799 ablations were performed at Spectrum Vein Institute. Vein ablation and EHIT was identified in 70 patients. At presentation, 95% of patients were asymptomatic, 3% reported pain, and 2% reported swelling. Patients with EHIT grades 3 or 4 were treated with daily aspirin, and most of these with grades 3 or 4 were treated with systemic anticoagulation. Repeat US imaging was performed at 1 to 3 weeks to evaluate progression. Thrombus progression was not seen in any patients treated with systemic anticoagulation (grades 3-4). Thrombus progression occurred in two patients with grades 1 or 2 EHIT treated with aspirin. A bleeding complication occurred in one patient.

Conclusions: EHIT after endovenous ablation occurred in ~1.5% of patients, which is similar to that reported in the literature. Our results show that systemic anticoagulation is effective in the prevention of progression with a low risk of bleeding complications. Patients with EHIT grades 1 or 2 can be treated with aspirin alone with a low risk of progression.

- 4799 ablations
- EHIT in 70 patients
- EHIT 1 and 2 ASA daily
- EHIT 3 and 4 AC therapy
- Thrombus progression 2 patients EHIT 1 and 2

Fig. 1. Endothermal heat-induced thromboembolism (EHIT) grade 3, thrombus is seen in the small saphenous vein (SSV) extending into the popliteal vein.

Fig. 2. Endothelial heat-induced thrombosis (EHIT) grade by type I to 4 (N = 70).

EHIT SSV

Management of endovenous heat-induced thrombus using a classification system and treatment algorithm following segmental thermal ablation of the small saphenous vein.

Table IV. Multivariable analysis for possible risk factors contributing to level B and C closure at the SPJ

<table>
<thead>
<tr>
<th>Variable</th>
<th>P value</th>
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<tbody>
<tr>
<td>Anticoagulation medication</td>
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<tr>
<td>Antiplatelet medication</td>
<td>.296</td>
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<tr>
<td>Prior documented DVT</td>
<td>.042</td>
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<tr>
<td>Prior GSV ablation</td>
<td>.349</td>
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<tr>
<td>Prior microphlebectomy</td>
<td>.266</td>
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<tr>
<td>Concomitant microphlebectomy</td>
<td>.349</td>
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<tr>
<td>Vein diameter &gt;6 mm</td>
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<tr>
<td>Vein diameter &gt;8 mm</td>
<td>.285</td>
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<tr>
<td>Vein diameter &gt;10 mm</td>
<td>.357</td>
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<tr>
<td>Age under 70</td>
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<td>Age under 80</td>
<td>.238</td>
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</table>
Endovenous Foam-induced thrombosis

776 patients; 1166 UGFS treatments
EFIT 1: 7
EFIT 2: 2
EFIT 3: 2
EFIT 4: 7
From the American Venous Forum

Rivaroxaban for thrombosis prophylaxis in endovenous laser ablation with and without phlebectomy.

Abstract

OBJECTIVE: Endovenous heat-induced thrombosis (EHT) is a well-described complication of endovenous laser ablation (EVLA). We report our centers’ experience on the efficacy (EHT level ≥2 according to the Kabnick classification) and safety (observed major and minor bleeding events) of rivaroxaban for EHT prophylaxis in EVLA with and without concomitant phlebectomy.

METHODS: Demographic, procedural, and outcome data of all patients with EVLA of the great, accessory, or small saphenous vein and EHT prophylaxis with 10 mg/d rivaroxaban between 2012 and 2014 were reviewed and analyzed in this investigator-initiated multicenter retrospective observational single-arm study.

RESULTS: During a median (interquartile range) follow-up duration of 51 (41-68) days, complete vein occlusion was achieved in 98.4% of 438 EVLA procedures in 306 patients. One patient had an EHT level 2 (0.2%; 95% confidence interval, 0.006%-1.3%). No major bleedings (0%; 95% confidence interval, 0.0%-0.8%) and six minor bleedings (1.4%; 95% confidence interval, 0.5%-3%) were observed.

CONCLUSIONS: Rivaroxaban (10 mg/d) for 5 to 10 days seems to be an efficacious and safe alternative for EHT prophylaxis in EVLA with or without phlebectomy.

Perioperative duplex ultrasound following endothermal ablation of the saphenous vein: is it worthless?

Abstract (NYU Kabnick)

Fifteen years ago, radiofrequency ablation of the saphenous vein was introduced as a new and minimally invasive modality for the treatment of superficial venous insufficiency. Three years later, it was followed by endovenous laser ablation. These procedures have revolutionized the treatment of superficial venous insufficiency and have caused a dramatic shift from a highly invasive and morbid inpatient procedure, to a minimally invasive and ambulatory office procedure. Soon after their introduction, a new clinical entity was identified: endothermal heat-induced thrombosis (EHIT). This terminology, a classification system, and treatment strategies were introduced by Kabnick in 2005. Subsequently, advances in technique, along with the discovery of associated risk factors and a better understanding of the pathophysiologic process of endothermal coagulum formation, have reduced the current incidence of EHIT classes 2-4 to between 1%-2%. Still, a paucity of data exists regarding the true incidence of clinically significant pulmonary embolism secondary to EHIT. The authors believe that the rate is less than 0.01%. Furthermore, successful thermal saphenous ablation efficacy in the perioperative period approaches 99%. Despite these excellent numbers, the standard of care is to obtain a duplex ultrasound to evaluate for the presence of EHIT within the first 1-2 weeks post endovenous thermal ablation. Given this information, the authors believe that performing duplex ultrasound in the perioperative period is wasteful and an inefficacious use of limited health-care resources. Thus, the authors advocate against routine duplex to evaluate treatment efficacy and EHIT presence during the perioperative period in asymptomatic patients.

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Cost analysis and implications of routine deep venous thrombosis duplex ultrasound scanning after endovenous ablation

Luis Suarez, MD, Erica Tangney, BA, Thomas F. O’Donnell, MD, and Mark D. Iaffred, MD. Boston Mass

Results: This analysis included 13,645 EVA-treated limbs. There were no reported deaths. The incidence of DUS-detected venous thromboembolism after EVA is 0.7%. The cost of unilateral DUS according to the Medicare global reimbursement fee for office-based studies is $1067.1. The total cost of performing DUS in this study population is estimated to be at least $14,771,599 and the amount of dollars expended per venous thromboembolism detected is $14,667.

Conclusions: The current Society for Vascular Surgery/American Venous Forum recommendation is to perform screening DUS after EVA within 72 hours postoperatively with a weak level of recommendation (grade 2C). The current analysis demonstrates a low incidence of EHIT/DVT with a corresponding high cost to detect each case with routine DUS screening. These data combined with the unclear clinical significance of EHIT suggest that the policy of universal post-EVA screening should be revised in the near future. (J Vasc Surg: Venous and Lym Dis 2017;5:126-33.)

PMID: 25274866#
Summary

- EFIT and EHIT classification
- Higher risk of DVT progression with EHIT 3 and 4 warranting anticoagulant therapy
- Incidence, clinical importance and therapy for EFIT less well studied
- Difficult to distinguish between EHIT and DVT
- Timing and frequency of ultrasound follow up post vein treatment controversial