Universitätsspital Basel

Nachkontrolle, Rekanalisation, Festlegung der OAK-Dauer

23.04.2026

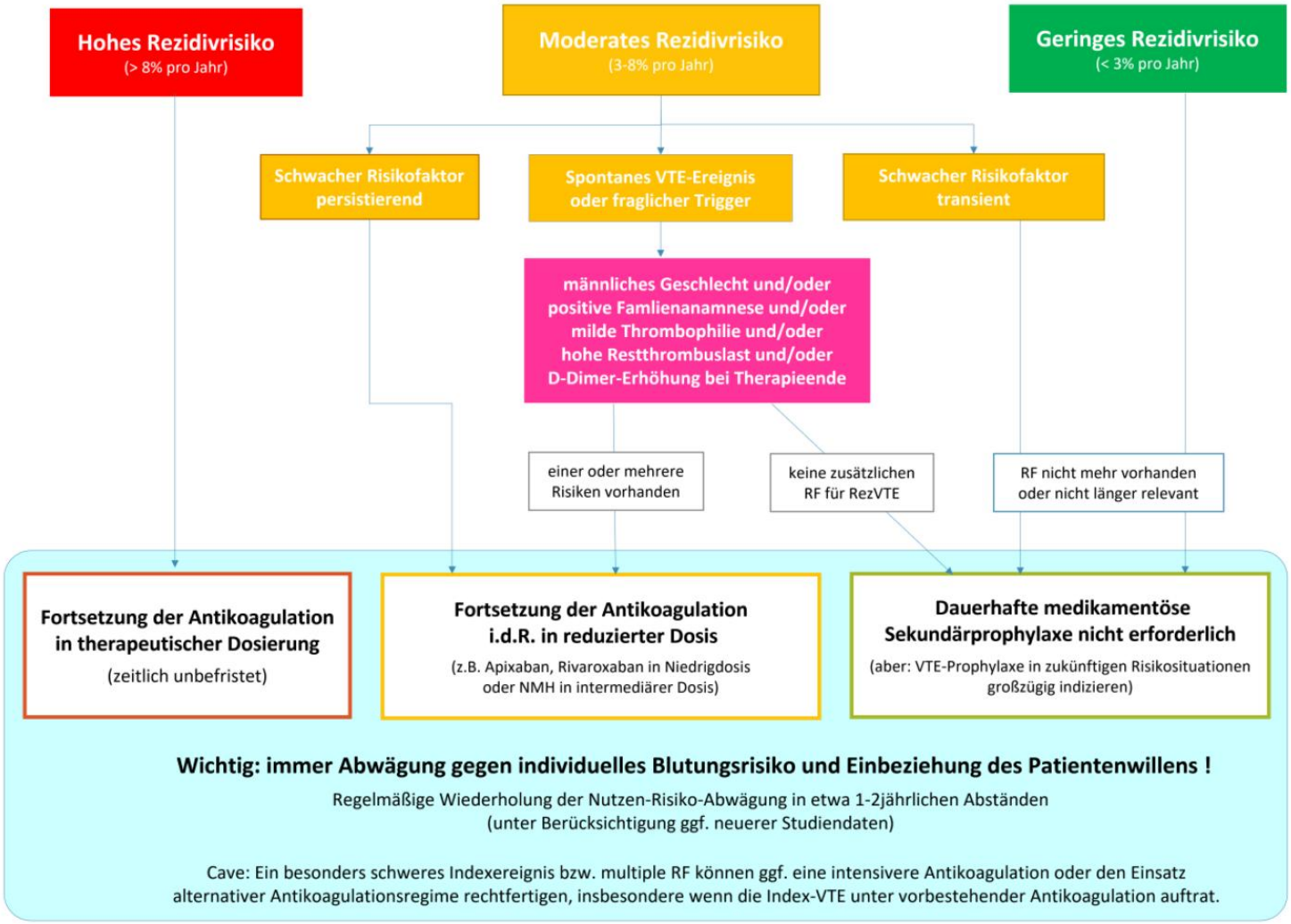
Daniel Vich
Oberarzt Angiologie

Universitätsspital Basel

OAK-Dauer

Antikoagulationsdauer

Initiale Behandlung üblicherweise nach 3–6 Monaten beendet – wie weiter?



Quelle: Interdisziplinäre S2k-Leitlinie «Diagnostik und Therapie der Venenthrombose und Lungenembolie 2023»

Antikoagulationsdauer

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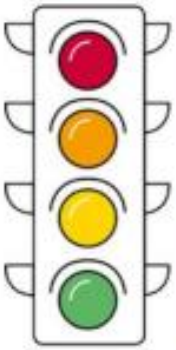

Risikofaktor bzw. Trigger bei Index-VTE	Rezidivrisiko nach Absetzen der Antikoagulation	Therapeutische Konsequenz
Persistierende starke Risikofaktoren: z.B. aktive TU-Erkrankung, Antiphospholipid-Syndrom, schwere hereditäre Thrombophilie, Rezidiv-VTE (ohne starken/reversiblen RF)	**hoch** (> 8%/Jahr)	**unbefristete Antikoagulation in Therapiedosis**
Persistierende, schwache Risikofaktoren: z.B. milde Thrombophilie, chronisch entzündliche Darmerkrankung, aktive Autoimmunerkrankung, Paresen der unteren Extremitäten	**moderat** (3-8%/Jahr)	**individuelle Nutzen-Risiko-Abwägung nach 3-6 Monaten;** **bei Entscheidung zur Fortführung der Antikoaogulation Dosisreduktion erwägen (z.B. Apixaban, Rivaroxaban in „Niedrigdosis")**
Spontanes VTE-Ereignis ohne Risikofaktor/Trigger		
Transiente, schwache Risikofaktoren: z.B. kleiner operativer Eingriff, Beinverletzung ohne Fraktur, Langstreckenreise > 6-8 h, Östrogentherapie, Schwangerschaft, Wochenbett		
Transiente, starke Risikofaktoren: z.B. OP mit Vollnarkose > 30 min, Trauma mit Fraktur, KH-Aufenthalt mit Immobilisierung ≥ 3 Tage	**gering** (< 3%/Jahr)	**zeitlich befristete Antikoagulation**

Abb. 5.2: Stratifizierung des Risikos für Rezidiv-VTE („Antikoagulationsampel")

Bei moderatem Rezidivrisiko ist eine Fortführung der Antikoagulation oft sinnvoll, allerdings ist der klinische Nutzen geringer und muss gemeinsam mit dem individuellen Blutungsrisiko und der Patientenpräferenz bewertet werden.

Quelle: Interdisziplinäre S2k-Leitlinie «Diagnostik und Therapie der Venenthrombose und Lungenembolie 2023»

Antikoagulationsdauer

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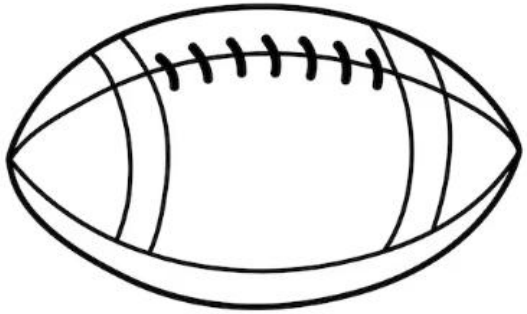
Bei moderatem Rezidivrisiko ist eine Fortführung der Antikoagulation oft sinnvoll, allerdings ist der klinische Nutzen geringer und muss gemeinsam mit dem individuellen Blutungsrisiko und der Patientenpräferenz bewertet werden



Quelle: Interdisziplinäre S2k-Leitlinie «Diagnostik und Therapie der Venenthrombose und Lungenembolie 2023»

- Hilfreich kann es sein, vor geplanter Beendigung der Antikoagulation die D-Dimere zu bestimmen, bei normwertigen D-Dimeren die Antikoagulation zu pausieren und 4 bzw. 12 Wochen später die DDimere nochmals zu bestimmen (543, 544). **Patienten, die bereits unter laufender Antikoagulation erhöhte D-Dimere aufweisen, sowie Patienten, bei denen es nach Beendigung der Antikoagulation zu einem Anstieg der D-Dimere kommt, weisen in Einzelstudien wie in Metaanalysen ein erhöhtes Rezidivrisiko auf (545, 546)**

Quelle: Interdisziplinäre S2k-Leitlinie «Diagnostik und Therapie der Venenthrombose und Lungenembolie 2023»

543. Palareti G, Legnani C, Cosmi B, Valdré L, Lunghi B, Bernardi F et al. Predictive value of D-dimer test for recurrent venous thromboembolism after anticoagulation withdrawal in subjects with a previous idiopathic event and in carriers of congenital thrombophilia. Circulation 2003; 108(3):313–8. doi: 10.1161/01.CIR.0000079162.69615.0F.

544. Cosmi B, Legnani C, Tosetto A, Pengo V, Ghirarduzzi A, Testa S et al. Usefulness of repeated D-dimer testing after stopping anticoagulation for a first episode of unprovoked venous thromboembolism: the PROLONG II prospective study. Blood 2010; 115(3):481–8. doi: 10.1182/blood-2009-08-237354

545. Verhovsek M, Douketis JD, Yi Q, Shrivastava S, Tait RC, Baglin T et al. Systematic review: D-dimer to predict recurrent disease after stopping anticoagulant therapy for unprovoked venous thromboembolism. Ann Intern Med 2008; 149(7):481-90, W94. doi: 10.7326/0003-4819-149-7-200810070-00008.

546. Douketis J, Tosetto A, Marcucci M, Baglin T, Cushman M, Eichinger S et al. Patient-level meta-analysis: effect of measurement timing, threshold, and patient age on ability of D-dimer testing to assess recurrence risk after

Vienna Prediction Model - Recalibrated

for patients with a first unprovoked venous thromboembolism

Sex

- Female ○
- Male ◉

Location

- Distal DVT ○
- Proximal DVT ◉
- Pulmonary Embolism ○

D-dimer

D-dimer (ug/l)

200

☑ I confirm that I have read the **disclaimer** carefully, that I understand it, and that I accept its contents.

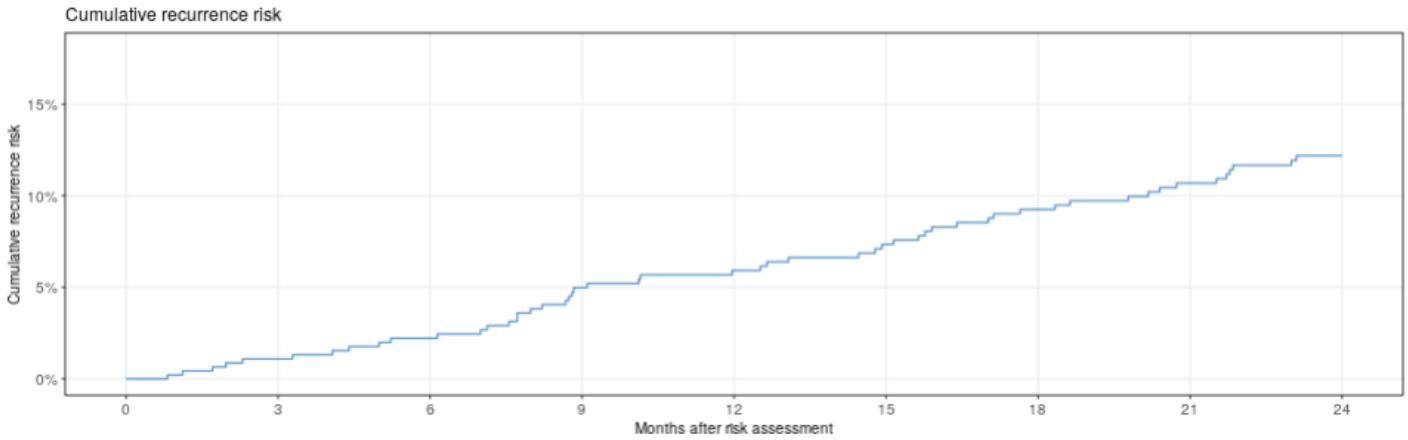
Results | Impressum | Disclaimer

Risk points

154

Cumulative recurrence risk (%)

At 12 months	95% confidence interval
5.9	(3.9, 8.4)
At 24 months	95% confidence interval
12.2	(9, 15.3)



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Vienna Prediction Model - Recalibrated

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Sex

- Female ○
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D-dimer

D-dimer

200

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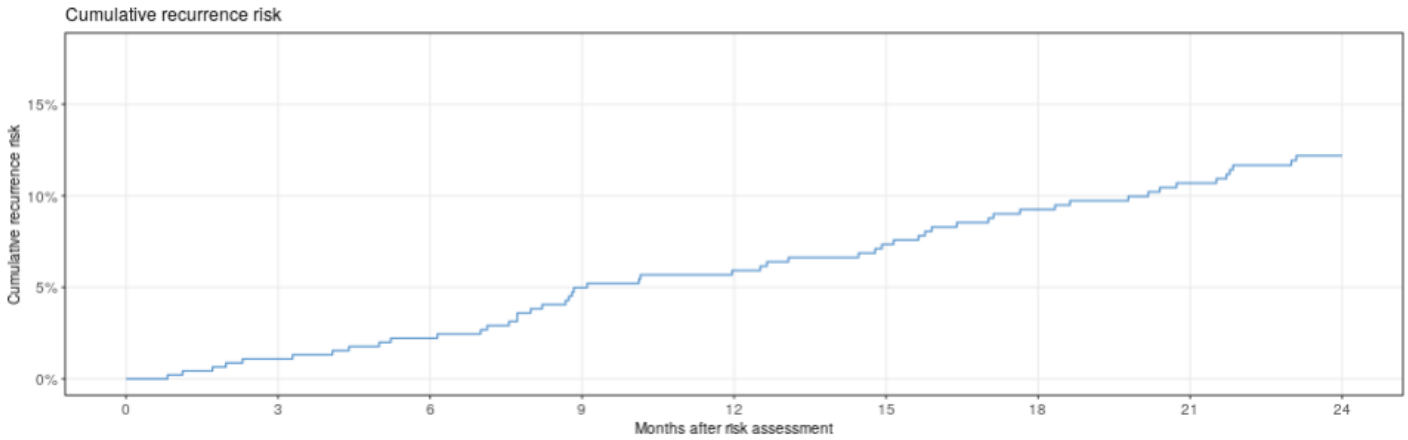

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Vienna Prediction Model - Recalibrated

for patients with a first unprovoked venous thromboembolism

The Vienna Prediction Model for identifying patients at low risk of recurrent venous thromboembolism: a prospective cohort study

Paul A. Kyrle [1,2], Lisbeth Eischer[1], Hana Šinkovec[3], Paul Gressenberger[4], Thomas Gary[4], Marianne Brodmann[4], Georg Heinze [3], and Sabine Eichinger [1,2]*

[1]Division of Hematology and Hemostasis, Department of Medicine I, Medical University of Vienna, Vienna A-1090, Austria; [2]Karl Landsteiner Institute of Thrombosis Research, Vienna A-1020, Austria; [3]Center for Medical Statistics, Informatics and Intelligent Systems, Institute of Clinical Biometrics, Medical University of Vienna, Vienna A-1090, Austria; and [4]Division of Angiology, Department of Medicine, Medical University of Graz, Graz A-8010, Austria

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See the editorial comment for this article 'The science and art of predicting recurrentVTE', by M. Carrier and P. Verhamme, https://doi.org/10.1093/eurheartj/ehad712.

Abstract

Background and Aims	Patients with unprovoked venous thromboembolism (VTE) have a high recurrence risk, and guidelines suggest extended-phase anticoagulation. Many patients never experience recurrence but are exposed to bleeding. The aim of this study was to assess the performance of the Vienna Prediction Model (VPM) and to evaluate if the VPM accurately identifies these patients.
Methods	In patients with unprovoked VTE, the VPM was performed 3 weeks after anticoagulation withdrawal. Those with a predicted 1-year recurrence risk of ≤5.5% were prospectively followed. Study endpoint was recurrent VTE over 2 years.
Results	A total of 818 patients received anticoagulation for a median of 3.9 months. 520 patients (65%) had a predicted annual recurrence risk of ≤5.5%. During a median time of 23.9 months, 52 patients had non-fatal recurrence. The recurrence risk was 5.2% [95% confidence interval (CI) 3.2–7.2] at 1 year and 11.2% (95% CI 8.3–14) at 2 years. Model calibration was adequate after 1 year. The VPM underestimated the recurrence risk of patients with a 2-year recurrence rate of >5%. In a post-hoc analysis, the VPM's baseline hazard was recalibrated. Bootstrap validation confirmed an ideal ratio of observed and expected recurrence events. The recurrence risk was highest in men with proximal deep-vein thrombosis or pulmonary embolism and lower in women regardless of the site of incident VTE.
Conclusions	In this prospective evaluation of the performance of the VPM, the 1-year rate of recurrence in patients with unprovoked VTE was 5.2%. Recalibration improved identification of patients at low recurrence risk and stratification into distinct low-risk categories.

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HERDOO2 Rule for Discontinuing Anticoagulation in Unprovoked VTE

Identifies low-risk women who can safely discontinue VTE treatment.

INSTRUCTIONS

Use in women ≥18 years old with unprovoked VTE. Do not use in patients with any of the following at the time of VTE diagnosis: leg fracture, lower-extremity plaster cast, immobilization >3 days, general anesthesia <3 months before, or cancer diagnosis within 5 years.

When to Use ⌄ | Why Use ⌄

Post-thrombotic signs Hyperpigmentation, edema, or redness (either leg)	No 0	**Yes +1**
D-dimer level	<250 µg/L 0	**≥250 µg/L +1**
BMI, kg/m²	<30 0	**≥30 +1**
Age, years	<65 0	**≥65 +1**

4 points
HERDOO2 Score

7.4 %
Risk of recurrent major VTE per 100 patient years

Not low risk
Continue oral anticoagulation

Copy Results **Next Steps »»**

HERDOO2	Risk group	Risk of recurrent major VTE*	Recommendation
0-1	Low	3.0%	Can safely discontinue oral anticoagulation
2-4	Not low	7.4%	Continue oral anticoagulation

*Proximal DVT and segmental or greater PE, % per 100 patient years.

17 low risk women who discontinued anticoagulants developed recurrent VTE during 564 patient years of follow-up (3.0% per patient year, 95% confidence interval 1.8% to 4.8%)

*Validating the HERDOO2 rule to guide treatment duration for women with unprovoked venous thrombosis: multinational prospective cohort management study
BMJ 2017; 356 doi: https://doi.org/10.1136/bmj.j1065 (Published 17 March 2017)Cite this as: *BMJ* 2017;356:j1065

The NEW ENGLAND JOURNAL of MEDICINE

Bleeding Risk with Apixaban vs. Rivaroxaban in Acute Venous Thromboembolism

Authors: Lana A. Castellucci, M.D., Vivien M. Chen, M.B., B.S., Ph.D., Michael J. Kovacs, M.D., Alejandro Lazo-Langner, M.D., Peter Greenstreet, Ph.D., Susan Kahn, M.D. , Benoit Côté, M.D., C.M., +25 , for the COBRRA Trial Investigators† Author Info & Affiliations

Published March 11, 2026 | N Engl J Med 2026;394:1051-1060 | DOI: 10.1056/NEJMoa2510703 | VOL. 394 NO. 11

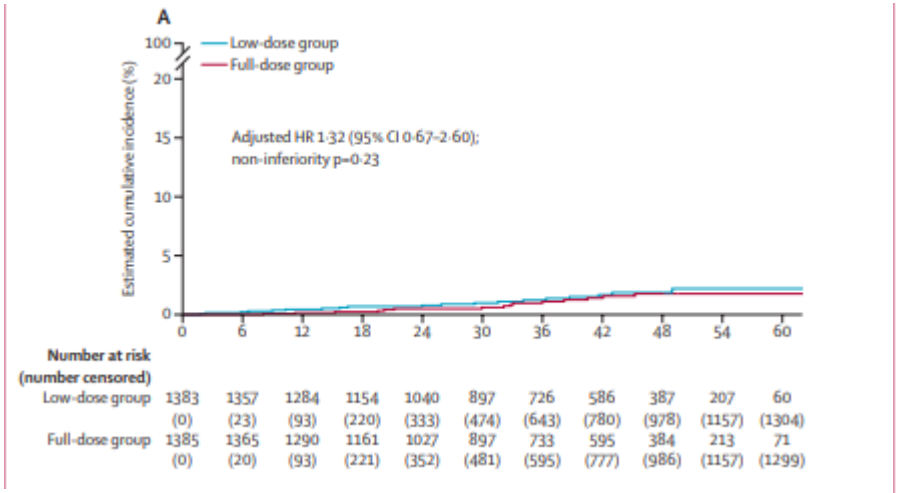
CONCLUSIONS

Among patients with acute venous thromboembolism, the risk of clinically relevant bleeding was significantly lower with apixaban than with rivaroxaban during the 3-month treatment period. (Funded by the Canadian Institutes of Health Research and others; COBRRA ClinicalTrials.gov number, NCT03266783.)

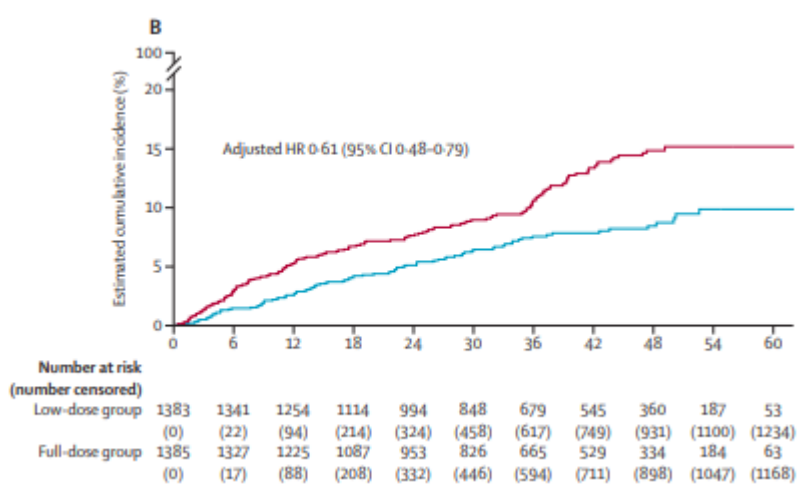
THE LANCET

Extended treatment of venous thromboembolism with reduced-dose versus full-dose direct oral anticoagulants in patients at high risk of recurrence: a non-inferiority, multicentre, randomised, open-label, blinded endpoint trial

Francis Couturaud, Jeannot Schmidt, Olivier Sanchez, Alice Ballerie, Marie-Antoinette Sevestre, Nicolas Meneveau, Laurent Bertoletti, Jérôme Connault, Ygal Benhamou, Joël Constans, Thomas Quemeneur, François-Xavier Lapébie, Gilles Pernod, Gaël Picart, Antoine Elias, Caroline Doutrelon, Claire Neveux, Lina Khider, Pierre-Marie Roy, Stéphane Zuily, Nicolas Falvo, Philippe Lacroix, Joseph Emmerich, Isabelle Mahé, Julien Boileau, Azzedine Yaici, Sylvain Le Jeune, Dominique Stéphan, Pierre Plissonneau-Duquene, Valérie Ray, Marc Danguy des Déserts, Rafik Belhadj-Chaidi, Bouchra Lamia, Yves Gruel, Emilie Presles, Philippe Girard, Cécile Tromeur, Farès Moustafa, Vincent Rothstein, Karine Lacut, Solen Melac, Sophie Barillot, Patrick Mismetti, Silvy Laporte, Dominique Mottier, Guy Meyer, Christophe Leroyer, for the RENOVE Investigators*



(A) Cumulative incidence of symptomatic recurrent venous thromboembolism during the treatment period (primary outcome)



(B) Cumulative incidence of major and clinically relevant non-major bleeding during the treatment period (first key secondary outcome)

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Rekanalisation (und Dauer der Antikoagulation)

The NEW ENGLAND JOURNAL of MEDICINE

EFFECTS OF A LOW-MOLECULAR-WEIGHT HEPARIN ON THROMBUS REGRESSION AND RECURRENT THROMBOEMBOLISM IN PATIENTS WITH DEEP-VEIN THROMBOSIS

HANS KLAUS BREDDIN, M.D., VIOLA HACH-WUNDERLE, M.D., ROUMEN NAKOV, M.D., AND VIJAY V. KAKKAR, M.D., FOR THE CORTES INVESTIGATORS*

(P<0.001) between venographic results and clinical recurrence. Among 490 patients classified as having no response on venography, 34 (7.0 percent) had a recurrent venous thromboembolic event, whereas only 5 (1.0 percent) of 476 patients classified as having a response had such an event. A plot of the time to a recurrent event in the three treatment groups is shown in Figure 1.

tiefes Beinvenensystem	Marder-Score (maximale Punktzahl)
V.iliaca	6
V.femoralis communis	4
V.femoralis superficialis	10
V.poplitea	4
Vv.tibiales anteriores	4 (jede 2)
Vv.tibiales posteriores	6 (jede 3)
Vv.fibulares	6 (jede 3)

Tabelle 2.1.3.: *maximaler Marder-Score für die einzelnen venösen Hauptleiter*

Patients were considered to have a response when their scores decreased by at least 30 percent

Day 0 vs. **day 21**

thrombus regression **40.2 -53.5** percent

Duplexsonographie und Antikoagulation (VKA)

Siragusa S, Malato A, Saccullo G, Iorio A, Di Ianni M, Caracciolo C, et al. Residual vein thrombosis for assessing duration of anticoagulation after unprovoked deep vein thrombosis of the lower limbs: the extended DACUS study. Am J Hematol 2011; 86:914-7;

Table III. Recurrent Venous Thromboembolism in Subgroups After VKA Discontinuation

Subgroups	RVT group (*n* = 258)		No-RVT group (*n* = 136)	
	No. of events/total (%)	No. per 100 person-years	No. of events/total (%)	No. per 100 person-years
Sex				
Male	15/131 (11.4)	11.4	2/72 (2.7)	2.7
Female	12/127 (9.4)	8.6	0/64 (0.0)	0.0
Age				
<65 years	11/139 (7.9)	7.9	0/78 (0.0)	0.0
≥65 years	16/119 (13.4)	13.4	2/58 (3.4)	3.4

RVT, residual vein thrombosis; VKA, vitamin-K antagonist.

Konklusion der Autoren:
Stopp Antikoagulation wahrscheinlich sicher, wenn nach 3 Monaten Therapie keine Restthrombosierung nach einer ersten Beinvenenthrombose vorhanden

Residuelle Thrombose: Meta-analysen

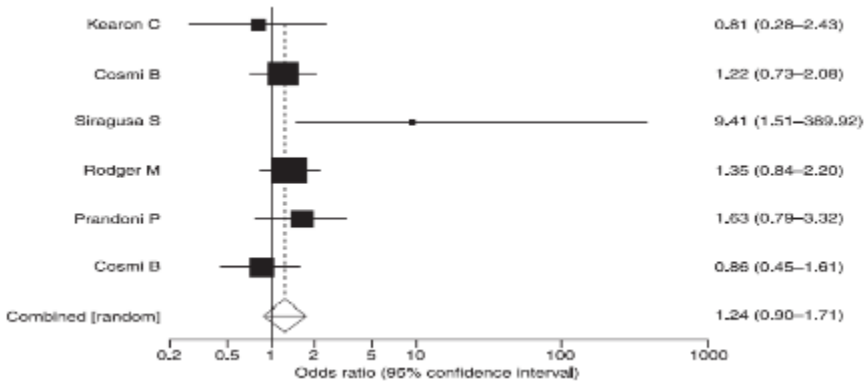
10 Studien, 2527 Patienten

Table 2: Results of multivariate Cox regression analysis. DVT, deep-vein thrombosis; VTE, venous thromboembolism; RVO, residual venous thrombosis; OAT, oral anticoagulant therapy.

Variables	Adjusted HR for recurrent VTE (95% CI)	P-value
RVO (present vs absent)	1.32 (1.06–1.65)	0.015
Age (for 1-year increase)	1.01 (1.00–1.02)	0.006
Sex (male vs female)	1.49 (1.2–1.84)	<0.001
Anticoagulation duration before RVO (for 1-day increase)	1.00 (1.00–1.00)	0.783
Anticoagulation continuation after RVO (yes vs no)	1.08 (0.73–1.59)	0.712

CI, confidence interval; HR, hazard ratio; RVO, residual venous obstruction; VTE, venous thromboembolism.

14 Studien, 4022 Patienten



In conclusion, after a first unprovoked DVT, RVO is a weak overall predictor of recurrent DVT.

Donadini MP, Thromb Haemost 2014

Carrier M, J Thromb Haemost 2011

Residual Vein Thrombosis After Deep Vein Thrombosis in Patients Treated with DOACs: Incidence and Associated Factors

- **Methods:** A total of 113 patients with newly diagnosed DVT underwent follow-up visits at **6 weeks (T1), 3 months (T2) and 6 months (T3)**

- study to evaluate the incidence of RVT in patients treated with direct oral anticoagulants (DOACs) and to identify the clinical factors associated with its persistence

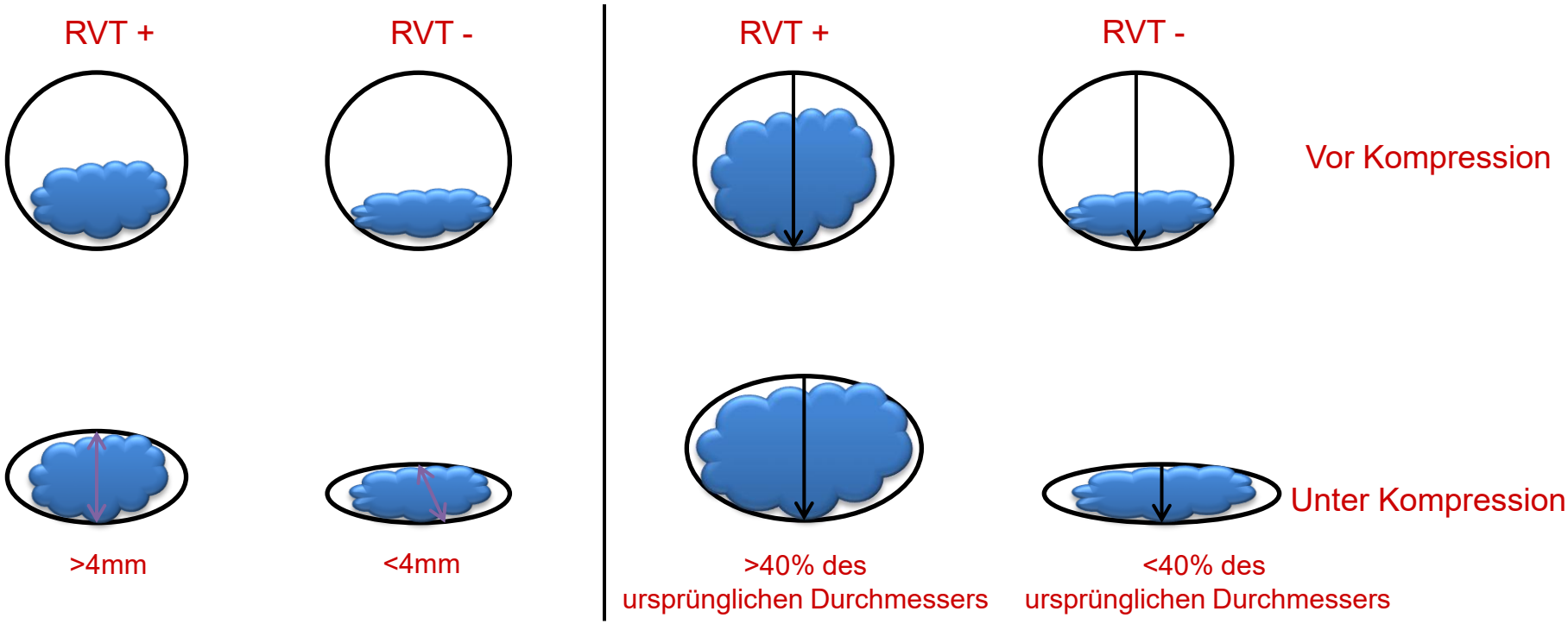
*prospective, observational, single-center cohort study

- 52% involved the popliteal vein alone, 8% the femoral vein alone and 39% both veins; in 7.3% of cases, thrombosis was bilateral. Concomitant PE occurred in 37.5% of patient*Primary Endpoint*

- **The prevalence of RVT ≥ 4 mm was 68.2% (58/85) at T1, 52.1% (50/96) at T2 and 37.7% (29/77) at T3**

Journal of *Clinical Medicine*

Restthrombuslast – Beurteilung in den Studien



Prandoni P, Ann Int Med 2009, Sarolo L, Thromb Res 2016

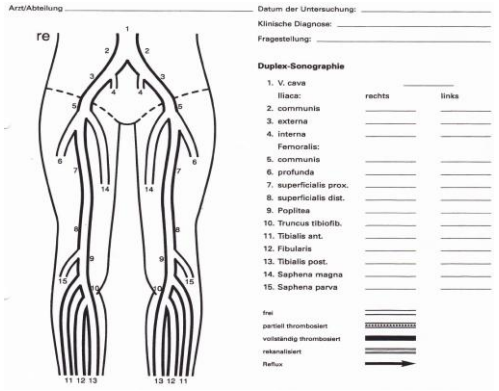
Siragusa S, Blood 2008

Beurteilung in der Praxis

Grosse Variabilität

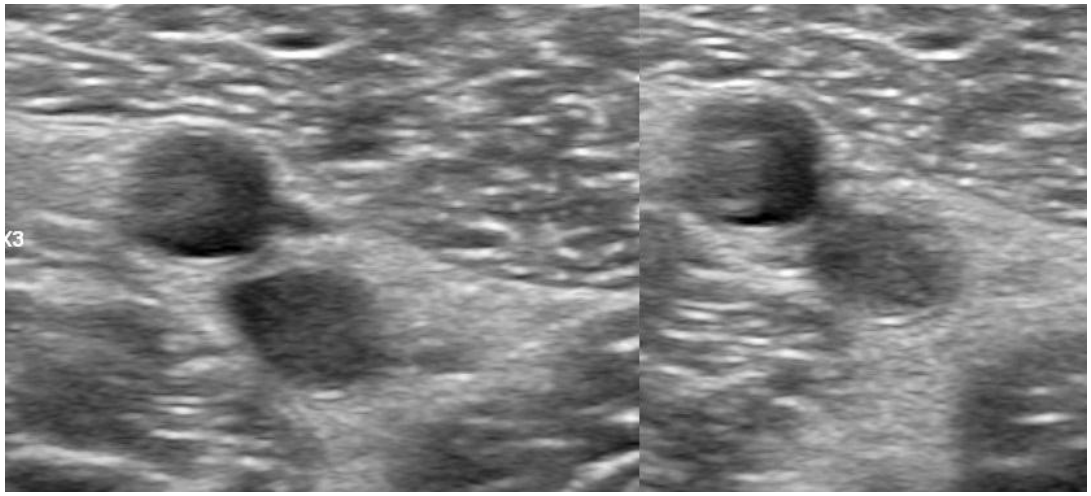
- Normal bei vollständiger Rekanalisation
- Wandunregelmässigkeiten, Kleinerer Durchmesser
- Partielle Komprimierbarkeit; hypoechogenes Restthrombus
- Echodichte Strukturen / Stränge
- Klappen verdickt, starr
- Insuffizienz des Venensystems

Gute initiale Dokumentation als Grundvoraussetzung

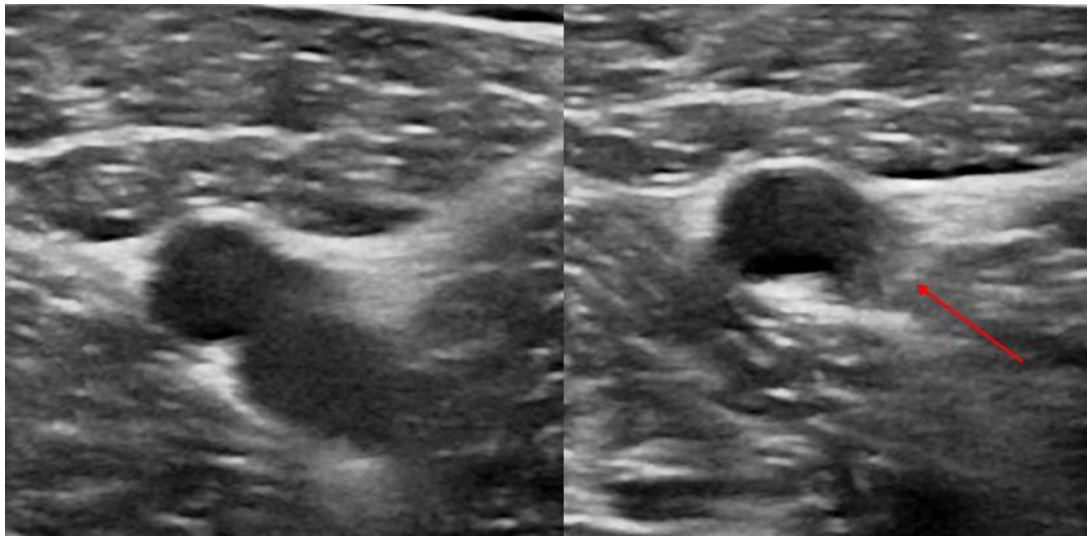


Thrombose der V. femoralis im Verlauf

Index Ereignis

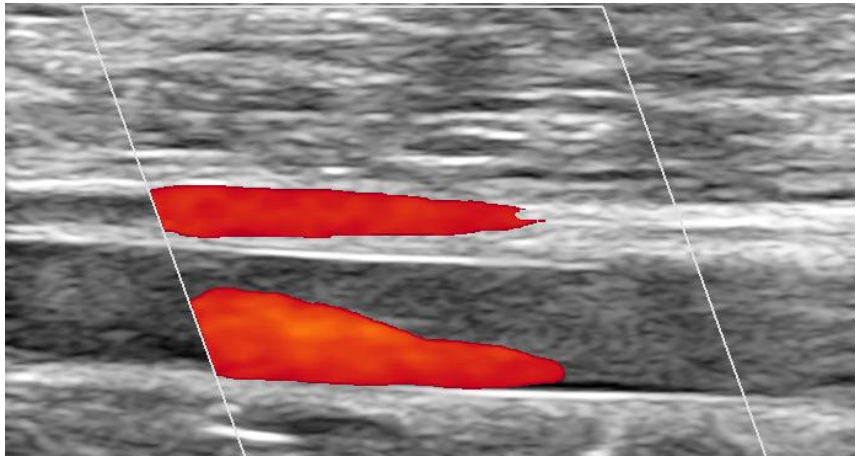


3 Monate

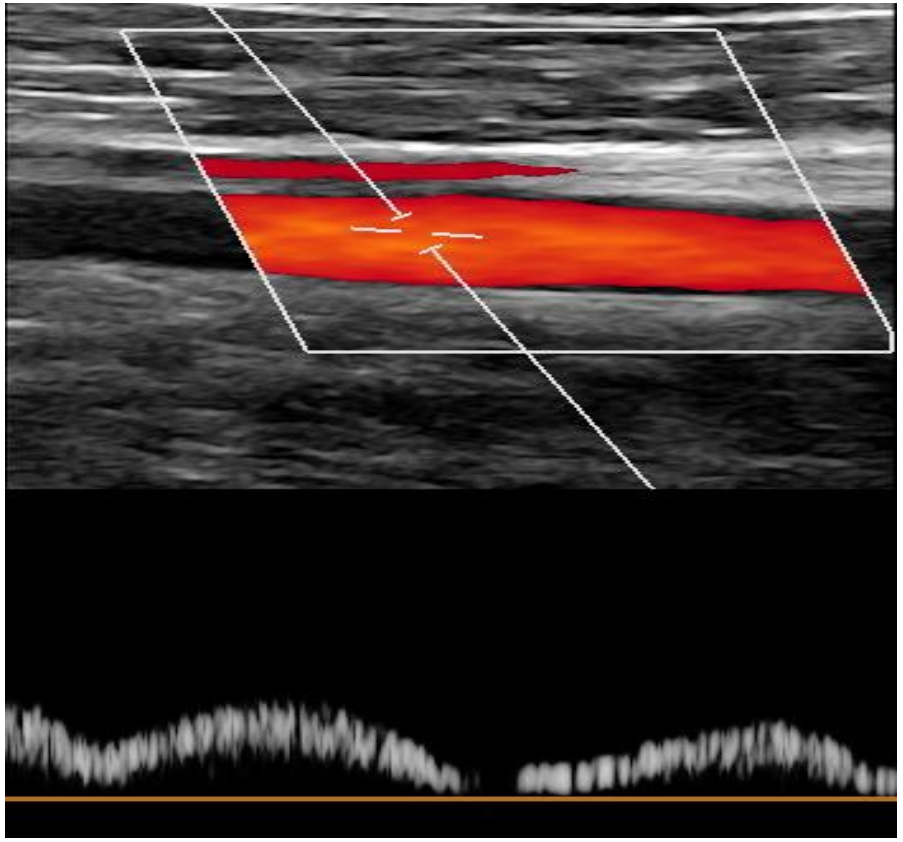


Thrombose der V. femoralis im Verlauf

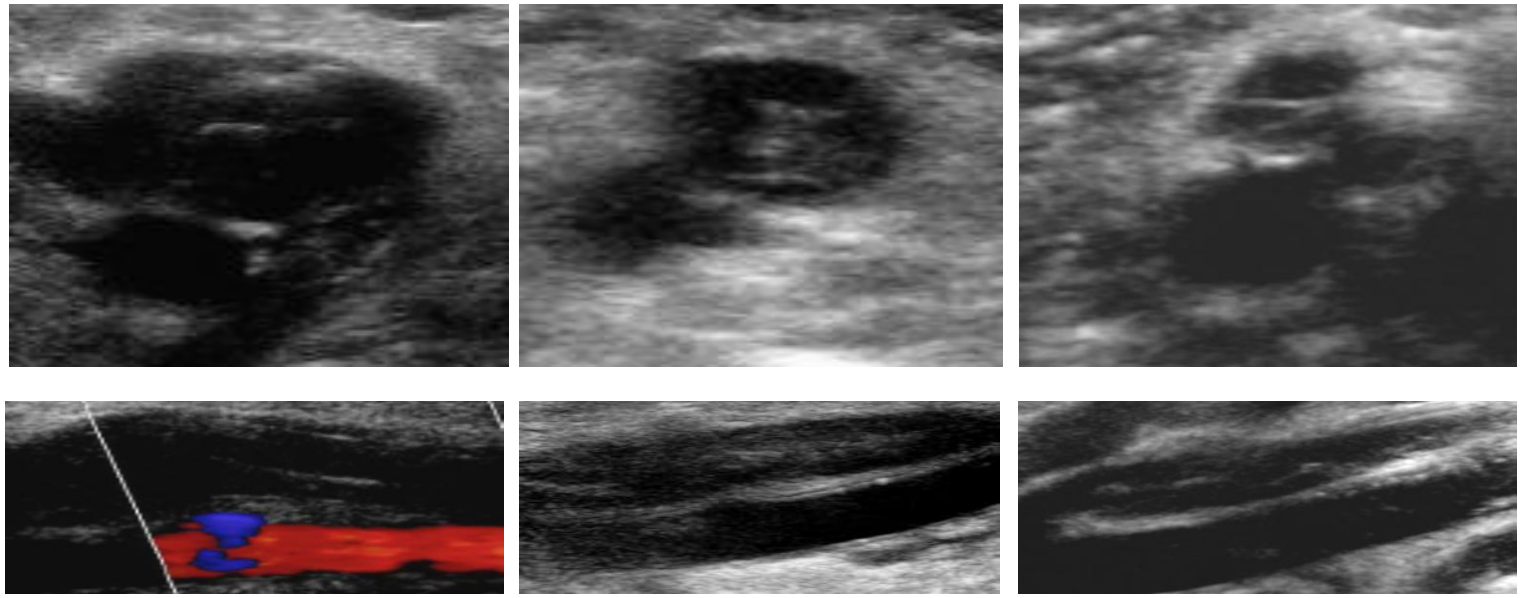
Index
Ereignis



3 Monate

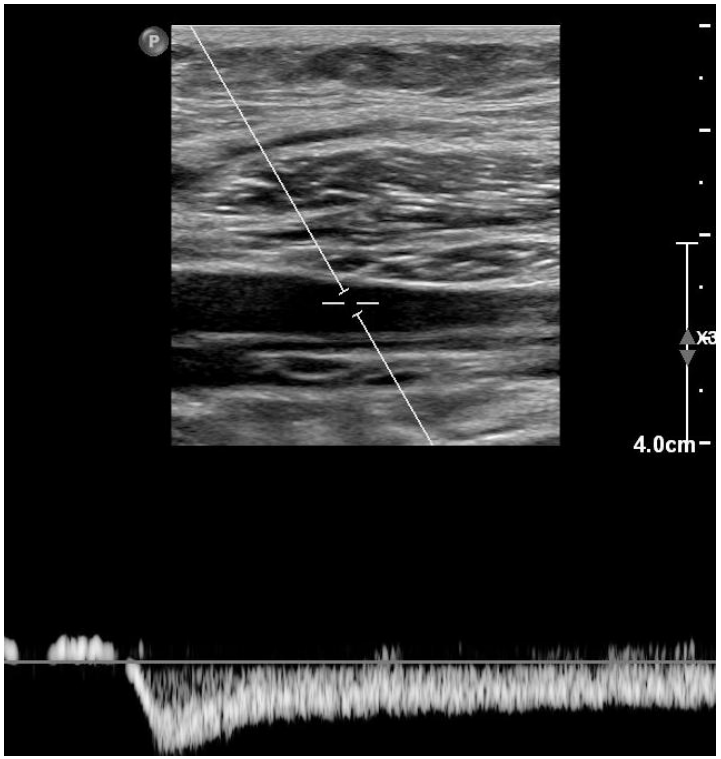


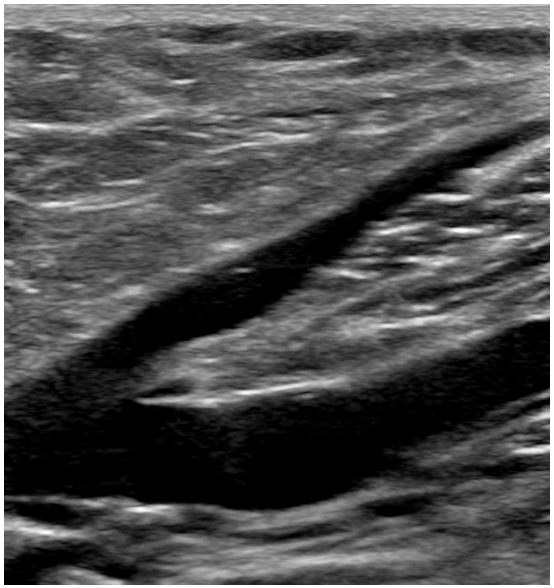
Thrombose der V. poplitea im Verlauf

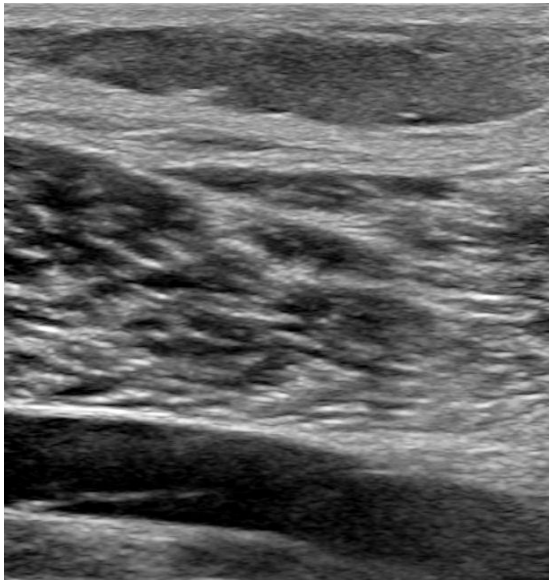


Diagnose | 3 Monate | 12 Monate

Postthrombotische Veränderungen in B-Bild- vs. PW-Doppler-Refluxbeurteilung vs. Klinischer Befund







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Nachkontrolle nach Diagnose einer tiefen Beinvenenthrombose (TVT)

Circulation
Volume 137, Issue 14, 3 April 2018; Pages 1505-1515
https://doi.org/10.1161/CIRCULATIONAHA.117.030687

American Heart Association.

CONSENSUS REPORT

Ultrasound for Lower Extremity Deep Venous Thrombosis

Multidisciplinary Recommendations From the Society of Radiologists in Ultrasound Consensus Conference

Laurence Needleman, MD, John J. Cronan, MD, Michael P. Lilly, MD, Geno J. Merli, MD, Srikar Adhikari, MD, Barbara S. Hertzberg, MD, M. Robert DeJong, RDMS, RVT, Michael B. Streiff, MD, and Mark H. Meissner, MD

Recommended Follow-Up After Initial Positive or Indeterminate Venous Ultrasound

Acute DVT, on treatment	Repeat not warranted unless a change in the scan will change patient management.Follow-up at the end of treatment to establish new baseline.

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Verlaufskontrolle nach Diagnose einer tiefen Beinvenenthrombose (TVT)

- Erkennung und Monitoring eines postthrombotischen Syndroms
- Kontrolle von Nebenwirkungen bzw. Blutungsrisiko unter Antikoagulation
- Sicherstellung der Compliance (Medikation, Kompressionstherapie)
- Reevaluation der Ätiologie (insb. bei unprovozierter TVT)
- Beurteilung der Rekanalisation
- Anpassung der Therapiedauer und -intensität (individuelle Risikoevaluation)

Individuell: 3 und 6 Monate?