

ANGIO UPDATE 2023

10. und 11. März

Hot Topic: Venöse Interventionen

Oliver Schlager, Wien

Interessenkonflikte

Forschungsunterstützung: -

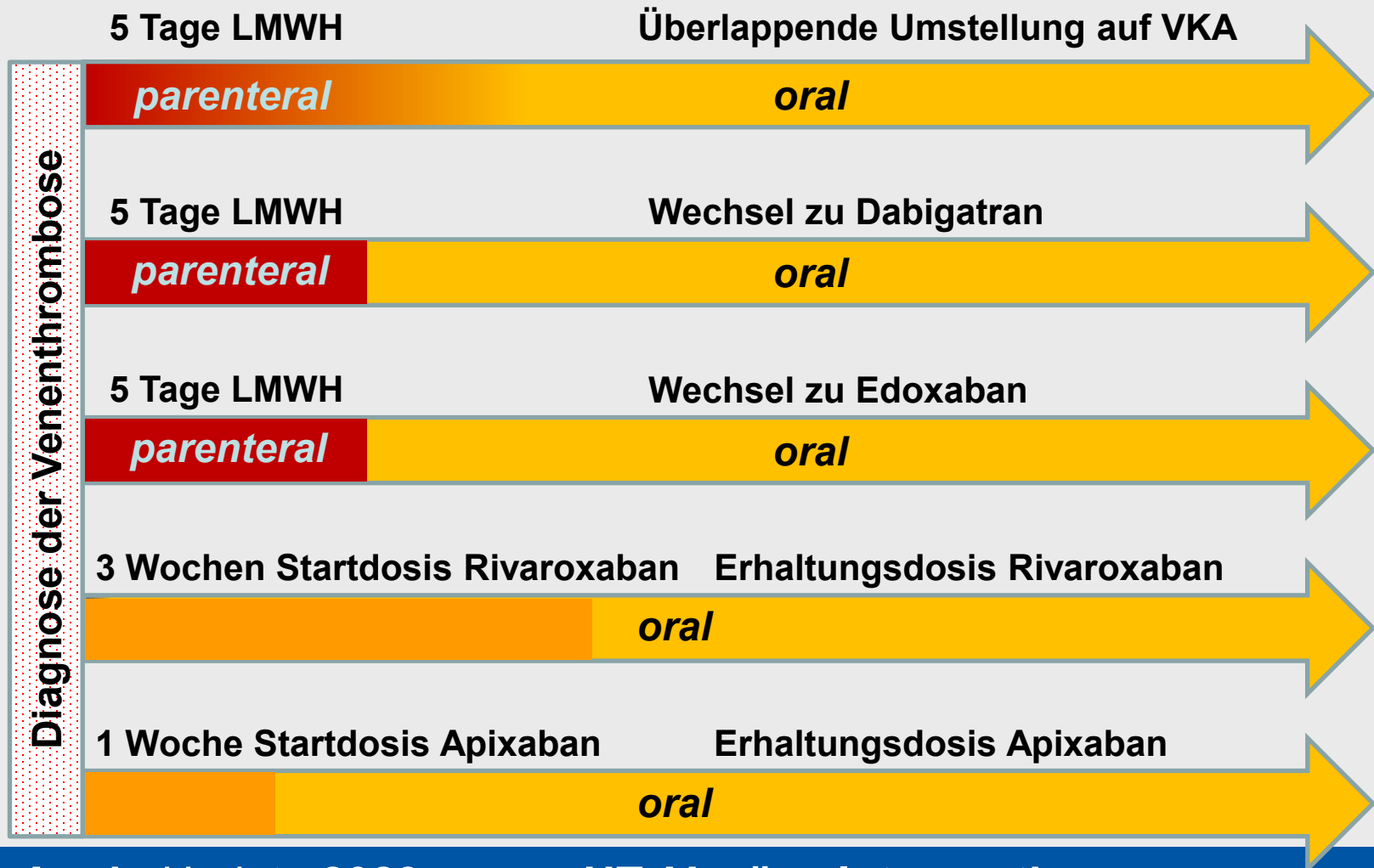
Vortragstätigkeit: Bard/BD, Bayer, Biotronik, Philips, Optimed

Beratertätigkeit: -

Akute Venenthrombose

State of the Art

Antikoagulation



Therapieziele

Antikoagulation - Intervention

Therapieziele

Antikoagulation

Kurzfristig
Reduktion der Progression

Langfristig
Reduktion des Rezidivs

Intervention

Kurzfristig
Symptomreduktion

Langfristig
Reduktion des PTS



Foto: O. Schlager

Relevanz des postthrombotischen Syndroms

Kahn SR et al. Circulation 2014;130:1636-61

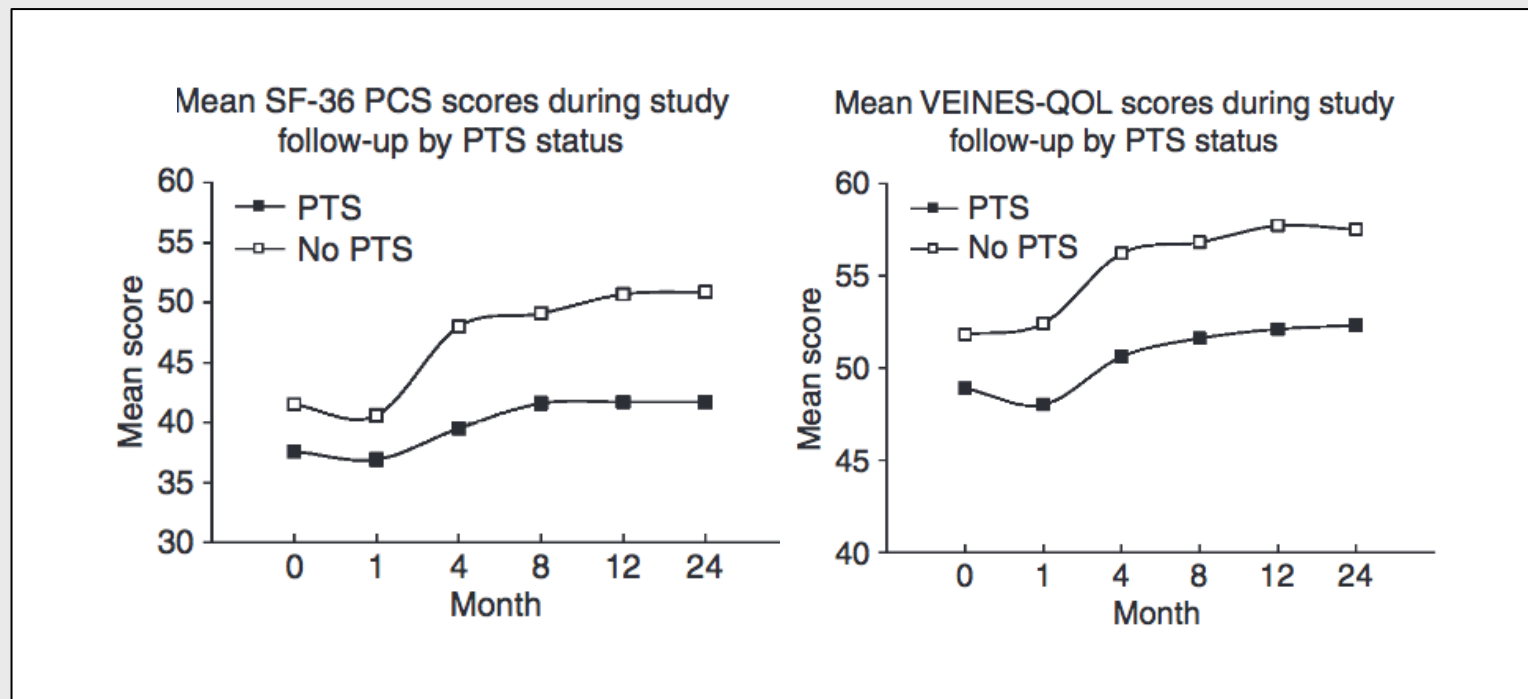


Foto: O. Schlager

- PTS steigert Kosten der Thrombosebehandlung um $\geq 50\%$
- Geschätzte jährliche Kosten $\approx$ \$7000 pro Patient (USA)
- Kosten = Behandlung + Verlust an Arbeitstagen + Verlust der Beschäftigung
- Beinulzerationen: Verlust von 2 Mio Arbeitstagen pro Jahr (USA)

Lebensqualität bei postthrombotischem Syndrom

Kahn SR et al. J Thromb Haemost 2008;6:1105-12



Bei PTS: möglicher anhaltender Einfluss auf die Lebensqualität

Evaluation des postthrombotischen Syndroms

Strijkers RHW et al. Phlebology 2012;27Suppl1:130-5

Klinische Scores

Scale	Clinical signs	Clinical symptoms	Specific for PTS
CEAP	+	-	-
VCSS	+	+	-
Widmer	+	-	-
Brandjes	+	+	+
Ginsberg	+	+	+
Villalta	+	+	+

Schweregrad des PTS

Utne KK et al. Thromb Haemost 2016;115(2):361-7

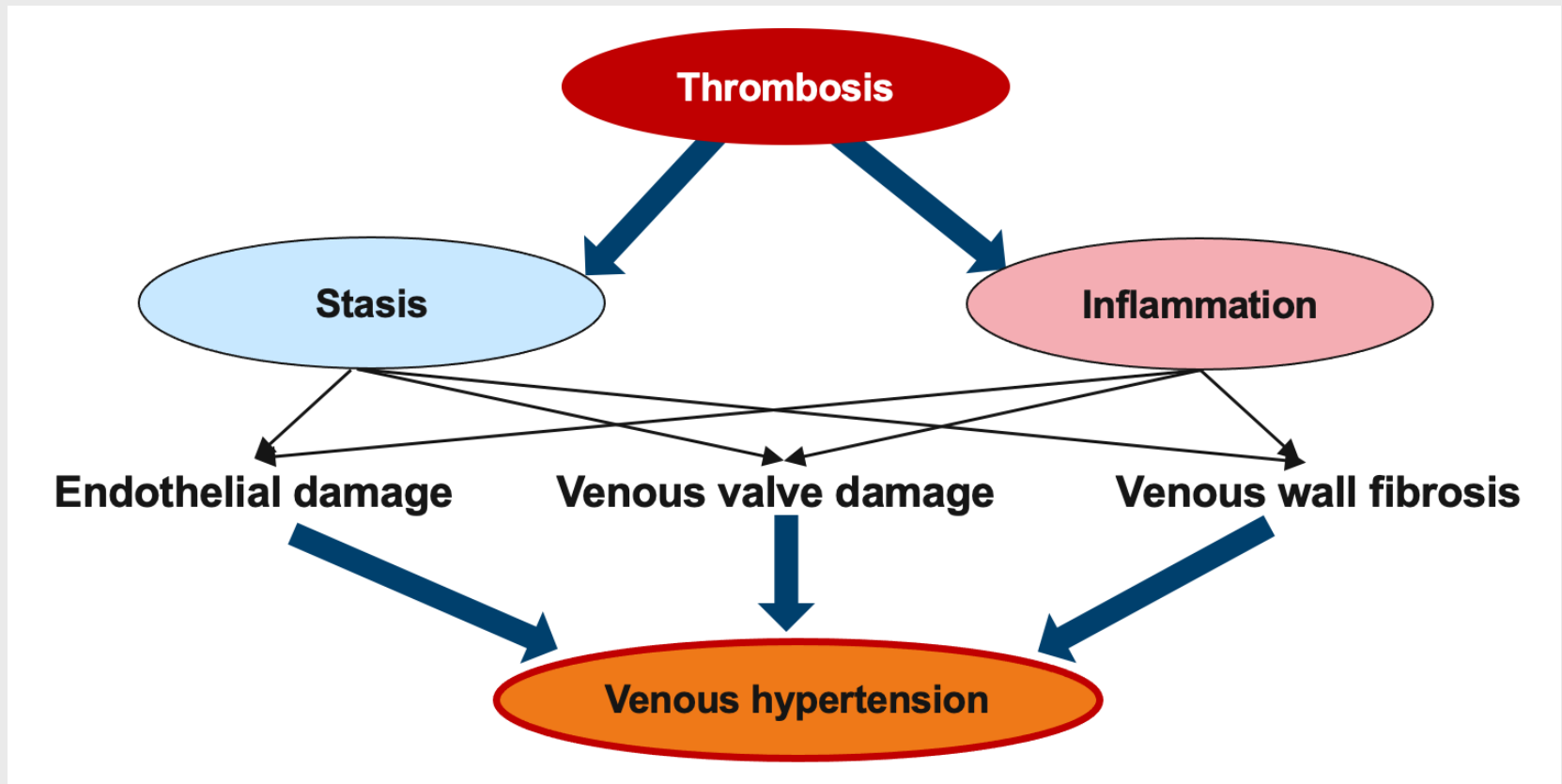
Villalta scale range 0 - 33

Symptoms	Clinical signs
Pain	Pretibial oedema
Cramps	Skin induration
Heaviness	Hyperpigmentation
Paresthesia	Redness
Itching	Venous ectasia
	Pain on calf compression

Pathophysiologie des PTS

Meissner MH et al. J Vasc Surg 2007;46 Suppl:4S-24S

Henke PK et al. J Vasc Surg 2011;53:500-9



Venöse Claudicatio

Laufbandergometrie

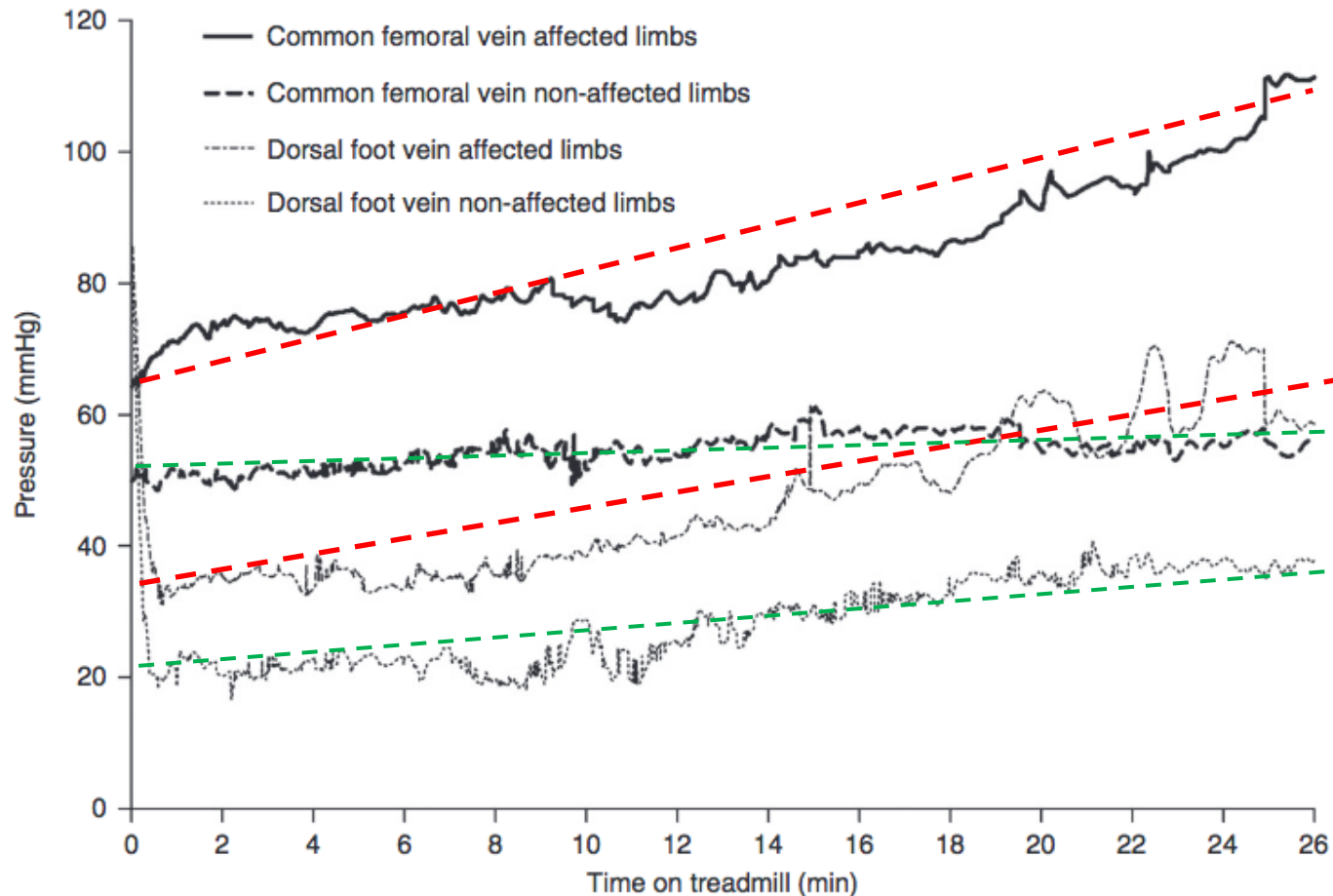


Foto: O. Schlager

Venöse Claudicatio – durch keinen score erfasst

Venöse Claudicatio

Kurstjens RL et al. J Thromb Haemost 2016;14(6):1163-70



Risikofaktoren für PTS

Rabinovich A et al. J Thromb Haemost 2017;15(2):230-41

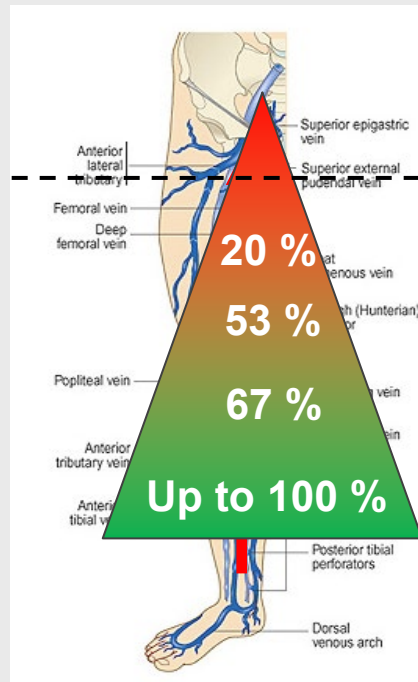
Open vein hypothesis

At DVT diagnosis	During follow-up after DVT	NO risk factor	Controversial / further research needed
Proximal DVT	Recurrent ipsilateral DVT	Unprovoked vs. Secondary DVT	Type of anticoagulant used (LMWH, DOAC)
Older age	Inadequate INR control during first 3 months of VKA treatment	Gender	Residual vein obstruction and/or valvular reflux
Obesity (BMI>30)	Persistent venous symptoms/signs 1 months after DVT	Inherited thrombophilia	Sonographic and biochemical properties of the initial or residual clot
History of ipsilateral DVT		Total duration of anticoagulation	Biomarkers of inflammation (CRP, IL-6, IL-8, IL-10, ICAM-1, MMPs)
Pre-existing primary venous insufficiency			D-Dimer
			F VIII

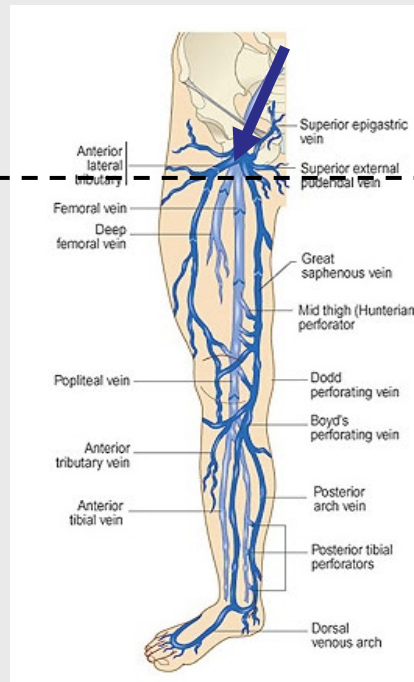
Thrombose-Entitäten

Vasa 2016, Supplement 90. DOI 10.1024/0301-1526/a000485

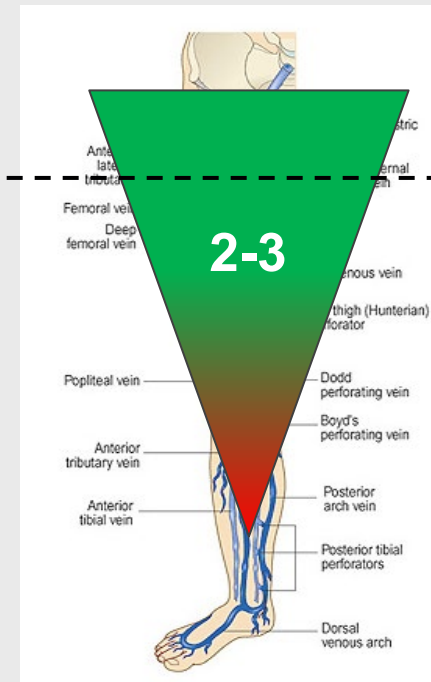
Ascendierend



Deszendierend



Transfascial



Klinische Studien

¹Enden T et al. *J Thromb Haemost* 2009;7(8):1268-75; Enden T et al. *Lancet* 2012;379(9810):31-8;

²Sharifi M et al. *Cath Cardiovasc Interv* 2010;76(3):316-25; Sharifi M et al. *J Endovasc Ther* 2012;19(2):273-80; ³Vedantham S et al. *New Engl J Med* 2017;377(23):2240-52; ⁴Notten P et al. *Lancet Haematol* 2020;7(1):e40-9

	Intervention	Control	Stent rate	Efficacy	Bleedings
CAVENT 2009+2012¹ (N=209)	Pharmacological CDT	OAC	17%	PTS @24 Mo: 41% vs. 56% (p=0.047)	3% major bleedings 5% clin. rel. bleedings
TORPEDO 2010+2012² (N=183)	Pharmacological CDT + Pharmaco-mechanical CDT	OAC	30%	PTS @6 Mo: 3% vs. 27% (p<0.001)	2% bleedings
ATTRACT 2017³ (N=692)	Pharmaco-mechanical CDT	OAC	28%	PTS @6-24 Mo: 47% vs. 48% (p=0.56)	1.7% major bleedings
CAVA 2020⁴ (N=184)	Pharmaco-mechanical CDT	OAC	45%	PTS @12 Mo: 29% vs. 35% (p=0.42)	5% major bleedings

Leitlinien

Stevens SM et al. Chest 2021;160(6):e545-e608

ACCP

OFFICIAL PUBLICATION OF THE AMERICAN COLLEGE OF CHEST PHYSICIANS
Volume 167(6) - January 2021

- ASTHMA**
- 18 Continuous Nebulization-Induced Loss of Control in Mild to Moderate Asthma: Is Improvement of Dose-Dependent Activation
Lewy E, S. de Castro, Hernandez, et al. *et al.*
- 22 Meeting the Challenge of Identifying New Treatments for Type 2 Low Neutrophilic Asthma
Orkheim, Dubé, Longtin, et al.
- CHEST INFECTIONS**
- 36 Incidence and the Utility of Adults Hospitalized With Community-Acquired Pneumonia According to Clinical Course
Pardo-Pereira, Bernal, et al.
- 42 Shale Virus in the Democratic Republic of the Congo: Abundance and Remission Detection in Sputum, Cerebrospinal Fluid, and Bloodstream
Joh, et al.
- COPD**
- 47 Subcutaneous CPAP by Using Visual and Quantitative CT Imaging Features
Johansson, et al.
- CRITICAL CARE**
- 61 Burden of Subcutaneous Abused Medication in the Hospital
Dodd, et al.
- 67 Plasma Pilocarpine and DNA Levels Are Associated With WBCs in Systemic Sclerosis Patients
Chen, et al.
- DEEP-VEIN DISEASE**
- 89 Right Ventricular to Left Ventricular Ratio at CT Pulmonary Angiography Predicts Mortality in Interstitial Lung Disease
Hirose, et al.
- EDUCATION AND CLINICAL PRACTICE**
- 99 Accuracy of Several Lung Ultrasound Methods for the Diagnosis of Acute Pleural Effusion in the ED: A Prospective Study
Kawachi, et al.
- 121 The Neurokinin-1 Receptor Antagonist Aprepitant Is a Novel Anticancer Therapy for Ovarian, Endometrial, and Cervical Cancers: A Phase 2 Trial Study (GOLAND-2)
Sakuma, et al.
- PULMONARY AND CARDIOVASCULAR**
- 151 Impact of the New Pulmonary Hypertension Definition on Heart Transplant Outcomes: Expanding the Transplantable Risk Profile
Baker, et al.
- 162 Anticoagulation Initiation of the WIFIN-2.0 Risk Score With the Australian and New Zealand Pulmonary Hypertension Registry Cohort
Baker, et al.
- SLEEP**
- 173 Upper Airway Stimulation on Positive Airway Pressure Impact on BP and Sleep-Related Symptoms in OSA
Foster, et al.
- 184 Sleep-Disordered Breathing for Gestational Sleep Disorders in Pregnancy and Lactation
Wong, et al.
- THORACIC ONCOLOGY**
- 198 A Randomized Trial of Intracavitary Cryoablation Versus Thoracotomy for Stage IV Lung Cancer: A Randomized Trial
Hirsh, et al.
- 212 Quality of Life in Patients With Lung Cancer in the United States
Hirsh, et al.

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ELSEVIER

Thrombolytic and mechanical interventions in acute DVT

PICO Question:

Should thrombolytic, mechanical, or pharmaco-mechanical interventions vs. anticoagulant therapy alone be given to patients with acute deep vein thrombosis?

Guidance Statement:

6. In patients with acute DVT of the leg we suggest anticoagulant therapy alone over interventional (thrombolytic, mechanical, or pharmaco-mechanical) therapy (weak recommendation, moderate-certainty evidence).

Leitlinien

Mazzolai L et al. Eur J Prev Cardiol 2022;29(8):1248-63

ESC

Second consensus document on diagnosis and management of acute deep vein thrombosis: updated document elaborated by the ESC Working Group on aorta and peripheral vascular diseases and the ESC Working Group on pulmonary circulation and right ventricular function

Lucia Mazzolai^{1*}, Walter Ageno², Adriano Alatri³, Rupert Bauersachs^{3,4}, Cecilia Becattini⁵, Marianne Brodmann⁶, Joseph Emmerich⁷, Stavros Konstantinides^{4,8}, Guy Meyer¹, Saskia Middeldorp⁹, Manuel Monreal¹⁰, Marc Righini¹¹, and Victor Aboyans¹²

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Received 19 October 2020; revised 22 February 2021; accepted 2 May 2021; accepted 7 May 2021

This consensus document is proposed to clinicians to provide the whole spectrum of deep vein thrombosis management as an update to the 2017 consensus document. New data guiding decisions in including extended anticoagulation, management of patients with cancer, and prevention and management of postthrombotic syndrome are presented. More data on benefit and safety of non-vitamin K antagonists oral anticoagulants are highlighted, along with the arrival of new antidotes for severe bleeding management.

Keywords: Consensus • Deep vein thrombosis • Unbound • Anticoagulation • Diagnostics • Pulmonary embolism • Cancer • Postthrombotic syndrome • Catheter-directed thrombolysis • Pregnancy • Risk • Compression

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ies). In light of these results, there is no clear benefit of systematic acute proximal DVT reperfusion. Hence, CDT should not be performed routinely. It can be reserved for very severe cases, such as phlegmasia cerulea dolens (*Figure 3*).

Leitlinien

Kakkos SK et al. Eur J Vasc Endovasc Surg 2021;61(1):9-82

ESVS

CLINICAL PRACTICE GUIDELINE DOCUMENT

European Society for Vascular Surgery (ESVS) 2021 Clinical Practice Guidelines on the Management of Venous Thrombosis^{1,2}

Stavros K. Kakkos^{1,2,3}, Marijn Gohel^{4,5}, Niels Baekgaard⁶, Rupert Bauwens⁷, Serg Bellmunt-Montoya⁸, Stephen A. Black⁹, Arina J. ten Cate-Hoek¹⁰, Ismael Gallani¹¹, Florian K. Enzmann¹², George Gioulakos¹³, Anders Gottschäfer¹⁴, Beverley J. Hunt¹⁵, Armando Manóu¹⁶, Andrew N. Nicolaides¹⁷, Per Morten Sandset¹⁸, Gerard Stansby¹⁹

ESVS Guidelines Committee²⁰, Gert J. de Borst, Frederico Bastos Gonçalves, Nabil Chahfá, Robert Hinchliffe, Philippe Kolh, Igor Koncar, Jes S. Lindholt, Rikita Tulum, Christopher P. Twine, Frank Vermassen, Anders Wartholm

Document reviewers²¹: Marianne G. De Maesseneer, Anthony J. Comerota, Petar Govicki, Mariëke J.H.A. Krul, Manuel Monreal, Paolo Prandoni, Melina Vega de Caceres

DEDICATION

These guidelines are dedicated to the memory of Dr Olive Keaton of McMaster University in Hamilton, Ontario, Canada. Dr Keaton extensively reviewed the first and second versions of the manuscript and he was always very punctual. In the first review round he submitted a review of 16 pages with many detailed and helpful comments. Unaware of his illness, we invited him to review the final version of the guidelines on June 2, 2020, but sadly he passed away one day later, on June 3, 2020. We will always remember Dr Keaton for his many contributions to the field of Thrombosis and Antithrombotic Treatment, including these guidelines.



Dr. Olive Keaton
1957–2020

Picture reproduced with permission from Wells J & Bates SM. Obituary for Dr. Olive Keaton. *J Thromb Haemost* 2020;18:2783–2784.

¹ For a full list of the authors' affiliations, please refer to Appendix.

² Writing Committee: Stavros K. Kakkos (Chair, Paris, France), Marijn Gohel (co-chair, Cambridge and London, UK), Niels Baekgaard (Copenhagen, Denmark), Rupert Bauwens (Darmstadt, Germany), Serg Bellmunt-Montoya (Barcelona, Spain), Stephen A. Black (London, UK), Arina J. ten Cate-Hoek (Maastricht, The Netherlands), Ismael Gallani (Paris, France), Florian K. Enzmann (Gallargues, Austria), George Gioulakos (Athens, Greece), Anders Gottschäfer (Malmö, Sweden), Beverley J. Hunt (London, UK), Armando Manóu (Porto, Portugal), Andrew N. Nicolaides (London, UK), and Nicolas, Olyria, Per M. Sandset (Oslo, Norway), as General Secretary (Sheffield Hallam University, UK).

³ ESVS Guidelines Committee: Gert J. de Borst (chair, The Netherlands), Frederico Bastos Gonçalves (Lisbon, Portugal), Nabil Chahfá (Strasbourg, France), Robert Hinchliffe (Oxford, UK), Philippe Kolh (Gene, Belgium), Igor Koncar (Belgrade, Serbia), Jes S. Lindholt (Odense, Denmark), Rikita Tulum (Tulsa, Oklahoma, USA), Christopher P. Twine (Oxford, UK), Frank Vermassen (Leuven, Belgium), and Anders Wartholm (Oslo, Norway).

⁴ Document reviewers: Marianne G. De Maesseneer (Antwerp, The Netherlands), Anthony J. Comerota (Alexandria, VA, USA), Peter Glavakis (Stuttgart, Germany), Mariëke J.H.A. Krul (Groningen, The Netherlands), Manuel Monreal (Barcelona and Madrid, Spain), Paolo Prandoni (Padova, Italy), Melina Vega de Caceres (Galdakao and Barakaldo, Spain).

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Email address: skakkos@vsn.be (Stavros K. Kakkos).
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<https://doi.org/10.1016/j.ejvs.2020.09.023>

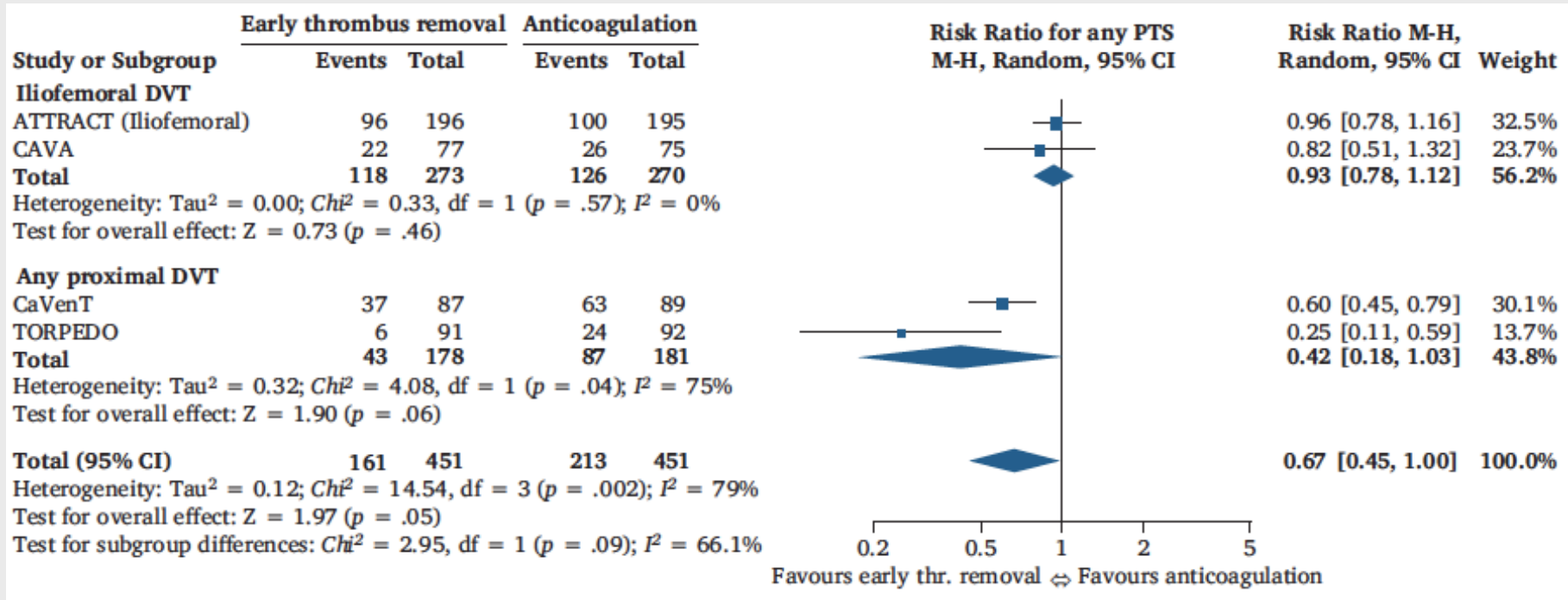
In selected patients with symptomatic iliofemoral deep vein thrombosis, early thrombus removal strategies should be considered.

Meta-Analyse der RCTs

Kakkos SK et al. Eur J Vasc Endovasc Surg 2021;61(1):9-82

Intervention vs. Konservativ

Effekt auf „*any*“ PTS

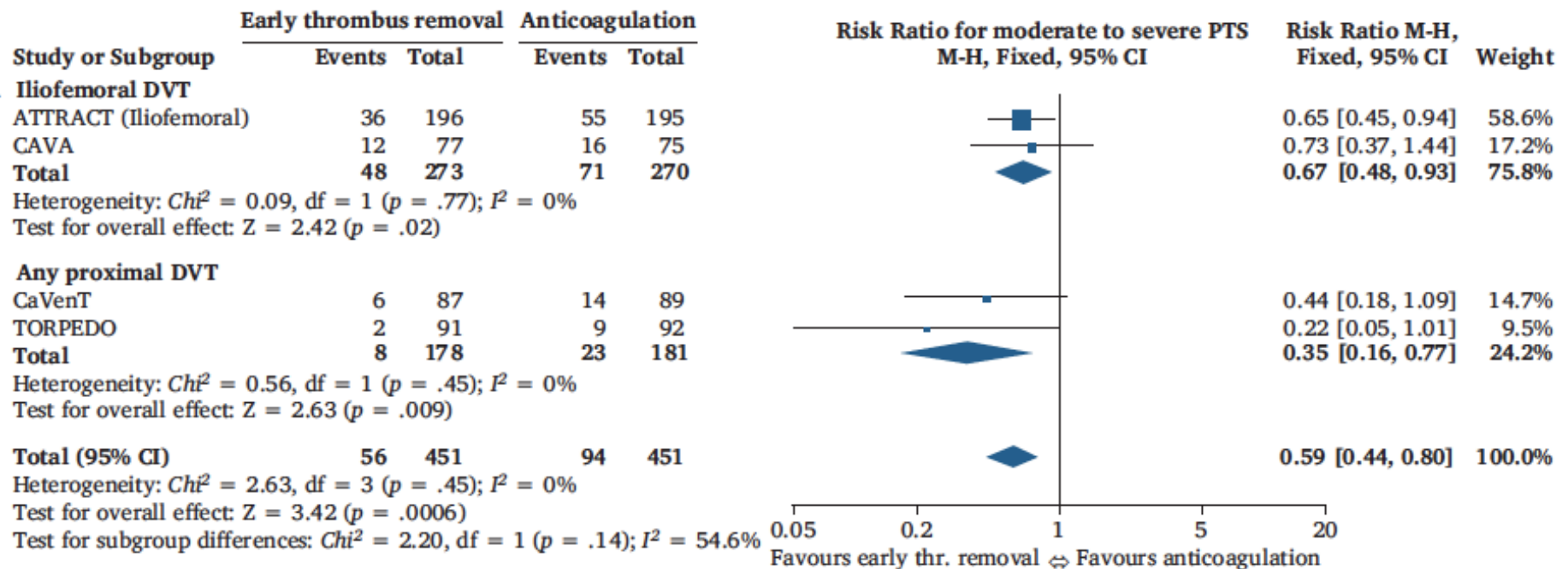


„Any PTS“: Villalta score ≥ 5

Meta-Analyse der RCTs

Kakkos SK et al. Eur J Vasc Endovasc Surg 2021;61(1):9-82

Intervention vs. Konservativ Effekt auf „*moderate to severe*“ PTS

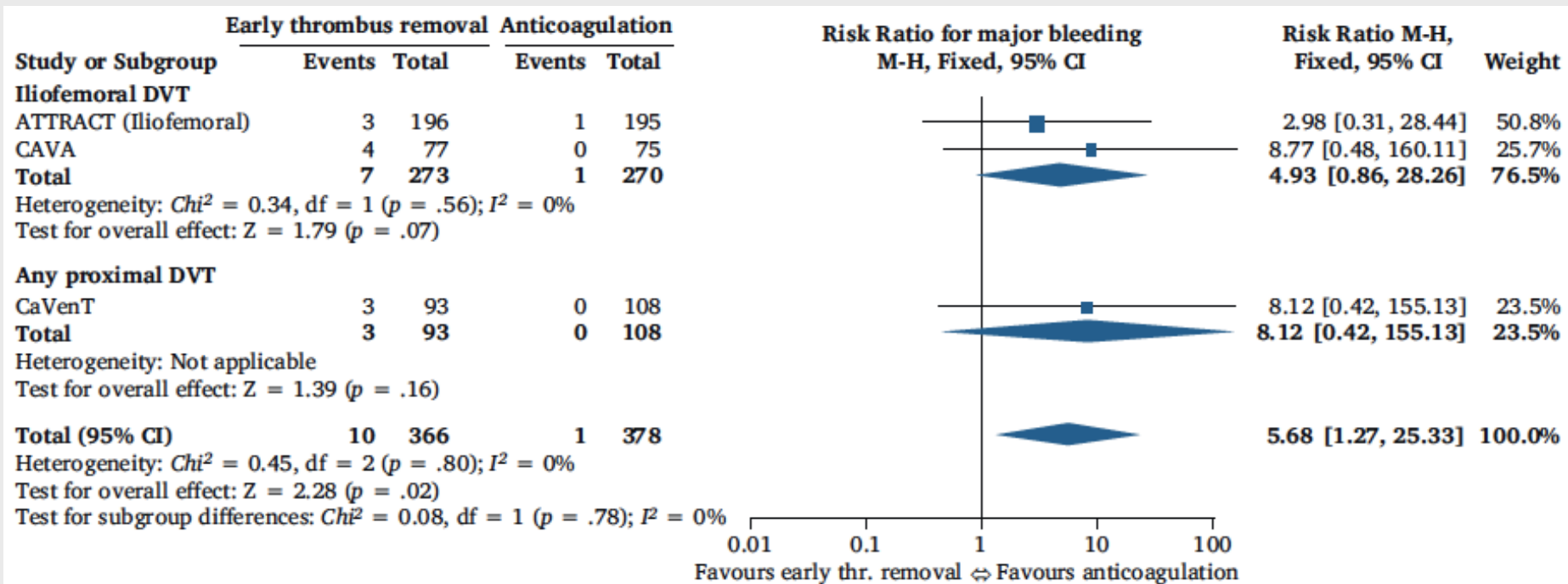


„Moderate to severe PTS“: Villalta score ≥ 10

Meta-Analyse der RCTs

Kakkos SK et al. Eur J Vasc Endovasc Surg 2021;61(1):9-82

Intervention vs. Konservativ Effekt auf *major bleeding*



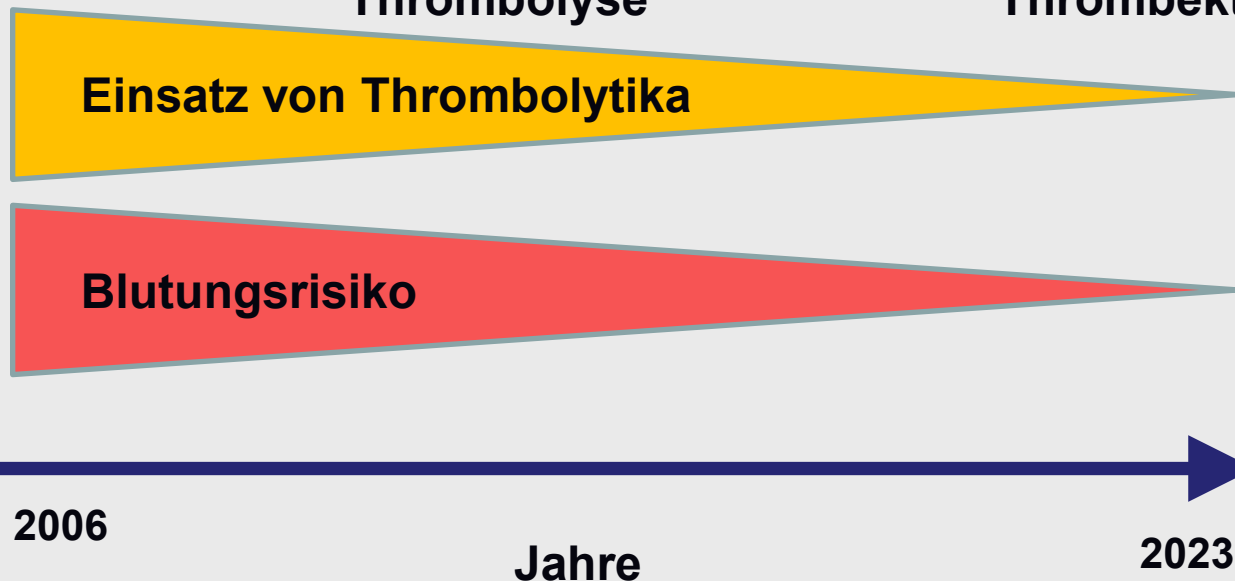
„Moderate to severe PTS“: Villalta score ≥ 10

Blutungsrisiko

Pharmakologisch
Katheter-basierte
Thrombolyse

Pharmakomechanisch
Katheter-basierte
pharmakomechanische
Thrombolyse

Mechanisch
Katheter-basierte
mechanische
Thrombektomie



Fallbeispiel TVT



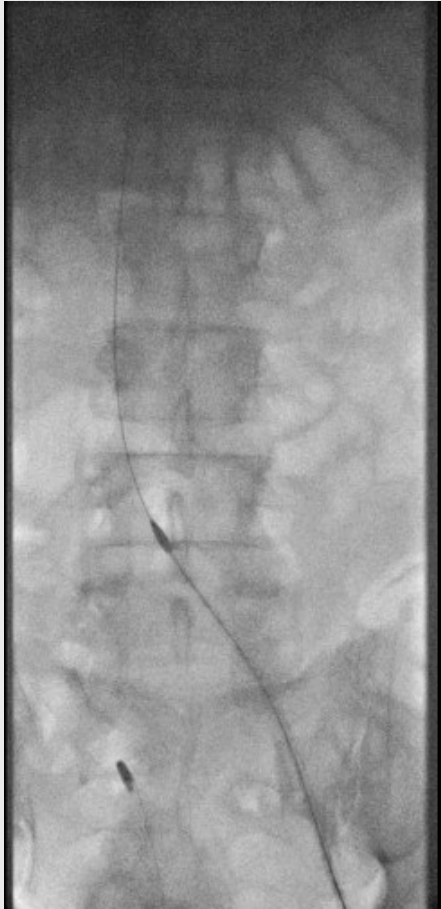
Foto: O. Schlager

Fallbeispiel TVT



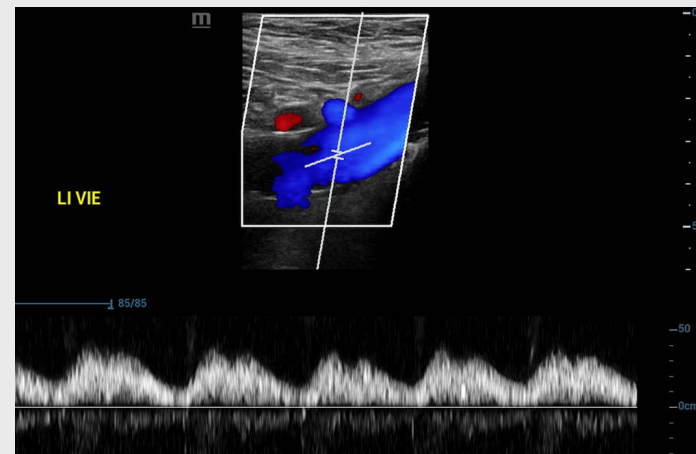
Alle Fotos dieser Folie: O. Schlager

Fallbeispiel TVT



Alle Fotos dieser Folie: O. Schlager

Fallbeispiel TVT



Alle Fotos dieser Folie: O. Schlager

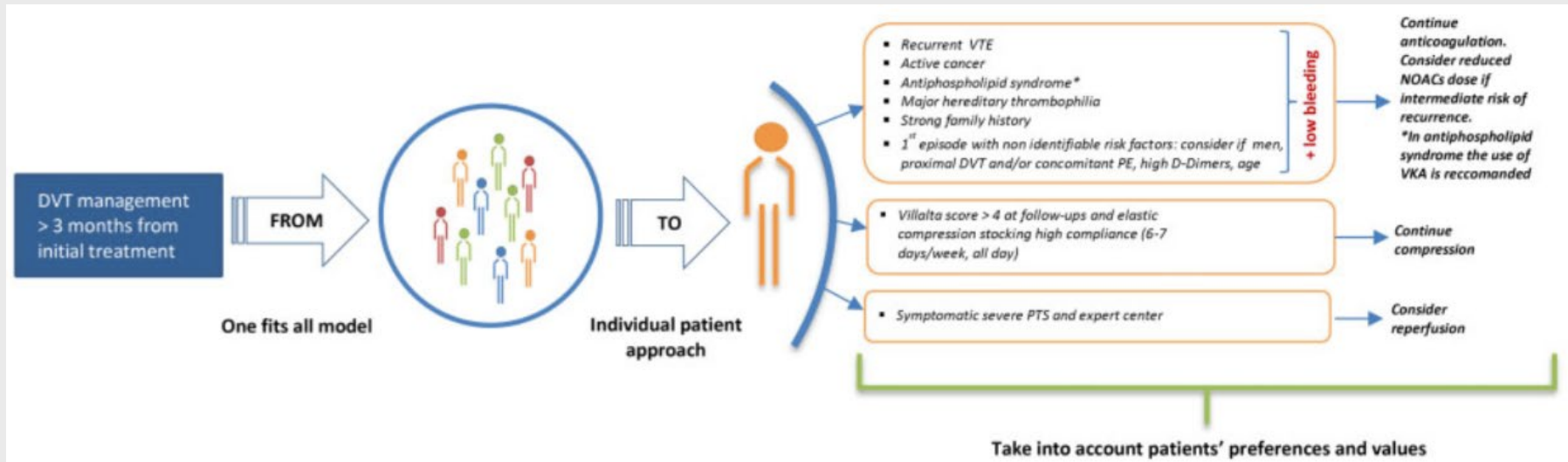
Fazit für Klinik und Praxis

Evaluation einer interventionellen Behandlung bei akuter Venenthrombose:

- Iliocavale/iliofemorale Venenthrombose

(- Anamnesedauer < 14 Tage)

(- Niedriges Blutungsrisiko)



Postthrombotisches Syndrom (PTS)

State of the Art

*De Maeseneer MG et al. Eur J Vasc Endovasc Surg 2022;63(2):184-267;
O'Donnell TF et al. J Vasc Surg 2014;60(2 Suppl):3S-59S*

ESVS

Bei Patienten mit aktiven venösen Ulzerationen oder venöser Ulkusanamnese bei zugrundeliegendem venösen Abflusshindernis (iliakal) sollte eine Stentrekanalisation in Erwägung gezogen werden (Class IIa, LOE B)

SVS/AVF

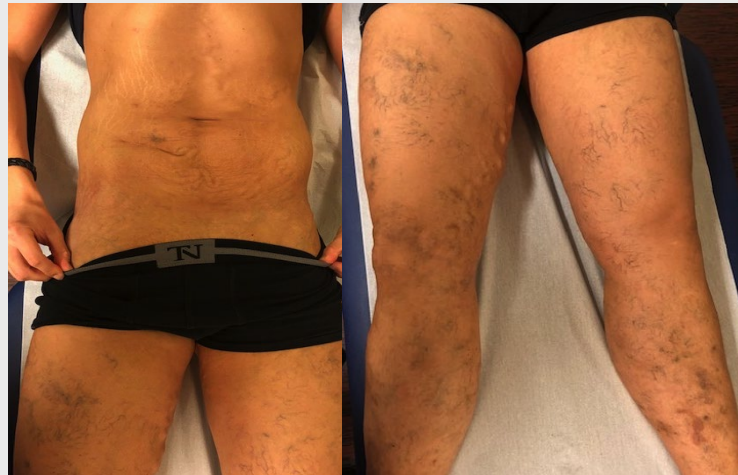
Bei Patienten mit signifikanter Stenose oder chronischem Verschluss der V. cava inferior oder der iliakalen Venen (mit oder ohne Reflux im tiefen Venensystem) sollte bei Vorliegen von Hautveränderungen mit einem Risiko für die Entstehung venöser Ulzera (C4b), abgeheilten venösen Ulzera (C5) oder aktiven venösen Ulzera (C6) eine venöse Angioplastie mit Stentimplantation als Zusatz zur Standardkompressionstherapie in Erwägung gezogen werden, um die Ulkusheilung zu unterstützen und das Auftreten neuer venöser Ulzera zu verhindern. (Class I LOE C)

Fallbeispiel PTS

37-jähriger Patient, chronischen Schmerzen, Druckgefühl und Schwellung beider Beine. Venöse Claudicatio in beiden Beinen nach 70 Metern.

FK: Thrombose der Beckenvenen rechts und der V. cava inferior vor 5 Jahren

Med.: laufende Antikoagulation seitdem (initial Phenprocoumon, zuletzt Rivaroxaban)



Fotos: O. Schlager

Fallbeispiel PTS

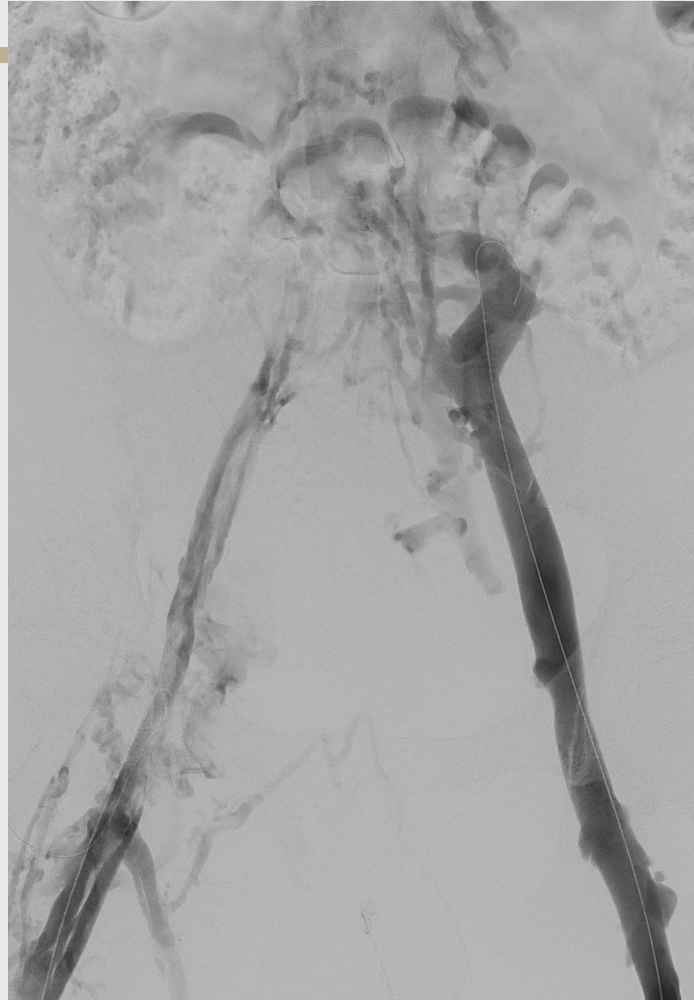
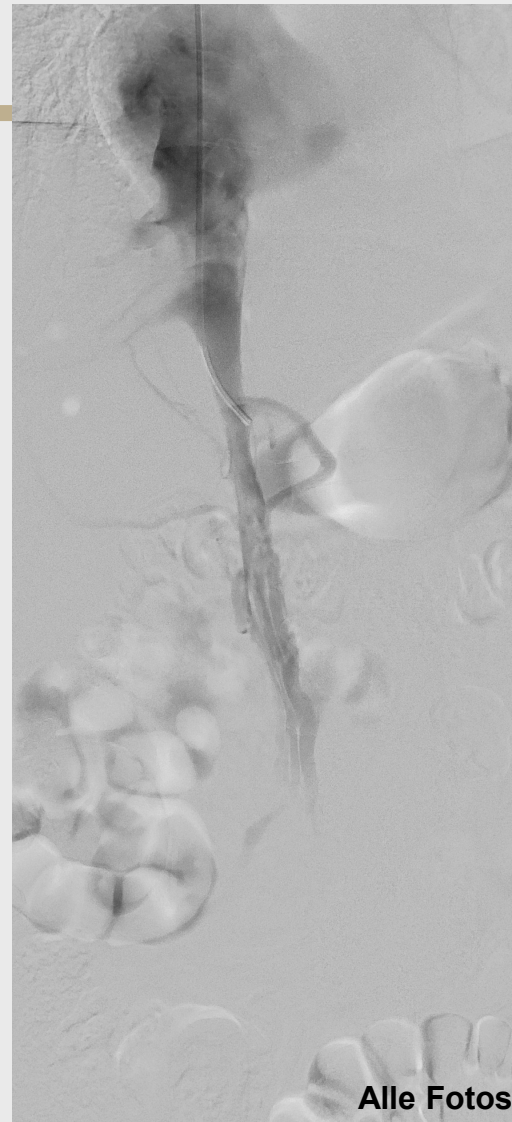


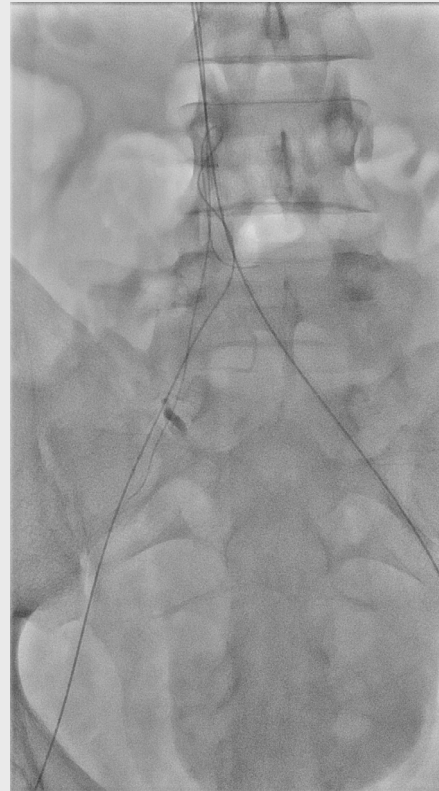
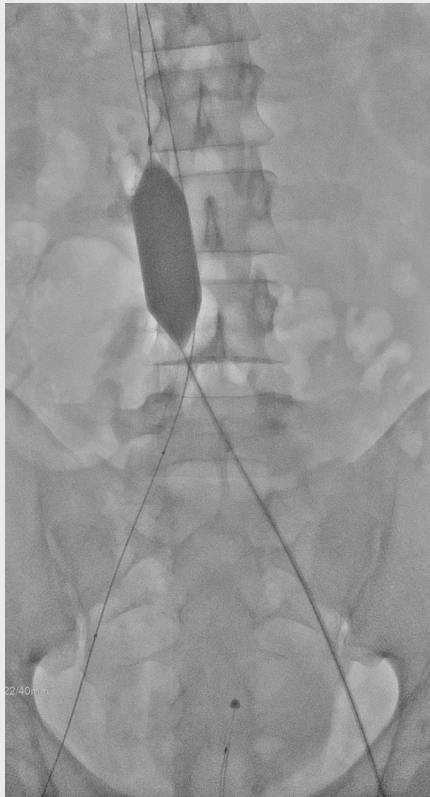
Foto: O. Schlager

Fallbeispiel PTS



Alle Fotos dieser Folie: O. Schlager

Fallbeispiel PTS



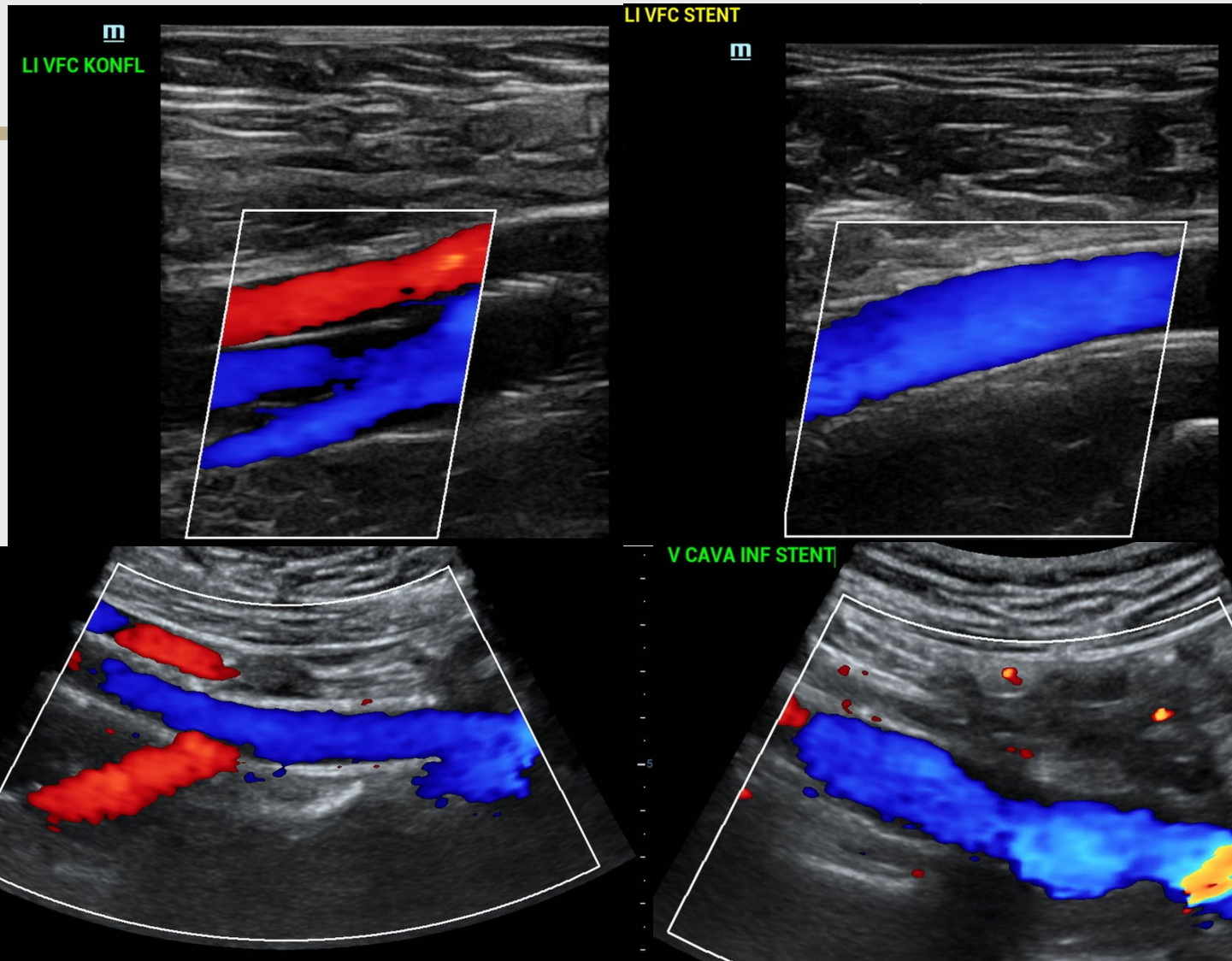
Alle Fotos dieser Folie: O. Schlager

Fallbeispiel PTS



Alle Fotos dieser Folie: O. Schlager

Fallbeispiel PTS



Alle Fotos dieser Folie: O. Schlager

Fazit für Klinik und Praxis

Evaluation einer interventionellen Behandlung bei PTS:

- Iliocavale/iliofemorale Venenläsionen
- Zur Morphologie korrelierende klinische Symptomatik
- Ausreichender Inflow über V. profunda femoris oder V. femoralis
- Keine Kontraindikation gegen eine längerfristige Antikoagulation

Nicht-thrombotische iliakale Venenläsionen (NIVL)

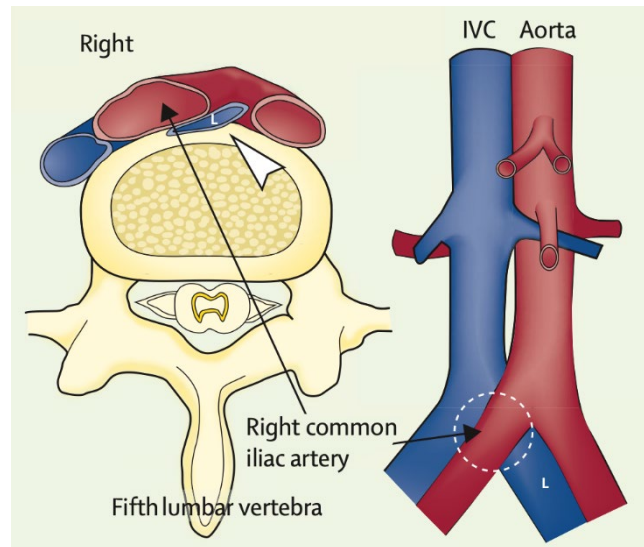
May-Thurner-Syndrom

May R, Thurner J. Angiology 1957;8(5):419-27

Ho AMH et al. Lancet 2019;394(10208):e33

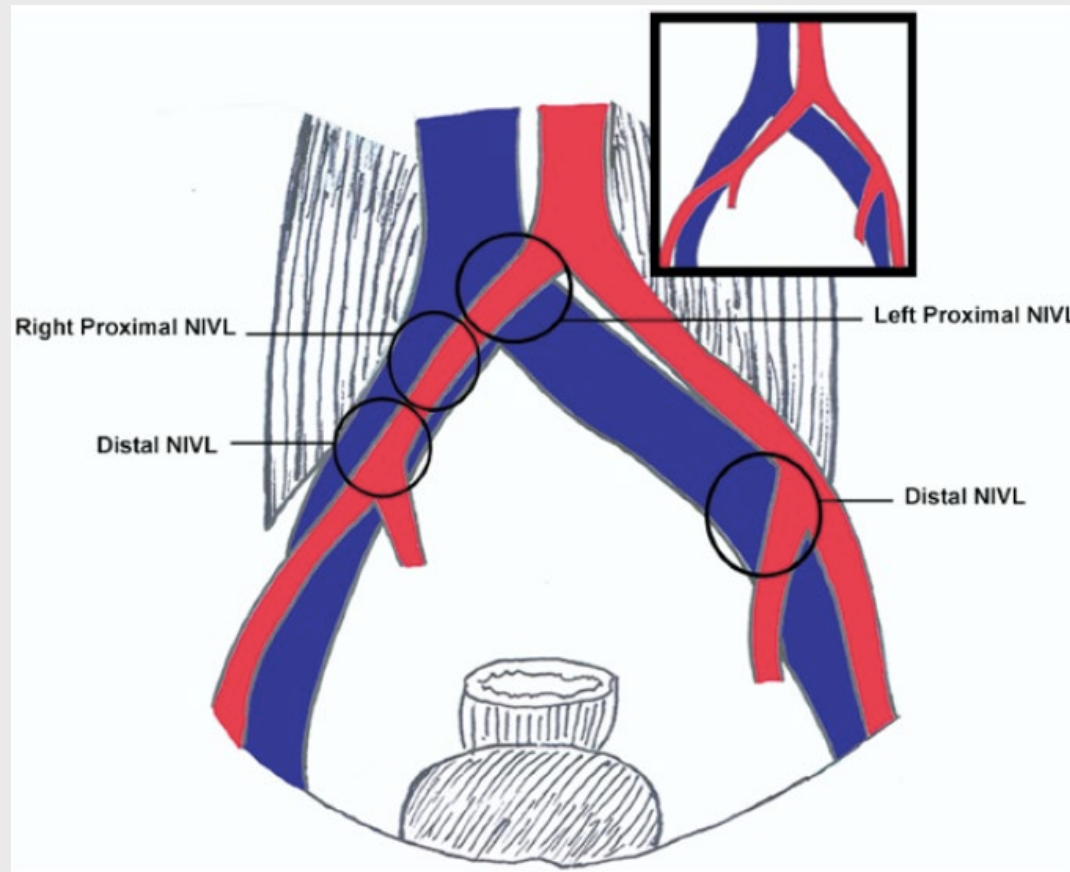
THE CAUSE OF THE PREDOMINANTLY SINISTRAL OCCURRENCE OF THROMBOSIS OF THE PELVIC VEINS¹

R. MAY, M.D., AND J. THURNER, M.D.



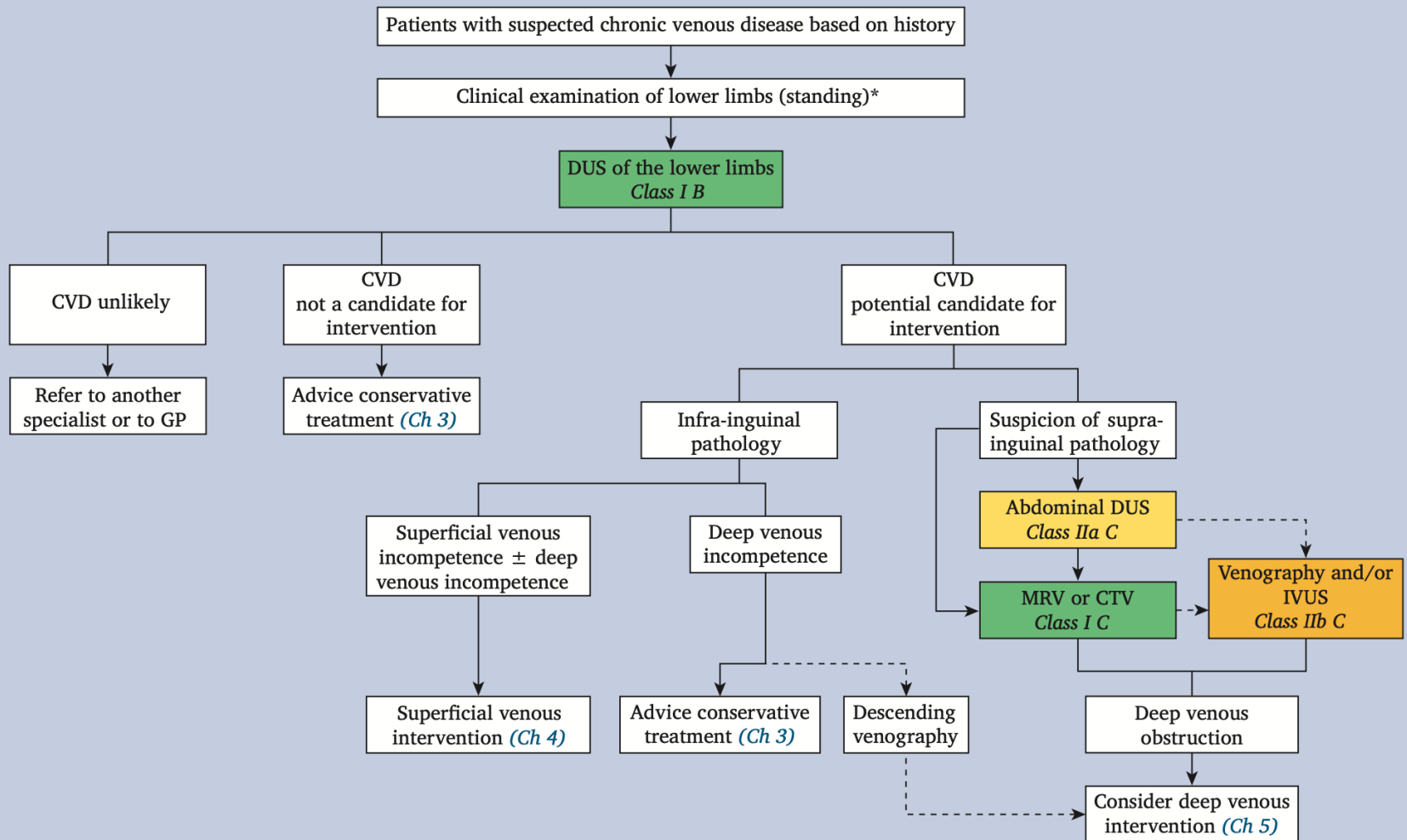
NIVL

Raju S et al. J Vasc Surg 2006;44:136-44



Diagnostik

De Maeseneer MG et al. Eur J Vasc Endovasc Surg 2022;63(2):184-267

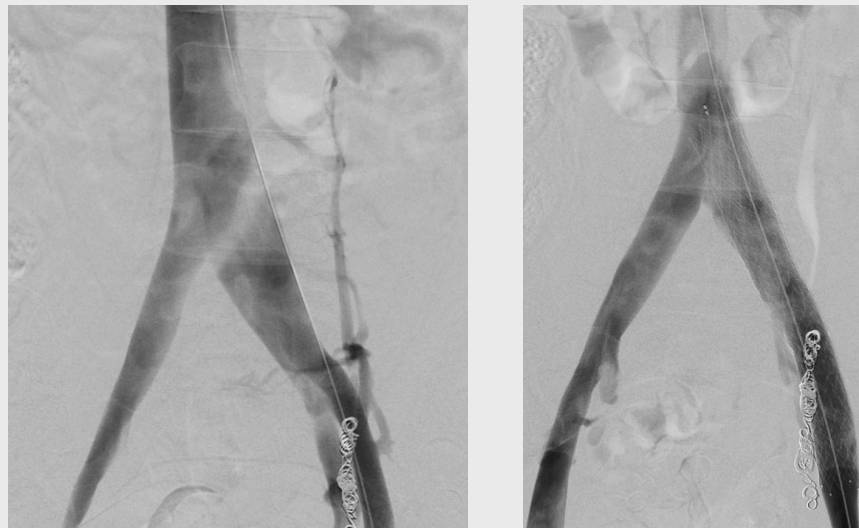


Fallbeispiel NIVL

32 jährige Frau mit chronischer Beinschwellung und Schmerzen links sowie linksseitigem Unterbauchschmerz

Vorgeschichte: coiling der linken V. ovarica (extern).

Keine Vorgeschichte venöser Thrombosen



Fotos: O. Schlager

Fazit für Klinik und Praxis

Evaluation einer interventionellen Behandlung bei NIVL:

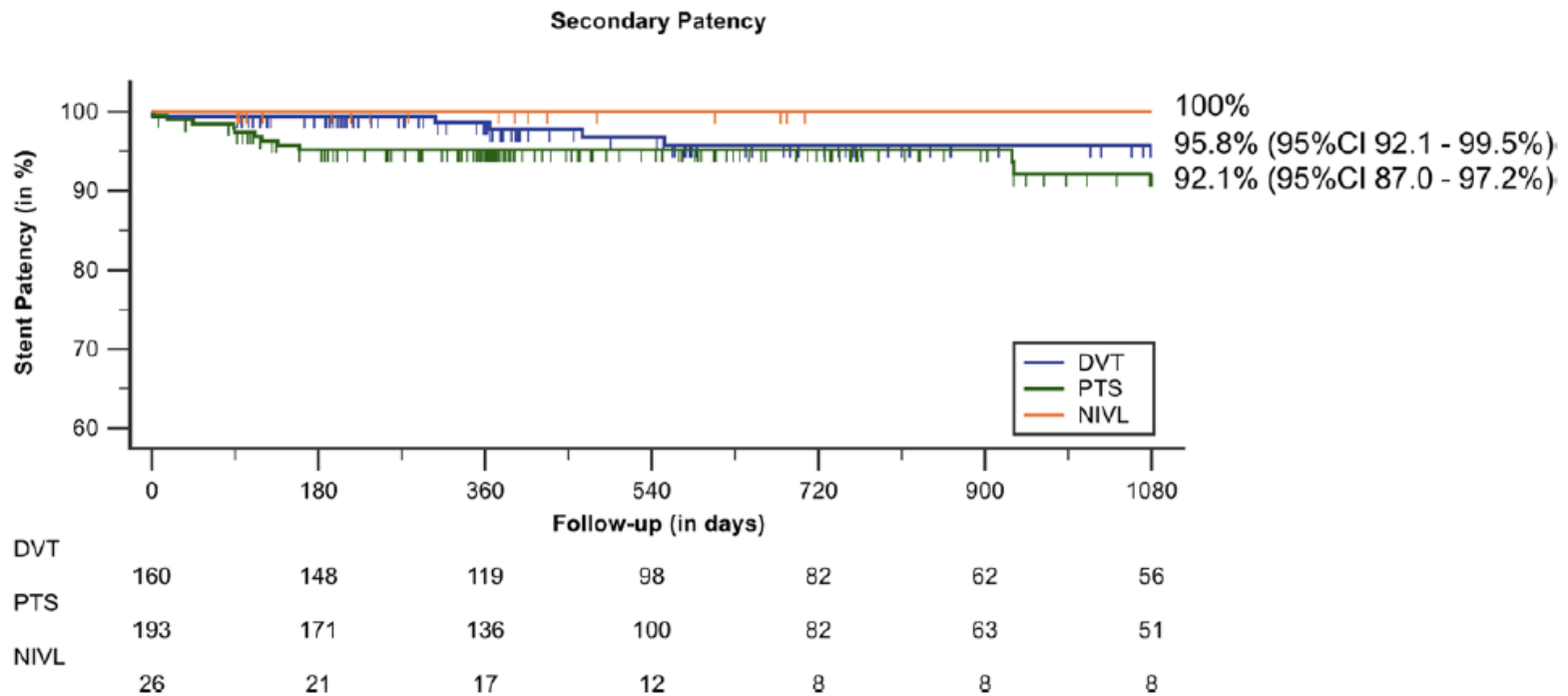
- NIVL-Morphologie ist häufig
- Intervention NUR bei entsprechender Klinik (und Schweregrad)
- Keine Kontraindikation gegen eine Antikoagulation

Nachbehandlung nach Venenstent

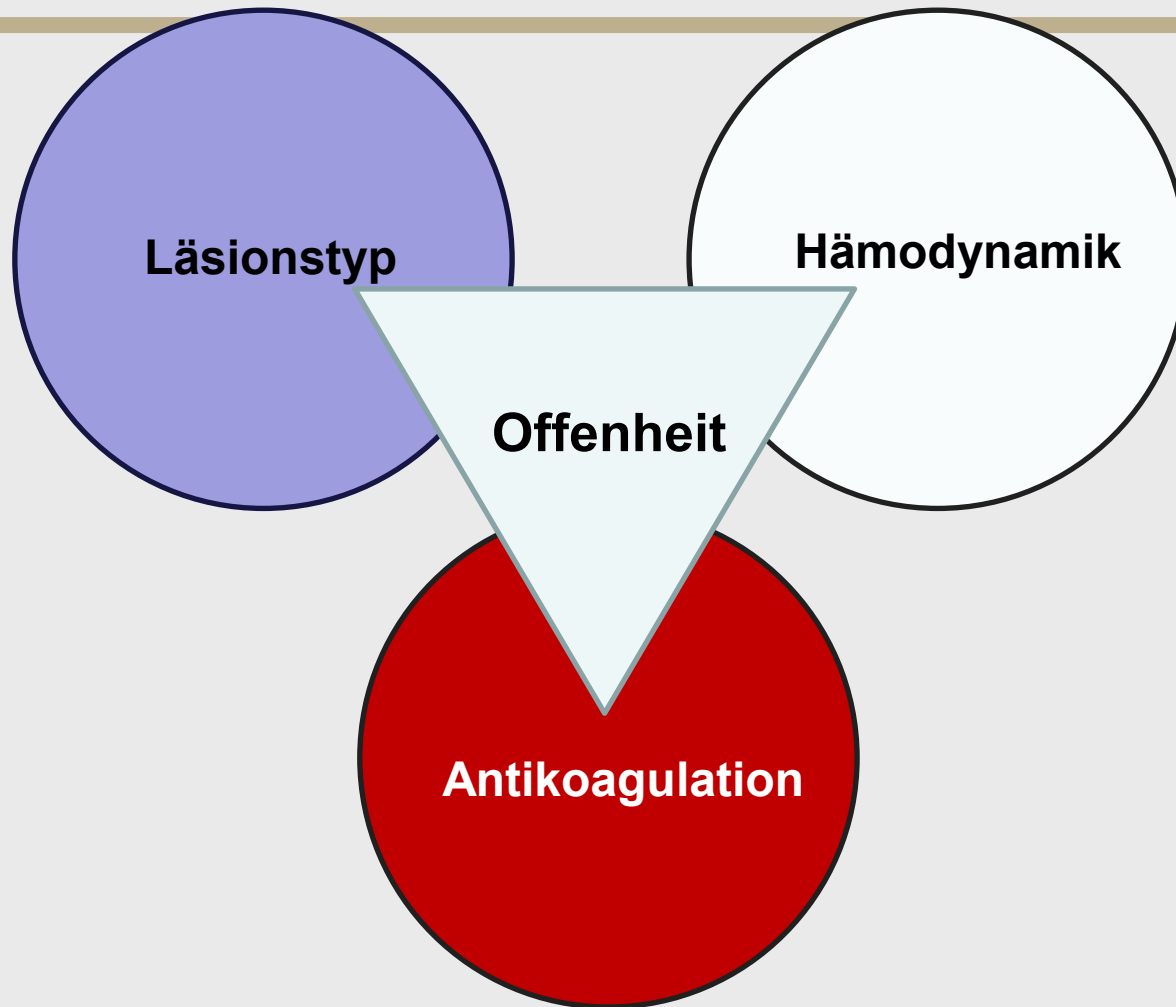
Stent-Offenheitsraten

Sebastian T et al. Circ Cardiovasc Interv 2020;13(12):e009673

Swiss Venous Stent Register: 379 Patienten (26 NIVL)



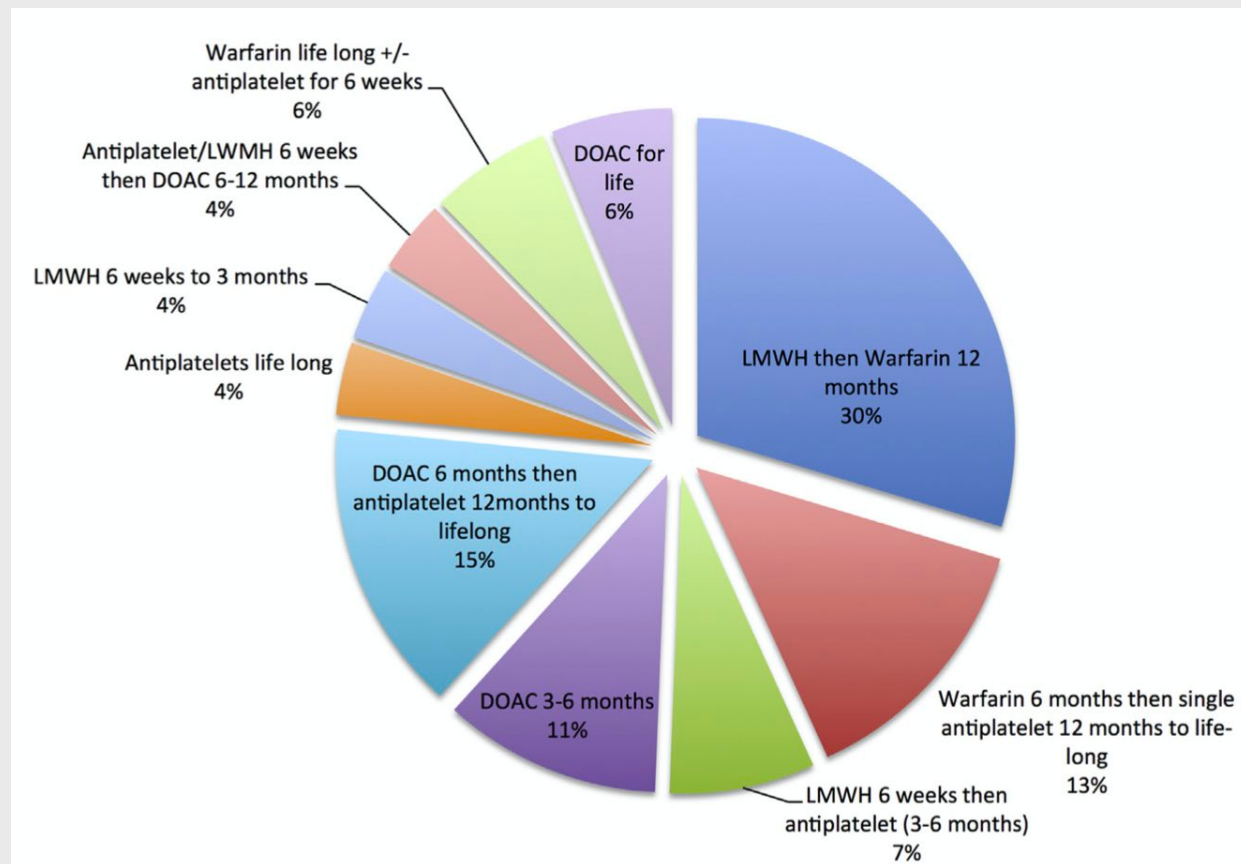
Stent-Offenheit



Antithrombotische Therapie

Milinis K et al. Eur J Vasc Endovasc Surg 2018;55(6):537-44

TVT



Antithrombotische Therapie

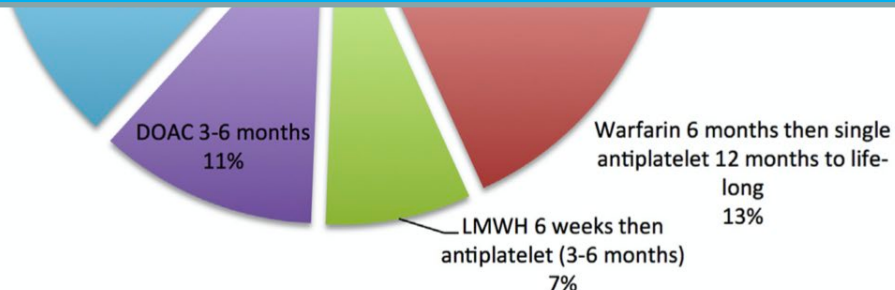
Milinis K et al. Eur J Vasc Endovasc Surg 2018;55(6):537-44

TVT



Consensus für Stenting nach TVT

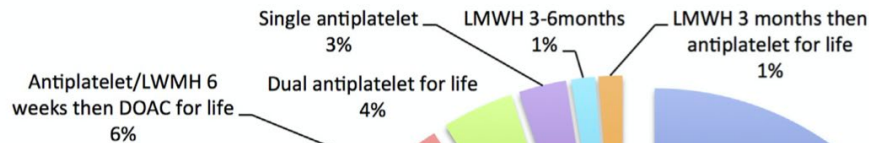
- Antikoagulation für 6-12 Monate (VKA oder DOAC)
- Antikoagulationsregime an VTE-Regime anpassen



Antithrombotische Therapie

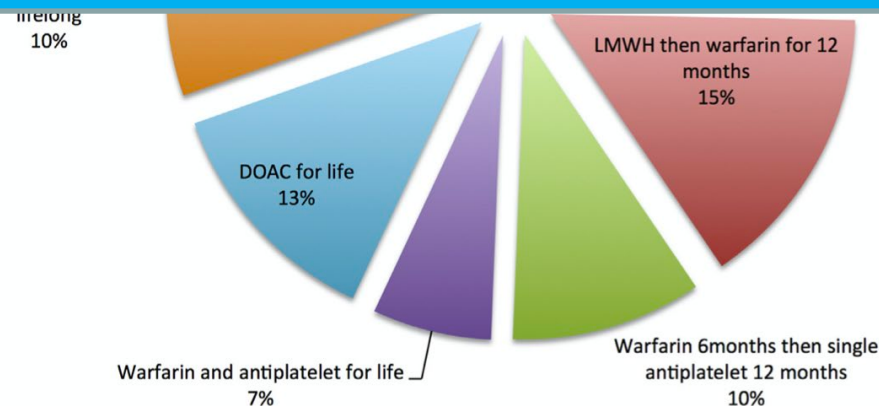
Milinis K et al. Eur J Vasc Endovasc Surg 2018;55(6):537-44

PTS



Consensus für Stenting bei PTS

- >50% dauerhafte Antikoagulation



Antithrombotische Therapie

Milinis K et al. Eur J Vasc Endovasc Surg 2018;55(6):537-44

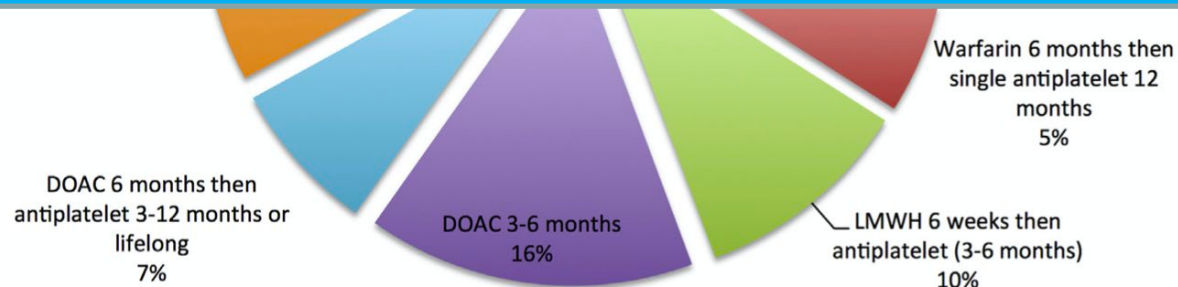
NIVL

Antiplaetlet/LWMH 6 weeks
then DOAC 6-12 months 9%

Warfarin 6 months then
antiplatelet lifelong 3%

Consensus für Stenting bei NIVL

- Antikoagulation für 6 Monate (VKA oder DOAC)
- (Plättchenhemmer nach Beendigung der OAK)



Nachkontrolle

*De Maeseneer MG et al. Eur J Vasc Endovasc Surg 2022;63(2):184-267;
Sebastian T et al. Eur J Vasc Endovasc Surg 2020;60(3):443-50*

Empfehlung 62

Bei Patienten, die sich einer endovaskulären oder chirurgischen Rekonstruktion einer Beckenvenenobstruktion unterziehen, wird eine Duplex-Ultraschallüberwachung einen Tag und zwei Wochen nach dem Eingriff sowie danach in regelmäßigen Abständen empfohlen. (Class I, LOE C, Consensus)

Empfehlung 63

Bei Patienten mit einer Beckenvenenobstruktion wird eine Behandlung durch ein multidisziplinäres Team empfohlen. (Class I, LOE C, Consensus)

Nachkontrolle

**De Maeseneer MG et al. Eur J Vasc Endovasc Surg 2022;63(2):184-267;
Sebastian T et al. Eur J Vasc Endovasc Surg 2020;60(3):443-50**

Empfehlung

Bei Patienten

Rekonstruk

Duplex-Ultr

Eingriff so

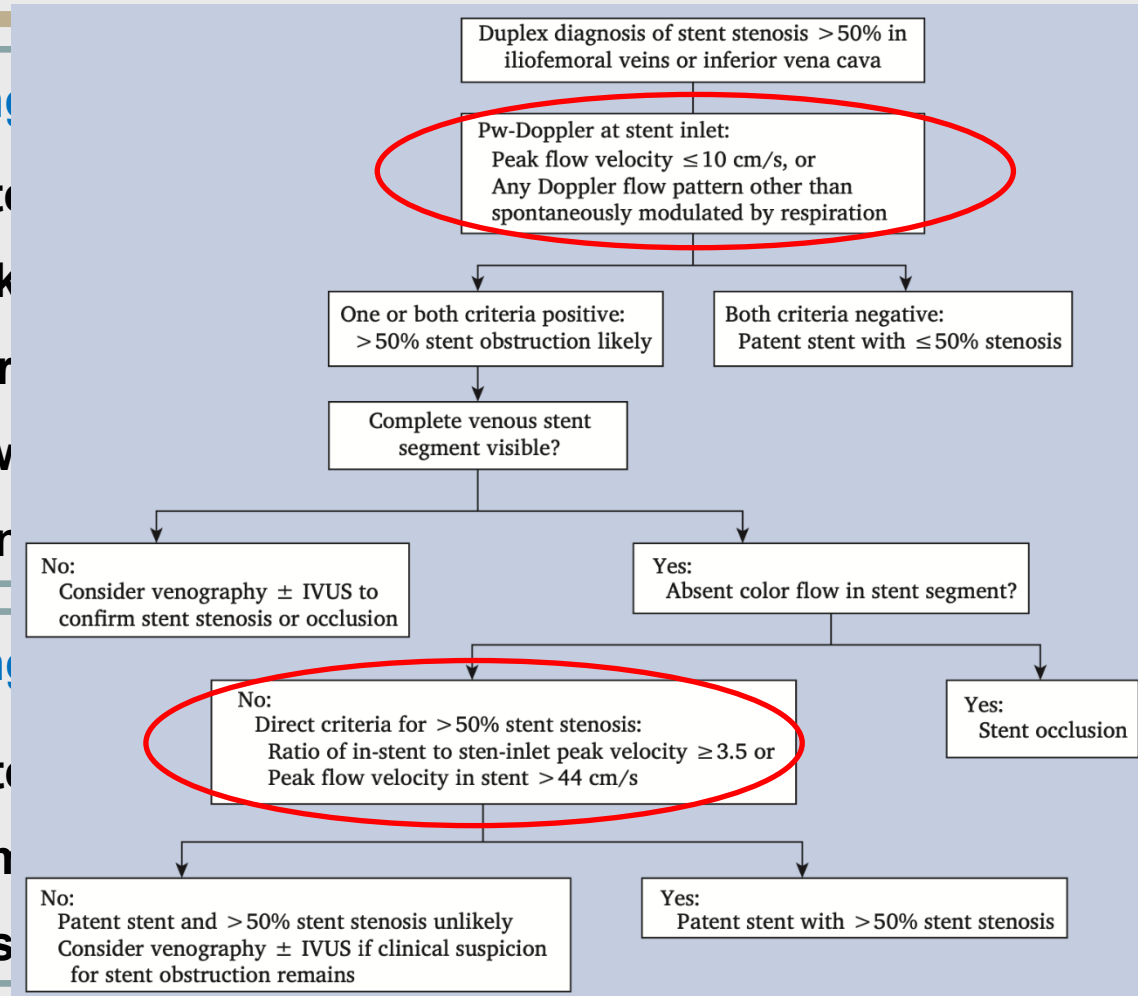
LOE C, Cor

Empfehlung

Bei Patienten

durch ein n

Consensus



nen

wird eine

nach dem

(Class I,

handlung

Fazit für Klinik und Praxis

- Antikoagulation für zumindest 6 Monate (TVT, NIVL)
- Bei PTS und längerstreckigem Stenting: längerfristige Antikoagulation
- Regelmäßige duplexsonographische und klinische Nachkontrollen