EUROPEAN SOCIETY FOR VASCULAR SURGERY (ESVS) 2023 CLINICAL PRACTICE GUIDELINES ON ANTITHROMBOTIC THERAPY FOR VASCULAR DISEASES

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ESVS 2023 ANTITHROMBOTIC GUIDELINES

- The ESVS 2023 antithrombotic guideline is a new guideline
- Four Major recommendation sections: Measurement of antithrombotic effect; Antithrombotics for patients with arterial disease; Antithrombotics for patients with venous disease; Congenital vascular malformation
- Deigned to be user friendly
- Flowcharts for conditions with multiple recommendations
- Table to compare this guideline recommendations with other guidelines, especially for areas of overlap with other ESVS guidelines

ESVS 2023 ANTITHROMBOTIC GUIDELINES

New or updated studies for the ESVS 2023 antithrombotic guideline

- *Four systematic reviews were created for the guideline:*
  - Zlatanovic P, et al. A Systematic Review and Meta-Analysis on the Impact of High On-Treatment Platelet Reactivity on Clinical Outcomes for Patients Taking ADP Receptor Inhibitors Following Lower Limb Arterial Endovascular Intervention. Eur J Vasc Endovasc Surg. 2022;63(1):91-101.
  - Wong KHF, et al. Antithrombotic therapy for aortic and peripheral artery aneurysms: a systematic review and meta-analysis. Eur J Vasc Endovasc Surg. 2022;64:544-56
  - Ambler GK, et al. Network Meta-analysis of the Benefit of Aspirin with Rivaroxaban vs. Clopidogrel for Patients with Stable Symptomatic Lower Extremity Arterial Disease. Eur J Vasc Endovasc Surg. 2021;62(4):654-5.
  - Ahmed H, et al. Editor's Choice - Antithrombotics in Atherosclerotic Renal and Mesenteric Arterial Disease: A Systematic Review. Eur J Vasc Endovasc Surg. 2023;66(1):138-9.
- *As there was no scoring system for the risk of bleeding for patients with PAD the first steps were taken to derive one:*
  - Behrendt CA, et al. The OAC3-PAD risk score predicts major bleeding events at one year after hospitalisation for peripheral artery disease. Eur J Vasc Endovasc Surg. 2022;63(3):503-10
- *A Cochrane review update was triggered by the process of the guideline:*
  - Mohamed I, et al. Medical adjuvant treatment to increase patency of arteriovenous fistulae and grafts. Cochrane Database Syst Rev. 2021;7(7):Cd002786

LEVEL OF EVIDENCE

Level of evidence A	Data derived from multiple randomized clinical trials or meta-analyses.
Level of evidence B	Data derived from a single randomized clinical trial or large non-randomized studies.
Level of evidence C	Consensus of opinion of the experts and/or small studies, retrospective studies, registries.

CLASSES OF RECOMMENDATION

Classes of recommendations	Definition	Suggested wording to use
Class I	Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.	Is recommended.
Class II	Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure.	
Class IIa	*Weight of evidence/opinion is in favour of usefulness/efficacy.*	Should be considered.
Class IIb	*Usefulness/efficacy is less well established by evidence/opinion.*	May be considered.
Class III	Evidence or general agreement that the given treatment or procedure is not useful/effective, and in some cases may be harmful.	Is not recommended.

RISK BALANCE WHEN PRESCRIBING ANTITHROMBOTICS

RISK BALANCE

- All patients being prescribed antithrombotics are at a risk of major bleeding as a result
- The stronger the antithrombotic the higher the risk
- There are no validated risk scores for PAD to quantify this risk
- There is randomised evidence to support proton pump inhibitor therapy reducing this risk for patients with a history of upper GI tract lesions

RISK BALANCE

Behrendt CA | christianbehrendt.net | @VASCevidence

Twine CP, Kakkos SK, Aboyans V, Baumgartner I, Behrendt CA, Bellmunt-Montoya S, Jilma B, Nordanstig J, Saratzis A, Reekers JA, Zlatanovic P.
European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on Antithrombotic Therapy for Vascular Diseases.
2023;In Press. https://doi.org/10.1016/j.ejvs.2023.03.042

I C

How can we predict the individual risk of bleeding in everyday clinical practice setting?

Lower Extremity PAD

HEMOR²RHAGES
Heart failure
Liver insufficiency
Myocardial infarction
Hypertension
Anaemia
Diabetes
Age
ACCP
Alcohol
mOBRI
History of bleeding
HAS-BLED
REACH
Cancer
Kidney failure
ARC-HBR
Drug abuse
PAD
Stroke
ATRIA
Trauma surgery
PE-CH
NSAIDs
RIETE
Antithrombotics

All scores were developed & validated (if at all) on cardiac populations (e.g., atrial fibrillation)

RISK BALANCE

Recommendation	Class	Level
Patients being prescribed antithrombotic therapy are recommended to have a bleeding risk assessment performed to aid shared decision making.	I	C
Patients with a modifiable risk of bleeding being prescribed antithrombotic therapy are recommended to have adequate management to limit the corresponding bleeding risk.	I	C
Patients taking antithrombotic therapy with a history of upper digestive tract lesions, or who are at higher risk of gastrointestinal bleeding, should be considered for proton pump inhibitor therapy to reduce the risk of gastrointestinal bleeding.	IIa	C

MEASUREMENT OF ANTITHROMBOTIC EFFECT

MEASUREMENT OF ANTITHROMBOTIC EFFECT

- Monitoring of function or effect is possible with many antithrombotics
- Antiplatelet function assessment has weak evidence supporting use
  - Adjusting antiplatelet agents base on function testing for coronary artery disease has weak evidence of effectiveness in meta-analysis
- Heparin and vitamin K antagonists have better evidence
  - Higher APTT values are associated with more major bleeding

MEASUREMENT OF ANTITHROMBOTIC EFFECT

Recommendation	Class	Level
Patients receiving unfractionated heparin infusions are recommended to have the activated partial thromboplastin time or activated partial thromboplastin time ratio monitored to reduce the risk of bleeding.	I	C
Patients undergoing open or endovascular arterial intervention being administered a bolus of unfractionated heparin may be considered for activated partial thromboplastin time, activated partial thromboplastin time ratio or activated clotting time monitoring as a measure of anticoagulation.	IIb	C

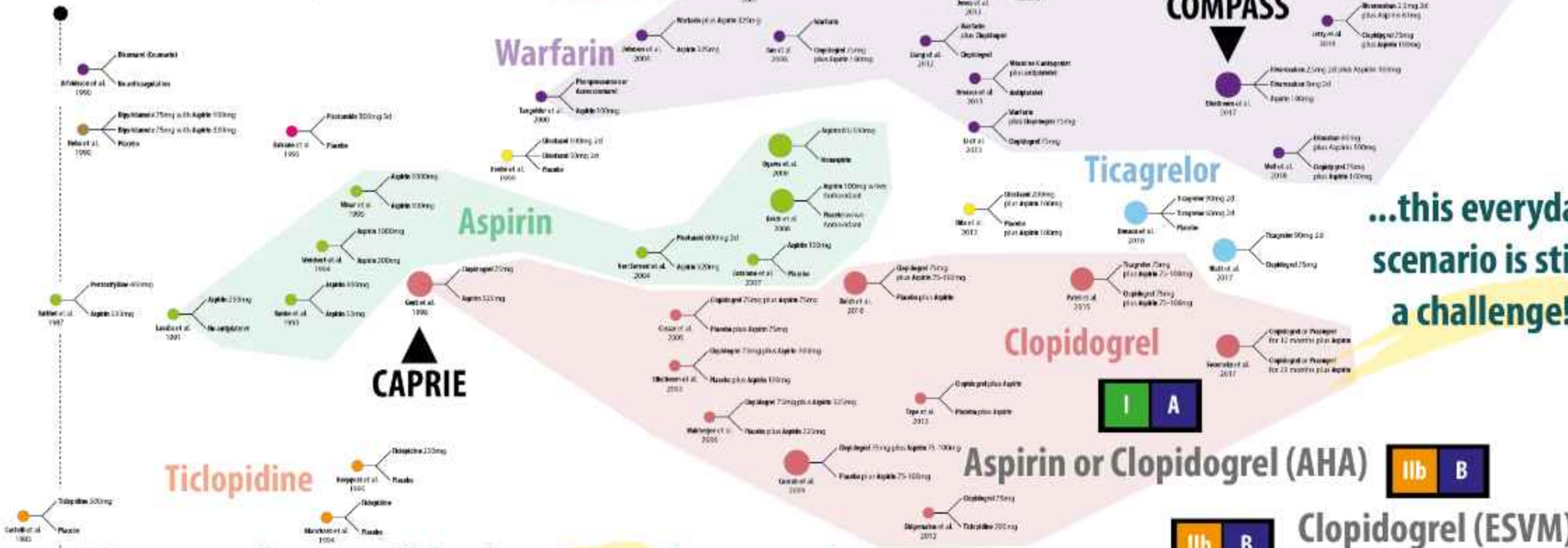
ANTITHROMBOTICS FOR PATIENTS WITH ARTERIAL DISEASE

ANTITHROMBOTICS FOR PATIENTS WITH ARTERIAL DISEASE

Behrendt CA | christianbehrendt.net | @VASCevidence

Rules of Evidence and Clinical Recommendations on the Use of Antithrombotic Agents

D. L. Sackett M.D. Chest. 1989;95:2S-4S.



...this everyday scenario is still a challenge!

I A — Aspirin or Clopidogrel (AHA)

IIb B — Clopidogrel (ESVM)

IIb B — Clopidogrel (ESC/ESVS)

I B — Clopidogrel (SVS)

30 years after a call for better evidence and recommendations on antithrombotics...

ANTITHROMBOTICS FOR PATIENTS WITH ARTERIAL DISEASE

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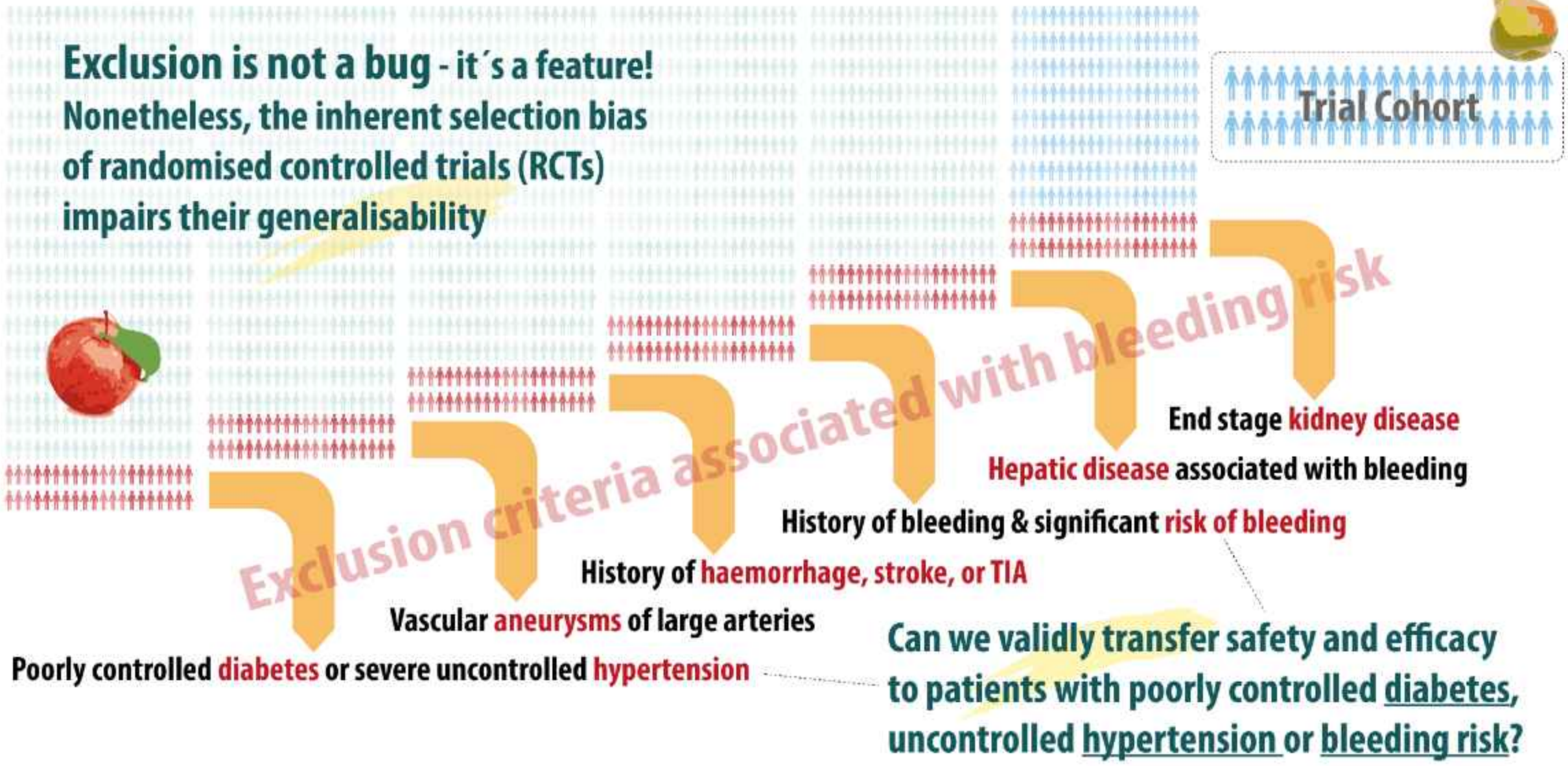

ANTITHROMBOTICS FOR PATIENTS WITH ARTERIAL DISEASE

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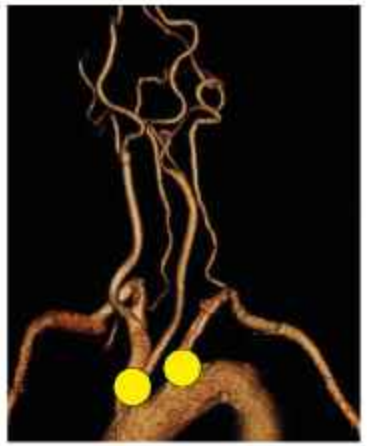

Recommendations on atherosclerotic upper limb PAD

Subclavian arteries and innominate trunk

▼

Very limited evidence (no specific RCTs & few observational data)

IIa	C

Patients with chronic symptomatic upper limb arterial disease should be considered for single antiplatelet therapy for secondary prevention of cardiovascular events.

I	C

Patients post-revascularisation for upper limb atherosclerotic arterial disease are recommended to have an invididualised antithrombotic strategy balancing risks and benefits to reduce the risk [...].

ANTITHROMBOTICS FOR PATIENTS WITH ARTERIAL DISEASE

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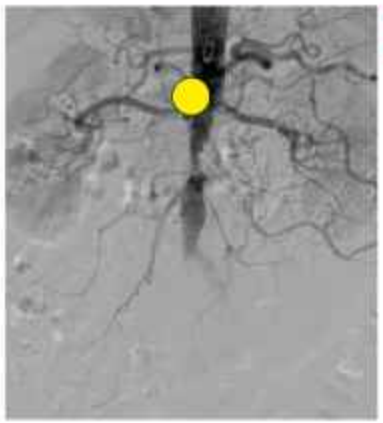


Recommendations on renal & mesenteric arterial disease

...but despite the lack of (direct) evidence...

...there is a value of antiplatelet therapies!

IIa	C

Patients with asymptomatic or symptomatic >50% atherosclerotic renal or mesenteric artery stenotic disease should be considered for single antiplatelet therapy for secondary prevention [...].

IIa	C

Patients post-revascularisation for atherosclerotic renal or mesenteric artery disease who are not at high risk of bleeding should be considered for a short course (minimum of one to maximum six months) dual antiplatelet therapy (aspirin 75mg and clopidogrel 75mg) to reduce the risk of stent thrombosis.

ANTITHROMBOTICS FOR PATIENTS WITH ARTERIAL DISEASE

Recommendations on lower extremity arterial disease

Asymptomatic Disease

Aspirin for Asymptomatic Atherosclerosis Trial (Fowkes et al. 2010)

1998-2008
Scotland
N = 28 980

Prevention of Progression of Arterial Disease and Diabetes (POPAPAD) Trial

1997-2001
Scotland
N = 1 276

No benefit over placebo (comparable bleeding risk)

Patients with isolated asymptomatic lower extremity artery disease are not recommended to have aspirin for cardiovascular prevention.

ANTITHROMBOTICS FOR PATIENTS WITH ARTERIAL DISEASE

Behrendt CA | christianbehrendt.net | @VASCevidence

Symptomatic stable lower extremity arterial disease

▼ ...a simplified approach...

I C — Perform a bleeding risk assessment and treat modifiable risk factors!

IIa C — Includes the use of proton pump inhibitors (in risk groups)

I A — Single antiplatelet therapy

IIa B — Clopidogrel 75mg as first choice

IIa B — Aspirin 75-100mg once and rivaroxaban 2.5mg twice per day (DPI)

For patients not at high risk of bleeding & considered in higher ischaemic risk patients!

III A — Dual antiplatelet therapy or full-dose anticoagulation not recommended for secondary cardiovascular prevention

ANTITHROMBOTICS FOR PATIENTS WITH ARTERIAL DISEASE

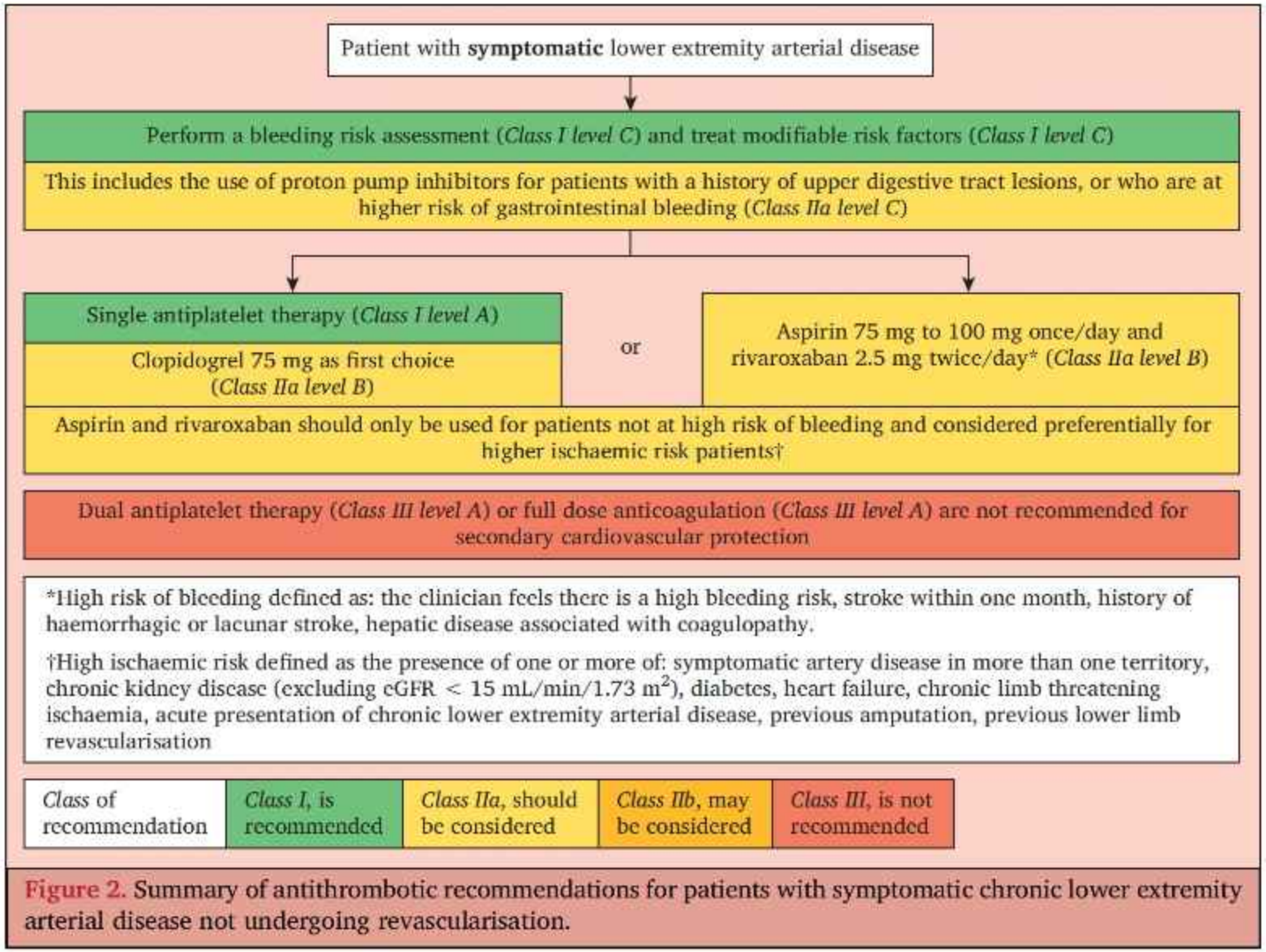
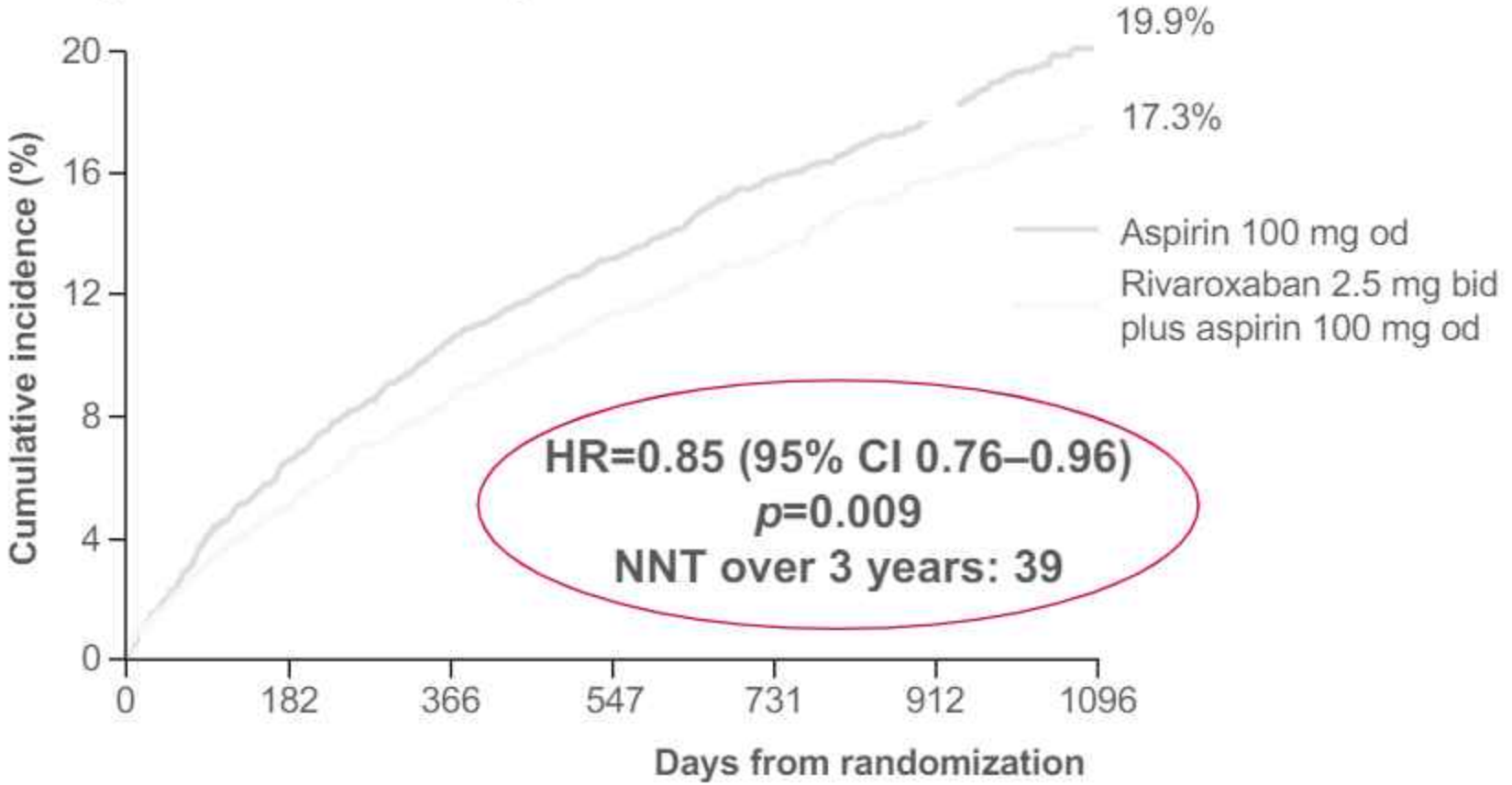


Figure 2. Summary of antithrombotic recommendations for patients with symptomatic chronic lower extremity arterial disease not undergoing revascularisation.

Recommendations post endovascular intervention

Cumulative incidence of: **acute limb ischemia, major amputation of vascular aetiology, myocardial infarction, ischaemic stroke or CV death**



Number at risk							
Rivaroxaban plus aspirin	3286	3082	2938	2834	2219	1415	684
Aspirin	3278	3030	2881	2773	2151	1351	642

Bonaca MP *et al. N Engl J Med* 2020; doi:10.1056/NEJMoa2000052.

NO DIFFERENCE IN TIMI MAJOR BLEEDING, BUT A HIGHER RISK FOR ISTH MAJOR BLEEDING
(140 events in the experimental arm and 100 in the placebo arm)

Recommendations post endovascular intervention

Recommendation 35

Patients undergoing endovascular intervention for lower extremity arterial disease who are not at high risk of bleeding may be considered for a short course (a minimum of one to maximum six months) dual antiplatelet therapy (aspirin 75 mg plus clopidogrel 75 mg) to reduce the risk of secondary cardiovascular and major adverse limb events.

Class	Level	References
IIb	C	Consensus

Recommendation 36

Patients undergoing endovascular intervention for lower extremity arterial disease who are not at high risk of bleeding should be considered for aspirin (75 – 100 mg once daily) combined with rivaroxaban (2.5 mg twice daily) to reduce the risk of secondary cardiovascular and major adverse limb events.

Class	Level	References	ToE
IIa	B	Bonaca *et al.* (2020)[29]	

Antithrombotic recommendations following lower limb surgical revascularisation

Recommendation 38

Patients undergoing infrainguinal endarterectomy or bypass using autologous vein or prosthetic conduit for lower extremity arterial disease who are not at high risk of bleeding should be considered for aspirin (75 – 100 mg once daily) in combination with rivaroxaban (2.5 mg twice daily) to reduce the risk of secondary cardiovascular and major adverse limb events.

Class	Level	References	ToE
IIa	B	Bonaca *et al.* (2020),[29] Debus *et al.* (2021)[215]	

Recommendation 42

Patients undergoing infrainguinal bypass surgery with a prosthetic conduit for lower extremity arterial disease may be considered for single antiplatelet therapy to improve graft patency.

Class	Level	References	ToE
IIb	B	Bedenis *et al.* (2015)[209]	

Recommendation 40

Patients undergoing infrainguinal bypass with autologous vein for lower extremity arterial disease who are not at high risk of bleeding may be considered for vitamin K antagonists to improve graft patency.

Class	Level	References	ToE
IIb	A	Monaco *et al.* (2012),[213] Dutch Bypass Oral anticoagulants or Aspirin Study Group (2000),[5] van Hattum *et al.* (2009),[210] de Smit *et al.* (1992)[214]	

➢ HOW ABOUT TRIPLE THERAPY?

- LOW-DOSE RIVAROXABAN
- LOW DOSE ASPIRIN
- CLOPIDOGREL

- 50% of VOYAGER participants also received DAPT, and short term DAPT also seemed relatively safe when added to low-dose rivaroxaban, but this was NOT a randomised comparison between DAPT and DPI (which is still lacking)
- After 1 month of therapy, triple therapy was associated with an increased risk of bleeding

Recommendation 37

If clopidogrel (75 mg) is added in exceptional circumstances to aspirin (75 – 100 mg once daily) in combination with rivaroxaban (2.5 mg twice daily) for patients undergoing endovascular intervention for lower extremity arterial disease who are not at high risk of bleeding, it is not recommended for longer than 30 days as the bleeding risk is likely to outweigh the benefit.

Class	Level	References	ToE
III	C	Hiatt *et al.* (2020)[206]	

Recommendation 39

If clopidogrel (75 mg) is added in exceptional circumstances to aspirin (75 – 100 mg once daily) in combination with rivaroxaban (2.5 mg twice daily) for patients undergoing infrainguinal bypass surgery using autologous vein or prosthetic conduit for lower extremity arterial disease who are not at high risk of bleeding, it is not recommended for longer than 30 days as the bleeding risk is likely to outweigh the benefit.

Class	Level	References	ToE
III	C	Hiatt *et al.* (2020)[206]	

ANTITHROMBOTICS FOR PATIENTS WITH ARTERIAL DISEASE

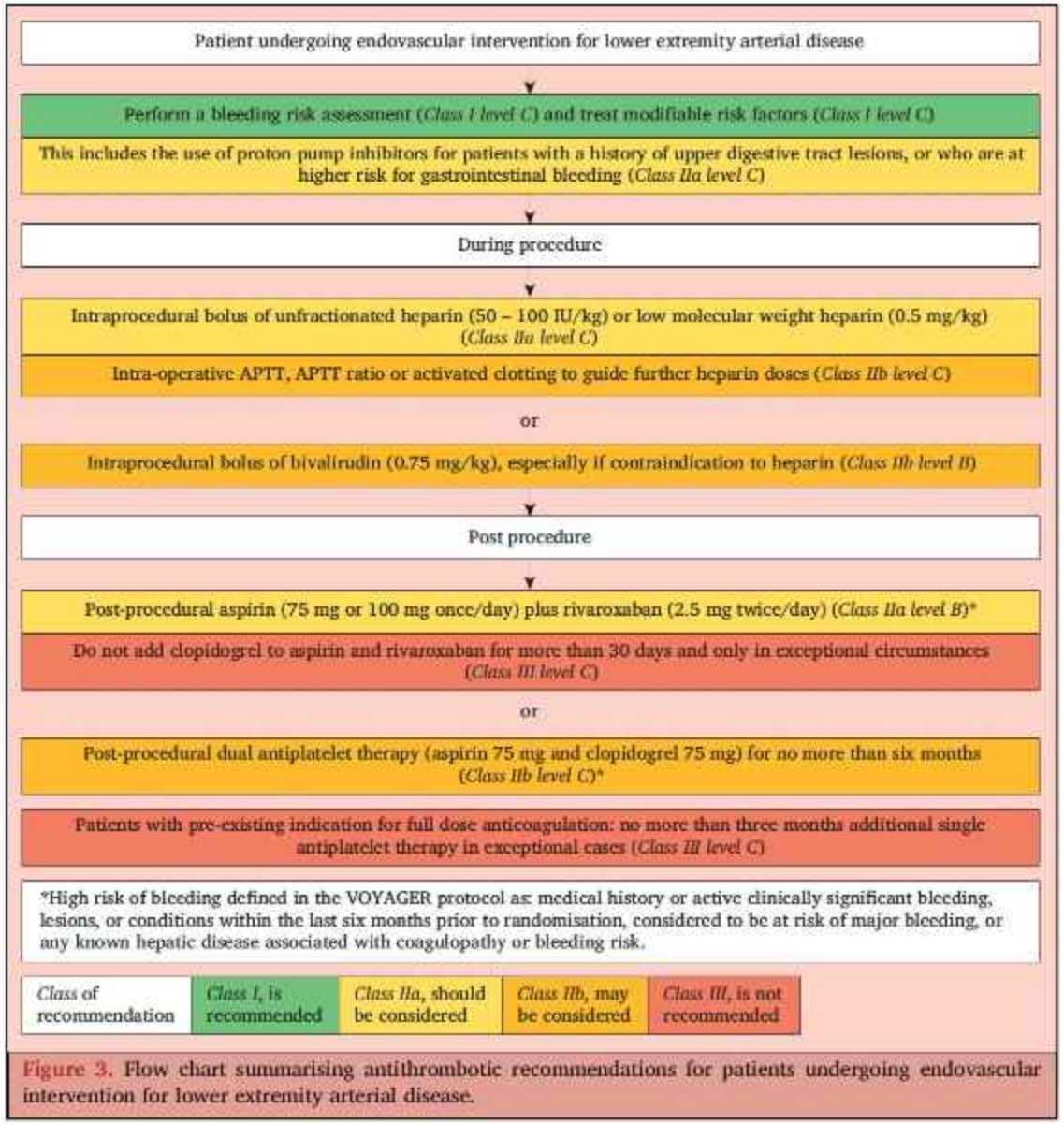


Figure 3. Flow chart summarising antithrombotic recommendations for patients undergoing endovascular intervention for lower extremity arterial disease.

ANTITHROMBOTICS FOR PATIENTS WITH VENOUS DISEASE

ANTITHROMBOTICS FOR SUPERFICIAL VENOUS THROMBOSIS

- **Causes**:
  - Varicose veins
  - Normal veins
    - Cancer
    - Thrombophilia
    - Buerger's disease may cause SVT in normal veins.

- **Thromboembolic complications** (10.2% at 3 months)
  - DVT
  - PE
  - Progression of DVT
  - Recurrent SVT

ANTITHROMBOTICS FOR SUPERFICIAL VENOUS THROMBOSIS

Recommendation 67

Patients with lower limb superficial vein thrombosis ≥ 3 cm away from the junction with the deep veins and extending ≥ 5 cm in length are recommended to have fondaparinux 2.5 mg once daily for 45 days to reduce the risk of further thromboembolic events.

Class	Level	References	ToE
I	B	Decousus *et al.* 2010[7]	

Recommendation 68

Patients with lower limb superficial vein thrombosis ≥ 3 cm away from the junction with the deep veins and extending ≥ 5 cm in length should be considered for rivaroxaban 10 mg or an intermediate dose of a low molecular weight heparin once daily as an alternative to fondaparinux to reduce the risk of further thromboembolic events.

Class	Level	References	ToE
IIa	B	Cosmi *et al.* (2012),[24] Decousus *et al.* (2010),[7] Beyer-Westendorf *et al.* (2017),[25] Di Nisio *et al.* (2018)[307]	

Intermediate LMWH doses: between full anticoagulation and prophylactic, e.g., two thirds of the therapeutic dose

SURPRISE study: The results suggested that rivaroxaban was as effective as fondaparinux; however, the study was not powered to prove non-inferiority

ANTITHROMBOTICS FOR SUPERFICIAL VENOUS THROMBOSIS

Recommendation 69		
Patients with lower limb superficial vein thrombosis ≤ 3 cm from the junction with the deep veins are recommended to have three months of full dose anticoagulation to reduce the risk of further thromboembolic events.		
Class	**Level**	**References**
I	C	Consensus

Recommendation 70			
Patients with superficial vein thrombosis of the leg who exhibit high risk clinical and or anatomical features (such as clinically extensive superficial vein thrombosis involving both the calf and the thigh, absence of local pain, superficial axial vein thrombosis or multiple thrombosed venous sites) may be considered for a three month (rather than 45 day) course of intermediate dose anticoagulation to reduce the risk of further thromboembolic events.			
Class	**Level**	**References**	**ToE**
IIb	C	Nikolakopoulos *et al.* (2018)[305]	

ANTITHROMBOTICS FOR DEEP VENOUS THROMBOSIS

- Principal phase of treatment:

Recommendation 63			
Patients with proximal deep vein thrombosis are recommended to have a three month course of a full dose direct oral anticoagulant rather than a vitamin K antagonist to reduce the risk of recurrent thromboembolic events.			
Class	**Level**	**References**	**ToE**
I	**A**	Kakkos *et al.* (2014)[104]	

ANTITHROMBOTICS FOR DEEP VENOUS THROMBOSIS

Table 11. Relative recurrence rates and bleeding events of direct oral anticoagulants compared with vitamin K antagonists used for venous thromboembolic treatment in pivotal trials

Drug	Trial	Number of patients included	Treatment group	Control group	Efficacy	Safety
Apixaban	AMPLIFY[4]	$n = 5\,395$	Recurrence: 59/2 609 (2.3) Bleeding: 115/2 676 (4.3)	Recurrence: 71/2 635 (2.7) Bleeding: 261/2 689 (9.7)	RR 0.84; 95 CI 0.60–1.18 DR -0.4; 95 CI -1.3–0.4*	RR 0.44; 95 CI 0.36–0.55†
Rivaroxaban	EINSTEIN[295]	$n = 3\,449$	Recurrence: 36/1 731 (2.1) Bleeding: 139/1 718 (8.1)	Recurrence: 51/1 718 (3.0) Bleeding: 138/1 711 (8.1)	HR 0.68; 95 CI 0.44–1.04‡	HR 0.97; 95 CI 0.76–1.22†
Edoxaban	HOKUSAI[296]	$n = 8\,240$	Recurrence: 130/4 118 (3.2) Bleeding: 34/4 189 (8.5)	Recurrence: 146/4 122 (3.5) Bleeding: 423/4 122 (10.3)	HR 0.89; 95 CI 0.70–1.13§	HR 0.81; 95 CI 0.71–0.94†
Dabigatran	RE-COVER and RE-COVER II[297]	$n = 5\,107$	Recurrence: 60/2 553 (2.4) Bleeding: 136/2 553 (5.3)	Recurrence: 55/2 554 (2.1) Bleeding: 217/2 554 (8.5)	HR 1.09 95 CI 0.76–1.57‖	HR 0.62 95 CI 0.50–0.76†

ANTITHROMBOTICS FOR DEEP VENOUS THROMBOSIS

Patients with a high risk of recurrence associated with a tolerable risk of bleeding

Recommendation 64

Patients with a proximal deep vein thrombosis requiring extended anticoagulation following the principal three month treatment phase should be considered for full dose direct oral anticoagulants rather than vitamin K antagonists to reduce the risk of further thromboembolic events.

Class	Level	References	ToE
IIa	B	Kakkos *et al.* (2014)[104]	

Recommendation 65

Patients with unprovoked deep vein thrombosis who are eligible for anticoagulants are not recommended to have aspirin for extended antithrombotic therapy to reduce the risk of thromboembolic events.

Class	Level	References	ToE
III	A	Vasanthamohan *et al.* (2018),[302] Marik *et al.* (2015)[301]	

ANTITHROMBOTICS FOR DEEP VENOUS THROMBOSIS

Patients with a low risk of recurrence

Recommendation 66			
Patients with a first episode of unprovoked proximal deep vein thrombosis not deemed to be at high risk of recurrence should be considered for reduced dose apixaban (2.5 mg twice daily) or rivaroxaban (10 mg once daily) after the principal three month treatment phase to reduce the risk of further thromboembolic events.			
Class	**Level**	**References**	**ToE**
IIa	**B**	Vasanthamohan *et al.* (2018)[302]	

ANTITHROMBOTICS FOR VENOUS THROMBOSIS

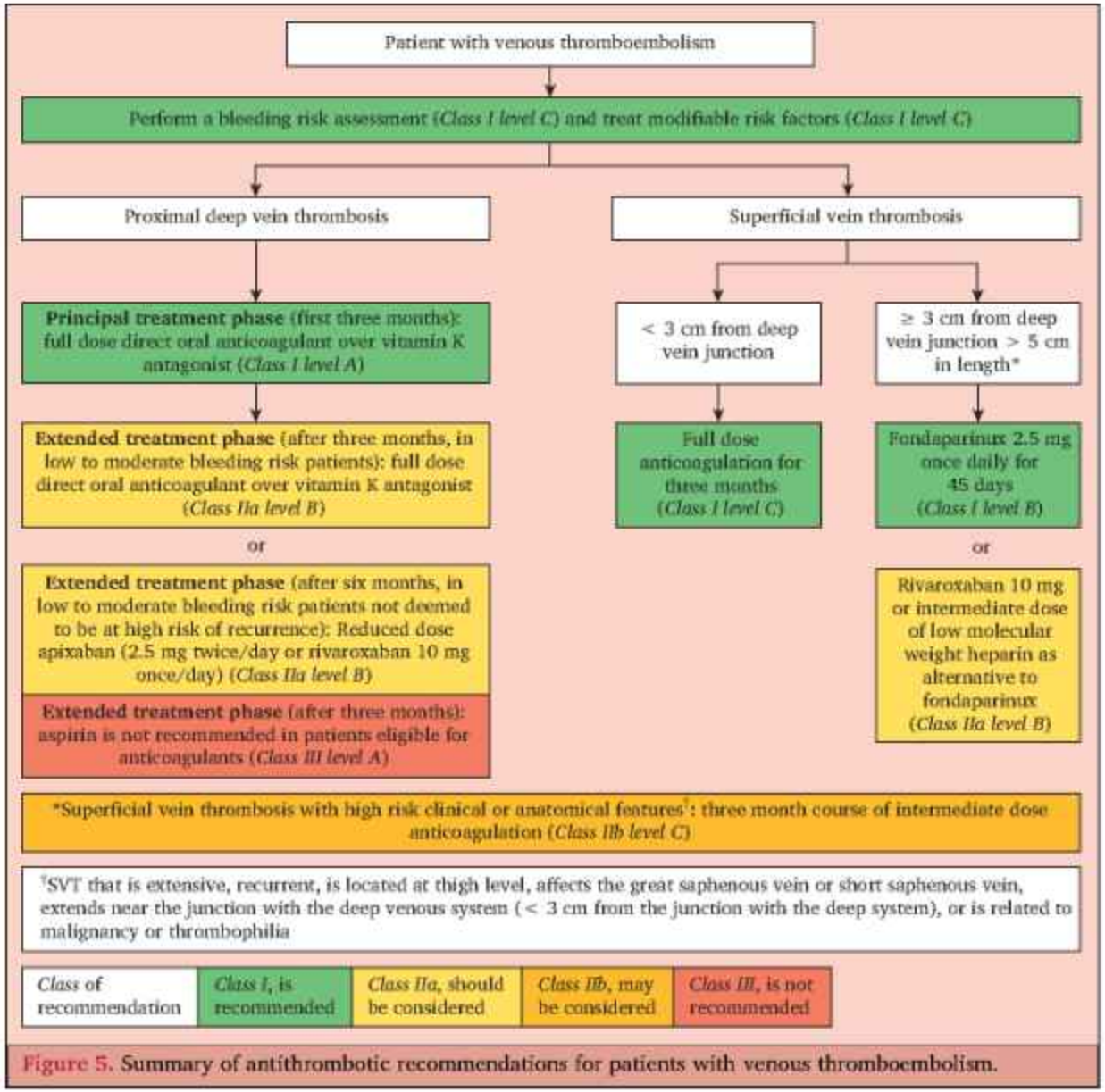
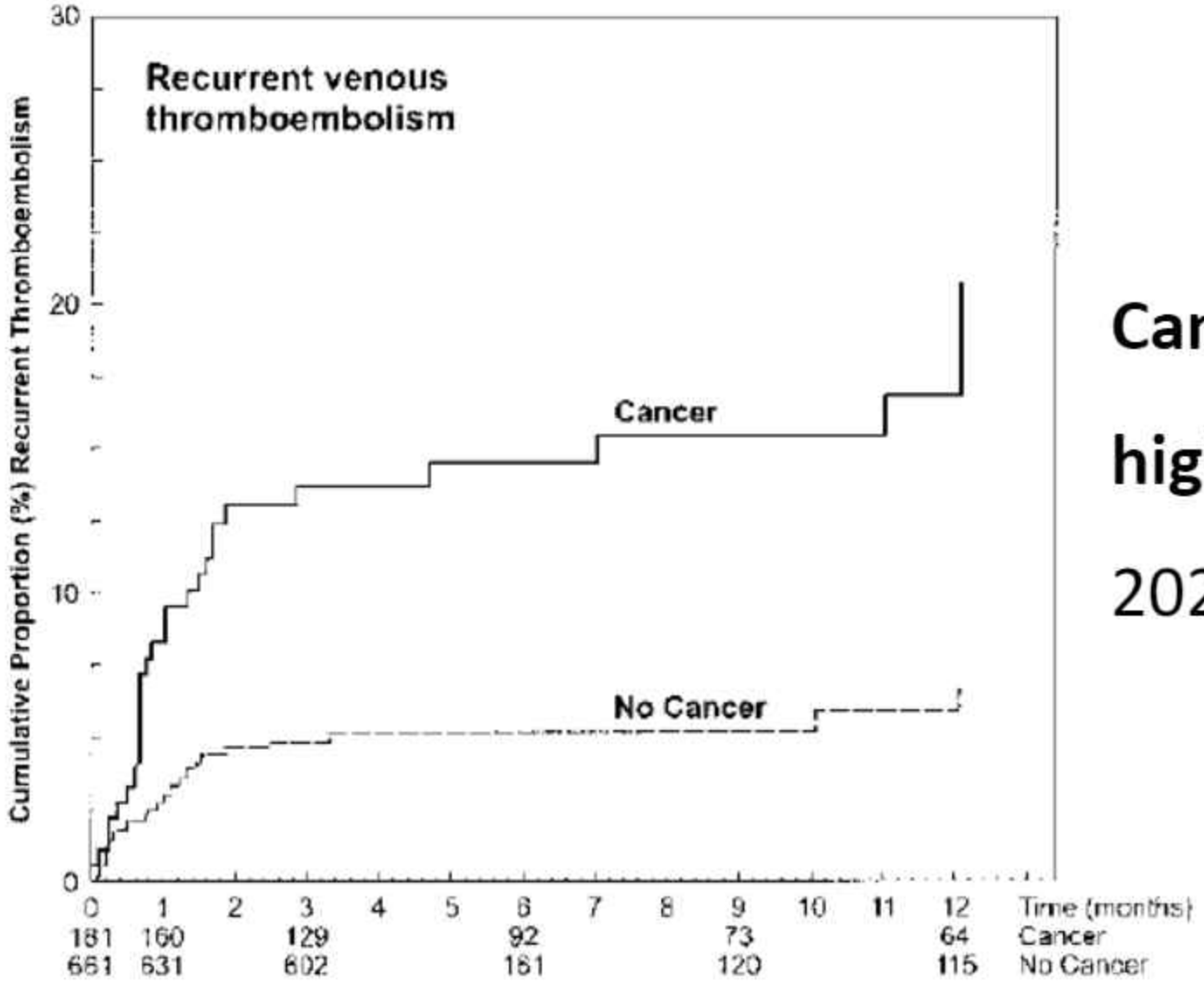


Figure 5. Summary of antithrombotic recommendations for patients with venous thromboembolism.

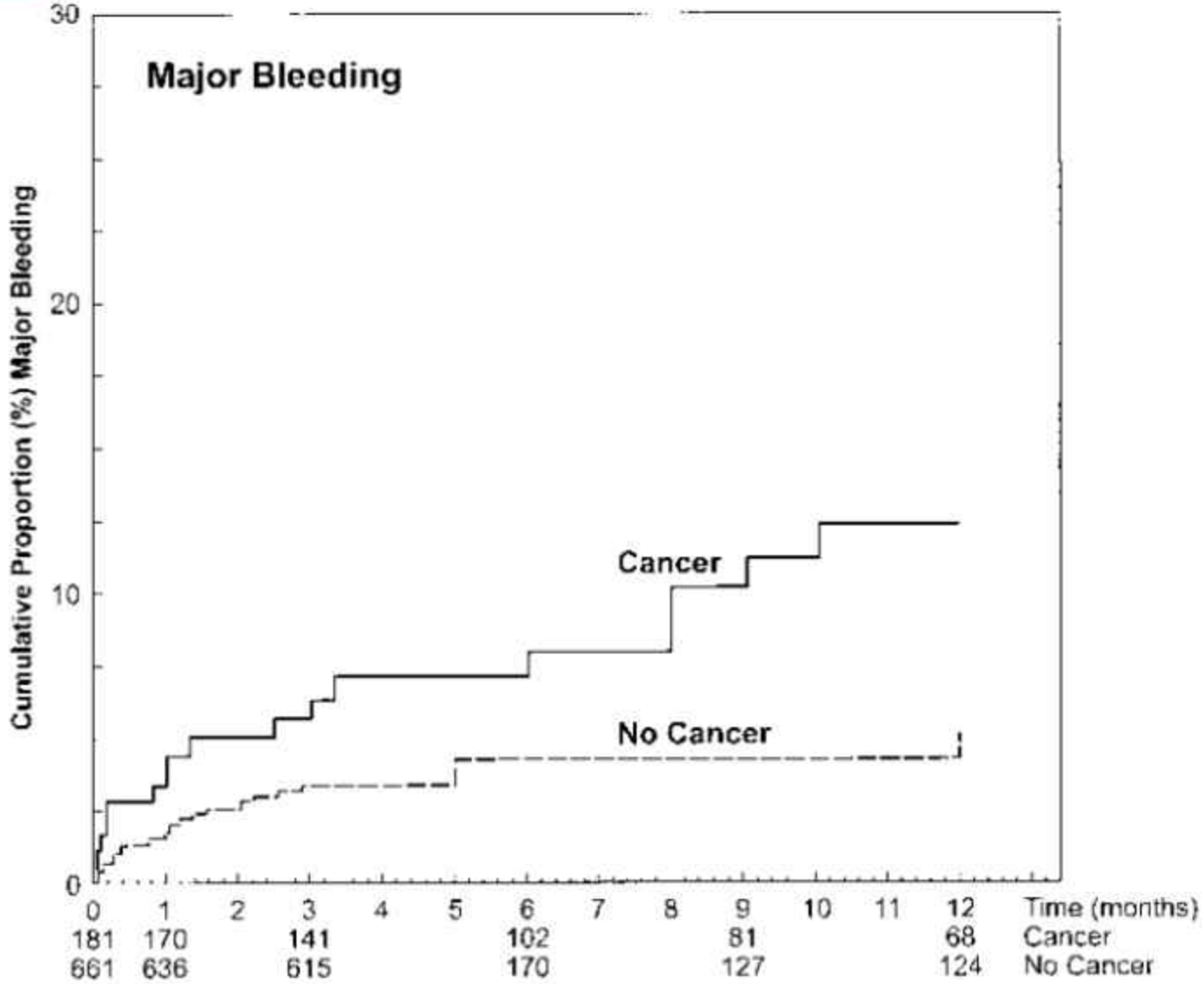
ANTITHROMBOTICS FOR CANCER ASSOCIATED VENOUS THROMBOEMBOLISM



Cancer is a typical example of a high risk persistent risk factor

2021 ESVS VT guidelines

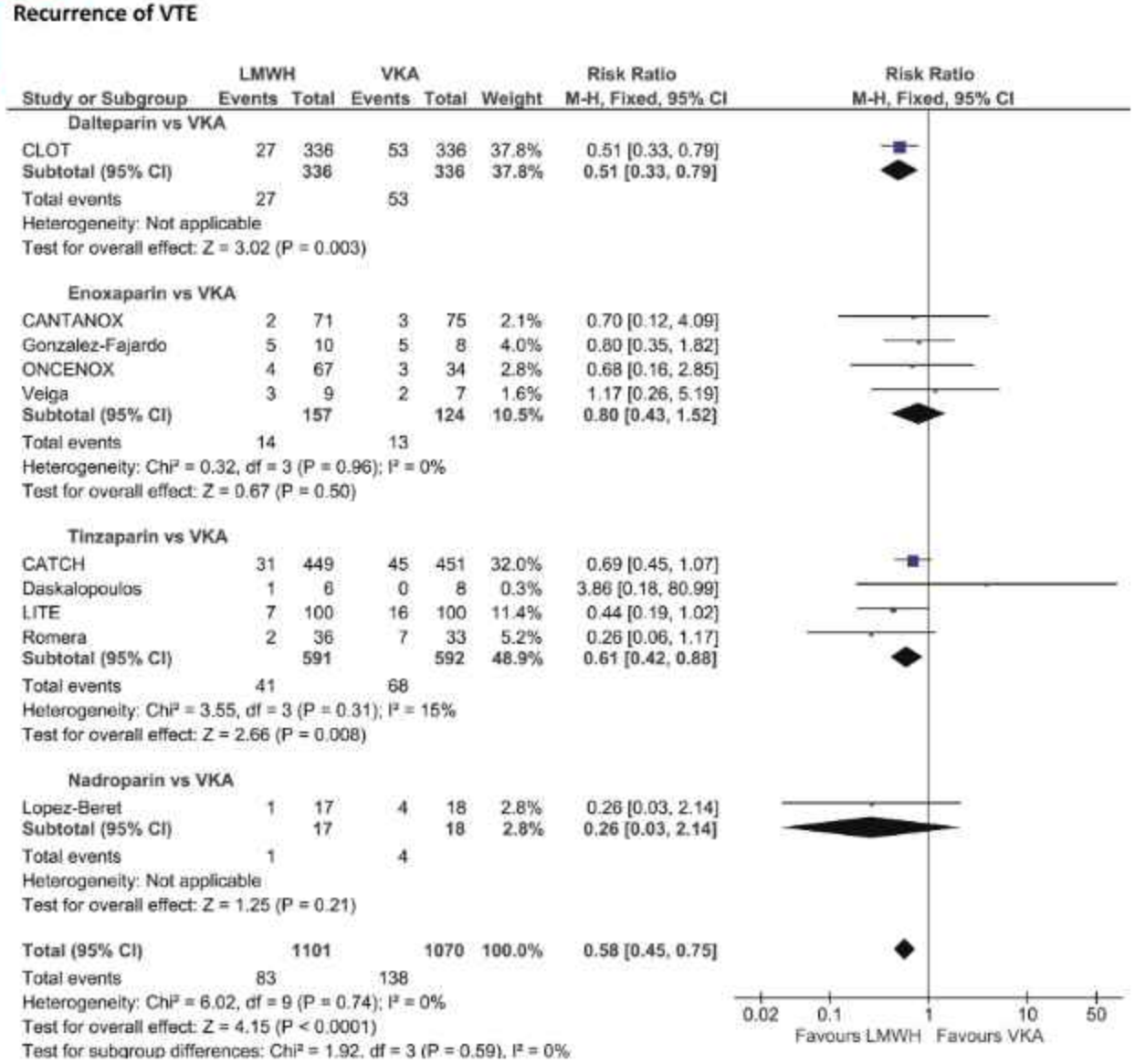
ANTITHROMBOTICS FOR CANCER ASSOCIATED VENOUS THROMBOEMBOLISM



Anticoagulation

can be challenging

ANTITHROMBOTICS FOR CANCER ASSOCIATED VENOUS THROMBOEMBOLISM



LMWHs vs VKAs

Kirkilesis, Kakkos, EJVES 2019

ANTITHROMBOTICS FOR CANCER ASSOCIATED VENOUS THROMBOEMBOLISM

Patients with cancer associated venous thromboembolism are recommended to have anticoagulation with low molecular weight heparin to reduce the risk of further thromboembolic events.

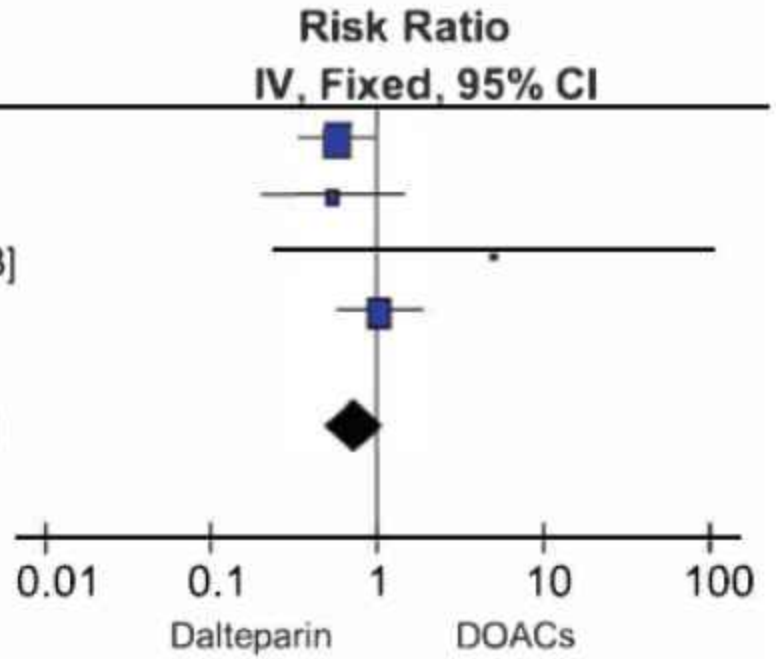
Class	Level	Refs
I	A	Sabatino et al. (2020)

ANTITHROMBOTICS FOR CANCER ASSOCIATED VENOUS THROMBOEMBOLISM

Major bleeding

Study	Dalteparin Events	Dalteparin Total	DOACs Events	DOACs Total	P value	Risk Ratio
Hokusai VTE	21	524	36	522	0.043	0.58 [0.34, 0.98]
Cancer SELECT-D	6	203	11	203	0.223	0.55 [0.21, 1.45]
ADAM VTE	2	150	0	150	0.298	5.00 [0.24, 103.28]
CARAVAGGIO	23	579	22	576	0.893	1.04 [0.59, 1.84]
Total (95% CI)	**52**	**1,456**	**69**	**1,451**	**0.110**	**0.74 [0.52, 1.06]**

Heterogeneity: Chi² = 4.08, df = 3 (P = 0.253); I² = 26%



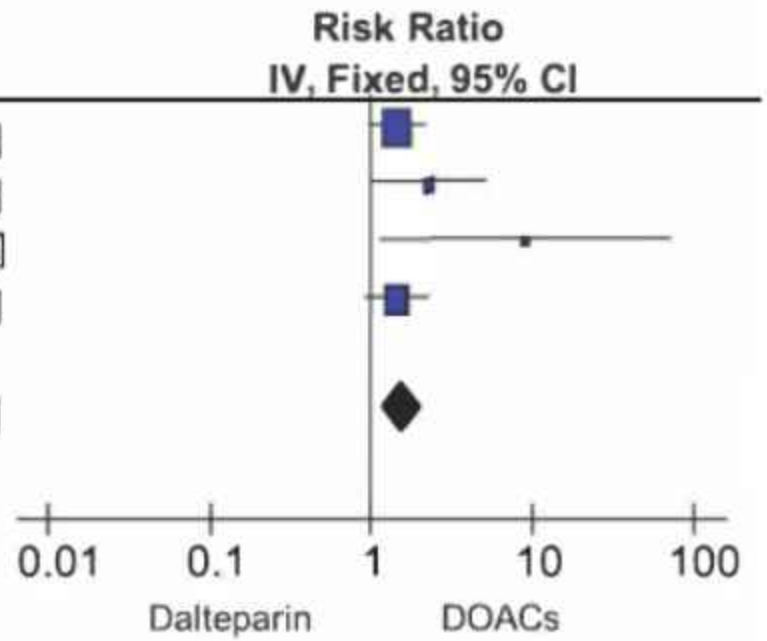
Sabatino et al. JACC CardioOncol, 2020

ANTITHROMBOTICS FOR CANCER ASSOCIATED VENOUS THROMBOEMBOLISM

Recurrent venous thromboembolism

Study	Dalteparin Events	Dalteparin Total	DOACs Events	DOACs Total	P value	Risk Ratio
Hokusai VTE Cancer	59	524	41	522	0.063	1.43 [0.98, 2.10]
SELECT-D	18	203	8	203	0.050	2.25 [1.00, 5.06]
ADAM VTE	9	150	1	150	0.036	9.00 [1.15, 70.16]
CARAVAGGIO	46	579	32	576	0.108	1.43 [0.92, 2.21]
Total (95% CI)	**132**	**1,456**	**82**	**1,451**	**0.001**	**1.55 [1.19, 2.03]**

Heterogeneity: Chi² = 3.93, df = 3 (P = 0.270); I² = 24%



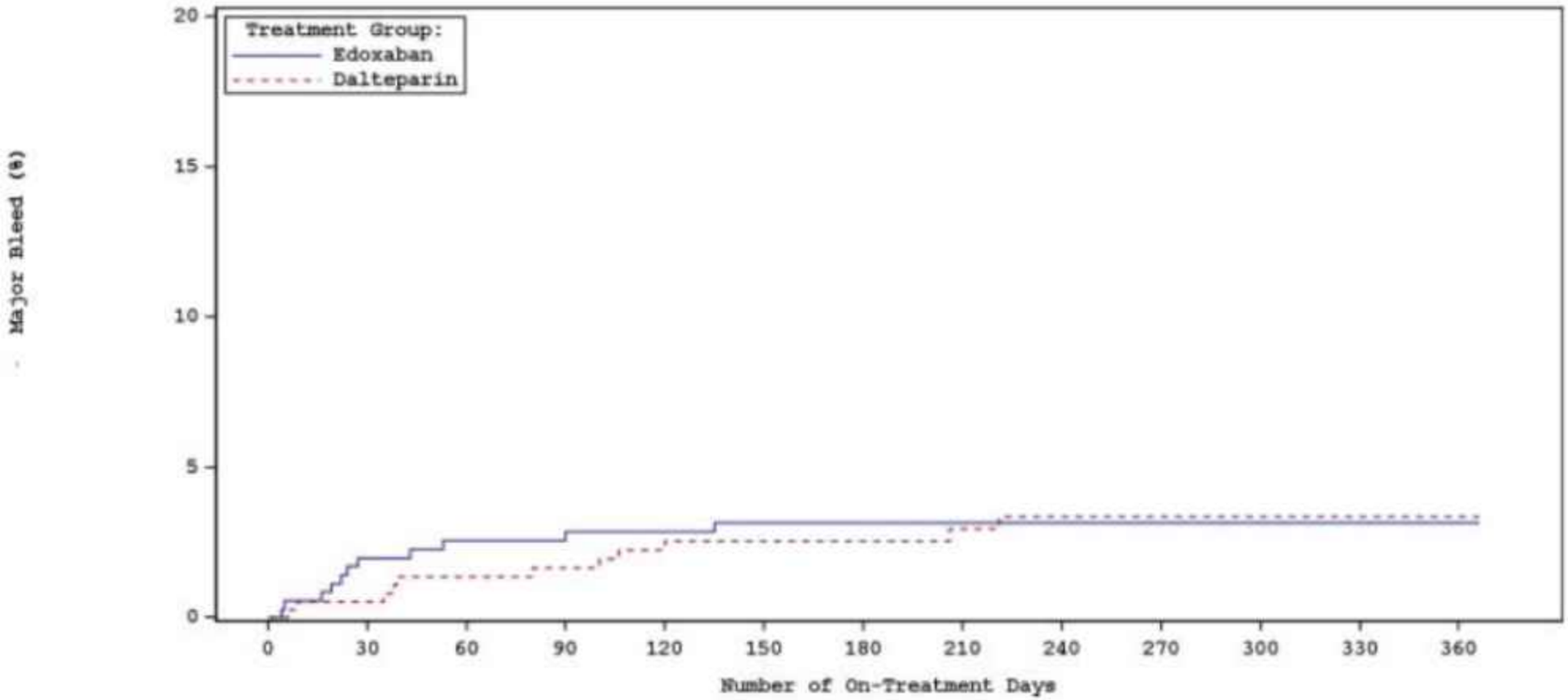
Sabatino et al. JACC CardioOncol, 2020

ANTITHROMBOTICS FOR CANCER ASSOCIATED VENOUS THROMBOEMBOLISM

Patients with cancer associated venous thromboembolism and a low risk of gastrointestinal or genitourinary bleeding are recommended to be considered for anticoagulation with a direct oral anticoagulant preferably apixaban, alternatively rivaroxaban or edoxaban.

Class	Level	Refs
I	A	Sabatino et al. (2020) Kirkilesis et al. (2019)

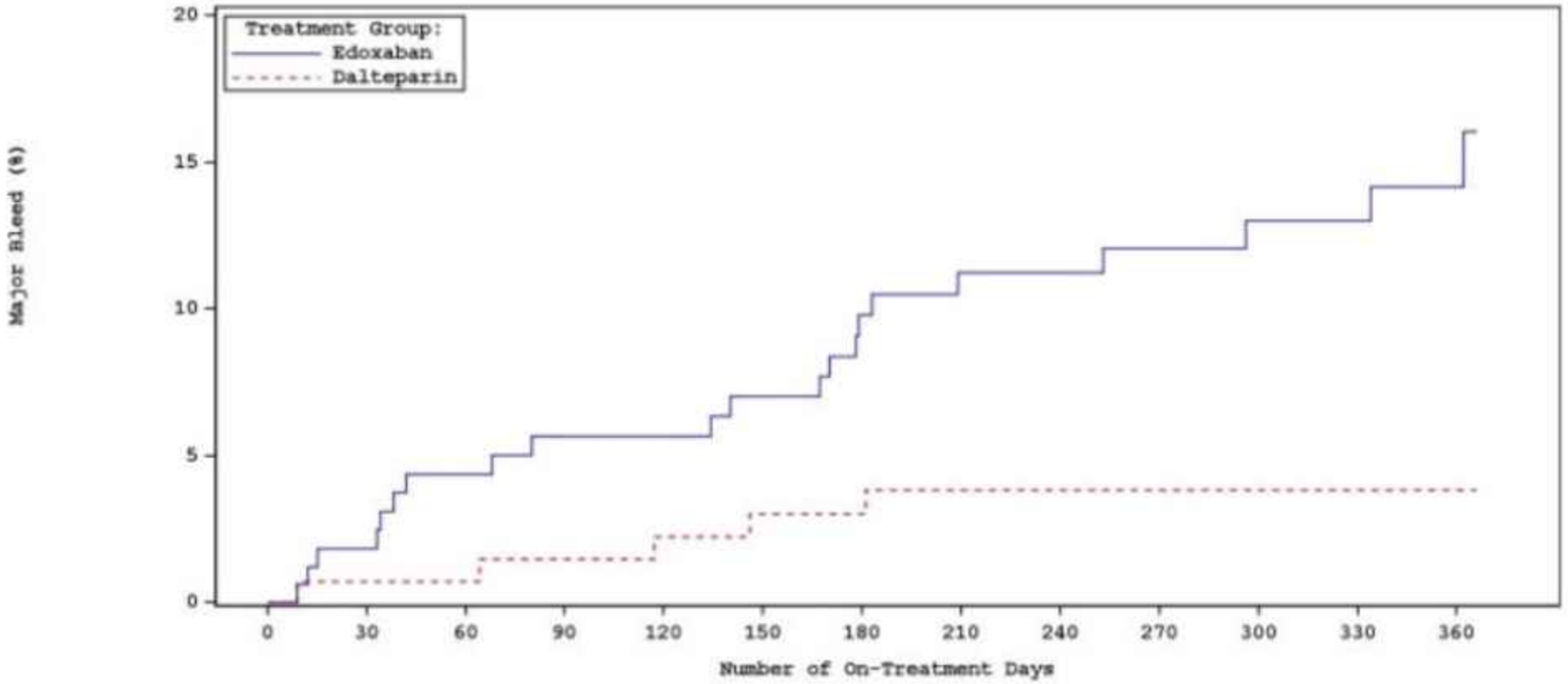
ANTITHROMBOTICS FOR CANCER ASSOCIATED VENOUS THROMBOEMBOLISM



Number at Risk:													
Edoxaban	357	315	284	271	255	234	220	190	179	171	144	123	88
Dalteparin	384	347	305	278	254	236	216	151	138	131	108	95	63

Kraaijpoel, Thromb Haemost 2018

ANTITHROMBOTICS FOR CANCER ASSOCIATED VENOUS THROMBOEMBOLISM



Number at Risk:													
Edoxaban	165	134	121	108	97	89	79	70	64	59	48	38	28
Dalteparin	140	123	116	108	94	89	79	67	60	54	48	40	25

A

x4 risk

Kraaijpoel, Thromb Haemost 2018

ANTITHROMBOTICS FOR CANCER ASSOCIATED VENOUS THROMBOEMBOLISM

- Unresected gastrointestinal or genitourinary cancer
- Nausea and vomiting, often associated with chemotherapy may prevent the use of oral anticoagulants, including DOACs
- Drug to drug interactions: inhibitors or inducers of CYP3A4 or P-glycoprotein (P-gp)
- Thrombocytopenia
- Liver or renal failure

ANTITHROMBOTICS POST VENOUS INTERVENTION

Patients with superficial venous incompetence undergoing high ligation and stripping of the great saphenous vein who are thought to be at higher risk of deep vein thrombosis should be considered for thromboprophylaxis with a low molecular weight heparin to prevent post-operative venous thromboembolism.

Class	Level	Refs
IIa	B	Wang et al. (2015)

Previous VTE, obesity, thrombophilia, or a high score on VTE risk assessment

ANTITHROMBOTICS POST VENOUS INTERVENTION

Patients with superficial venous incompetence undergoing endovenous ablation of the great saphenous vein who are thought to be at higher risk of deep vein thrombosis should be considered for thromboprophylaxis with a low molecular weight heparin to prevent post-operative venous thromboembolism.

Class	Level	Refs
IIa	C	Consensus

BMI > 30 kg/m^2, reduced mobility or calf muscle function, use of hormone replacement therapy or oral contraceptive pill, personal or family history of VTE, flight more than three hours in length within four weeks of the procedure, a past history of malignancy, inherited thrombophilia, or surgery within the last 12 weeks

ANTITHROMBOTICS POST VENOUS INTERVENTION

Patients undergoing iliofemoral venous stenting for deep venous disease should be considered for an individualised antithrombotic regimen considering the risk of bleeding associated with more aggressive antithrombotic strategies.		
Class	Level	Refs
IIa	C	Notten et al. (2021)

The ideal antithrombotic strategy and duration of use after venous stenting, both in the acute and chronic setting, is not supported by trial evidence.

ANTITHROMBOTICS POST VENOUS INTERVENTION

Patients undergoing intervention for deep vein thrombosis (with or without stenting) are recommended to have a duration of anticoagulation at least as long as standard treatment following deep vein thrombosis to prevent recurrent thromboembolic events.		
Class	Level	Refs
I	C	Consensus