Optimal Anticoagulant and Antiplatelet Treatment for Various Vascular Procedures

Peter Henke, MD
Section of Vascular Surgery
University of Michigan
@henke1965

DISCLOSURES:

None

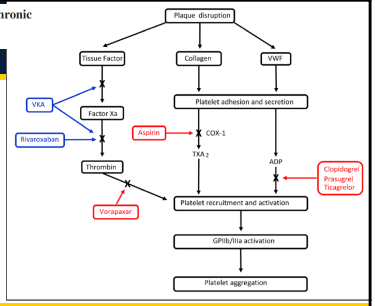
Overview

- Atherosclerosis pharmacological targets
- Benefits and harms
- ESVS 2023 Guidelines
- A bit more PAD data
- Novel score for future

DOI: 10.1056/NEJMoa2000052

SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER

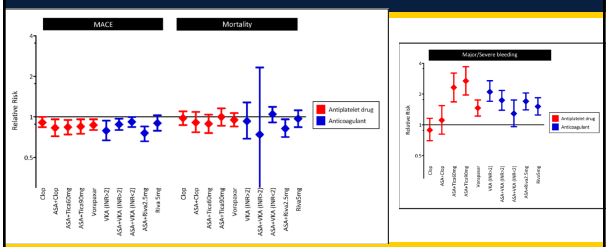
Synergy of Dual Pathway Inhibition in Chronic Cardiovascular Disease
Lessons From the COMPASS Trial



(*Circ Res*. 2019;124:416-

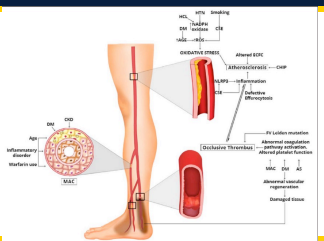
SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER

Synergy of Dual Pathway Inhibition in Chronic Cardiovascular Disease
Lessons From the COMPASS Trial



SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER

Peripheral Artery Disease: Molecular Mechanisms and Novel Therapies



Arterioscler Thromb Vasc Biol. 2024;44:1165–1170.

SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER

Editor's Choice — European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on Antithrombotic Therapy for Vascular Diseases

Eur J Vasc Endovasc Surg (2023) 65, 627–689

Recommendation 6

Patients with asymptomatic > 50% carotid artery stenoses are recommended to be offered aspirin (75 – 325 mg) to reduce the risk of secondary cardiovascular events.

Class	Level	References	ToE
I	B	King *et al.* (2013),[124] Murphy *et al.* (2019)[125]	

Recommendation 8

Patients with transient ischaemic attack or minor ischaemic stroke with any degree of carotid artery stenosis not undergoing carotid endarterectomy or stenting are recommended to have dual antiplatelet therapy with aspirin (75 – 325 mg) and clopidogrel (75 mg) for 21 days followed by clopidogrel 75 mg, or long term aspirin (75 – 100 mg) plus dipyridamole (200 mg twice daily) to reduce the risk of stroke.

Class	Level	References	ToE
I	A	Johnston *et al.* (2018),[10] Wang *et al.* (2013),[12] Kennedy *et al.* (2007)[14]	

Recommendation 16

Patients scheduled for carotid artery stenting for carotid stenosis are recommended to have dual antiplatelet therapy consisting of aspirin (75 – 325 mg) plus clopidogrel (75 mg) to reduce recurrent stroke risk. Clopidogrel should be started at least three days before stenting or as a single 300 mg loading dose in urgent cases.

Class	Level	References	ToE
I	C	McKevitt *et al.* (2005),[145] Murphy *et al.* (2019)[125]	

Recommendation 17

Patients undergoing carotid artery stenting are recommended to have dual antiplatelet therapy with aspirin and clopidogrel continued for at least four weeks after carotid stenting, then clopidogrel 75 mg continued indefinitely to reduce stroke risk.

Class	Level	References	ToE
I	C	McKevitt *et al.* (2005),[145] Murphy *et al.* (2019)[125]	

SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER
UNIVERSITY OF MICHIGAN HEALTH SYSTEM

Editor's Choice — European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on Antithrombotic Therapy for Vascular Diseases

Eur J Vasc Endovasc Surg (2023) 65, 627–689

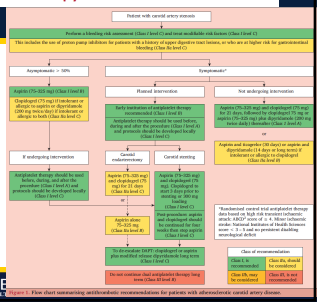
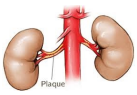


Figure 1 Flow chart summarising antithrombotic recommendations for patients with atherosclerotic carotid artery disease.

SAMUEL AND JE
UNIVERSITY OF MICHIGAN HEALT

Editor's Choice — European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on Antithrombotic Therapy for Vascular Diseases

Eur J Vasc Endovasc Surg (2023) 65, 627–689



Recommendation 21

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

Class	Level	References	ToE
IIa	C	Ritchie *et al.* (2016),[157] Oderich *et al.* (2012)[158]	

Recommendation 22

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 75 mg and clopidogrel 75 mg) to reduce the risk of stent thrombosis.

Class	Level	References
IIa	C	Consensus

SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER
UNIVERSITY OF MICHIGAN HEALTH SYSTEM

Editor's Choice — European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on Antithrombotic Therapy for Vascular Diseases

Eur J Vasc Endovasc Surg (2023) 65, 627–689

Recommendation 23

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

Class	Level	References	ToE
III	A	Ambler *et al.* (2020)[53]	

Recommendation 25

Patients with chronic symptomatic lower extremity arterial disease should be considered for clopidogrel (75 mg) as the first choice antiplatelet agent when single antiplatelet therapy is indicated for secondary cardiovascular prevention.

Class	Level	References	ToE
IIa	B	CAPRIE (1996),[9] Hiatt *et al.* (2017)[6]	

Recommendation 28

Patients with chronic symptomatic lower extremity arterial disease who are not at high risk of bleeding, especially those at higher ischaemic risk, should be considered for aspirin (75 – 100 mg once daily) in combination with rivaroxaban (2.5 mg twice daily) for secondary cardiovascular and major adverse limb event risk reduction.

Class	Level	References	ToE
IIa	B	Eikelboom *et al.* (2017),[159] Kaplovitch *et al.* (2021),[160] Kreutzburg *et al.* (2021)[161]	

Recommendation 35

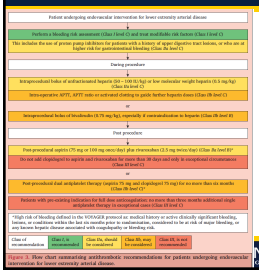
Patients undergoing endovascular intervention for lower extremity arterial disease who are not at high risk of bleeding may be considered for a short course (a minimum of one to maximum six months) dual antiplatelet therapy (aspirin 75 mg plus clopidogrel 75 mg) to reduce the risk of secondary cardiovascular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

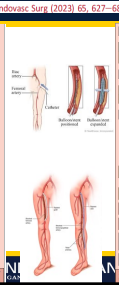
Class	Level	References
IIb	C	Consensus

SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER
UNIVERSITY OF MICHIGAN HEALTH SYSTEM

Editor's Choice — European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on Antithrombotic Therapy for Vascular Diseases

Eur J Vasc Endovasc Surg (2023) 65, 627–689





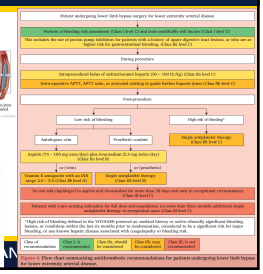


Figure 3 Flow chart summarising antithrombotic recommendations for patients undergoing endovascular intervention for lower extremity arterial disease.

Figure 4 Flow chart summarising antithrombotic recommendations for patients undergoing lower limb bypass for lower extremity arterial disease.

SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER
UNIVERSITY OF MICHIGAN HEALTH SYSTEM

Editor's Choice — European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on Antithrombotic Therapy for Vascular Diseases

Eur J Vasc Endovasc Surg (2023) 65, 627–689

Recommendation 52

Patients undergoing formation of an arteriovenous fistula should be considered for clopidogrel (75 mg) for up to six months as the first line antiplatelet agent to improve fistula patency.

Class	Level	References	ToE
IIa	B	Dember *et al.* (2008)[163]	

Recommendation 46

Patients undergoing endovascular or open abdominal aortic aneurysm repair should be considered for aspirin (75 – 100 mg) following repair to reduce the risk of secondary cardiovascular events.

Class	Level	References	ToE
IIa	B	Wong *et al.* (2022)[55]	

Recommendation 47

Patients with popliteal aneurysms should be considered for single antiplatelet therapy to reduce the risk of major adverse limb events.

Class	Level	References
IIa	C	Consensus

Recommendation 48

Patients undergoing open popliteal aneurysm repair may be considered for single antiplatelet therapy post-operatively to reduce the risk of major adverse limb events.

Class	Level	References
IIb	C	Consensus

SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER
UNIVERSITY OF MICHIGAN HEALTH SYSTEM

Rivaroxaban in Peripheral Artery Disease after Revascularization

- RCT
- 6564 patients with PAD and endo (65%)/open LE revascularization (35%)
- Rivaroxaban +/- aspirin vs aspirin
- MALE, MACE
- Most dramatic was ALI 33% reduction

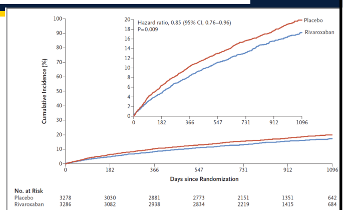


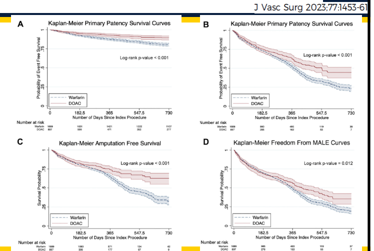
Figure 2. Kaplan–Meier Analysis of the Primary Composite Efficacy Outcome.
The primary efficacy outcome was a composite of acute limb ischemia, major amputation for vascular causes, myocardial infarction, ischemic stroke, or cardiovascular death. The inset shows the same data on an expanded y axis.

DOI: 10.1056/NEJMoa2000052

Use of direct-acting oral anticoagulants associated with improved survival and bypass graft patency compared with warfarin after infrageniculate bypass

J Vasc Surg 2023;77:1453-61

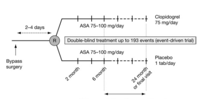
- VQI review of infrageniculate bypass
- 2007-2020
- N = 57,887
- Not able to determine DOAC dose

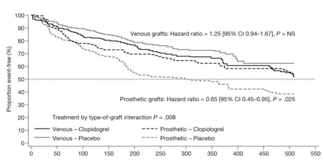


SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER
UNIVERSITY OF MICHIGAN HEALTH SYSTEM

Results of the randomized, placebo-controlled clopidogrel and acetylsalicylic acid in bypass surgery for peripheral arterial disease (CASPAR) trial

RCT of bypasses
N = ~ 430 per arm
Composite outcome



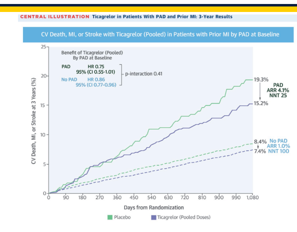


JVS 2010;52:825

SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER
UNIVERSITY OF MICHIGAN HEALTH SYSTEM

Ticagrelor for Prevention of Ischemic Events After Myocardial Infarction in Patients With Peripheral Artery Disease

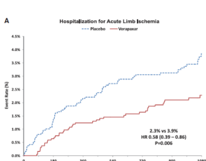
More effective than plavix

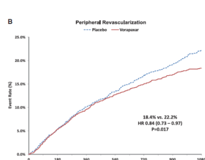


SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER
UNIVERSITY OF MICHIGAN HEALTH SYSTEM

Vorapaxar in Patients With Peripheral Artery Disease
Results From TRA2°P-TIMI 50

- RCT of PAR1 antagonist
- N = 3787
- Composite endpoint NS
- Signal with ALI and revascularization

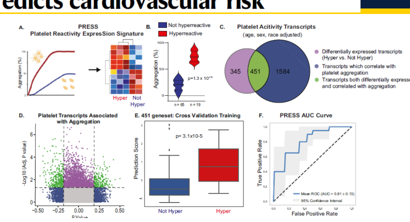




DOI: 10.1161/CIRCULATIONAHA.112.000679

SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER
UNIVERSITY OF MICHIGAN HEALTH SYSTEM

A Platelet Reactivity ExpreSsion Score derived from patients with peripheral artery disease predicts cardiovascular risk



Nature Communications | (2024)15:6902

SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER
UNIVERSITY OF MICHIGAN HEALTH SYSTEM


Thank you!
SAMUEL AND JEAN FRANKEL CARDIOVASCULAR CENTER
UNIVERSITY OF MICHIGAN HEALTH SYSTEM