Apixaban Loading in Anticoagulated Patients and Updates to Antiplatelet Bridging Therapy in Cardiac Catheterization

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Disclosures

- The planners and speakers have indicated that there are no relevant financial relationships with any ineligible companies to disclose.
- Off labeled use of apixaban and rivaroxaban will be discussed.

Learning Objectives

At the end of this session, learners should be able to:

- Outline the pharmacology and mechanism of action of apixaban as a direct oral anticoagulant
- Identify the clinical indications for initiating apixaban in patients already on therapeutic anticoagulation and transitions from alternative IV and oral anticoagulants
- Identify updated guidelines and recommendations in the setting of antiplatelet bridging post-cardiac catheterization
- Outline and compare available pharmacologic agents in the setting of antiplatelet bridging post-cardiac catheterization

Abbreviation Key

ACS: Acute Coronary Syndrome
ASA: Aspirin
AWP: Average Wholesale Price
BID: Twice Daily
BMS: Bare-metal Stent
BVS: Bioresorbable Vascular Stent (Scaffold)
CABG: Coronary Artery Bypass Graft
CHEST: American College of Chest Physicians
CKD: Chronic Kidney Disease
CrCl: Creatinine Clearence
CS: Cardiac Surgery
CTO: Chronic Total Occlusion
DAPT: Dual Antiplatelet Therapy
DES: Drug Eluting Stent
DM: Diabetes Mellitus
DOAC: Direct Oral Anti-Coagulation
GPIIb/IIIa: Glycoprotein IIb/IIIa
HF: Heart Failure
HIT: Heparin Induced Thrombocytopenia
IU: International Units
IV: Intravenous
JACC: Journal of the American College of Cardiology
KG: Kilogram
LAD: Left Anterior Descending Artery
LHC: Left Heart Catheterization
LMWH: Low Molecular Weight Heparin
LV: Left Ventricular
LVEF: Left Ventricular Ejection Fraction
MI: Myocardial Infarction
MOA: Mechanism of Action
NACE: Net Adverse Clinical Event
NCS: Non-Cardiac Surgery
NEJM: New England Journal of Medicine
NSTEMI: Non-ST-Elevation Myocardial Infection
OR: Operating Room
P2Y12i: P2Y12 Inhibitor
PCI: Percutaneous Coronary Intervention
PLT: Platelet
PO: By Mouth
PRU: P2Y12 Reaction Unit
PVD: Peripheral Vascular Disease
RCT: Randomized Controlled Trial
RCRI: Revised Cardiac Risk Index
RR: Risk Ratio
rVTE: Recurrent Venous Thromboembolism
SCr: Serum Creatinine
ST: Stent Thrombosis
STEMI: ST-Elevation Myocardial Infarction
SUBQ: Subcutaneous
TIA: Transient Ischemic Attack
UFH: Unfractionated Heparin
VKA: Vitamin K Antagonist
VTE: Venous Thromboembolism

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Outline

- Apixaban mechanism of action and dosing
- Transitioning to apixaban from alternative anticoagulants
- Review of apixaban's current literature and recommendations

- Identify target patient population for antiplatelet bridging
- Review pharmacological agents and current guidelines and recommendations in antiplatelet bridging post cardiac catheterization
- Compare Enterprise formulary to current guidelines and recommendations for antiplatelet bridging

Apixaban Loading in Anticoagulated Patients

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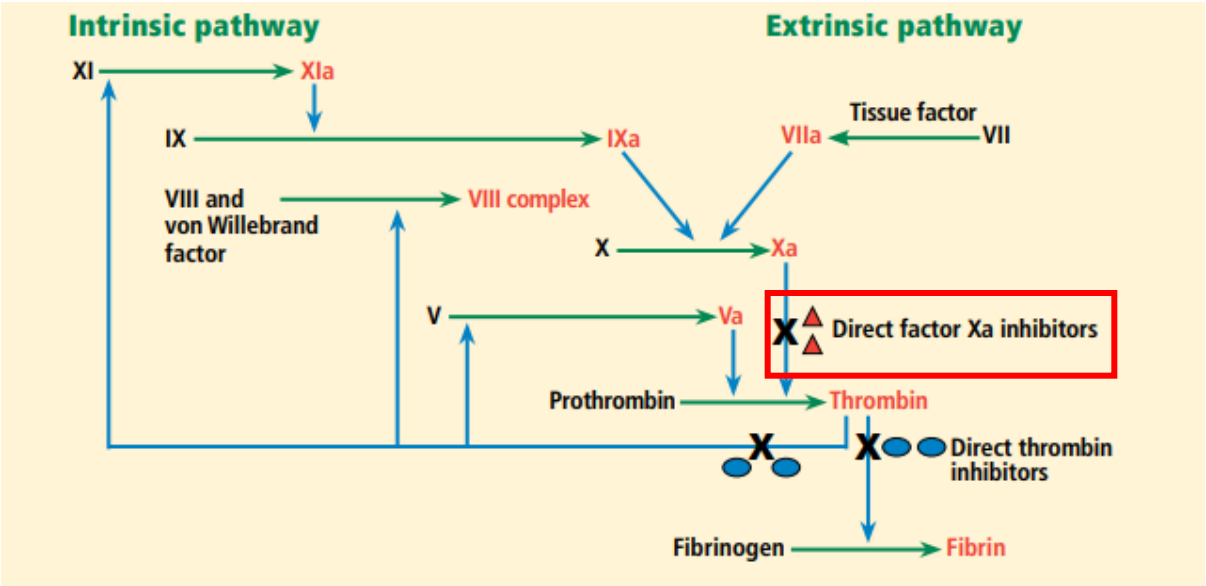
Apixaban Hypercoagulable Dosing

- Loading Dose misnomer
- Loading Dose: higher initial dose given to rapidly achieve **therapeutic concentration**
- Lead in oral dose used in acute phase of hypercoagulable state

Eliquis® (apixaban) tablets: Full Prescribing Information. Bristol Myers Squibb 2012. https://www.fda.gov/drugsatfda. Accessed 2026

Apixaban Mechanism of Action



Fawole A, et al. *Cleveland Clinic Journal of Medicine*. 2013;80(7):443-451.

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AMPLIFY Trial

Measure	Study
Design	Prospective, double blinded, placebo controlled RCT
Population	N=5,395 Apixaban (n=2,691) Conventional therapy (n=2,704) 65% DVT 35% PE
Intervention	**Apixaban 10 mg PO BID for 7 days then 5 mg PO BID** Along with placebo LMWH and warfarin Fake INR result was given to simulate routine adjustments **Conventional therapy** Enoxaparin 1 mg/kg SUBQ q12h for ≥5 days bridged to warfarin PO adjusted to an INR of 2-3

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Agnelli G, et al. *N Engl J Med*. 2013;369(9):799-808.

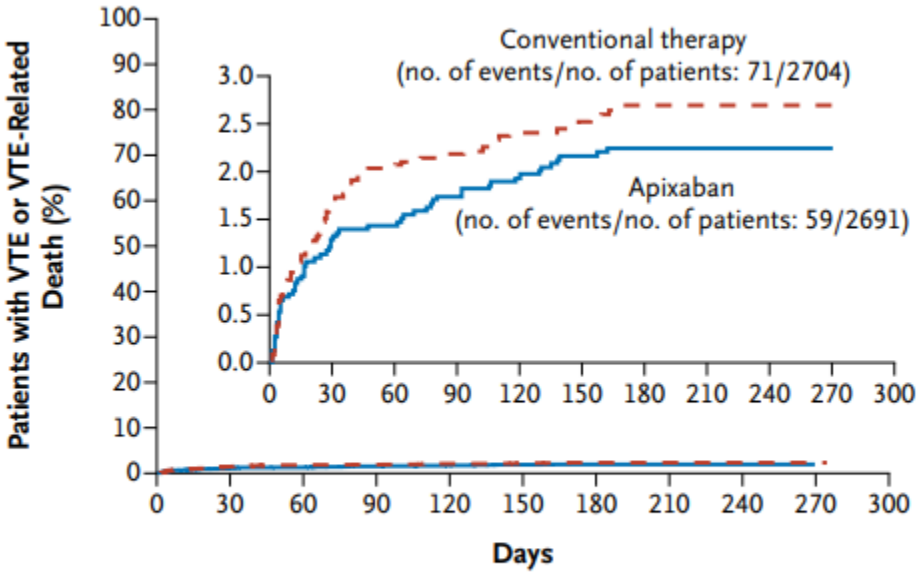
AMPLIFY Trial

Primary Outcome	Study
Recurrent symptomatic VTE or VTE mortality	2.3% vs. 2.7% RR 0.84 (95% CI 0.60-1.18) p <0.001 for non-inferiority Non inferiority margin: RR = 1.80
Principal Safety Outcomes	**Study**
Major bleeding plus clinically-relevant non-major bleeding	Clinically-relevant non-major bleeding defined as overt bleeding not meeting criteria for major bleeding but associated with a medical intervention, contact with a physician, interruption of a study drug, or pain or impairment in carrying out ADLs. 4.3% vs. 9.7% RR 0.44 (95% CI 0.36-0.55) p <0.001 for superiority; NNH 19
Major Bleeding Alone	Defined as Hgb drop ≥2 g/dL, requiring ≥2 units pRBC transfusion, bleeding in a critical site, or contributing to death. 0.6% vs. 1.8% RR 0.31 (95% CI 0.17-0.55) p <0.001 for superiority; NNH 100

Agnelli G, et al. *N Engl J Med*. 2013;369(9):799-808.

AMPLIFY Trial

A



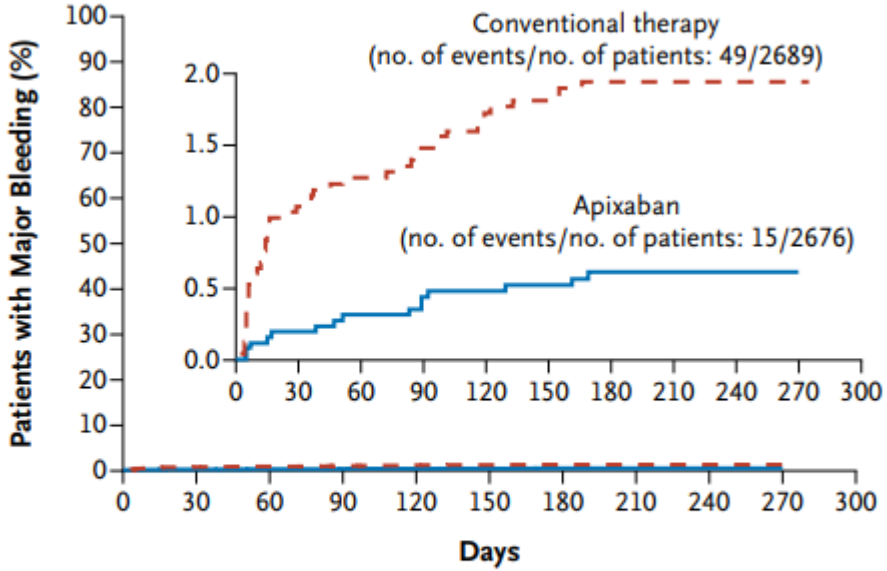
No. at Risk											
Apixaban	2691	2606	2586	2563	2541	2523	62	4	1	0	0
Conventional therapy	2704	2609	2585	2555	2543	2533	43	3	1	1	0

ADVOCATE HEALTH

Agnelli G, et al. *N Engl J Med*. 2013;369(9):799-808.

AMPLIFY Trial

B



No. at Risk

Apixaban	2676	2519	2460	2409	2373	2339	61	4	1	0	0
Conventional therapy	2689	2488	2426	2383	2339	2310	43	3	1	1	0

ADVOCATE HEALTH

Agnelli G, et al. *N Engl J Med*. 2013;369(9):799-808.

AMPLIFY Trial

Measure	Study
Primary Outcome	Recurrent symptomatic VTE or VTE mortality
Principal Safety Outcomes	Major bleeding alone Major bleeding plus clinically-relevant non-major bleeding
Relevant Exclusion Criteria	LMWH treatment for >2 doses if daily, >3 doses if q12h or >36 hours of UFH IV infusion >2 doses of PO VKA therapy
Results	Apixaban is non inferior to conventional therapy for VTE Apixaban has a greater reduction in rates of bleeding

Agnelli G, et al. *N Engl J Med*. 2013;369(9):799-808.

Conclusion AMPLIFY Trial

- Trial established initial VTE Treatment dosing regimen of apixaban
  - 10 mg PO BID x 7 days -> 5 mg PO BID thereafter

Agnelli G, et al. *N Engl J Med*. 2013;369(9):799-808.
Agnelli G, et al. *N Engl J Med*. 2013;368(8):699-708.

Clinical Indications for Apixaban

Indication	Dosing
Atrial Fibrillation and Atrial Flutter*	5 mg PO BID
LV Thrombus Treatment* or Prophylaxis*	5 mg PO BID
VTE Prophylaxis	2.5 mg PO BID
VTE Treatment	**10 mg PO BID x 7 days** -> 5 mg PO BID thereafter
HIT*	**10 mg PO BID x 7 days** -> 5 mg PO BID thereafter

* Off-label use

Eliquis® (apixaban) tablets: Full Prescribing Information. Bristol Myers Squibb 2012. https://www.fda.gov/drugsatfda. Accessed 2026
Glenn N, et Al 2023 AHA/ACC/ACCP/ASPC/NLA/PCNA Guideline for the Management of Patients With Chronic Coronary Disease. *Circulation.* 2023

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Transitioning to Apixaban

Medication	Transition
Warfarin (PO)	When INR < 2
Fondaparinux (SUBQ) Enoxaparin (SUBQ)	Administer apixaban at time of next dose
Heparin (IV) Argatroban (IV) Bivalirudin (IV)	Stop infusion at the time of apixaban initiation

*Dosing dependent on indication

Eliquis (apixaban) tablets: Full Prescribing Information. Bristol Myers Squibb 2012. https://www.fda.gov/drugsatfda. Accessed 2026

Assessment Question #1

What is the mechanism of action of apixaban?

A. Vitamin K Antagonist
B. Factor Xa Inhibitor
C. Direct Thrombin Inhibitor
D. A & B

CARAVAGGIO Clinical Trial

Measure	Study: Apixaban for the Treatment of Venous Thromboembolism Associated with Cancer
Design	Multinational, randomized, investigator-initiated, open-label, noninferiority trial with blinded central outcome adjudication
Population	N = 1,170 with cancer-associated VTE 576 apixaban 579 dalteparin
Intervention	Patients were randomly assigned in a 1:1 ratio to receive monotherapy with either apixaban or dalteparin for 6 months. Apixaban: 10 mg PO BID x 7 days then 5 mg PO BID Dalteparin: 200 IU/kg SUBQ daily x 1 month then 150 IU/kg daily
Primary Outcomes	Recurrent VTE Major bleeding

Agnelli G, et al. *N Engl J Med.* 2020;382:1599-1607

CARAVAGGIO Clinical Trial

Measure	Study: Apixaban for the Treatment of Venous Thromboembolism Associated with Cancer
Primary Outcomes	**Recurrent VTE** Apixaban: 32/576 (5.6%) Dalteparin: 46/579 (7.9%) Hazard ratio: 0.63 (95% CI, 0.37–1.07) p value: <0.001 for noninferiority; p =0.09 for superiority (superiority not met) **Major bleeding** Apixaban: 22/576 (3.8%) Dalteparin: 23/579 (4.0%) Hazard ratio: 0.82 (95% CI, 0.40–1.69) p value: 0.60 (no significant difference)
Relevance	Allowed up to 72 hours of parenteral anticoagulant and 7 days of 10 mg PO BID apixaban was still given additionally, before transitioning to 5 mg PO BID
Results	Oral apixaban was noninferior to subcutaneous dalteparin in cancer-associated VTE **without an increased risk of major bleeding**

ADVOCATE HEALTH

Agnelli G, et al. *N Engl J Med.* 2020;382:1599-1607

CARAVAGGIO Conclusions

- Parenteral lead in therapy followed by a 7-day 10 mg PO BID lead in of apixaban prior to transitioning to the maintenance 5 mg PO BID did not increase risk of bleeding
- Evidence to support abbreviating apixaban lead in due to bleed risk is low

Renner, E, et al. *JACC.* 2020 Nov, 76 (18) 2142–2154.

Why Consider Abbreviating Lead In Therapy?

- Supporting evidence displays general low bleed risk when 7-day apixaban lead in is combined with parenteral lead in
- Potentially due to how other DOACs are dosed or dosing utilized in HIT

Edoxaban and Dabigatran

- Both DOACs require 5 days of parenteral anticoagulation lead – in therapy prior to starting maintenance dose
- Neither require an initial oral lead in
- Dabigatran RE-COVER Clinical Trial
  - Received initial parenteral anticoagulation (UFH or LMWH) for at least 5 days and true INR or sham INR ≥2 for 2 consecutive days
- Edoxaban Hokusai VTE Study
  - Patients received ≥5 days of therapeutic LMWH followed by edoxaban 60 mg PO daily

PRADAXA (dabigatran etexilate mesylate) capsules for oral use Label. Boehringer Ingelheim, 2010, https://www.accessdata.fda.gov/drugsatfda_docs/label/2011/022512s007lbl.pdf. Accessed 2026
SAVAYSA (edoxaban) tablets for oral use Label. Daiichi Sankyo Inc, 2015, https://www.accessdata.fda.gov/drugsatfda_docs/label/2015/206316s002lbl.pdf. Accessed 2026

American Society of Hematology 2018 Guidelines

- Patients with remote HIT
- Require VTE treatment or prophylaxis
- Recommends non-heparin anticoagulant (or a VKA) rather than UFH or LMWH
- Strong recommendation, very low certainty

Cuker A, et al. Blood Adv 2018; 2(22):3360-3392

American Society of Hematology 2018 Guidelines

- In patients with subacute HIT A
- Suggests treatment with a DOAC rather than a VKA
- Conditional recommendation, moderate certainty

Cuker A, et al. Blood Adv 2018; 2(22):3360-3392

Apixaban Lead In Dose in HIT

- No randomized trials that compare DOACs in patients with acute HIT*
  - If initially treated for HIT* with a parenteral non-heparin anticoagulant, transition to 5 mg PO BID after platelet count recovery

OR

  - Parenteral non-heparin anticoagulant administered < 7 days
    - Transition to 10 mg PO BID; and after total of 7 days with non-heparin anticoagulation -> 5 mg PO BID

* Off-label use

Cirbus K, et al. *J Clin Pharm Ther*. 2022;47(1):112-118.
Cuker A, et al. Blood Adv 2018; 2(22):3360-3392

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Rivaroxaban Lead In Dose

- VTE
  - 15 mg PO BID x 21 days followed by 20 mg PO once daily
- HIT*
  - If initially treated with a parenteral non-heparin anticoagulant for 21 days, transition to 20 mg PO once daily after platelet count recovery

  OR

  - If the parenteral non-heparin anticoagulant is administered for < 21 days
    - Transition to 15 mg PO BID
    - After a total of 21 days with non-heparin anticoagulation -> reduce to 20 mg PO once daily

* Off-label use

Xarelto (rivaroxaban) tablets. Prescribing information. Janssen Pharmaceuticals, Inc; 2011. https://www.accessdata.fda.gov/drugsatfda_docs/label/2011/202439s001lbl.pd; Accessed 2026
Cirbus K, et al. *J Clin Pharm Ther*. 2022;47(1):112-118.
Cuker A, et al. Blood Adv 2018; 2(22):3360-3392

Apixaban Abbreviated Lead In

Measure	Study: Reduced Versus Full Apixaban Lead-In Dosing Following Parenteral Treatment of Acute Venous Thromboembolism
Design	Single center, retrospective, cohort study
Population	N = 119 Full lead in group apixaban 10 mg PO BID > 6 Days = 35 Reduced lead in group apixaban 10 mg PO BID ≤ 6 Days = 84 Median duration of parenteral anticoagulation was longer in the reduced lead-in group 6.7 vs. 2 days
Primary Outcome	Rate of recurrent VTE events within 30 days of the index VTE event
Intervention	Full lead-in cohort was defined as receiving apixaban 10 mg BID for ≥ 6 days, while the reduced lead-in cohort was defined as receiving apixaban 10 mg PO BID for < 6 days
Results	No difference in VTE or bleeding events within 30 days of the index VTE in the reduced vs. full lead in group **Further validation in clinical trials is warranted to confirm the safety and efficacy**

ADVOCATE HEALTH

Veloria D, et al. *Thrombosis Update*, Volume 18, 2025, 100199, ISSN 2666-5727

Apixaban Abbreviated Lead In

Measure	Study: Comparing the Safety and Effectiveness of Apixaban Lead-In Dosing Strategies in Hospitalized Adults With Venous Thromboembolism
Design	Single center, retrospective, observational study
Population	N = 68 Parenteral + Abbreviated Lead-in apixaban N = 11 Parenteral + Full Lead-in apixaban N = 25 Apixaban only full Lead-in N = 32
Primary Outcome	Incidences of recurrent VTE (rVTE) or bleeding events within 6 months of the index visit
Intervention	Patients either receive ≥ 48 hour parenteral + 0 – 6 days apixaban lead-in, ≥ 48 hour parenteral + 7 days apixaban lead-in, or 7 days apixaban lead-in
Results	There were no differences between groups for incidences of recurrent VTE (rVTE) or bleeding events VTE within 6 months occurred in 2 patients: 1 patient in the parenteral + full lead-in and 1 patient in the apixaban only group (P = 0.99) Bleeding evens within 6 months occurred in 3 patients: 1 in the parenteral plus full lead-in and 2 in the apixaban only group (P = 0.99) **Further validation in clinical trials is warranted to confirm the safety and efficacy of abbreviated lead in**

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Spencer J, et al.. *J Pharm Technol*. March 17, 2025.

Enterprise DOAC Policy

- Does not provide guidance on abbreviated lead in dosing

ADVOCATEHEALTH Enterprise Pharmacy	Title: Direct Oral Anticoagulants (DOACs) Pharmacy Reference
Type: ☐ Education/Tip Sheet (Non-Epic) ☒ Job Aid ☐ Process/Workflow Diagram ☐ Standard Operating Procedure (SOP) ☐ Standard Practice ☐ Other:	Scope: ☒ AH Enterprise Pharmacy ☐ AH Enterprise Pharmacy – IL Division ☐ AH Enterprise Pharmacy – WI Division ☐ AH Enterprise Pharmacy – NC/GA Division ☐ Site Pharmacy Dept:
Review/Approval Group: Acute Care Core Team	

Direct Oral Anticoagulant Comparison (Enterprise Sharepoint > Clinical Resources > General Medicine > Direct Oral Anticoagulants (DOACs) Pharmacy Reference

Assessment Question #2

Which patient currently on parenteral therapeutic anticoagulation could be transitioned to oral therapy with lead in apixaban dosing?

A. 72-year-old female with bilateral swelling in the peripheries. Lower extremity doppler found to be negative.

B. 55-year-old male newly diagnosed with atrial fibrillation. CHA_2DS_2VASc of 3.

C. 65-year-old female with heart failure found to have apical thrombus on echocardiogram.

D. 82-year-old male with cancer that was assessed for weakness. Incidental sub-segmental pulmonary embolism was found on chest imaging.

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Summary

- Apixaban directly inhibits Factor Xa
- Initial dosing provides increased anti-coagulation during acute phase of a hypercoagulable state
- Randomized controlled trials and subsequent literature of a 7-day lead in in addition to parenteral lead in demonstrates risk of bleeding is low
- Guidance supports abbreviated dosing in HIT
- Low quality of evidence to support foregoing or abbreviating a lead in dose of apixaban

Updates to Antiplatelet Bridging Therapy in Cardiac Catheterization

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Outline

- Apixaban mechanism of action and dosing
- Transitioning to apixaban from alternative anticoagulants
- Review of apixaban's current literature and recommendations

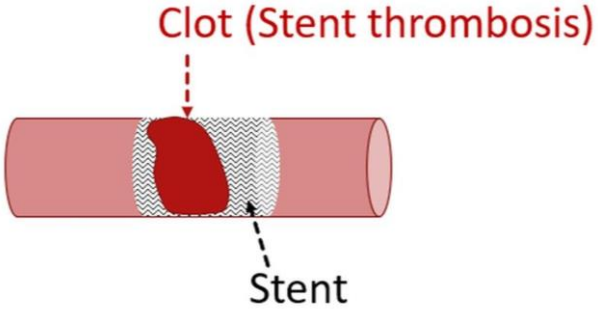
- Identify target patient population for antiplatelet bridging
- Review pharmacological agents and current guidelines and recommendations in antiplatelet bridging post cardiac catheterization
- Compare Enterprise formulary to current guidelines and recommendations for antiplatelet bridging

Patient Population Requiring Antiplatelet Bridging

Patients presenting with ACS event who receive a cardiac catheterization and need to be bridged to future procedure

Recent cardiac catheterization with stent placement requiring antiplatelet bridge to planned future procedure

Stent Thrombosis Risk Timeline



Highest Risk → Lowest Risk

Phase	Acute	Subacute	Early	Late	Very Late
Time from stent deployment	<24 hours	24 hours – 1 month	<1 month	1 – 12 months	>12 months

Francis J. Clot formation within a stent (stent thrombosis). Illustration. Drug coated balloon for angioplasty. Accessed January 29, 2026
Modi K et al. *StatPearls*. July 25, 2023

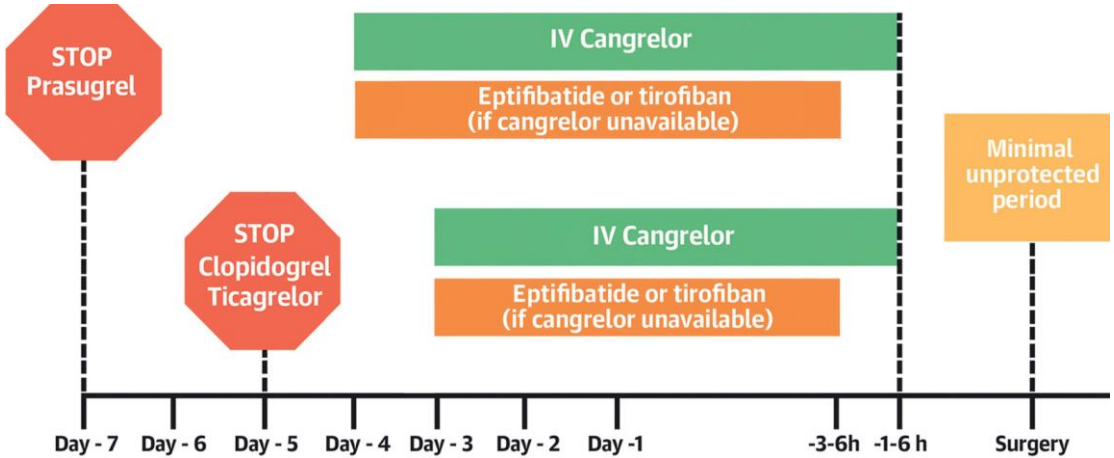
Major Risk Factors for Perioperative Stent Thrombosis per JACC

- Bifurcation PCI with ≥ 2 stents
- Left main PCI
- Recent ACS
- Multiple MI
- Prior ST
- LVEF <35%
- <1 month from PCI
- DAPT noncompliance

Sullivan A et al. *JACC*. 2021; Vol. 78, No. 15

What is Antiplatelet Bridging?

- Discontinuation of oral antiplatelet agents prior to future procedure
  - Subsequent use of IV antiplatelet agents leading up to the procedure



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Sullivan A et al. *JACC*. 2021; Vol. 78, No. 15

Antiplatelet Agents

P2Y12 Inhibitors

- Clopidogrel (Plavix®)
- Ticagrelor (Brilinta®)
- Prasugrel (Effient®)
- Cangrelor (Kengreal®)

Glycoprotein IIb/IIIa Inhibitors

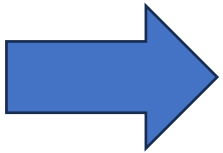
- Eptifibatide (Integrilin®)
- Tirofiban (Aggrastat®)

Douketis JD et al. *CHEST*. 2022;162(5):e207-e243
Sullivan A et al. *JACC*. 2021; Vol. 78, No. 15

Common Antiplatelet Agents for Bridging

Oral Agents

- Clopidogrel (Plavix®)
- Ticagrelor (Brilinta®)
- Prasugrel (Effient®)



IV Agents

- **Eptifibatide (Integrilin®)**
- **Tirofiban (Aggrastat®)**
- **Cangrelor (Kengreal®)**

Douketis JD et al. *CHEST*. 2022;162(5):e207-e243
Sullivan A et al. *JACC*. 2021; Vol. 78, No. 15

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Assessment Question #3

Which patient scenario would be the most appropriate to receive an antiplatelet bridging agent prior to procedure based on their risk level of stent thrombosis?

A. 44-year-old male with prior DES of the LAD for STEMI 2 years ago
B. 75-year-old male who underwent PCI of the left main coronary artery with stenting for NSTEMI 3 weeks ago
C. 68-year-old female presenting for a LHC with recent ACS event who did not have a stent placed
D. 57-year-old female who had an NSTEMI 13 months ago and has been compliant with DAPT

Recommendation and Guideline Comparison		
Consensus	**JACC 2021 Recommendations**	**CHEST 2022 Guidelines**
	Against routine use of bridging but can consider in select high-risk patients	
Risk Timeline Cutoffs from Stent Deployment		
Weeks	**<1 month** Highest Risk for ST (7%) Consider Bridge	**<3 Months** Highest Risk for ST Consider Bridge
Months	**>3 Months** Bridging agents limited to highest risk patients with multiple risk factors for ST ST Risk at 6 Months (4.2%)	**>3 Months** Likely safe to not bridge
12 Months	ST Rates return to baseline (0.78%)	
Preferred Agent		
	Suggest that cangrelor be used as the first-line agent for perioperative bridging • Suggest reserving the GPIIb/IIIa for situations in which cangrelor is not available	No preferred agent

Douketis JD et al. *CHEST*. 2022;162(5):e207-e243
Sullivan A et al. *JACC*. 2021; Vol. 78, No. 15

Pharmacokinetic Properties of Antiplatelet Agents

- Oral agents
  - Not preferred for continuation due to half-life and time of therapeutic effect
  - Theoretically could pursue reversal but introduces risks of its own
- IV Cangrelor
  - Only intravenous antiplatelet agent that has been evaluated in an RCT for bridging

	Clopidogrel PO (Plavix®)	Ticagrelor PO (Brilinta®)	Prasugrel PO (Effient®)	Cangrelor IV (Kengreal®)	Eptifibatide IV (Integrilin®)	Tirofiban IV (Aggrastat®)
Half-life	6 hours	7 hours	7 hours	3-6 mins	6 hours	7 hours
Hold time prior to procedure	5 days	3-5 days	7 days	1-2 hours	6-8 hours	

Douketis JD et al. *CHEST*. 2022;162(5):e207-e243
Sullivan A et al. *JACC*. 2021; Vol. 78, No. 15

Bridging antiplatelet therapy with cangrelor in patients undergoing cardiac surgery: a randomized controlled trial

Measure	Study
Design	Prospective, randomized, double-blind, placebo-controlled trial to evaluate cangrelor for bridging to CABG
Population	210 Patients with an ACS or prior coronary stent on a thienopyridine awaiting CABG
Intervention	Thienopyridine discontinuation and administration of cangrelor bridge or placebo for 48 hours
Results	• Determined **cangrelor 0.75 µg/kg/min** • **Efficacy: PRU <240; 98.9% vs 19.0% (cangrelor vs placebo)** RR, 5.2 [95% CI, 3.3-8.1] • **Safety: Excessive CABG related bleeding; 11.8% vs 10.4%** RR, 1.1 [95% CI, 0.5-2.5]

ADVOCATE HEALTH

Angiolillo DJ et al. *JAMA*. 2012;307(3):265–274

Bleeding Risk Associated with Eptifibatide (Integrilin®) Bridging in Thoracic Surgery Patients

Measure	Study
Design	Retrospective analysis of eptifibatide bridge in high-risk or recent PCI patients undergoing surgery
Population	30 patients with prior coronary stent on a P2Y12 inhibitor undergoing surgery
Intervention	P2Y12 inhibitor discontinuation and administration of eptifibatide bridge vs no bridging agent
Results	• **Perioperative transfusion; 30% vs 26.1% (eptifibatide vs no bridge)** P = 0.69 • **Intraoperative blood loss; 385.4 mL vs 380 mL** • **Acute MI; 3.3% vs 2.9%**

ADVOCATE HEALTH

Waldron NH et al. *J Thromb Thrombolysis*. 2017;43(2):194-202

Intravenous Antiplatelet Therapy Bridging in Patients Undergoing Cardiac or Non-Cardiac Surgery Following Percutaneous Coronary Intervention

Measure	Study
Design	Retrospective analysis of patients bridged to surgery after PCI
Population	60 patients on DAPT with prior PCI who underwent surgery requiring bridging
Intervention	DAPT discontinuation and tirofiban, eptifibatide or cangrelor bridge to surgery
Results	• **NCS: 11.11% had bleeding complications.** All received eptifibatide • **CS: 26.67% had bleeding complications.** All received eptifibatide

ADVOCATE HEALTH

Dargham BB et al. *Cardiovasc Revasc Med.* 2019;20(9):805-811

Bridge therapy or standard treatment for urgent surgery after coronary stent implantation: Analysis of 314 patients

Measure	Study
Design	Retrospective analysis of tirofiban bridging after coronary stenting
Population	87 patients on P2Y12 inhibitors undergoing surgery
Intervention	P2Y12 inhibitor discontinuation and administration of tirofiban bridge vs no bridging agent
Results	**Significantly lower rate of NACE with tirofiban bridging; 8.0% vs 28.6% (tirofiban vs no bridge)** P = 0.001

De Servi S et al. *Vasc Pharmacol.* 2016;80:85-90

Outcomes of preoperative bridging therapy for patients undergoing surgery after coronary stent implantation: A weighted meta-analysis of 280 patients from eight studies

Measure	Study
Design	Meta-analysis of preoperative bridging with GPIIb/IIIa inhibiting agents
Population	280 patients with prior coronary stenting on antiplatelet therapy undergoing surgery
Intervention	Antiplatelet therapy discontinuation and administration of GPIIb/IIIa inhibitor bridge
Results	• ST occurrence 1.3% • Major bleeding occurrence 7.4% • Any bleeding 20.6%
Conclusion	**GPIIb/IIIa bridging agents can mitigate ischemic complications but may result in significant bleeding**

ADVOCATE HEALTH

Warshauer J et al. *Catheter Cardiovasc Interv*. 2014;85(1):25-31

Antiplatelet Bridging Literature Summary

- JACC recommendations and CHEST guidelines are the most recent organizations to publish updates in this space
- No FDA approved medications supporting antiplatelet bridging
- Lack of multiple RCTs
- Instent rethrombosis risk terminology – no consensus on timeframes
- Renal dysfunction, major risk factors, risk of bleeding, etc.

Angiolillo DJ et al. *JAMA*. 2012;307(3):265–274
Rao S et al. *JACC*. 2025 Jun, 85 (22) 2135–2237

Enterprise Policy on Cangrelor Cardiac Indications

- *Bridging for the interruption of enteral P2Y12 inhibitors for procedures is not permitted in adult patients*
- Adult cardiology – for use during percutaneous coronary intervention (PCI) in acute coronary syndrome patients with cardiogenic shock (awake, patients who have not had cardiac arrest) who require or are likely to require mechanical circulatory support with use limited to a 4-hour duration [guidance for stocking: for use by facilities capable of initiating percutaneous ventricular assist devices]
- Pediatrics - mechanical circulatory support patients who require antiplatelet therapy and are NPO or planned to be NPO for procedures, immediate post-operative cardiology patients who require antiplatelet therapy; use limited to 72-hour duration of administration

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Enterprise Policy on GPIIb/IIIa Cardiac Indications

- Eptifibatide is formulary restricted
- Tirofiban is not formulary restricted

AH formulary with restriction criteria and therapeutic interchanges.xlsx

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Dosing for Anti-PLT Bridging Agents

- Oral agents should be stopped 48 hours prior to initiation of IV agents

Anti-PLT Bridging Agent	Renal Function	Dose	Time to Discontinue Prior to Surgery
Cangrelor IV	No renal adjustments	0.75 µg/kg/min	1 hour
Eptifibatide IV	CrCl ≥ 50 mL/min	2.0 µg/kg/min	4-6 hours
	CrCl < 50 mL/min	1.0 µg/kg/min	8-12 hours
	ESRD/Dialysis	Contraindicated per package insert	
Tirofiban IV	CrCl ≥ 50 mL/min	0.1 µg/kg/min	4-6 hours
	CrCl < 50 mL/min	0.05 µg/kg/min	8-12 hours
	ESRD/Dialysis	Not recommended due to insufficient data	

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Cost Comparison of Antiplatelet Bridging Agents

Cost for 100 kg patient to bridge from DAPT (clopidogrel/ASA) to planned procedure

Anti-PLT Bridging Agent	Cost ($)*
Cangrelor IV	8,053.38
Eptifibatide IV	1,425.00
Tirofiban IV	403.92

*Prices per Lexicomp AWP for approximately 3 days

Cangrelor: In: Lexi-Drugs. UpToDate Inc; 2026. Updated December 26, 2025. Accessed February 13, 2026
Eptifibatide: In: Lexi-Drugs. UpToDate Inc; 2026. Updated February 13, 2026. Accessed February 13, 2026
Tirofiban: In: Lexi-Drugs. UpToDate Inc; 2026. Updated October 2, 2025. Accessed February 13, 2026

Assessment Question #4

Which of the following is the primary advantage of using cangrelor as a bridging agent over other available agents?

A. It provides a long half-life that maintains platelet inhibition for several hours after discontinuation
B. It reduces the need to restart oral P2Y12 inhibitors post surgery
C. It is the only antiplatelet agent with a bridge dose validated as safe by an RCT
D. It is a cheap and effective agent with a low risk and side effect profile

Antiplatelet Bridging Summary

- Bridging should not be routine and should only be considered for certain patients with high-risk factors for ST
- No official FDA approved antiplatelet bridging agent
- Cangrelor is the only antiplatelet agent with bridging dose validated by an RCT
- Cangrelor is associated with less severe bleeding than GPIIb/IIIa inhibitors
- Cost of cangrelor bridge is significantly more than GPIIb/IIIa inhibitors
- JACC suggests that GPIIb/IIIa inhibitors should be reserved for when cangrelor is unavailable
- Cangrelor and eptifibatide are both restricted at Advocate Health

Cangrelor: In: Lexi-Drugs. UpToDate Inc; 2026. Updated December 26, 2025. Accessed February 13, 2026
Douketis JD et al. *CHEST*. 2022;162(5):e207-e243
Sullivan A et al. *JACC*. 2021; Vol. 78, No. 15

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Conclusion

- Apixaban directly inhibits Factor Xa
- Initial dosing provides increased anti-coagulation during acute phase of a hypercoagulable state
- Randomized controlled trials and subsequent literature of a 7-day lead in in addition to parenteral lead in demonstrates risk of bleed is generally low
- Low quality of evidence to support foregoing or abbreviating a lead in dose of apixaban
- JACC Recommendations and CHEST Guidelines
  - Most updated references for antiplatelet bridging guidance
- Literature is mixed on preferred first-line agent for antiplatelet bridging
- Routine antiplatelet bridging is not recommended per JACC or CHEST

References

1. Food and Drug Administration. Eliquis (apixaban) tablets: Full Prescribing Information. Silver Spring, MD: US Dept of Health and Human Services; 2012.

2. Fawole A, Daw HA, Crowther MA. Practical management of bleeding due to the anticoagulants dabigatran, rivaroxaban, and apixaban. Cleve Clin J Med. 2013;80(7):443-451.

3. Agnelli G, Buller HR, Cohen A, et al. Oral apixaban for the treatment of acute venous thromboembolism. N Engl J Med. 2013;369(9):799-808.

4. Agnelli G, Buller HR, Cohen A, et al. Apixaban for extended treatment of venous thromboembolism. N Engl J Med. 2013;368(8):699-708.

5. Bristol-Myers Squibb. ELIQUIS 360 Support.

6. Glenn et al. 2023 AHA/ACC/ACCP/ASPC/NLA/PCNA Guideline for the Management of Patients With Chronic Coronary Disease. *Circulation.* 2023;148(12):e267-e364. doi:10.1161/CIR.0000000000001092

7. Agnelli G, Becattini C, Meyer G, et al. Apixaban for the treatment of venous thromboembolism associated with cancer. N Engl J Med. 2020;382:1599-1607.

8. Renner E, Barnes G. Antithrombotic management of venous thromboembolism: JACC Focus Seminar. J Am Coll Cardiol. 2020;76(18):2142-2154.

9. Boehringer Ingelheim. PRADAXA (dabigatran etexilate mesylate) capsules for oral use Label. 2011.

10. Daiichi Sankyo, Inc. SAVAYSA (edoxaban) tablets for oral use Label. 2015.

11. Cuker A, Arepally GM, Chong BH, et al. American Society of Hematology 2018 guidelines for management of venous thromboembolism: heparin-induced thrombocytopenia. Blood Adv. 2018;2(22):3360-3392.

12. Janssen Pharmaceuticals, Inc. Xarelto (rivaroxaban) tablets: Prescribing information. 2011.

13. Cirbus K, Simone P, Szwak J. Rivaroxaban and apixaban for the treatment of suspected or confirmed heparin-induced thrombocytopenia. J Clin Pharm Ther. 2022;47(1):112-118.

14. Veloria D, Wang B, Ran R, Ha D, Diep R, Diep C. Reduced versus full apixaban lead-in dosing following parenteral treatment of acute venous thromboembolism. Thromb Update. 2025;18:100199.

15. Spencer J, Buchanan T, Heacock S, et al. Comparing the safety and effectiveness of apixaban lead-in dosing strategies in hospitalized adults with venous thromboembolism. J Pharm Technol. 2025.

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References

16. Francis J. Drug coated balloon for angioplasty. Johnson's Techworld. Published July 15, 2022. Accessed March 2026. https://johnsonfrancis.org/general/drug-coated-balloon-for-angioplasty/

17. Modi K, Soos MP, Mahajan K. Stent thrombosis. In: StatPearls. Treasure Island, FL: StatPearls Publishing; 2025. Updated July 25, 2023. Accessed March 2026. https://www.ncbi.nlm.nih.gov/sites/books/NBK441908/

18. Sullivan A, Nanna M, Wang T, et al. Bridging antiplatelet therapy after percutaneous coronary intervention: JACC review topic of the week. J Am Coll Cardiol. 2021;78(15):1550-1563. doi:10.1016/j.jacc.2021.08.013

19. Douketis JD, Spyropoulos AC, Murad MH, et al. Perioperative management of antithrombotic therapy: an American College of Chest Physicians clinical practice guideline. Chest. 2022;162(5):e207-e243.

20. Angiolillo DJ, Firstenberg MS, Price MJ, et al. Bridging antiplatelet therapy with cangrelor in patients undergoing cardiac surgery: a randomized controlled trial. JAMA. 2012;307(3):265-274. doi:10.1001/jama.2011.2002

21. Rao S, O'Donoghue M, Ruel M, et al. 2025 ACC/AHA/ACEP/NAEMSP/SCAI guideline for the management of patients with acute coronary syndromes. J Am Coll Cardiol. 2025;85(22):2135-2237. doi:10.1016/j.jacc.2024.11.009

22. Waldron NH, Dallas T, Erhunmwunsee L, Wang TY, Berry MF, Welsby IJ. Bleeding risk associated with eptifibatide bridging in thoracic surgery patients. J Thromb Thrombolysis. 2017;43(2):194-202. doi:10.1007/s11239-016-1441-5

23. Dargham BB, Baskar A, Tejani I, et al. Intravenous antiplatelet therapy bridging in patients undergoing cardiac or non-cardiac surgery following PCI. Cardiovasc Revasc Med. 2019;20(9):805-811. doi:10.1016/j.carrev.2018.11.018

24. De Servi S, Morici N, Boschetti E, Rossini R, Martina P, Musumeci G, et al. Bridge therapy or standard treatment for urgent surgery after coronary stent implantation. Vasc Pharmacol. 2016;80:85-90. doi:10.1016/j.vph.2015.11.085

25. Warshauer J, Patel VG, Christopoulos G, Kotsia AP, Banerjee S, Brilakis ES. Outcomes of preoperative bridging therapy for patients undergoing surgery after coronary stent implantation: meta-analysis. Catheter Cardiovasc Interv. 2014;85(1):25-31. doi:10.1002/ccd.25507

References

26. Formulary Alignment of Cangrelor IV

27. AH formulary with restriction criteria and therapeutic interchanges.xlsx

28. IV Antiplatelet Medications in Cardiology Reference

29. Cangrelor: In: Lexi-Drugs. UpToDate Inc; 2026. Updated December 26, 2025. Accessed February 13, 2026

30. Eptifibatide: In: Lexi-Drugs. UpToDate Inc; 2026. Updated February 13, 2026. Accessed February 13, 2026

31. Tirofiban: In: Lexi-Drugs. UpToDate Inc; 2026. Updated October 2, 2025. Accessed February 13, 2026

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