Consider VKA vs. DOAC, evaluate patient bleed risk, evaluate procedural bleed risk (no clinically relevant, low, intermediate, high or uncertain), consider additional information and use clinical judgment.

Consider VKA, FXa Inhibitor or DTI, and either INR or CrCl.

Consider VKA vs. DOAC, evaluate thrombotic risk balanced by patient bleed risk, consider additional information, and use clinical judgment.

Evaluate CrCl and patient allergies.

Consider post-procedure bridging plan, VKA vs. DOAC, procedure type (cardiac valve, intraspinal, intracranial); and evaluate post-procedure bleed risk, bleeding complications, hemostasis, and tolerance of oral medications.

CrCl = creatinine clearance; DOAC = direct oral anticoagulant; DTI = direct thrombin inhibitor; FXa = factor Xa; INR = international normalized ratio; VKA = vitamin K antagonist.
**FIGURE 2.**
Detailed Algorithm: Whether to Interrupt and How to Interrupt for VKAs

**WHETHER TO INTERRUPT VKA THERAPY**

- **Increased patient bleed risk?**
  - No
  - **Procedural bleed risk?**
    - Not clinically important or low
    - Intermediate or high
    - Uncertain
  - Perform the procedure uninterrupted. Exit the pathway.
  - Insufficient data on best practices; likely interrupt but consult with proceduralists.
  - Use clinical judgment: Persistent concern for bleeding?
    - No
    - **Procedural bleed risk?**
      - Not clinically important or low
      - Intermediate or high
      - Uncertain
    - Perform the procedure uninterrupted. Exit the pathway.
    - Yes

**GUIDANCE**

**INTERRUPT**

**WHEN TO INTERRUPT**

- **INR measurement 5-7 days prior to procedure?**
  - Supratherapeutic
  - Goal level (2.0 to 2.5 or 2.0 to 3.0)
  - Subtherapeutic
  - Discontinue ≥5 days before procedure depending on current INR, time to procedure, and desired INR for procedure; recheck INR 24 hours before procedure.
  - Discontinue 5 days before procedure depending on current INR, time to procedure and desired INR for procedure; recheck INR 24 hours before procedure.
  - Discontinue 3-4 days before procedure; recheck INR 24 hours before procedure if a normal INR is desired.

DOAC — direct oral anticoagulant
ICH — intracranial hemorrhage
INR — international normalized ratio
VKA — vitamin K antagonist

**CONTINUE TO WHETHER TO BRIDGE**
FIGURE 3.
Detailed Algorithm: Whether to Interrupt and How to Interrupt for DOACs

WHETHER TO INTERRUPT
DOAC THERAPY

CONSIDERATIONS

Increased patient bleed risk?

No

Yes

Procedural bleed risk?

No clinically important risk

Low

Uncertain, intermediate, or high

Perform the procedure uninterrupted, but time it at DOAC interval trough.

GUIDANCE

INTERRUPT

INTERRUPT

WHEN TO INTERRUPT

CONSIDERATIONS

Type of DOAC

Type of DOAC

DTI — direct thrombin inhibitor (dabigatran)

dTT — dilute thrombin time assay

DOAC — direct oral anticoagulant

FXa inhibitor — Factor Xa inhibitor (apixaban, edoxaban, rivaroxaban)

ICH — intracranial hemorrhage

INR — international normalized ratio

VKA — vitamin K antagonist

Measure CrCl

CrCl

<15

Discontinue

No data;
consider dTT
and/or ≥96 hrs.

≥72 hrs

≥48 hrs

≥36 hrs

≥24 hrs

15-29

30-49

50-79

≥80

Discontinue

No data;
consider anti Xa level
and/or≥48 hrs.

15-29

≥36 hrs

≥24 hrs

30-49

≥72 hrs

≥80

≥48 hrs

CrCl

<15

Discontinue

No data;
consider dTT.

15-29

≥120

30-49

≥96 hrs

50-79

≥72 hrs

≥80

≥48 hrs

CrCl

<30

Discontinue

No data;
consider anti Xa level
and/or ≥72 hrs.

≥48 hrs

Insufficient data on best practices. Interrupt at least as long as determined by CrCl (Table 2) and possibly longer.

Use clinical judgment.

PARENTERAL BRIDGING
NOT INDICATED
FOR DOACS.

Perform the procedure and continue to "How to Restart."

Assess patient bleed risk checklist
Bleed risk considered increased if any 1 of the following: major bleed or ICH <3 months; quantitative or qualitative platelet abnormality, including aspirin use; prior bleed during previous bridging.
FIGURE 4. Detailed Algorithm: Whether to Bridge and How to Bridge for DOACs and VKAs

Assess patient thrombotic risk definitions:
Low: CHA₂DS₂-VASc 1-4 (annualized stroke risk <5%), no prior TE
Moderate: CHA₂DS₂-VASc 5-6 (annualized stroke risk 5-10%) or prior TE more than 3 months previously
High: CHA₂DS₂-VASc 7+ (annualized stroke risk >10%) or prior TE within 3 months

Assess patient bleed risk checklist
Bleed risk considered increased if any 1 of the following: major bleed or ICH <3 months; quantitative or qualitative platelet abnormality including aspirin use, INR above therapeutic range; prior bleed from previous bridging

Whether to Bridge

Type of anticoagulant?
DOAC
VKA

Considerations

Do Not Bridge

Use clinical judgment

Bridge

Guidance

Use of parenteral agent not indicated.

Likely do not bridge

Likely bridge

Likely do not bridge

Indication for bridging; strongly consider parenteral agent.

Guidance

Conclusions

No

GrCl ≥30?

Heparin allergy or recent HIT?

High stroke risk and increased bleed risk?

Yes

Administer therapeutic UFH or LMWH.

Follow local protocol for management of HIT and heparin allergy.

Consider individualized strategies such as using prophylactic/low-dose parenteral anticoagulant, or postoperative bridging only.

Use clinical judgment

UFH

LMWH

UFH

LMWH

Start UFH when the INR is <2 or after omitting 2-3 doses of the OAC if the INR is not measured. Discontinue >4 hours prior to the procedure and if the aPTT is the normal range.*

Start LMWH when the INR is <2 or after omitting 2-3 doses of the OAC if the INR is not measured. Discontinue >12-24 hours prior to the procedure based on renal function and whether you are administering it once daily or q12 hours.

Perform the Procedure

*aPTT – activated partial thromboplastin time assay; ASA – acetylsalicylic acid (aspirin); DOAC – direct oral anticoagulant; HIT – heparin-induced thrombocytopenia; ICH – intracranial hemorrhage; INR – international normalized ratio; LMWH – low-molecular-weight heparin; OAC – oral anticoagulation; TE – thromboembolic event; TIA – transient ischemic attack; UFH – unfractionated heparin; VKA – vitamin K antagonist
FIGURE 5. Detailed Algorithm: How to Restart Anticoagulation

PERFORM THE PROCEDURE

HOW TO RESTART ANTICOAGULATION

CONSIDERATIONS

Cardiac valve surgery? 
No
Original anticoagulant?

DOAC

VKA

Recommend anticoagulation therapy using a VKA.

Complete hemostasis achieved, with no bleeding complications, no high-risk features of the patient, and absence of a potentially catastrophic bleed location (intracranial, intraspinal)

Yes

No

Can the patient tolerate oral medications?

Yes

No

Postprocedural bleed risk?

High

Low

Postprocedural bleed risk?

High

Low

Plan or indication to administer parenteral agent after procedure?

Yes

No

Use clinical judgment.*

Consider parenteral anticoagulation until oral medications are possible. Start parenteral agent 48-72 hrs following the procedure. When tolerating oral medications, convert from parenteral agent to DOAC.

Consider parenteral anticoagulation until oral medications are possible. Start parenteral agent within 24 hrs following the procedure. When tolerating oral medications, convert from parenteral agent to DOAC.

Reasonable to reinstate DOAC 48-72 hrs after the procedure.*

Reasonable to reinstate DOAC within 24 hrs of the procedure. Consider using reduced dose on the evening after the procedure.*

Postprocedural bleed risk?

High

Low

Consider delaying reinstitution of anticoagulation; use clinical judgment.*

Start VKA within 24 hrs.*

Start VKA within 24 hrs. Restart parenteral agent if applicable 48-72 hours following the procedure. Discontinue parenteral agent when INR reaches 2.

Guidance

* In cooperation with the managing team and the proceduralist
* At a dose based on postprocedural renal function

DOAC — direct oral anticoagulant
INR — international normalized ratio
VKA — vitamin K antagonist
Expert Consensus Decision Pathways

ACC has modernized Expert Consensus Documents to target key points of care with concise decision pathways rather than the traditional longer documents. These newly rebranded Expert Consensus Decision Pathways (ECDPs) leverage the expert insights drawn from a multidisciplinary group of experts and relevant stakeholders who are convened for Roundtables and Think Tanks often held as part of ACC quality programs.

ECDPs are intended to provide guidance for clinicians in areas where evidence may be limited, new and evolving, or lack sufficient data to fully inform clinical decision making. They include algorithms and/or checklists that are more actionable and can be translated into tools or apps to further accelerate the use of ACC clinical policy at point of care.

Translated Into Clinical Apps

**BridgeAnticoag App**

This app supports clinicians across specialties in safely managing anticoagulation around an invasive procedure for NVAF patients. The app calculates patient and procedural risk to provide individualized advice that balances bleed and stroke risk.

Use the app to assess whether and how to:

- Interrupt anticoagulation
- Bridge anticoagulation
- Restart anticoagulation

Email yourself a detailed report of the app assessment.

Search “BridgeAnticoag” on the web or in your app store to download the app for free.

*To access other relevant ACC mobile tools and apps, visit ACC.org/Apps*