Perioperative Management of Oral Anticoagulation

Victoria Lambert, PharmD, CACP
Medication Management Pharmacist
Janki Shah, PharmD, BCACP
Anticoagulation Care Provider
William W. Backus Hospital

Learning Objectives

- Review recommendations for when to interrupt oral anticoagulation therapy
- Review guidelines for determining thromboembolic risk
- Review recommendations for bridging therapy implementation as clinically indicated
- Review cases for appropriate method to manage oral anticoagulation interruption based on risk stratification
- Apply case-specific monitoring parameters for anticoagulation bridge therapy

What’s the hype about interrupting anticoagulation therapy?

- Anticoagulation serves an important role in reducing the risk of thromboembolism or stroke
- A number of patients are at risk of developing arterial or venous thromboembolism if anticoagulation therapy needs to be withheld
- Patients will eventually need to undergo some type of procedure
- Perioperative management is a common clinical dilemma

When to interrupt anticoagulation and implement “bridging”?  

- Ask yourself 4 questions…
- Does anticoagulation need to be withheld?
- What is the patient’s risk for clotting?
- What is the patient’s risk for bleeding?
- What oral anticoagulant is the patient taking?

What is bridging therapy?

- "In the absence of a universally accepted definition, we define bridging anticoagulation as the administration of a short-acting anticoagulant, for an ~10-12 day period during interruption of VKA therapy when the INR is not within a therapeutic range".

Faculty Disclosures

There are no actual or potential conflicts of interest associated with this presentation.

- Victoria Lambert
- Janki Shah

Ask the Audience

Warfarin therapy must be interrupted for all surgical procedures?

a. True
b. False
c. Not sure

Discontinue oral anticoagulation therapy:

- Orthopedic surgeries
- TKR, THR
- Biopsy
- Breast, Lung
- Neurosurgery
- Hernia Surgery
- Colonoscopy
- Family history of cancer/polyps

Ask the Audience

To assess the risk of clotting, we need to review?

a. The patient’s anticoagulation indication
b. The type of procedure
c. Co-morbidities
d. All of the above

Does anticoagulation need to be withheld?

- Continue anticoagulation:
  - Dental procedures (2C)
  - Cataract Removal (2C)
  - Endoscopy (diagnostic)
  - Joint injections*
    - Knees, wrist, hip
  - Minor dermatologic procedures (2C)
    - Consider procedures that do not pose increased bleeding risk while on anticoagulation

  * CAUTION: spinal/epidural procedures + anticoagulants INCREASE risk of hematoma = possible paralysis

What is the patients’ risk of clotting?

- Considerations
  - Underlying indication for anticoagulation therapy
  - Patient’s risk factors for thromboembolism
    - Morbid obesity, hypercoagulable state, immobility
  - Duration of anticoagulation cessation
    - MHV – TE risk 0.046%/day
    - A fib – TE risk 0.013%/day

Limited studies have been done to guide warfarin interruption for atrial fibrillation

- Atrial fibrillation: BRIDGE Trial provides some insight into risk stratification
  - NOT applicable to VTE and mechanical valve patients
- Further studies are warranted for warfarin interruption in other disease states
- To date, there are no validated risk stratification schemes to reliably separate VKA-treated patients into risk strata for thromboembolism and bleeding.
- Advance planning and coordination is required to optimally manage perioperative anticoagulation
Thrombosis Risk

- Chest guidelines vs. ASH guidelines
- Evidence based practice guidelines which incorporate data from existing literature.
  - Atrial fibrillation
  - Mechanical Heart Valves
  - VTE

Most common indications for long term anticoagulation

Risk Stratification for Perioperative TE

<table>
<thead>
<tr>
<th>Risk</th>
<th>Mechanical Heart Valve</th>
<th>Venous Thromboembolism</th>
<th>Atrial Fibrillation</th>
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</table>
| High       | Mitral Mechanical Valve
  - Any mechanical valve with history Stroke/ TIA
  - Aortic mechanical valve with the following risk factors: AF, prior stroke/ TIA, HTN, DVT, CHF, age >75, EF <35% |
  - VTE within 3 months
  - Severe thrombophilia (protein C, S or antithrombin deficiency, APLS, or multiple thrombophilias)
  - Active cancer treated within 6 months
  - Recurrent VTE occurring with previous interruption of anticoagulant therapy |
  - CHADS2 score: 2-3
  - CHA2DS2-VASc score: 7
  - Stroke or TIA within 3 months
  - Rheumatic valvular heart disease
  - History of ischemic stroke or systemic embolism occurring with previous interruption of anticoagulant therapy |
| Low        | Bioprosthetic aortic valve prosthesis without AF and no other risk factors for stroke |
  - Single VTE event greater than 12 months ago and no other risk factors
  - Non-severe thrombophilia
  - Dabigatran (Fondaparinux Factor V Leiden mutation) |
  - CHADS2 score: 0-4
  - CHA2DS2-VASc score: 0-6
  - No prior stroke or TIA |

Ask the Audience

- Which is the correct description of CHADS2 scoring?
  a. CHF, hypertension, age >65, DM, prior history of stroke
  b. Cardiomyopathy, hypertension, age >75, DM, prior history of stroke
  c. CHF, hypertension, age >75, DM, prior history of stroke
  d. CHF, hyperlipidemia, age >75, DM, prior history of stroke

CHADS2 Score

<table>
<thead>
<tr>
<th>CHADS2 Risk Criteria</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>CHF</td>
<td>1</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1</td>
</tr>
<tr>
<td>Age ≥ 75</td>
<td>1</td>
</tr>
<tr>
<td>DM</td>
<td>1</td>
</tr>
<tr>
<td>Stroke/TIA</td>
<td>2</td>
</tr>
</tbody>
</table>

Strength of the Recommendations Grading System

<table>
<thead>
<tr>
<th>Grade of Recommendation</th>
<th>Benefit vs Risk and Burdens</th>
<th>Methodologic Strength Supporting Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong (Level 1 Evidence)</td>
<td>Benefit &gt; Risk or Burden</td>
<td>Very high evidence from high quality RCT, observational studies</td>
</tr>
<tr>
<td>Strong (Level 2 Evidence)</td>
<td>Benefit &gt; Risk or Burden</td>
<td>High evidence from high quality RCT, observational studies</td>
</tr>
<tr>
<td>Strong (Level 3 Evidence)</td>
<td>Benefit &gt; Risk or Burden</td>
<td>Evidence from high quality RCT, observational studies</td>
</tr>
<tr>
<td>Moderate (Level 4 Evidence)</td>
<td>Benefit ≥ Risk or Burden</td>
<td>Moderate evidence from high quality RCT, observational studies</td>
</tr>
<tr>
<td>Moderate (Level 5 Evidence)</td>
<td>Benefit &gt; Risk or Burden</td>
<td>Evidence from high quality RCT, observational studies</td>
</tr>
<tr>
<td>Weak (Level 6 Evidence)</td>
<td>Benefit &gt; Risk or Burden</td>
<td>Low evidence from high quality RCT, observational studies</td>
</tr>
</tbody>
</table>

ASH Guidelines

- Type of Recommendation
  - Strong
  - Moderate
  - Weak

- Strength of Recommendation
  - Evidence
  - Benefit vs Risk and Burdens
  - Methodologic Strength

What is CHADS2 Scoring?

- Clinical prediction rule for estimating the risk of stroke in patients with nonrheumatic atrial fibrillation.
- Used to determine the degree of anticoagulation needed.
What about CHA2DS2-VASc?

• Refinement of CHADS2
  • Additional common stroke risk factors
    • Female gender, vascular disease, age range 60-74
  • Max score is 9
    • More patients classified as high risk?
    • Score ≥2 may benefit from anticoagulation therapy
    • More patients require bridging for warfarin interruption?

<table>
<thead>
<tr>
<th>CHA2DS2-VASc Score</th>
<th>Total Score</th>
<th>Risk Level</th>
<th>Stroke Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHF 1</td>
<td>1</td>
<td>Low</td>
<td>1.3-4</td>
</tr>
<tr>
<td>Hypertension 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age ≥ 75 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DM 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke/Tia 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vascular Disease* 1</td>
<td></td>
<td></td>
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<td>Ager 65-74 1</td>
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<tr>
<td>Female sex 1</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>5-6</td>
<td>Intermediate</td>
<td>6.7-9.8</td>
</tr>
<tr>
<td></td>
<td>7-9</td>
<td>High</td>
<td>9.6-15.2</td>
</tr>
</tbody>
</table>

* Prior myocardial infarction, peripheral artery disease, aortic plaque

Pre Procedure Planning

- Low/Intermediate TE Risk
  - Hold warfarin 5 days prior to procedure (Grade 1C)
  - No Bridging (Grade 2C)
  - Check INR 1 day prior to procedure
  - If INR > 1.5, consider administering a low dose of vitamin K (1 mg)

- High TE Risk
  - Bridging anticoagulation suggested instead of no bridging (Grade 2C)
  - Refers to therapeutic dose bridging regimen - most widely studied and used in clinical practice

Pre Procedure Plan

- For the bridging patient
  - Aim to minimize ATE or VTE
  - No established single “heparin” bridging regimen
  - Variability exists in
    - The type of anticoagulant
    - Intensity of anticoagulation
    - Timing of perioperative administration

Types of Bridging Strategies

- High dose (therapeutic dose)
  • similar to that used in acute TE
- Low dose (prophylactic dose)
  • doses used typically to prevent postop VTE or prophylaxis in hospitalized patients
- Intermediate dose
  • Based on patient specific considerations
    • Eg. Bleeding risk of patient

Implementing bridging

- What does the provider need to know before implementation of LMWH?
  • Allergies
  • Weight
  • Creatinine Clearance
  • Platelet count
  • INR
William W Backus Hospital Anticoagulation Clinic

• Bridging protocol
  • High Risk
    ▪ hold warfarin 5 days prior to procedure
    ▪ initiate enoxaparin 1.5mg/kg sc daily when INR is below the patients defined therapeutic range
    ▪ Day prior to procedure, administer 0.75mg/kg

Post Procedure

• Anticipate bleeding risk (preop) and hemostasis (postop)
• Factors affecting the risk for surgery related bleeding:
  ▪ How close to surgery is the anticoagulant administered?
  ▪ What is the dose of anticoagulant?
  ▪ What type of surgery and its bleeding risk?

Procedures associated with HIGH bleeding risk

• Major surgery – expected duration> 1 hr
• Bowel resection or any major abdominal procedure
• Kidney biopsy
• Radical Prostatectomy
• Neurosurgical
• Heart valve replacement
• Joint replacement

Bleeding and Bridging Continued (specific to warfarin)

• PROSPECT Trial, Dunn et al.
  • Prospective, multicenter, cohort study.
  • 260 patients, 24 sites
  • Afib and DVT patients received bridging with full dose enoxaparin

...“bleeding risk varied markedly by the extensiveness of procedure: incidence of major bleeding - invasive procedures 0.7%, minor surgery 0%, major surgery 20%.”

Dunn AS et al. (Thromb Haemost 2007; 97:191-2.)
The BRIDGE Study

Penoperative Bridging Anticoagulation in Patients with Atrial Fibrillation

https://www.youtube.com/watch?v=pl2kxVxLTzg

The BRIDGE Study Details

- Randomized double blind placebo controlled
- Elective or scheduled procedures
- US & Canada, 108 sites
- Patients with atrial fibrillation, mean CHADS2 = 2.3
  - ~38% had a CHADS2 score ≥ 2
- Warfarin held x 5 days prior to procedure
- Randomized to LMWH (Dalteparin) vs placebo injection
  - Total of 1884 patients randomized: 950 placebo injection, 934 Dalteparin
  - Injection started 3 days before procedure until 24 hours prior to procedure
- Post procedure
  - Bridged with placebo or LMWH with warfarin
  - Patients followed for 30 days post procedure

BRIDGE Study Results

- Placebo vs. LMWH
  - Risk of stroke – holding warfarin alone non-inferior to bridging
  - Incidence of arterial thromboembolism
    - 0.4% in no bridging group, 0.3% in the bridging group
    - P = 0.01 for noninferiority
    - Incidence of deep vein thrombosis
      - Bridge arm 5.2%, non bridge 1.9%; P = 0.005 for superiority
- Limitations
  - No prosthetic valve or VTE patients
  - ~3 of group male...think CHA2DS2VASc
  - Less patients in the non bridge group had history of stroke

Bruise Control

- Pacemaker or Defibrillator Surgery without Interruption of Anticoagulation
  - Multicenter, single blind, RCT
  - Randomly assign patients with annual TE risk ≥ 5% to continue warfarin or bridge with heparin
  - Primary outcome – clinically significant device pocket hematoma

Bruise Control Results

- 681 pts randomized
- 343 continue warfarin vs 338 bridge with IV heparin or full dose LMWH
- Primary outcome
  - 3.5% in the continue warfarin arm developed pocket hematoma vs 16% in the bridging arm
    - P < 0.001
- Continue warfarin arm reported increased satisfaction with AC therapy
- Authors do not apply results to patients on DOACs
Case #1 – GH

• GH is a 66 year old male on indefinite warfarin therapy for a h/o multiple DVT’s including when warfarin therapy had been interrupted. INR range of 2-3. PMH includes HTN, hyperlipidemia, diverticulitis. GH is scheduled for colon resection.

1) What is GH's TE risk level when warfarin is withheld?
2) What perioperative plan should be implemented?

Risk Stratification for Perioperative TE

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<tr>
<th>Risk</th>
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<th>Atrial Fibrillation</th>
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<tbody>
<tr>
<td>High</td>
<td>Mitral Mechanical Valve</td>
<td>VTE within 3 months</td>
<td>CHADS2 score: 5</td>
</tr>
<tr>
<td></td>
<td>Any mechanical valve</td>
<td>Severe thrombophilia</td>
<td>CHADS2 score: 6</td>
</tr>
<tr>
<td></td>
<td>with history Stroke/</td>
<td>(protein C, S or</td>
<td>CHADS2 score: 7</td>
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<tr>
<td></td>
<td>TIA</td>
<td>antithrombin deficiency,</td>
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<td></td>
<td>Aortic mechanical</td>
<td>APS, or multiple</td>
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<td>valve with the</td>
<td>thrombophilia)</td>
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<td></td>
<td>following risk factors:</td>
<td>Active cancer treated</td>
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<tr>
<td></td>
<td>AF, prior stroke/</td>
<td>within 6 months</td>
<td></td>
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<tr>
<td></td>
<td>TIA, HTN, DM, CHF, age &lt;75, EF &lt;35%</td>
<td>Recurrent VTE occurring</td>
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<td></td>
<td></td>
<td>with previous</td>
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<td></td>
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<td>interruption of</td>
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<td></td>
<td></td>
<td>anticoagulant therapy</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>Bileaflet aortic valve</td>
<td>Single VTE event</td>
<td>CHADS2 score: 0-4</td>
</tr>
<tr>
<td></td>
<td>prosthesis without</td>
<td>greater than 12 months</td>
<td>CHADS2 score: 0-6</td>
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<tr>
<td></td>
<td>AF and no other risk</td>
<td>and no other risk factors for stroke</td>
<td></td>
</tr>
<tr>
<td></td>
<td>factors for stroke</td>
<td>Non-severe thrombophilia</td>
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<td></td>
<td></td>
<td>(heterozygous Factor V</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Leiden mutation)</td>
<td></td>
</tr>
</tbody>
</table>

Woller SC. Anticoagulation update: DOACs, VTE Guidelines, Bridging, and Conxs 2016.

GH’s risk?

Thromboembolic

High

• h/o recurrent DVTs while warfarin therapy was interrupted

Post Procedure

For Warfarin

• Resume warfarin approximately 12-24 hours after surgery (evening of or next morning) and when adequate hemostasis achieved (Grade 2C)

LMWH

• As per risk selection for bleeding

Post Procedure

Low/Intermediate risk patient (William W Backus Hospital protocol)

• Resume warfarin the evening of the procedure at usual dosing
• Follow-up INR check ~ 1 week after resumption of warfarin

High Risk

| Minor Surgery/Low Bleeding Risk | Resume enoxaparin 1.5mg/kg/day 24 hrs post procedure |
| Moderate Bleeding Risk          | Resume enoxaparin 1.5mg/kg/day 48 hours after procedure |
| High Bleeding Risk              | Enoxaparin 40mg daily starting 24 hours after procedure |
| Very High Bleeding Risk         | No post- procedure enoxaparin |

Resume warfarin day of procedure
Continue enoxaparin post procedure until INR is therapeutic

Ask the Audience

- Routine monitoring of AntiXa levels is necessary for LMWH bridging patients?
  
  a. True
  b. False

Monitoring continued

- Anti Xa monitoring may be considered if...
  
  - Severe renal insufficiency
    - CrCl < 30ml/min or SCr > 2 g/dL
  
  - Extremes of body weight

Chest guidelines suggest against the routine use of Anti Xa levels to monitor the anticoagulant effect of LMWH during bridging (Grade 2 C)

GH – High risk for TE / High bleeding risk surgery

- Pre procedure
  - Hold warfarin 5 days prior to procedure
  - Initiate enoxaparin 1.5mg/kg sc daily when INR is below patients established INR range
  - Day before procedure initiate 0.75mg/kg sc x1

- Post Procedure
  - Restart warfarin night of procedure at usual dosing
  - Enoxaparin 40mg sc daily 24 hours after procedure
  - Continue enoxaparin bridge until INR therapeutic or at discretion of treating MD; hemostasis should be assured

DOACs for Bridging?

- Fast onset and offset
- No need for injection as the currently available NOACs for Afib and VTE are oral

The use of DOACs has not been adequately studied as a bridging agent and are not currently recommended at this time for bridging Safety and Efficacy unknown for this purpose

Case #2 MJ – Risk Selection

- MJ is an 80 year old male on warfarin indefinitely for atrial fibrillation with an INR range of 2-3. PMH includes hypertension and overactive bladder.
- MJ is scheduled for colonoscopy and gastroenterologist wants warfarin held.

- What is his risk for clot?
- What plan should be implemented?
Ask the Audience

• What is MJ’s TE risk?
  a. low
  b. high

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<td></td>
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<tr>
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<tr>
<td></td>
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</tr>
</tbody>
</table>

Summary of Perioperative Management for Warfarin Interrupted Patients

• Low/Intermediate TE risk patient
  • Hold warfarin 5 days prior to procedure
  • Resume warfarin right of procedure or when hemostasis assured

• High TE risk patient
  • Hold warfarin 5 days prior to procedure
  • Start LMWH when INR below defined range
  • Resume warfarin right of procedure or when hemostasis assured
  • Resume LMWH 24 hours after procedure or when hemostasis assured
  • Discontinue LMWH when INR in therapeutic range

LMWH

- **Enoxaparin**
  - Anti Xa and antithrombin effects
  - **T**<sub>1/2</sub>: 7 hours
  - Weight based dosing (ABW)
  - Thrombocytopenia risk < 3%
  - Risk major hemorrhage 4% or less
  - Dosing: 1.5mg/kg sc daily or 1mg/kg sc bid

- **Dalteparin**
  - Anti Xa and antithrombin effects
  - **T**<sub>1/2</sub>: 3-5 hours
  - Weight based dosing (ABW)
  - Thrombocytopenia risk < 1%
  - Risk major hemorrhage 0-4.6%
  - Dosing: 200 IU/kg sc q24 hr. Max 18,000 IU
  - Dosage based on TBW up to 190kg

Other Injectables

- **Fondaparinux**
  - Inhibitor of factor Xa
  - **T**<sub>1/2</sub>: 17-21 hours
  - Fixed dosing
  - Thrombocytopenia risk ~ 0.5% up to 3%
  - Risk of major hemorrhage < 3%; up to 5% in pts < 50kg
  - Body weight
    - < 50kg: 5mg
    - 50-100kg: 7.5mg
    - >100kg: 10mg
  - SC once daily dosing

Other considerations

• Who will perform injections?
• Does patient have RX coverage?
• Is patient homebound following surgery?
• Does patient understand instructions?
• Provide written instructions
Down the pipeline

**PERIOP-2**

- Double blind randomized controlled trial of Post-Operative LMWH Bridging Therapy vs Placebo Bridging Patients Who Are at High Risk for Arterial TE

Moving on to DOACs

Leaving Warfarin-ville

Perioperative Management of Direct Oral Anticoagulants (DOACs)

- **Anti Xa Inhibitors**
  - Rivaroxaban (Xarelto®)
  - Apixaban (Eliquis®)
  - Edoxaban (Savaysa®)
  - Betrixaban (Bevyxxa®)

- **Direct Thrombin Inhibitor**
  - Dabigatran (Pradaxa®)

DOAC Indications

<table>
<thead>
<tr>
<th>Drug</th>
<th>Nonvalvular Atrial Fibrillation</th>
<th>DVT and/or PE Treatment</th>
<th>Extended VTE Prophylaxis</th>
<th>VTE Prophylaxis</th>
<th>Stable CAD or PVD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dabigatran</td>
<td>+</td>
<td>+</td>
<td>+ (THA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apixaban</td>
<td>+</td>
<td>+</td>
<td>+ (THA/TKA)</td>
<td></td>
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</tr>
<tr>
<td>Rivaroxaban</td>
<td>+</td>
<td>+</td>
<td>+ (THA/TKA)</td>
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<td>Edoxaban</td>
<td>+</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Betrixaban</td>
<td>-</td>
<td>+ [in hospitalized patients]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DOAC Interruption Considerations

- Does the DOAC need to be withheld?
- What is the patient’s risk for clotting?
- What is the patient’s risk for bleeding?
- What is the renal function?
- DOAC half life?

Pharmacokinetics

<table>
<thead>
<tr>
<th>Medication</th>
<th>Urinary Excretion</th>
<th>Half Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rivaroxaban</td>
<td>80%</td>
<td>5-9 hours</td>
</tr>
<tr>
<td>Apixaban</td>
<td>~27% parent drug</td>
<td>8-15 hours</td>
</tr>
<tr>
<td>Edoxaban</td>
<td>~50%</td>
<td>10-14 hours</td>
</tr>
<tr>
<td>Betrixaban</td>
<td>11%</td>
<td>19-27 hours</td>
</tr>
<tr>
<td>Dabigatran</td>
<td>80%</td>
<td>12-17 hours</td>
</tr>
</tbody>
</table>
DOAC Package Insert Interruption Recommendations

- **Dabigatran**
  - **CrCl ≥ 50ml/min**: 1-2 days
  - **CrCl < 50ml/min**: 3-5 days

- **Apixaban**
  - Low bleeding risk: 24 hours prior
  - Moderate to high bleeding risk: 48 hours prior

- **Rivaroxaban**
  - At least 24 hours prior
  - Consider > 24 hours if increased bleeding risk vs urgency of procedure

- **Edoxaban**
  - At least 24 hours prior

Pradaxa (dabigatran) [package insert]. Boehringer Ingelheim; 2011.
Savaysa (edoxaban) [package insert]. Daiichi Sankyo; 2015.

2017 ACC Consensus Decision Pathway for Perioperative Management of Patients with Nonvalvular Atrial Fibrillation

American College of Surgeons’ Guidelines for the Perioperative Management of Antithrombotic Medication

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Low bleeding risk criteria</th>
<th>High bleeding risk criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warfarin</td>
<td>Give low dose 6 h before, bridge with LMWH or UFH, resume 2 h postoperatively.</td>
<td>Give low dose 6 h before, bridge with LMWH or UFH, resume 2 h postoperatively.</td>
</tr>
<tr>
<td>DOAC</td>
<td>Give low dose 2 days before, resume 2-3 days postoperatively.</td>
<td>Give low dose 2 days before, resume 2-3 days postoperatively.</td>
</tr>
</tbody>
</table>

Hartford HealthCare Perioperative DOAC management reference

PAUSE Study

- **PAUSE**: Perioperative Anticoagulant Use for Surgery Evaluation
  - **Included patients**
    - AF taking DOAC requiring interruption for an elective procedure
  - **Excluded patients**
    - Severe renal dysfunction
  - **Methods**
    - Standardized protocol based on DOAC PK parameters, procedure associated bleeding risk, and CrCl
    - **Low bleeding risk procedure**: Hold DOAC 1 day prior to and after
    - **High bleeding risk procedure**: hold DOAC 2 days prior to an after
  - **Outcomes**
    - **Major bleeding <2%**
    - **ATE <1%**


Case #3 - CC

- CC is a 79 year old male on apixaban 5mg bid indefinitely for the diagnosis of atrial fibrillation. PMH inclusive of hypertension and GERD. CC is scheduled for Left Total Knee Replacement.
- Relevant information: 5’10”, 86.4kg, Scr 1.5
- How should CC’s apixaban therapy be managed for surgery?
Ask the Audience

CC’s TE risk can be classified as
a. low
b. high

DOAC Resumption

In general:
- High bleeding risk - 24 to 72 hours
- Low bleeding risk - 6-8 hours
- Bleeding risk considerations
- Hemostasis
- Mechanical VTE prophylaxis in hospitalized patients if anticoagulation resumption is delayed
- Prolonged cessation of anticoagulation post operatively, can consider VTE prophylaxis.

Summary

- Determine if anticoagulation needs to be withheld for procedure
- Determine risk for thromboembolism or stroke
- Determine bleeding risk
- Pre and post procedure
- Hemostasis achieved
- Implement monitoring parameters
- Patient education and teaching is important throughout entire perioperative period

References

Atrial Fibrillation.

References


