

Periprocedural Considerations for Anticoagulated Atrial Fibrillation Patients

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Periprocedural patient instruction and coordination is an important piece in achieving safe outcomes for patients needing procedures and receiving anticoagulants for atrial fibrillation. Balancing the needs for anticoagulation versus bleeding during the procedure requires clinical reasoning and preparation. In this article, the current guidelines for use of anticoagulants with atrial fibrillation, the relevant pharmacology, and the use of standardized tools to quantify the risks of thrombus or bleeding in the procedures will be discussed. In addition, resources for examining the optimal practice for these case types will be provided. Peri-anesthesia health care providers are pivotal to lead relevant stakeholders in the perianesthesia setting work together to create protocols and individual plans of care for this patient population.

Keywords: atrial fibrillation, direct acting oral anticoagulants (DOACs), perianesthesia risks, thrombosis risk, CHAD-VAS score, HAS BLED score.

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OBJECTIVES—1. DISCUSS current guidelines for use of anticoagulants with atrial fibrillation. 2. Discuss the relevant pharmacology, and the use of standardized tools to quantify the risks of thrombus or bleeding in the procedures. 3. Review resources for examining the optimal practice for these types of cases.

The constant churning of the blood in the patient with atrial fibrillation (AF) activates platelets leading to thrombi formation within the surfaces of the heart. These thrombi can dislodge from the left atrium, leading to an embolic stroke. To prevent this outcome clinical practice guidelines for

AF recommend the use of direct acting oral anticoagulants (DOACs), direct thrombin inhibitors, or warfarin to reduce the risk of thrombotic stroke.¹ In the periprocedural setting this gives rise to a paradox. AF patients in need of a procedure, or surgery, must be able to clot for a period of time during the intervention, whereas at the same time require suppression of thrombus formation. Depending on the surgical or procedural case type the anticoagulated patient may experience significant bleeding. This presents a challenge in determining whether anticoagulant medication should be continued, tapered, discontinued, or bridged for the procedure or surgery. Risk assessment must include validated tools that help care providers quantify the risks of the medication in the periprocedural period. This allows the surgical, cardiology, and anesthesia teams to weigh the risk of bleeding versus stroke for each patient. The Centers for Disease Control estimates that there are 2.7 to 6.1 million persons in the United States² with AF, making this problem impactful in the perianesthesia area. A process or decision tree in place to assist in evaluating the medication and surgery interface for these patients is important for patient care providers.^{3,4} The purpose of

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this article was to present factors that can be evaluated when considering the risks, benefits, and alternatives for AF patients when procedures are indicated. This discussion is not applicable to AF patients who also have a mechanical valve.

Categories of Anticoagulants

There has been a surge in available oral pharmacologic options for anticoagulation. In addition to the traditional vitamin K antagonist warfarin, direct thrombin inhibitors and factor Xa antagonists are now commonly prescribed for anticoagulation in AF patients. Each of these categories of medica-

tions uniquely impact the coagulation cascade at different points⁵ (Figure 1).

Warfarin (Coumadin, Bristol-Myers Squibb Company, Princeton, NJ) is the oldest oral anticoagulant and acts by inhibiting the synthesis of vitamin K-derived clotting factors II, VII, IX, X, protein C, and protein S. The inhibition of proteins C and S, which are natural anticoagulants, makes the patient more prone to clotting when first initiated. Warfarin has been extensively studied and possesses strong evidence regarding dosing, reversal, and chronic management. Because of its mechanism of preventing clotting factor synthesis,

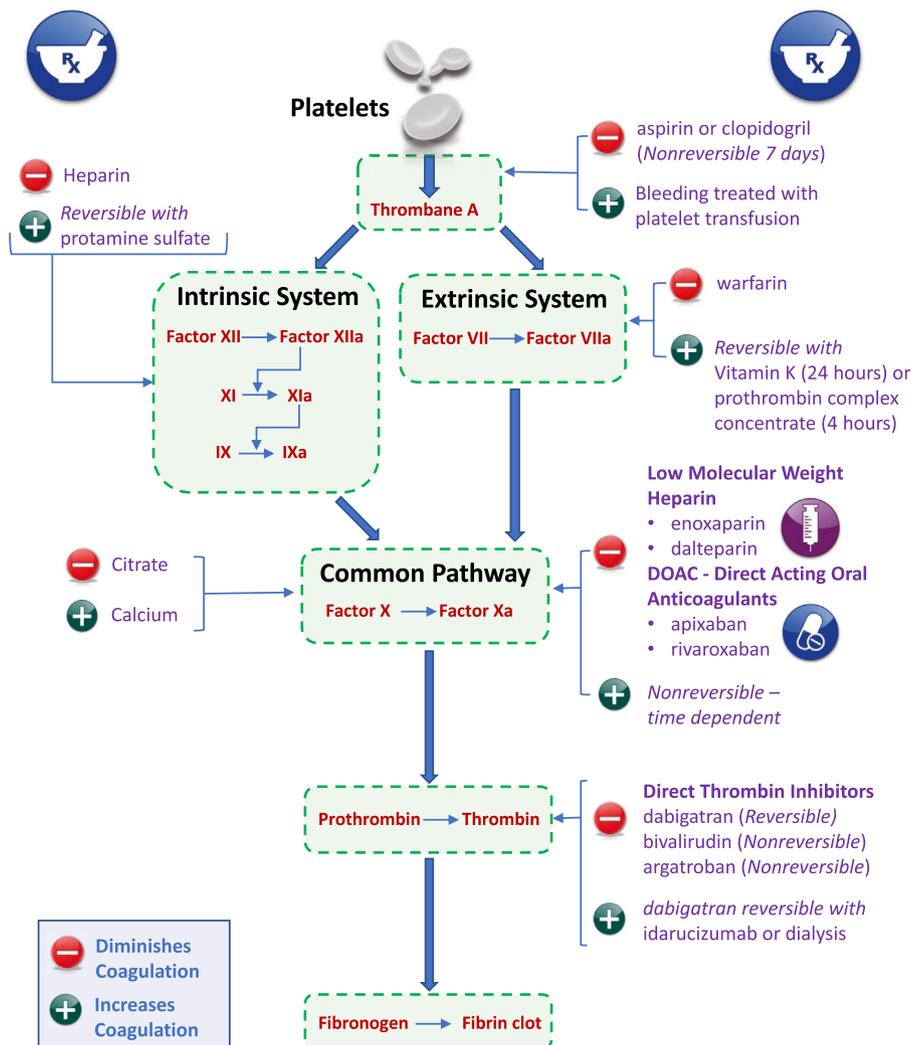


Figure 1. Coagulation cascade.⁶ This figure summarizes and illustrates the site in the coagulation cascade that different medications impact. Additionally, if reversal is possible then that is also noted. This figure is an original rendering by Roger Yoder graphic artist. This figure is available in color online at www.jopan.org.

warfarin requires a longer time to provide effective anticoagulation than the DOACs. Warfarin is usually initiated with a parenteral agent to provide the necessary interim anticoagulant effect. The terms “bridging” or “bridge therapy” are used to describe when warfarin is given concomitantly with a parenteral anticoagulant, such as low molecular weight heparin, when warfarin is initiated or warfarin therapy is interrupted. The efficacy of warfarin therapy is determined by routine international normalized ratio (INR) monitoring, with the goal INR for patients with AF or a mechanical heart valve set at 2.0 to 3.0.^{1,6}

Warfarin has an extensive list of food and drug interactions, largely because of its mechanism and metabolism. The anticoagulant effect of warfarin is derived from the inhibition of vitamin K-derived clotting factors. Vitamin K supplements and foods high in vitamin K will interfere with the effectiveness of warfarin. Warfarin is metabolized in the liver by the CYP450 system, primarily the CYP 2C9 enzyme.⁷ Most drug interactions with warfarin are because of the inhibition or induction of one of the metabolizing enzymes by concomitant medications. Complex drug interactions include amiodarone, trimethoprim and sulfamethoxazole, metronidazole, fluconazole, and antiretroviral agents.⁶ Because of the numerous interactions with warfarin, dosing may need to be adjusted frequently to keep the INR within the desired range. Frequent monitoring and dose adjustments are often a barrier to medication adherence. The newer anticoagulants are more appealing to many patients largely because they do not require routine monitoring and generally have fewer food and drug interactions. The rationale for the continued use of warfarin is that the medication is inexpensive. Many patients would be unable to take the current generation of medications because of cost.

The direct thrombin inhibitor dabigatran etexilate (Pradaxa, Boehringer Ingelheim Pharmaceuticals, Inc, Ridgefield, CT), as its category implies, directly inhibits thrombin, also called clotting factor II. Dabigatran is approved for the treatment and prevention of deep vein thrombus and pulmonary embolus, and as an anticoagulant in AF, as well as postoperative prophylaxis of deep vein thrombus.⁸ Because of the direct action of the agent, time to effective anticoagula-

tion is relatively short. Unlike warfarin, dabigatran does not require bridging with parenteral anticoagulants on initiation or during interruption. If emergent reversal is needed there is a reversal agent that may be used, idarucizumab (Praxbind, Boehringer Ingelheim Pharmaceuticals, Inc, Ridgefield, CT). Another option for effective reversal with Pradaxa is dialysis.⁹

The factor Xa inhibitors are the newest class of DOACs. This class includes rivaroxaban (Xarelto, Janssen Ortho, LLC, Gurabo, Puerto Rico), apixaban (Eliquis, Bristol-Myers Squibb Company Princeton, NJ), and edoxaban (Savaysa, Daiichi Sankyo Co, LTD, Tokyo, Japan), all approved for use as anticoagulants in AF.¹ The newest member of this class, betrixaban (Bevyxxa, Portola Pharmaceuticals, Inc, South San Francisco, CA), is only approved for prophylaxis of venous thromboembolism and should not be used for reduction of stroke in AF.⁶ These agents act to directly inhibit clotting factor Xa in the common pathway of coagulation. Like dabigatran, they have a short time to onset of effective anticoagulation and do not require bridging.¹⁰ When emergency reversal is needed, dialysis is not helpful with these medications because they are protein bound.¹¹

An advantage of DOACs is that routine laboratory work such as prothombin time/INR is not required for dosing. DOACs have very few specific drug interactions, but like all anticoagulants, caution is warranted when DOACs are given concomitantly with drugs that are known to increase bleeding. There are many over the counter (OTC) and prescription agents that can increase risk of bleeding including selective serotonin reuptake inhibitors (SSRIs), serotonin and norepinephrine reuptake inhibitors (SNRIs), nonsteroidal anti-inflammatory drugs (NSAIDs), high doses of vitamin E, and many herbal supplements.¹²

One of the biggest differences between the DOACs and warfarin is the time to effective anticoagulation. Warfarin can take up to 5 days to achieve therapeutic anticoagulation and has a prolonged anticoagulant effect when discontinued.⁶ The DOACs provide effective anticoagulation soon after the first dose. The anticoagulant effect wanes within 24 hours.¹³ Because of this pharmacokinetic difference, one of the main concerns that has arisen with increasing use of the DOACs is

Table 1. Comparison of Oral Thrombin Inhibitors and Direct Acting Anticoagulants^{6,7}

FDA Labeling Information	Dabigatran (Pradaxa)	Rivaroxaban (Xarelto)	Apixaban (Eliquis)	Edoxaban (Savaysa)	Important Information
Mechanism of action	Dabigatran is a competitive, direct thrombin inhibitor Thrombin II Because thrombin (serine protease) enables the conversion of fibrinogen into fibrin during the coagulation cascade, its inhibition prevents the development of a thrombus	Rivaroxaban is a selective inhibitor of FXa. It does not require a cofactor (such as antithrombin III) for activity. Rivaroxaban inhibits free FXa and prothrombinase activity. Rivaroxaban has no direct effect on platelet aggregation, but indirectly inhibits platelet aggregation induced by thrombin. By inhibiting FXa, rivaroxaban decreases thrombin generation	Apixaban is a selective inhibitor of FXa. It does not require antithrombin III for activity. Apixaban inhibits free and clot-bound FXa, and prothrombinase activity. Apixaban has no direct effect on platelet aggregation, but indirectly inhibits platelet aggregation induced by thrombin. By inhibiting FXa, apixaban decreases thrombin generation and thrombus development	Edoxaban inhibits free factor Xa and prothrombinase activity and inhibits thrombin-induced platelet aggregation	The pharmacokinetics varies with each medication
Reversal	Praxbind (idarucizumab) May also use dialysis for acute toxicity	None FDA approved at this time	None FDA approved at this time	None FDA approved at this time	Discontinuing the medication for the duration of action is first intervention Toxicities can be treated with fresh frozen plasma and infusion of clotting factors if there is no reversal agent available Prothrombin complex may also be prescribed
Atrial fibrillation to prevent embolic stroke	x	x	x	x	

Black box warnings	Most common adverse reactions (>15%) are gastritis-like symptoms and bleeding Spinal hematomas	Stroke risk increased with discontinuation of medication Spinal hematomas Increased risk of active bleeding	Stroke risk increased with discontinuation of medication Spinal hematomas Increased risk of active bleeding	Stroke risk increased with discontinuation of medication Spinal hematomas Increased risk of active bleeding	BBWs for these medications Risk of significant bleed Avoid spinal anesthesia and nerve blocks Discontinuation increases risk of thrombus
Contraindications Not recommended for patients with mechanical heart valves	Active pathologic bleeding History of serious hypersensitivity reaction to Pradaxa	Active pathologic bleeding History of serious hypersensitivity	Active pathologic bleeding History of serious hypersensitivity	Not recommended with liver failure patients May not be used with Rifampin	Important to evaluate bleeding thrombosis risk and renal function
Renal dose adjustment	Patients with CrCl 30-50 mL/min: reduce dose or avoid Inhibitors in patients with CrCl < 30 mL/min: not recommended	Compared with healthy subjects with normal creatinine clearance, rivaroxaban exposure increased in subjects with renal impairment. Increases in pharmacodynamic effects were also observed	No dose adjustment is recommended for patients with renal impairment alone, including those with end-stage renal disease maintained on hemodialysis	Impaired renal function (CrCl 15-50 mL/min): reduce Savaysa dose to 30 mg once daily	Measurement of creatinine clearance recommended for diabetics
Medication half life	Creatinine clearance >80 13 h Creatinine clearance < 15 is 30 h off dialysis	Creatinine clearance >30 6-15 h Creatinine clearance < 15 if off dialysis 9 h	Creatinine clearance >30 6-15 h Creatinine clearance < 15 if off dialysis 17 h	Creatinine clearance >30 6-15 h Creatinine clearance < 15 if off dialysis 10-17 h	

FDA, US Food and Drug Administration; BBW, black box warning, the highest level of provider information alert on a drug.

how to manage the medications in the periprocedural period. The concern for patients with AF on anticoagulants is that if the drug is discontinued, the risk of stroke significantly increases. Therein lies the clinical decision. Should the anticoagulant be continued to prevent additional stroke risk or should the anticoagulant be discontinued to reduce the risk of bleeding with the procedure? The current AF guidelines state only that the decision to interrupt anticoagulation for a procedure should balance the risk of stroke with the risk of bleeding in AF patients without a mechanical heart valve.¹ Although many studies exist to determine appropriate management of warfarin in the periprocedural period, there are a few data currently available regarding the periprocedural management of DOACs. [Table 1](#) summarizes the different medications used in AF for anticoagulation with relevant pharmacokinetics.

Tools to Quantify Risk of Thrombosis and Risk of Bleeding

The 2014 AHA/ACC/HRS guideline for the management of patients with AF provides numerous recommendations and rationales for the use of anticoagulants to reduce the risk of stroke and thromboembolism. Two main tools are used to determine if a patient with AF requires anticoagulation. These are the congestive heart failure, hypertension, age, diabetes, and prior stroke score (CHADS₂). A modification to this tool is a score that includes the prior five elements with the added assessment of history of vascular disease and gender (CHA₂DS₂-VASc) score. Although both scores boast supporting evidence, the CHA₂DS₂-VASc has become the preferred score in recent years.^{7,14} The CHA₂DS₂-VASc score considers several additional factors and increases the point value for elderly patients adding accuracy in predicting stroke risk. The higher the score, for both the CHADS₂ and CHA₂DS₂-VASc, the higher the risk of thromboembolism. For patients with nonvalvular AF with a CHA₂DS₂-VASc score of 0 or 1, anticoagulant therapy may not be necessary¹ ([Table 2](#)). In a patient with a CHA₂DS₂-VASc score of greater than 2, or a prior stroke or transient ischemic attack, or a patient with a mechanical heart valve, initiation of an oral anticoagulant is recommended. Appropriate options for anticoagulation in patients with normal renal function

Table 2. CHADS-VAS Scoring Tool¹

Abbreviation	Risk Factor	Points Allotted
CHADS ₂		
C	Congestive heart failure	1
H	Hypertension	1
A	Age ≥75 y	1
D	Diabetes mellitus	1
S	Stroke, TIA, or TE	2
CHA ₂ DS ₂ -VASc		
C	Congestive heart failure	1
H	Hypertension	1
A	Age ≥75 y	2
D	Diabetes mellitus	1
S	Stroke, TIA, or TE	2
V	Vascular disease	1
	Prior MI, PAD, or aortic plaque	
A	Age 65-74 y	1
Sc	Sex category female	1

TIA, transient ischemic attacks; TE, thromboembolism; MI, myocardial infarction; PAD, peripheral artery disease.

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include dabigatran etexilate, rivaroxaban, and apixaban in addition to warfarin.¹⁴

Assessing Bleeding Risk

To best determine the appropriate management of a patient with AF on an anticoagulant, the risk of bleeding should be assessed. There are many patient and procedural factors that can affect bleeding risk including invasiveness of the procedure, history of hemorrhage, and concomitant diseases.¹⁵ One of the most useful tools to assess bleeding risk is known as the (HAS-BLED) hypertension, abnormal renal or liver function, prior stroke, prior bleeding, labile partial thromboplastin time, elderly, and medications predisposing to bleeding score.¹⁵ Each category receives 1 point with the higher score indicating a greater risk of bleeding. A low bleeding risk is considered a score of 0 to 1, a moderate bleed risk is 1 to 3, and a high bleed risk is greater than 3. When evaluating a patient before a surgical procedure, it is vital to obtain an accurate history and apply the HAS-

Table 3. HAS BLED Risk Scoring Tool¹⁵

Abbreviation	Risk Factor	Points Allotted
H	Hypertension	1
A	Abnormal renal or liver function	1 point each
S	Prior stroke or TIA	1
B	Active bleeding or history of a major bleed	1
L	Labile international normalized ratio, time within therapeutic range < 60% Not applicable if the patient is not on warfarin	1
E	Elderly (>65 y)	1
D	Drug or excess alcohol use Drugs considered are antiplatelet agents or NSAIDs including aspirin	1 point each, max of 2 points

NSAID, nonsteroidal anti-inflammatory drug; TIA, transient ischemic attacks.

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BLED score to quantify the risk of bleeding.¹⁵ In patients with AF on anticoagulants, the anticoagulant increases the risk of bleeding independently of the factors considered in the HAS-BLED¹⁵ (Table 3).

Many drugs in addition to those considered for the HAS-BLED score can increase the risk of bleeding. In addition to anticoagulants, prescription medications for depression can affect bleeding. SSRIs and SNRIs treat depression by targeting the serotonin receptors in the body. Serotonin in the body can act as an antagonist for platelet activity and increase the effects of other hormones that stimulate platelet aggregation.¹⁶ This means that serotonin can, in part, be responsible for helping blood clot when necessary. With the use of SSRIs and SNRIs, serotonin levels in the body will be disrupted. This can cause a decrease in platelet aggregation and therefore an increase in bleeding. Another class of prescription drugs affecting platelet aggregation is the antiplatelet agents including clopidogrel, prasugrel, ticlopidine, and aspirin. These agents are often prescribed after a myocardial infarction or stenting procedure and can be given concomitantly with anticoagulants if there are additional risk factors for thrombosis.¹⁷ Antiplatelet agents act directly on platelets to prevent aggregation, therefore preventing blood clots from forming.

OTC medications and herbal supplements can also increase the risk of bleeding, but may not be reported by the patient. Use of NSAIDs, aspirin, herbal supplements, and vitamins should be identified

before a procedure to best assess the risk of bleeding. NSAIDs carry a risk for gastrointestinal bleeding because of ulceration. This bleeding can sometimes be difficult for a patient to identify and should be a topic of counseling for patients on chronic NSAID therapy.¹⁸ NSAIDs reduce inflammation and pain by inhibiting the cyclooxygenase 1 and 2 enzymes.¹⁹

Although the mechanism of increased bleeding risk with herbal agents has not been well defined, many herbal agents and some vitamins have been linked to increased bleeding. Agents that should be avoided in a patient on anticoagulants include garlic, ginkgo biloba, chondroitin, high doses of vitamin E, and high doses of fish oil. Any concomitant medications for patients on anticoagulants, prescription, OTC, or supplements may affect bleed, and potentially stroke risk. In addition to the medications assessed in the HAS-BLED score,²⁰ all medications should be evaluated before a procedure.

Examining the Care Process for Anticoagulated Procedural Patients

Ideally each periprocedural area should collaborate with the relevant stakeholders to develop the best clinical pathways and protocols to optimize the safety of AF patients while on anticoagulation. Stakeholders may vary by institution. An example of those who may offer a contribution and unique perspective is listed in Table 4. The three areas that require examination by the

Table 4. Potential Stakeholders for Process Development

Clinician Designee	Contribution
Perianesthesia nurse	360 Views of patient experience and throughput in the procedural area
Administrator of procedural area	Resource analysis and cost analytics
Anesthesia provider	Stability measures, optimization of anesthesia prescription, resource management, pain control
Blood bank leader	Impact on workflow and needed resources within the blood bank
Cardiologist	Cardiac impact of atrial fibrillation on cardiac output, CHAD-VAS scoring
Clinical pharmacist	Current pharmacology cost and utilization
	Renal impact and duration of last medication dose
Blood conservation specialist	Guidance on protocols for patients who have spiritual beliefs that conflict with blood usage
	Autotransfusion options

This table describes multiple stakeholders who need input into process development for these patients.

periprocedural team are timing of the procedure, the type of intervention planned, and reversal protocols. The end goal is a process of care that minimizes the risks of the procedure, creates support for the benefits, and offers alternatives.

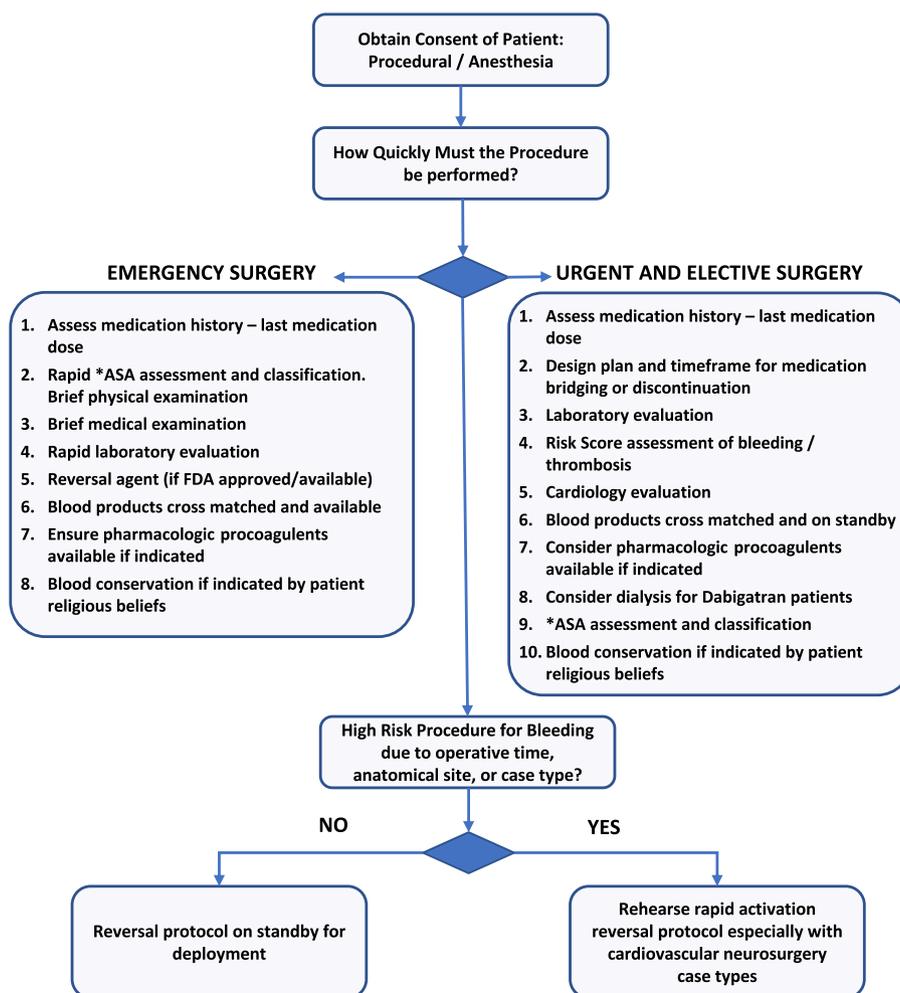
Timing of procedures may be elective, urgent, or emergent. Elective surgeries may be delayed for a period decided consensually by the health care provider and the patient. Elective procedures provide time for risk assessment, consultation, and laboratory evaluation. Urgent procedures may be delayed for a range of 24 to 48 hours.²¹ This allows to stabilize the patient's physiological status. Resource planning can occur and allow for laboratory evaluation. By definition, emergency procedures necessitate immediate need for intervention. Assessment is ongoing and data gathering is more difficult. These procedures require emergent reversal protocols and blood bank resources.

The type of surgical procedure also has impact on the risk of bleeding. More invasive procedures such as cardiothoracic intervention, joint replacement, or any procedure lasting more than 45 minutes are associated with a relatively high risk for operative and postoperative bleeding.¹⁷ Low bleed risk procedures include simple dental surgeries, biopsies, angiography, endoscopy, and many other common procedures.²² Hospitals and outpatient surgical facilities may have independent classifications for high and low bleed risk procedures as well. Clinical judgment and experience are invaluable when determining the risk associated with a procedure, as there is scant evidence to be translated to practice.²¹

Reversal policies and protocols are vital to the care of anticoagulated patients. Resources that are clinically useful to protocol development are listed in Table 5. It is important that the involved stakeholders and departments have an efficient communication loop so that essential resources are available at the point of need.²³ However, because reversal requires the use of expensive pharmacologic resources the institution must make tough choices about the par level of the medications in the pharmacy and blood bank.²⁴ The Neurosurgery and American College of Cardiology consensus guidelines speak about situations in which blood products, clotting concentrates, and pharmacologic reversal are optimally used^{23,24} (Figure 2). New consensus guidelines have recently been published and are summarized in Table 6. Rapid activation reversal protocols should

Table 5. Helpful Resources for Reversal Protocol Development

Web sites
International Society of Thrombosis and Hemostasis: https://www.isth.org/members/group.aspx?id=100387
Institute of Safe Medical Practices: http://www.ismp.org/selfassessments/Antithrombotic/2017/2017_ISMP_Antithrombotic_Self_Assessment.pdf
American College of Cardiology: http://www.acc.org/latest-in-cardiology/articles/2017/03/03/07/42/reversing-oral-anticoagulants-new-possibilities-lingering-misconceptions
AABB (Transfusion Certification Professional Body): http://www.aabb.org/programs/clinical/Pages/default.aspx



* American Society of Anesthesiology

Figure 2. Periprocedural process development for the anticoagulated atrial fibrillation patient.²⁵⁻²⁸ This is a flowchart diagram that summarizes recommendations from multiple societies. This diagram can be used to evaluate current policies for care of these patients. The art is original rendering by Roger Yoder graphic artist. This figure is available in color online at www.jopan.org.

be developed for use in high-risk surgeries such as cardiovascular or neurosurgery that are deemed to be emergent²⁵ (Table 6).

An alternative and unique plan of care could be created for an AF patient if a procedure is elective. A deidentified example of this type of patient is one who needed a vascular procedure with a high bleeding risk but also had concurrent high risk of thrombus.^{24,26} The cardiologist recommended to the surgeon that an atrial appendage closure device be inserted before the vascular procedure. After the risks, benefits, and

alternatives were discussed with the patient this became the plan of care. This device would decrease the incidence of thrombus during the vascular procedure and reduce the need for intraprocedural anticoagulation. This required a 2-month delay in the vascular procedure but allowed for an improved outcome. Another example of a needed alternate plan for patient care would be a person who for religious reasons declines blood products. Religious beliefs that contraindicate the use of blood products require consultation with a minimal blood loss and autodonation preprocedural clinician (Figure 2).^{27,28}

Table 6. Summary of Society's Recommendations for Periprocedural Anticoagulation²⁵⁻²⁸

	American College of Cardiology ²⁵	American Society of Regional Anesthesia ²⁸	European Heart Rhythm Association ²⁷
Interruption of anticoagulant before elective procedures	Warfarin: discontinue 5 days before the procedure and initiate a bridging agent (heparin or LMWH) Discontinue DOAC for approximately 3-5 half-life's based on bleeding risk of procedure and estimated CrCl	See spinal anesthesia recommendation	Low bleeding risk procedures: DOACs should be discontinued on the morning of the procedure High bleeding risk procedures: discontinue DOACs 2 d before the procedure
Management during emergency procedures	See the European Heart Rhythm Association guidelines and use clinical judgment for emergency procedures	Spinal anesthesia is not recommended for patients on anticoagulant therapy requiring emergency procedures	Discontinue DOAC immediately Obtain partial thromboplastin time, prothrombin time, and antifactor Xa levels to assess bleeding risk and determine if the procedure should be delayed or if anticoagulant reversal is needed
Spinal anesthesia recommendation	All existing guidelines concur that anticoagulant therapy should be discontinued before neuraxial anesthesia because of the risk of spinal hematoma and additional complications Discontinue DOAC at least 5 half-life's before spinal anesthesia Discontinue warfarin 5 days before the procedure, discontinue bridging agent (heparin or LMWH) 6 h before the procedure		
Restart of an anticoagulant after interruption	Minor surgical procedure: resume warfarin 24 h after the procedure Major surgical procedure: resume warfarin 48-72 h after the procedure Continue bridging agent along with warfarin until a therapeutic international normalized ratio is reached* High postprocedural bleeding risk: DOAC can be reinitiated 48-72 h after the procedure Low postprocedural bleeding risk: DOAC can be reinitiated within 24 h after the procedure	DOACs can be reinitiated 4-6 h after a spinal catheter has been removed	Low bleeding risk procedures: DOACs can be restarted 6-8 h after the procedure High bleeding risk procedures: restart DOAC \geq 48 h after the procedure. Refer to institutional protocols for thromboprophylaxis No recommendation listed for warfarin

DOAC, direct acting oral anticoagulant; LMWH, low molecular weight heparin.

*Refer to the recommendations listed in Douketis et al⁷ regarding specific monitoring and management of warfarin during interruption and reinitiation.

Summary

Each health care center that does invasive procedures must triage the risks, benefits, and alternatives for the anticoagulated patient with AF. Two risk

scoring systems that can be used to help quantify the risk of thrombosis versus bleeding have been presented. Perianesthesia nurses should be vigilant and assist in developing a collaborative plan of care for this vulnerable population.

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Procedural Considerations for Anticoagulated Atrial Fibrillation Patients

1.5 Contact Hours

Purpose of the Journal of PeriAnesthesia Nursing: To facilitate communication about and deliver education specific to the body of knowledge unique to the practice of perianesthesia nursing.

Outcome of this CNE Activity: To enable the nurse to increase knowledge on the care of the anticoagulated atrial fibrillation patient.

Target Audience: All perianesthesia nurses.

Article Objectives

1. Discuss current guidelines for use of anticoagulants with atrial fibrillation.
2. Discuss the relevant pharmacology, and the use of standardized tools to quantify the risks of thrombus or bleeding in the procedures.
3. Review resources for examining the optimal practice for these types of cases.

Accreditation

American Society of Perianesthesia Nurses is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

Additional provider numbers: Alabama #ABNP0074, California #CEP5197

Contact hours: Registered nurse participants can receive 1.5 contact hours for this activity.

Disclosure

All planners and authors of continuing nursing education activities are required to disclose any significant financial relationships with the manufacturer(s) of any commercial products, goods or services. Any conflicts of interest must be resolved prior to the development of the educational activity. Such disclosures are included below.

Planners and Author Disclosures

The members of the planning committee for this continuing nursing education activity do not have any financial arrangements, interests or affiliations related to the subject matter of this continuing education activity to disclose.

The authors for this continuing nursing education activity do not have any financial arrangements, interests or affiliations related to the subject matter of this continuing nursing education activity to disclose.

Verification of Participation: Verification of your participation in this educational activity is done by having you go to the ASPAN website: (1) select the article, and (2) complete the registration form and payment.

Requirements for Successful Completion : To receive contact hours for this continuing nursing education activity you must complete the registration form and payment, read the article, complete the online posttest and achieve a minimum grade of 100%, and complete the online evaluation.

Commercial Support / Unrestricted Educational Grant: No commercial support or unrestricted educational grant has been received for this educational activity.

Directions

A multiple-choice examination, designed to test your understanding of **Procedural Considerations for Anticoagulated Atrial Fibrillation Patients** according to the objectives listed, is available on the ASPAN Website: <https://www.aspan.org/Education/CE-Articles-Online/>

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