Periprocedural Management (Warfarin) v1.2

Procedure Bleed Risk (see table below)	**Low thromboembolic risk** **AF**: CHA_2DS_2-VASc score 1-4 or $CHADS_2$ score of 0-2 (and no prior stroke or TIA) **VTE**: VTE >12 months ago **MHV**: Bileaflet aortic valve prosthesis without major risk factors for stroke[1]	**Moderate thromboembolic risk** **AF**: CHA_2DS_2-VASc 5-6 or $CHADS_2$ score 3 or 4 **VTE**: VTE within past 3-12 months, recurrent VTE, non-severe thrombophilia[4], recurrent VTE, active CA or recent hx of CA[5] **MHV**: Mechanical mitral valve without additional stroke risk factors [1,2,11]; Bileaflet aortic valve prosthesis with major risk factors for stroke[1]	**High thromboembolic risk**[10] **AF**: CHA_2DS_2-VASc score ≥ 7 or $CHADS_2$ score 5 or 6, recent stroke or TIA (< 3 months), or rheumatic valvular heart disease **VTE**: VTE < 3 months, severe thrombophilia[6], antiphospholipid antibodies, associated with vena cava filter, associated with active CA with high VTE risk[7] **MHV**: Mitral valve with major risk factors for stroke[1]; caged-ball or tilting disc mitral/ aortic valve prosthesis; recent (<3 months) stroke or TIA, or other high risk stroke risk factors[2]
Minimal	Do not interrupt[3]	Do not interrupt[3]	Do not interrupt[3]
Low/Moderate/High	-Interrupt[7] -Do not bridge	-Interrupt[7] -Do not bridge	-Interrupt[7] -Bridging suggested[8,9]

[1]multiple prior strokes, prior perioperative stroke, or prior valve thrombosis; [2]atrial fibrillation, prior stroke or TIA, HTN, Diabetes, CHF, or age>75; [3]Interruption may be appropriate if there is increased concern for bleeding due to patient factors (eg. dental extraction in a patient with poor dentition, a screening colonoscopy in a patient with history of polyps that may require resection, or coronary angiography with a femoral (instead of radial) access; [4]heterozygous factor V Leiden or prothrombin gene mutation; [5]within 5 years if history of cancer, excluding non-melanoma skin cancer; [6]eg. deficiency of protein C, protein S or antithrombin, homozygous factor V Leiden or prothrombin gene mutation or double heterozygous for each mutation, multiple thrombophilias; [7]shorter interruption periods may be acceptable for low/moderate bleed risk procedures; [8] Address any reversible patient risk factors such as high INR or aspirin use, and consider bleed history before bridging; [9]Bridging not suggested for colonoscopies with anticipated polypectomy; [10]Consider delaying procedure, if possible, in high thrombotic risk patients with recent thromboembolism (within 3 months).[11] Based on MAQI consensus: mechanical mitral valves without stroke risk factors are not listed in 2022 CHEST guidelines thrombotic risk table.

Estimate Procedure Bleed Risk (examples)			
Minimal	**Low/Moderate**		**High**
-Minor dermatologic procedures -Ophthalmologic (cataract) procedures -Minor dental procedures -Pacemaker or cardioverter-defibrillator device implantation	-Arthroscopy -Cutaneous/lymph node biopsies -Foot/hand surgery -Coronary angiography -GI endoscopy ± biopsy -Colonoscopy ± biopsy	-Abdominal hysterectomy -Laparoscopic cholecystectomy -Abdominal hernia repair -Hemorrhoidal surgery -Bronchoscopy ± biopsy	-Major surgery with extensive tissue injury -Cancer surgery, especially solid tumor resection -Major orthopedic surgery, including shoulder replacement surgery -Reconstructive plastic surgery -Major thoracic surgery -Urologic or GI surgery, especially anastomosis surgery -Transurethral prostate resection, bladder resection, or tumor ablation	-Colonic polyp resection -Bowel resection -Percutaneous endoscopic gastrostomy placement, endoscopic -Retrograde cholangiopancreatography -Surgery in highly vascular organs (kidneys, liver, spleen) -Cardiac, intracranial, or spinal surgery -Any major operation (procedure duration > 45 minutes) -Neuraxial anesthesia -Epidural injections

Stopping warfarin

INR result (5-7 days before procedure)	Supratherapeutic	Therapeutic	Subtherapeutic
When to start holding warfarin	At least 5 days before	5 days before	3-4 days before

Bridging

Patient/ procedure factors	Bridging agent	When to start bridging agent prior to procedure	When to stop bridging agent prior to procedure	When to restart anticoagulants following procedure [d]	When to stop bridging agent
CrCl ≥30	LMWH	Start LMWH when INR goes below therapeutic range or after omitting 2-3 doses of warfarin (if INR not checked)	24 hours prior to the procedure.[a]	Warfarin: within 24 hours LMWH: at least 24 hours following low/ moderate risk procedure; at least 48-72 hours in high bleed risk procedures	When INR becomes therapeutic
	UFH	Start UFH when INR goes below therapeutic range or after omitting 2-3 doses of warfarin (if INR not checked)	At least 4 hours prior to procedure and if aPTT is in normal range.[b]	Warfarin: within 24 hours UFH: at least 24 hours following procedure[2]; after 48-72 hours in high bleed risk procedures	When INR becomes therapeutic
CrCl <30	UFH (recommended over LMWH) [c]	Start UFH when INR goes below therapeutic range or after omitting 2-3 doses of warfarin (if INR not checked)	At least 4 hours prior to procedure and if aPTT is in normal range. [b]	Warfarin: within 24 hours UFH or LMWH: at least 24 hours following procedure; after 48-72 hours in high bleed risk procedures	When INR becomes therapeutic
Heparin allergy or recent HIT	Follow local protocol	Follow local protocol	Follow local protocol	Follow local protocol	Follow local protocol

[a] Half the total daily dose of LMWH the day prior to the procedure is suggested.
[b] If aPTT is not in normal range, delay procedure and recheck aPTT every 2 hours until in normal range.

Doherty et al. 2017 ACC Expert Consensus Decision Pathway for Periprocedural Management of Anticoagulation in Patients With Nonvalvular Atrial Fibrillation. DOI: 10.1016/j.jacc.2016.11.024
Douketis et al. Perioperative Management of Antithrombotic Therapy: An American College of Chest Physicians Clinical Practice Guideline, Chest, Volume 162, Issue 5, 2022, Pages e207-e243, ISSN 0012-3692