

VMFH Perioperative Medications Guidance Document
APRIL 2024

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
ANALGESIC AGENTS				
Non-selective NSAIDs	Short $t_{1/2}$: Ibuprofen Indomethacin Diclofenac Ketoprofen Etodolac Ketorolac Intermediate $t_{1/2}$: Naproxen Sulindac Diflunisal Meloxicam Long $t_{1/2}$: Nabumetone Piroxicam	Short half-life (2 to 6 hours): discontinue on the day before surgery Intermediate half-life (7 to 20 hours): discontinue 3 to 4 days before surgery Long half-life (>20 h): discontinue 10 days before surgery <i>*Some physicians recommend stopping all NSAIDs 10 days before surgery</i>	May resume when risk of bleeding is acceptable and intravascular volume status is normal	Discontinuation 5 half-lives prior to surgery should be sufficient, except in individuals with hepatic or renal dysfunction Although some experts recommend discontinuing NSAIDs based on half-life, there's a poor correlation between COX inhibition and effects on platelet aggregation. May need to consider alternative analgesics or low-dose corticosteroids for arthritis patients who are NSAID-dependent perioperatively
COX-2 Inhibitors	Celecoxib (Celebrex®)	Stop 1-2-2-3 days before surgery <i>*Some physicians recommend stopping 1 week before surgery</i>	May resume when volume status and renal function is stable	Have much less effect on platelet function than aspirin or non-selective NSAIDs Have similar effects on renal function as non-selective NSAIDs Because of lack of effect on platelet function, may not require discontinuation if benefit > risk
Opioids	Buprenorphine	Anticipated minimal post-op pain: continue buprenorphine Moderate-severe post-op pain: if elective surgery, may consider	Maximize non-opioid analgesia. Resume buprenorphine once post-op pain has resolved.	When used chronically, patients are subject to physiologic and psychological dependence. Both opioids and benzodiazepines are used frequently and safely in the routine care of perioperative

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		discontinuing buprenorphine a week before surgery and transitioning to another opioid, if necessary		<p>patients</p> <p>Patients on buprenorphine may present a challenge for postoperative pain control due to the antagonist effect at the kappa opioid receptor.</p> <p>Opioids decrease bowel motility; monitor for decreased bowel motility in post-operative patients receiving opioids. Use with caution in the perioperative setting; individualize treatment when transitioning from parenteral to oral analgesics.</p>
Urinary Analgesics	Pentosan polysulfate sodium (Elmiron®)	Hold 12 to 24 hours prior to surgery	Depending on the type of surgery, Elmiron should be re-started at physician's discretion	Elmiron is a low-molecular weight heparin-like compound with anticoagulant and fibrinolytic effect. It is a weak anticoagulant with 1/15 the activity of heparin. Bleeding complications of ecchymosis, epistaxis, and gum hemorrhage have been reported.
ANTICOAGULANTS				
<p><i>**See Perioperative Anticoagulation Management Guidelines from the IntraNet homepage. OneNet → Resources → Anticoagulation Therapy → Perioperative or Procedural Guidelines Updated 2023</i></p>				
Vitamin K Antagonists <i>**See Perioperative Anticoagulation Management Guidelines **</i>	Warfarin (Coumadin®)	<p>Should be stopped >5 days prior to surgery if INR supratherapeutic, 5 days prior if INR therapeutic, 3-4 days if INR subtherapeutic</p> <p>In patients who require temporary interruption of Warfarin and whose INR is still</p>	<p>Resume warfarin on evening of or the morning after procedure or surgery</p> <p>The traditional management of perioperative anticoagulation, referred to as “bridging” therapy, uses preoperative and postoperative therapy with</p>	<p>Considerations:</p> <ol style="list-style-type: none"> 1. The risk of thromboembolism if anticoagulation is discontinued (the risk is related to the indication for anticoagulation as well as the postoperative risk induced by the procedure) 2. Risk of bleeding if anticoagulant is continued (procedural risk and

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		<p>above 1.5 one to two days prior to surgery, 2.5 mg of oral vitamin K is suggested</p> <p><u>**See Vitamin K – INR Reversal Protocol for patients with elevated INR despite discontinuation of warfarin</u></p> <p><u>**Bridging recommendations: Use therapeutic-dose SC LMWH > IV UFH in patients with mechanical heart valve, atrial fibrillation or VTE at moderate or high risk for thromboembolism</u></p>	<p>LMWH when an alternative is needed after oral anticoagulant therapy is discontinued for several days</p> <p><u>**Bridging recommendations: see preoperative recommendations</u></p>	<p>patient-specific risk)</p> <p>3. Effectiveness and safety of alternative anticoagulant interventions (i.e. “bridging” therapy)</p> <p>Please refer to: ACCP Evidence-Based Clinical Practice Guidelines (9 Edition) [Chest 2012;141(2)(Suppl):e326S-e350S] and 2017: ACC Expert Consensus Decision Pathway for NVAF.</p>
<p>Thrombin Inhibitor</p> <p><u>**See Perioperative Anticoagulation Management Guidelines**</u></p>	Dabigatran (Pradaxa®)	<p>Surgery with low/mod risk of bleeding: CrCl >50: discontinue >24 hours before surgery CrCl <50: discontinue >48 hours before surgery</p> <p>Surgery with high risk of bleeding: CrCl >50: discontinue >48 hours before surgery CrCl <50: discontinue >96 hours before surgery</p>	<p>Peak plasma level 6 hours Post-surgery.</p> <p>Once hemostasis has been established:</p> <p>Low/mod post-procedural bleeding risk: wait 24 hours following procedure. If thrombotic risk is high, prophylactic dose on the evening after procedure can be considered</p> <p>High post-procedural bleeding risk: 48-72 hours following Procedure</p>	<p>Extreme caution must be considered before performing neuraxial anesthesia</p> <p>Dabigatran should not be used for bridging warfarin due to lack of supporting literature and the perioperative bleed risk</p> <p>Please refer to: 2017 ACC Expert Consensus Decision Pathway for NVAF. JACC 2017;69:</p> <p>Douketis JD, et al. (2022). Perioperative Management of Antithrombotic Therapy: An American College of Chest Physicians Clinical Practice Guideline. Chest. September 23, 2022: e1-e36.</p>

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	<p>Argatroban (Acova)</p> <p>Bivalirudin (Angiomax)</p>	<p>Normal hepatic function: 3 hr Hepatic impairment, multi-organ dysfunction, heart failure exacerbation: 9 hr</p> <p>Low Risk Pre-Procedure CrCl \geq 30 ml/min: 1.5 hr CrCl < 30 ml/min 4 hrs High Risk Pre-Procedure: 4 hrs</p>	<p>For low risk procedure, may resume within 24 hours. For high risk post-procedure, may resume in 6 hrs</p> <p>Low Risk Post-Procedure: within 24 hrs High Risk Post-Procedure: 4-6 hrs</p>	
<p>Unfractionated Heparin (UFH)</p> <p><i>**See Perioperative Anticoagulation Management Guidelines**</i></p>	Heparin	<p>Stop heparin infusion 4 to 6 hours prior to surgery</p> <p>Stop SQ heparin 6 hours prior to surgery</p> <p>If patient receiving UFH infusion: Stop heparin infusion at least 4-6 hours before puncture/removing epidural catheter</p> <p>If patient receiving SubQ UFH: Stop heparin infusion at least 10 hours before puncture/removing epidural catheter</p>	<p>Restarting UFH should be done at the surgeon's discretion</p> <p>For minor surgical/invasive procedures or low/mod bleeding risk resume therapeutic dose UFH \geq 24 hours after procedure (or next day)</p> <p>For major surgery or a high bleeding risk delay initiation for at least 48 to 72 hours post-op OR administer low-dose UFH after surgery when hemostasis is secured</p> <p>Neuraxial Block/Epidural Catheter: If a patient received UFH infusion: heparin may be resumed 2 hours after puncture/catheter removal</p>	<p>Establish that hemostasis has been achieved, procedure specific bleeding complications have been considered, and patient-specific bleeding has been evaluated.</p> <p>Observe epidural catheter limitations.</p>

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
			If a patient received prophylactic SubQ UFH, the SubQ heparin may be resumed a minimum of 2 hours after puncture/epidural catheter removal	
Low-molecular weight heparin (LMWH) **See Perioperative Anticoagulation Management Guidelines **	Enoxaparin (Lovenox®) Dalteparin (Fragmin®)	<i>Enoxaparin and Dalteparin:</i> Hold <u>prophylactic</u> LMWH for at least 12 hours preop <u>Therapeutic (BID)</u> LMWH for at least 24 hours preop <u>Therapeutic (daily)</u> LMWH for at least 24 hour and last dose should be half-dose Hold first LMWH prophylactic or therapeutic dose until 4 hours after epidural catheter removal	Restarting LMWHs or Anti-Xa Inhibitors should be done at the surgeon's discretion For minor surgical/invasive procedures with low to moderate bleed risk : resume therapeutic dose LMWH \geq 24 hours after procedure (or next day) and Anti-Xa Inhibitors ~6-8 hours after procedure For major surgery or a high bleeding risk: delay initiation for ~48 to 72 hours post-op OR administer low-dose LMWH or prophylactic fondaparinux after surgery when hemostasis is secured	Please refer to: ACCP Evidence-Based Clinical Practice Guidelines (9th Edition) [Chest 2012;141(2)(Suppl):e326S-e350S]
Indirect Factor Xa Inhibitor **See Perioperative Anticoagulation Management	Fondaparinux (Arixtra®)	Due to 17-hour half-life, hold at least 36 to 48 hours prior to major surgery Hold for 72 hours prior to neuraxial anesthetic. **Consult anesthesiologist	For minor surgical/invasive procedures: resume ~6-8 hours after procedure Recommended duration of bridging overlap with fondaparinux and warfarin is 5-9 days	Avoid use in spinal injury or surgery patients Extreme caution must be considered before performing neuraxial anesthesia

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<u>Guidelines</u> **				
Direct Factor Xa Inhibitor **See <u>Perioperative Anticoagulation Management Guidelines</u> **	Rivaroxaban (Xarelto®) Apixaban (Eliquis®) Edoxaban (Savaysa®)	<p>Surgery with low or moderate risk of bleeding: Rivaroxaban, apixaban, edoxaban: CrCl ≥ 30 ml/min: Discontinue ≥ 24 hours before surgery CrCl < 30 ml/min: Discontinue ≥ 36 hours before surgery</p> <p>Surgery with high risk of bleeding: Rivaroxaban, apixaban, edoxaban: CrCl ≥ 30 ml/min: Discontinue ≥ 48 hours before surgery CrCl < 30 ml/min: Discontinue ≥ 72 hours before surgery</p> <p>Note: CrCl cut-off differs from CSH guidance</p> <p>Epidural Catheters: If a patient is receiving apixaban or rivaroxaban, hold therapy 3 days before puncture/removing epidural catheter.</p>	<p>Once hemostasis has been established:</p> <p>Low/moderate post-procedural bleeding risk: wait ≥ 24 hours following procedure; if thrombotic risk is high, prophylactic dose on the evening after the procedure can be considered</p> <p>High post-procedural bleeding risk: wait $\geq 48-72$ hours before resuming full dose DOAC therapy</p> <p>Epidural Catheters: Apixaban and rivaroxaban may be resumed 24 hours after puncture/catheter removal.</p>	<p>Avoid use in spinal injury or surgery patients</p> <p>Extreme caution must be considered before performing neuraxial anesthesia. Longer intervals for interruption may be required in cases in which the bleeding risk is very high.</p> <p>Bridging with a parenteral agent is generally not required due to the rapid offset and offset of DOACs</p> <p>**The manufacturer of edoxaban does not specify the difference between standard and high-risk surgery, but for patients with high bleed risk, may consider holding ~ 48 hours prior to surgery due to T $\frac{1}{2}$ of $\sim 10-14$ hours.</p> <p>Please refer to 2017 ACC Expert Consensus Decision Pathway for NVAf. JACC 2017;69:</p>
ANTIPILEPTICS				

Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Brivaracetam Carbamazepine Cannabidiol Cenobamate Clobazam Eslicarbazepine Ethosuximide Gabapentin Ganaxolone Levetiracetam Lacosamide Lamotrigine Felbamate Pregabalin Phenytoin Topiramate Zonisamide Valproic acid	<p>Continue medications during the perioperative period</p> <p>An antiseizure medication is typically administered for breakthrough or acute seizure</p> <p>If patient will be admitted after surgery and will be NPO for 24 hours, consider obtaining baseline preoperative serum drug levels if available</p>	<p>Continue patient's regular schedule; if oral intake is not possible, utilize intravenous Preparations</p> <p>IV Formulations:</p> <ul style="list-style-type: none"> • Levetiracetam • Fosphenytoin, • Phenytoin • Valproate • Phenobarbital • Lacosamide • Diazepam, lorazepam, and midazolam • Propofol (used in small doses to halt seizures in operating room) 	<p>In outpatients who have been stable on their AED regimen with a long-standing seizure-free history, there is probably no need to routinely check serum levels</p> <p>If patient is being treated with a drug for which there is no intravenous form and delay in postoperative oral intake is anticipated, preoperative conversion to a drug for which an intravenous form is available may be considered. Neurology should be consulted for alternatives to cover the perioperative period if IV formulation of the patient's regular antiepileptic medication is not available.</p> <p>Levetiracetam is increasingly administered rather than phenytoin for seizure prophylaxis.</p> <ul style="list-style-type: none"> • Not associated with hypotension during administration • No serum-level monitoring <p>May increase or decrease the metabolism of some anesthetic agents, especially neuromuscular blocking agents</p> <p>Patients with epilepsy have an increased risk for postoperative complications</p>
ANTIHYPERTENSIVES				
β-blockers	Atenolol Bisoprolol Carvedilol Metoprolol	Continue preoperatively and throughout the hospital stay without interruption, if possible while weighing risks vs. benefits	Resume postoperatively Several intravenous β-blockers are available for patients who have not resumed taking oral	Beta blockers may have benefits when taken perioperatively by decreasing ischemia via decreased oxygen demand and by preventing/controlling arrhythmias.

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Propranolol		medications when postoperative doses are due	<p>Potential adverse effects of perioperative beta blockage include bradycardia and hypotension</p> <p>Nonselective beta blockers can interact with epinephrine, often used for infiltration anesthesia, but patients who are taking a nonselective beta blocker (eg, propranolol) chronically do not need to be switched to a beta 1 selective agent perioperatively</p> <p>Intravenous forms of beta blockade, such as metoprolol, propranolol, and labetalol, should be considered if the patient cannot take oral medications</p>
Angiotensin-Converting Enzyme Inhibitors (ACE-Inhibitors)	Lisinopril Enalapril Captopril Benazepril Ramipril Quinapril	<p>For most patients, hold on day of procedure</p> <p>If patient is taking ACE-I/ARB for Heart Failure, or poorly controlled hypertension, verify with anesthesiologist to continue or not continue</p>	<p>Resume postoperatively as long as the patient is not hypotensive and has not suffered acute renal injury</p> <p>Intravenous enalaprilat may be used if the patient becomes hypertensive before resuming oral medications</p>	<p>Exaggeration of hemodynamic lability after induction of anesthesia has been reported with patients taking ACEIs/ARBs.</p> <p>While controversial, the evidence seems to support holding ACEIs/ARBs the day of surgery.</p> <p>It is recommended that ACE-I/ARB's be continued during perioperative phase if treating for Heart Failure, or poorly controlled hypertension to avoid further exacerbation of these conditions.</p>
Angiotensin Receptor Blockers (ARBs)	Valsartan Irbesartan Losartan Candesartan Olmesartan			

Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
Calcium Channel Blockers (CCBs)	Amlodipine Nifedipine Diltiazem Verapamil	Continue preoperatively and throughout the hospital stay without interruption, if possible, as long as heart rate and blood pressure are stable	Resume postoperatively Intravenous verapamil and diltiazem are available for patients who have not resumed taking oral medications when postoperative doses are due	Concerns have been raised about CCB's having increased risk of bleeding. Two large trials did not find any association. Withholding these agents for significant bradycardia or hypotension should not result in withdrawal effects.
Centrally Acting Sympatholytics	Clonidine Methyldopa Guanfacine	Continue perioperatively to avoid withdrawal/rebound effects, most significant with clonidine. Avoid initiation for the prevention of cardiac events. <i>Will patient be able to take oral meds within 12 hours of preoperative dose? If not, see next column.</i>	If a surgical patient who is taking oral clonidine is expected to resume it within 12 hours of the preoperative dose, oral dosing may continue If more than 12 hours are expected to pass, conversion from oral clonidine to a clonidine patch at least 3 days before surgery should be considered	If prolonged NPO is expected, then prior to surgery, discontinue the oral dose by tapering over 2 to 3 days while initiating an equivalent dose of a clonidine patch. This provides steady dosing during the conversion. Transdermal patch (Catapres-TTS) is available. Steady-state levels are achieved 2-3 days after application. Each patch is used for 7 days.
Direct Renin Inhibitors	Aliskiren (Tekturna®)	Hold on day of procedure	Resume postoperatively as long as patient is not hypotensive and has not suffered acute renal injury	Assess risk vs. benefit between hyper- and hypotensive events intraoperatively
Direct vasodilators and alpha-adrenergic blockers	Hydralazine Prazosin Terazosin	Continue perioperatively when possible	Use intravenous preparations postoperatively if blood pressure is elevated and patient is unable to resume oral intake	IV hydralazine is a potent arterial dilator and may cause reflex tachycardia Use caution with intravenous formulations as the dose required is lower than the oral dose

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
ANTIHYPERTENSIVES (COMBINATION)				
HCTZ/ ACE-Inhibitors	Benazepril/ HCTZ (Lotensin®) Captopril/HCTZ (Capozide®)	Hold on day of procedure	Resume postoperatively as long as patient is not hypotensive and has not suffered acute renal injury Assess needs for volume overload and if patient can tolerate PO medications	Refer to HCTZ and ACE-I's
HCTZ/ARBs	Losartan/HCTZ (Hyzaar®) Valsartan/HCTZ (Diovan®)	Hold on day of procedure	Resume postoperatively as long as the patient is not hypotensive and has not suffered acute renal injury Assess needs for volume overload and if patient can tolerate PO medications	Refer to HCTZ and ARB's
ACE-Inhibitors or ARBs & CCBs	Benazepril/ Amlodipine (Lotrel®) Enalapril/ Felodipine (Lexxel®) Trandolapril/ Verapamil (Tarka®) Valsartan/ Amlodipine (Exforge®) Perindopril arginine/ amlodipine (Prestalia®)	Hold on day of procedure	Resume postoperatively as long as the patient is not hypotensive and has not suffered acute renal injury	Refer to ACE-I's, ARB's, and CCB's

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HCTZ/ARBs/CCB s	Olmesartan/ HCTZ/ Amlodipine (Tribenzor®) Valsartan/ Amlodipine/ HCTZ (Exforge HCT®)	Hold on day of procedure	Resume postoperatively as long as the patient is not hypotensive and has not suffered acute renal injury Assess needs for volume overload and if patient can tolerate PO medications	Refer to HCTZ, ARB's, and CCB's
HCTZ/ β-blockers	Bisoprolol/ HCTZ (Ziac®) Metoprolol/ HCTZ (Lopressor HCT®)	Continue without interruptions	Resume postoperatively Assess needs for volume overload and if patient can tolerate PO medications	Refer to HCTZ and β-blockers
ARBs/Direct Renin Inhibitor	Aliskiren/ Valsartan (Valturna®)	Hold on day of procedure	Resume postoperatively as long as patient is not hypotensive and has not suffered acute renal injury	Refer to ARB's and Direct Renin Inhibitor
CCBs/Direct Renin Inhibitor	Aliskiren/ Amlodipine (Tekamlo®) Aliskiren/ Amlodipine/ HCTZ (Amturnide®)	Hold on day of procedure	Resume postoperatively as long as patient is not hypotensive and has not suffered acute renal injury	Refer to CCBs and direct renin inhibitors
ARB/ARNI	Sacubitril/ Valsartan (Entresto®)	Hold on day of procedure	Resume postoperatively as long as patient is not hypotensive and has not suffered acute renal injury	Refer to ARBs

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ANTI-INFECTIVE AGENTS				
Aminoglycoside	Plazomicin (Zemdri®)	Continue until the time of surgery	Resume postoperatively	May cause nephrotoxicity; monitor renal function closely. May cause neuromuscular blockade in patients receiving concomitant neuromuscular blocking agents and/or with underlying neuromuscular disorders
Antileishmanial/ Antiparasitic Medications	Miltefosine Abametapir (Xeglyze®) Artesunate	Continue until the time of surgery Hold for two serum half-lives prior to surgery (~1.5 hours)	Resume when the patient's GI tract is functioning properly Resume postoperatively Restart after completed wound healing.	While there are no specific recommendations, antimalarials are generally continued perioperatively due to the low risk presented in surgery. The perioperative risk of treatment with biologics is still far from clear.
Antiprotozoal and Anthelmintic	Benznidazole Moxidectin Tafenoquine (Krintafel®) Triclabendazole (Egaten®) Nifurtimox (Lampit®) Fexinidazole	Continue until time of surgery Consult with infectious disease specialists Monitor for anemia	Resume postoperatively Tafenoquine: resume when GI tract is functioning properly Nifurtimox: if vomiting occurs within 30 minutes of dose, repeat the same dose. If vomiting occurs within 30 to 60 minutes of dose, a half dose should be given.	Continue medication for duration of therapy Benznidazole: Bone marrow depression has been reported in post-marketing case reports, but frequency is not defined. The mean plasma half-life is 13 hours. Moxidectin: may cause symptomatic orthostatic hypotension with inability to stand without support after lying down for 5 minutes. Advise patients to lie down until the symptoms resolve Triclabendazole: Short course of therapy for fascioliasis - only 2 doses given 12 hours apart. Fexinidazole: may cause hypertension

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Antifungal Agent, Azole Derivatives	Isavuconazole (Cresemba®) Oteseconazole Vivjoa®	Continue until the time of surgery	Resume postoperatively	The half-life of isavuconazole is 130 hours. The half-life of oteseconazole is 138 days. Oteseconazole is taken weekly. Based on this data, if the doses must be held for a short period of time pre- and post-operatively, this shouldn't affect overall patient exposure to the medication.
Beta lactam - Beta lactamase inhibitor	Sulbactam/durlobactam (XACDURO®)	Continue until the time of surgery	Resume postoperatively	Concomitant administration with OAT1 inhibitors may increase plasma concentration of Xacduro. Adverse reaction include anemia (13%), arrhythmia (9%), thrombocytopenia (6%)
Carbapenem	Imipenem, cilastatin, relebactam (Recarbrio®)	Continue until the time of surgery	Resume postoperatively	Non-formulary. Consult with infectious disease specialists prior to approval. May have augmented renal clearance with surgery.
H. Pylori Agent (Potassium-Competitive Acid Blockers)	Vonoprazan, amoxicillin, and clarithromycin (Voquezna®)	Continue until the time of surgery	Resume postoperatively	Contains the following three drug products: <ul style="list-style-type: none"> • Tablets: Vonoprazan 20 mg • Tablets: Clarithromycin 500 mg • Capsules: Amoxicillin 500 mg Vonoprazan has been shown reduce post- ESD bleeding and promote ulcer healing if used peri-operatively
Pleuromutilin	Lefamulin (Xenleta®)	Continue until the time of surgery and consult with infectious disease specialists	Resume postoperatively	The half-life of this medication is approximately 8 hours. Continue medication for duration of therapy. Non-formulary.
Cephalosporins		Continue until the time of surgery	Resume postoperatively	The half-life of this medication is 2-3 hours. Primarily excreted unchanged via the kidneys; monitor renal function. May have augmented renal clearance with surgery

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Tetracycline derivatives	Seysara® Nuzyra® Xerava®	Continue until the time of surgery.	Resume postoperatively	Non-formulary.
Antiviral	Valacyclovir Acyclovir	Continue until the time of surgery.	Resume postoperatively.	
ANTIPARKINSON AGENTS				
Adenosine Receptor Antagonist	Istradefylline (Nourianz®)	Medication can be taken up to the day of surgery	May resume when patient is able to take oral medication	Monitor for potential increase in serum glucose (1-2%)
Dopamine Precursor	Carbidopa/Levodopa (Sinemet®)	Continue during the perioperative period, discontinuation may cause parkinsonian crisis or neuroleptic malignant syndrome (NMS), no IV form available One source indicates that “Treatment should continue until the morning of surgery. One dose with a minimal amount of water may be administered on the same morning. Although the half-life of levodopa is 90min, its effects can last for several hours, thus facilitating perioperative mobility. After surgery, patients should resume treatment as soon as possible.”	Resume medications at same doses as soon as possible. If a patient has a nasogastric tube, a levodopa/carbidopa solution can be delivered to the duodenum via a weighted feeding tube. Otherwise, for patients who are NPO, there are few effective alternatives that may be given IV/IM: <ul style="list-style-type: none"> • trihexyphenidyl • benztropine • diphenhydramine 	Without treatment, muscle rigidity increases which may complicate medical care Carbidopa/levodopa interacts with many drugs used in anesthesia, increasing the risk for arrhythmias – but the benefits of continued therapy outweigh the risks
Dopamine Agonists	Bromocriptine Pramipexole	Dopamine agonists should be discontinued the evening before	May be restarted when the patient resumes oral intake	

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	Ropinirole	surgery to avoid postural hypotension in the perioperative periods		
Dopamine Antagonist	Amisulpride (Barhemsys®)	May be administered prior to surgery at the time of induction of anesthesia	Can be intravenously administered immediately after surgery	Causes dose- and concentration-dependent QT prolongation. Recommended to avoid with other drugs known to prolong the QT interval (e.g. ondansetron).
Monoamine Oxidase Inhibitor (MAOIs) used in Parkinson's	Selegiline (Eldepryl®) Pargyline Phenelzine Safinamide (Xadago®)	Consult anesthesiologist FLAG CHARTS to alert that patient is on an MAOI and place stickers on chart cautioning against the use of meperidine and indirect sympathomimetics (i.e. ephedrine) “They should be discontinued 3 weeks before surgery if the condition of the patient permits it. Their association with other serotonergic-acting drugs (meperidine) could trigger serotonin syndrome.”		MAO inhibition becomes non-selective in doses greater than 10 mg/day AVOID meperidine and indirect sympathomimetics (i.e. ephedrine), as these drugs may cause neuroleptic malignant syndrome. (Doak GH) Increased risk of serotonin syndrome in patients who receive methylene blue intraoperatively. Combination should be avoided unless benefit outweighs risk. Patients should not be forced to discontinue these agents. MAO function takes 2 weeks to recover after discontinuation of a MAOI so if discontinuation is warranted, taper off slowly over 2 weeks; but still follow recommended precautions above since discontinuation does not guarantee complete elimination
COMT Inhibitors	Entacapone (Comtan®) Opicapone (Ongentys®)	Continue up to the time of surgery	For patients who are NPO, there are few effective alternatives that may be given IV/IM: • trihexyphenidyl	Work by extending the duration of action of levodopa No specific contraindications regarding their use

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Tolcapone (Tasmar®)		<ul style="list-style-type: none"> benztropine diphenhydramine 	<p>perioperatively</p> <p>Abrupt withdrawal can cause a syndrome similar to neuroleptic malignant syndrome (as can carbidopa/levodopa)</p>
ANTIPLATELET AGENTS				
**See Perioperative Anticoagulation Management Guidelines from the IntraNet homepage. OneNet → Resources → Anticoagulation Therapy → Perioperative or Procedural Guidelines Updated 2023				
Salicylates **See Perioperative Anticoagulation Management Guidelines **	Aspirin (ASA)	<p>Recommend continuation in patients with history of cardiovascular disease when the potentially increased bleeding risk is acceptable for the surgeon for both non-cardiac and cardiac procedures. Otherwise, consider stopping at least 5-10 days prior to surgery. The decision to hold aspirin earlier prior surgery sometimes depends on whether the surgery is cardiac versus noncardiac.</p> <p>Preoperative decisions regarding discontinuation of aspirin administered for antiplatelet effects should be individualized and based upon conversation</p>	<p>Resume ~24 hours after surgery (next morning) assuming risk of bleeding has diminished</p> <p>May resume ~6 hours after CABG surgery or after extubation, assuming risk of bleeding has diminished, with or without a loading dose.</p> <p>Prompt resumption of ASA should be considered for patients with or at high risk for atherosclerosis</p>	<p>Aspirin is continued preferentially in many cardiac surgeries because of its positive effects on mortality and cardiac morbidity. Preoperative use of aspirin has been shown to reduce early mortality, acute kidney failure, and MI.</p> <p>Widely published experience exists regarding the safety of aspirin and NSAID use in the setting of regional anesthesia</p> <p>Patients on recent DAPT undergoing upcoming, elective non-cardiac surgery:</p> <ul style="list-style-type: none"> Recommend delaying elective non-cardiac surgery for 6 months after placement of drug-eluting stents (DES) and 30 days after bare-metal stents (BMS) and by considering early surgery after 3 months if the risk of delaying surgery is greater than the risk of stent

Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
		<p>between the patient's surgeon, PCP, neurologist, or cardiologist. For patients at high risk for cardiovascular events (e.g. cardiac stents, CAD, DM, CHF, renal insufficiency, cerebrovascular disease) and those requiring CABG surgery it is recommended that ASA be continued through the operative period, unless it's determined that the patient is at very high risk of bleeding.</p>		<p>thrombosis. DAPT therapy for at least 4–6 weeks after DES stenting was recommended in patients undergoing urgent non-cardiac surgery.</p> <ul style="list-style-type: none"> - Regardless of timing of surgery, recommend continuing at least aspirin throughout the perioperative period and ideally continuing DAPT unless surgery demands discontinuation. After surgery, the P2Y12 receptor inhibitor should be restarted as soon as possible if stopped preoperatively. <p><i>Recommend continuing dual antiplatelet therapy perioperatively in patients with coronary stents if surgery is required within 30-90 days of bare metal stent placement or within 12 months of drug-eluting stent placement. Elective surgery should not be performed during these critical periods. Patients with bare metal stents older than 30-90 days or drug-eluting stents older than 12 months should continue ASA therapy perioperatively with the exception of intracranial, ophthalmic and intermedullary spinal cord surgery when the risk of bleeding exceeds the risk of major cardiac event from in stent rethrombosis.</i></p>
Other Antiplatelet Drugs	Vorapaxar (Zontivity®)	Preoperative decisions regarding discontinuation of antiplatelet agent should be individualized and based upon conversation between the patient's surgeon, PCP, neurologist, or cardiologist.	Resume ~24 hours after surgery, when hemostasis is secured	<p>Vorapaxar is typically taken in combination with aspirin and/or clopidogrel in patients with diabetes and a history of MI. (Circulation. 2015;131(12):1047-53.)</p> <p>Contraindicated in patients with a history of stroke, TIA, ICH, or active pathological bleeding.</p>

Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
		Significant inhibition of platelet aggregation remains 4 weeks after discontinuation due to long half-life of parent drug and active metabolite (T $\frac{1}{2}$ 72-96 hours; terminal T $\frac{1}{2}$ 5-13 days)		The risk of bleeding is proportional to the patient's underlying bleeding risk.
	Ticagrelor (Brilinta®)	<p>Preoperative decision regarding discontinuation of antiplatelet agent should be individualized and based upon conversation between patient's surgeon, PCP, neurologist, or cardiologist.</p> <p>Discontinue 3-5 days before noncardiac surgery</p> <p>Discontinue 5-7 days before cardiac surgery.</p>	Resume ~24 hours after surgery, when hemostasis is secured	<p>Do not start in patients planned to undergo urgent CABG.</p> <p>Maintenance doses of aspirin above 100mg reduce the effectiveness of ticagrelor</p> <p>In patients scheduled for neuraxial anesthesia, a discontinuation interval of 5 to 7 days is recommended to reduce the potential risk of bleeding complications</p> <p>Postponing cardiac surgery for at least 2 to 3 days might relevantly reduce the risk for significant perioperative bleeding</p> <p>Patients on recent DAPT undergoing upcoming, elective non-cardiac surgery:</p> <ul style="list-style-type: none"> - Recommend delaying elective non-cardiac surgery for 6 months after placement of drug-eluting stents (DES) and 30 days after bare-metal stents (BMS) and by considering early surgery after 3 months if the risk of delaying surgery is greater than the risk of stent thrombosis. DAPT therapy for at least 4-6 weeks after DES stenting was recommended in patients undergoing

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
				<p>urgent non-cardiac surgery.</p> <ul style="list-style-type: none"> - Regardless of timing of surgery, recommend continuing at least aspirin throughout the perioperative period and ideally continuing DAPT unless surgery demands discontinuation. After surgery, the P2Y12 receptor inhibitor should be restarted as soon as possible if stopped preoperatively. <p><i>Recommend continuing dual antiplatelet therapy perioperatively in patients with coronary stents if surgery is required within 30-90 days of bare metal stent placement or within 12 months of drug-eluting stent placement. Elective surgery should not be performed during these critical periods. Patients with bare metal stents older than 30-90 days or drug-eluting stents older than 12 months should continue ASA therapy perioperatively with the exception of intracranial, ophthalmic and intermedullary spinal cord surgery when the risk of bleeding exceeds the risk of major cardiac event from in stent rethrombosis.</i></p>
	Clopidogrel (Plavix®)	<p>Preoperative decisions regarding discontinuation of antiplatelet agents should be individualized and based upon conversation between the patient's surgeon, PCP, neurologist, or cardiologist.</p> <p>Discontinue at least 5-7 days before surgery. The decision to hold clopidogrel earlier prior</p>	Resume ~24 hours after surgery (next morning), when hemostasis is secured	<p>Neuraxial anesthesia is relatively contraindicated if these antiplatelet agents are not discontinued 7-10 days preoperatively</p> <p>Consider discussing with surgeon and cardiologist about whether or not a loading dose of clopidogrel should be given at the time of resumption, since reinitiation of maintenance dose would take 5-10 days to attain maximal platelet function inhibition</p>

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
		surgery sometimes depends on whether the surgery is cardiac versus noncardiac.		<p>Postponing cardiac surgery for at least 2 to 3 days might relevantly reduce the risk for significant perioperative bleeding</p> <p><i>Recommend continuing dual antiplatelet therapy perioperatively in patients with coronary stents if surgery is required within 30-90 days of bare metal stent placement or within 12 months of drug-eluting stent placement. Elective surgeries should not be performed during these critical periods. Patients with bare metal stents older than 30-90 days or drug-eluting stents older than 12 months should continue ASA therapy perioperatively.</i></p>
	Prasugrel (Effient®)	Preoperative decisions regarding discontinuation of antiplatelet agents should be individualized and based upon conversation between the patient's surgeon, PCP, neurologist, or cardiologist. Discontinue at least 7-10 days before surgery. The decision to hold clopidogrel earlier prior surgery sometimes depends on whether the surgery is cardiac versus noncardiac.	Resume ~24 hours after surgery, when hemostasis is secured	
Glycoprotein IIb/IIIa Inhibitors	Eptifibatide (Integrilin) Tirofiban (Aggrastat)	Low Risk Pre-Procedure: 4-8 hrs (if post-PCI, discuss with prescriber) High Risk Pre-Procedure: 8 hrs	Shared decision with prescriber	

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
		(if post-PCI, discuss with prescriber)		
Combination Drugs	Aspirin/ dipyridamole (Aggrenox®)	Stop 7-10 days before surgery	Resume after procedure or surgery when the risk of bleeding has diminished	
Phosphodiesterase Inhibitor	Cilostazol (Pletal®)	Stop at least 5 days before surgery Note: recommendation differs from CSH guidance <i>*In patients who cannot discontinue 7-10 days in advance, stopping 3 days in advance may be acceptable</i>	Resume after procedure	Antiplatelet actions and vasodilatory effects When stopped, claudication symptoms may recur; symptoms should subside once cilostazol is reinitiated post-op.
BENZODIAZEPINES				
	Lorazepam Diazepam Alprazolam Temazepam Chlordiazepoxide	Continue with minimal interruption in the perioperative period IV preparations are available if needed	Resume when patient is hemodynamically stable If patient NPO, parenteral diazepam and lorazepam are available	May cause delirium in elderly patients Abrupt withdrawal can result in agitation, hypertension, delirium, and seizures
CARDIOVASCULAR MEDICATIONS				
Antianginal Medications	Nitrates Ca 2+ Channel blockers (CCBs)	<i>All</i> antianginal medications should be <i>continued</i> in the perioperative period	Nitrates: Once-daily oral and transdermal nitrate formulations available	<i>Nitrates</i> : Transdermal nitrates may lose effectiveness if skin perfusion decreases during or after surgery
	B blockers	Abrupt discontinuation of	CCBs: IV verapamil and	<i>Calcium channel blockers</i> should be continued

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Ivabradine (Corlanor®)	calcium channel blockers may cause vasospasm Ivabradine is used for angina as an off-label indication	diltiazem available β-blockers: IV form available Continue IV preparation until patient can resume regular PO medications	because there have been no major adverse reactions reported in the perioperative period – they appear safe and have theoretical benefits including reduced mortality in cardiac surgery and reduced ischemia in noncardiac surgery. Two trials which focused on cardiac surgery patients found no correlation between use of CCBs perioperatively and increased bleeding. <i>β blockers</i> should be continued to avoid withdrawal effects; use of β-blockers has been shown to reduce cardiovascular morbidity and mortality postoperatively in some patient populations
Cardiac Glycoside	Digoxin (Lanoxin® Digitek®)	Continue perioperatively to provide stability, especially for arrhythmias Check serum digoxin and potassium levels preoperatively if clinically indicated	Due to long half-life of digoxin, it is permissible to miss one dose If patient is unable to resume oral intake of medications, it is acceptable to give IV digoxin **When switching a patient from intravenous to oral digoxin, allowances must be made for differences in bioavailability (digoxin tablets are ~60-80% bioavailable)	Patient is at risk for digoxin toxicity due mainly to physiologic stress effects, particularly acidosis, electrolyte abnormalities (especially hypokalemia), hypoxia and increased catecholamines If a pressing reason exists or if the physiologic status of the patient is significantly altered, a serum digoxin level should be measured preoperatively and/or postoperatively, but generally a drug level is not required
Antiarrhythmics	Amiodarone Sotalol Procainamide Diltiazem Verapamil	Continue all antiarrhythmic agents for prevention of arrhythmias intra- and postoperatively	Cardiologist should be consulted if patient is taking an antiarrhythmic that has no alternative preparation, other than oral, and will be NPO for	Given the relative risk of therapy vs. that of rhythm disturbances, these drugs are usually prescribed for significant arrhythmias Hypokalemia, hypomagnesemia, and

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Dofetilide		some time Multiple IV preparations available (i.e. amiodarone, diltiazem, etc.)	hypocalcemia can all increase risk of dangerous dysrhythmias with certain antiarrhythmic agents
Alpha-/Beta-Agonist	Droxidopa	Can be continued at physician's discretion. However, it is recommended that patients be evaluated for supine hypertension while on the medication. If supine hypertension persists and surgery requires supine positioning, droxidopa can be held approximately 8 hours prior to surgery.	Resume postoperatively.	US Black Box Warning: Droxidopa may cause or exacerbate supine hypertension Patients who are being treated for neurogenic orthostatic hypotension are sensitive to catecholamines secondary to up-regulation of catecholamine receptors Short-term supine hypertension can be managed with transdermal nitrates if no contraindications exist.
Neprilysin Inhibitor/ARB	Sacubitril/valsartan (Entresto)	Refer to ARBs section above		
Transthyretin Stabilizer	Tafamidis (Vyndamax®) Tafamidis meglumine (Vyndaqel®)	Continue until time of surgery	Resume postoperatively when patient is stable and able to swallow the capsule whole	Vyndamax and Vyndaqel have not been thoroughly studied during perioperative and postoperative phases of care but does not appear to affect wound healing.
CORTICOSTEROIDS				
	Prednisone Methyl-prednisolo	Can be held at physician's discretion; however, it is	Minor to moderate surgical stress: resume home dose	If a patient is taking ≥ 20 mg/day of prednisone or equivalent steroid for more than three weeks or on

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	ne Hydrocortisone	<p>recommended that patients continue their usual dose through the day of surgery. Possible perioperative complications include wound infections but risk is low</p> <p>Suggested perioperative stress corticosteroid coverage for suppressed HPA axis patients:</p> <p>Minor procedures or surgery under local anesthesia (eg, inguinal hernia repair): take usual morning steroid dose</p> <p>Moderate surgical stress (eg, lower extremity revascularization, total joint replacement): Give 50 mg hydrocortisone IV right before surgery followed by 25 mg IV every 8 hours for 24 hours</p> <p>Major surgical stress (eg, esophagogastrectomy, total proctocolectomy, open heart surgery): Take usual morning steroid dose. Give 100 mg hydrocortisone IV before induction of anesthesia followed by 50 mg IV Q8H for 24hr.</p>	<p>Major surgical stress: decrease prednisone dose by 50% per day to the usual daily dose</p> <p>Monitor closely for infection as glucocorticoids may suppress fever response</p>	<p>steroids for Cushing's Syndrome, perioperative coverage with hydrocortisone is necessary in accordance with the magnitude of the stress. If a patient is taking doses of 5-20 mg/day or higher of prednisone or equivalent steroid, perioperative coverage with hydrocortisone may be necessary due to variability in HPA axis suppression.</p> <p>Suggested that the following groups do not need additional glucocorticoid coverage because of they do not have suppression of their HPA axis:</p> <ul style="list-style-type: none"> On glucocorticoid for less than 3 weeks Morning doses of <5mg/day of prednisone or its equivalent for any length of time Doses of <10mg/day of prednisone or its equivalent every other day <p>For patients currently off glucocorticoids but history of use in the past year, it is suggested to preoperatively assess the HPA axis beginning with checking a morning serum cortisol. Clinicians may consider withholding steroids, watching BP, and administering a dose of hydrocortisone if the patient develops hypotension.</p> <p>Steroid equivalencies: Prednisone 5 mg = Methylprednisolone 4 mg = hydrocortisone 20 mg = dexamethasone 0.75 mg</p>

DIABETIC MEDICATIONS

Preoperative Home Medication Instructions for Patients with Diabetes and/or Hyperglycemia **See [Perioperative Glycemic Control Guidelines](#)*

Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
Biguanide	Metformin (Glucophage®)	<p>Hold the morning of surgery.</p> <p>Temporarily discontinue for 48 hours following the administration of iodine contrast media only in patients with acute kidney injury, severe chronic kidney disease (stage IV/V, eGFR <30) or in those undergoing arterial studies.</p> <p>Withhold metformin for cardiac cases and cases in which significant blood loss is expected.</p>	<p>May restart drug after procedure once patient resumes a normal diet and it is certain that no acute renal dysfunction has developed (e.g. eGFR >30); Preferred inpatient treatment is insulin management. Inpatient metformin can be restarted and used in combination with insulin or DPP4i if no contraindications exist.</p>	<p>Calculate eGFR; discontinue immediately or do not resume therapy if eGFR is <30 mL/min/1.73 m². Assess the benefit of continuing metformin treatment in patients whose eGFR is 30-45 mL/min/1.73m². May continue at reduced dose of 500 mg BID with close monitoring of renal function.</p> <p>Metformin does not typically cause hypoglycemia unless combined with a sulfonylurea or insulin.</p> <p>Risk factors for developing lactic acidosis:</p> <ul style="list-style-type: none"> • Renal impairment • CHF • Inadequate renal perfusion/hypovolemia
Sulfonylureas	<p><i>Short-acting:</i> Glyburide Glipizide Glimepiride</p> <p><i>Long-acting:</i> Chlorpropamide (rarely used)</p>	<p><i>Short-acting:</i> Hold the day of surgery</p> <p><i>Long-acting:</i> Stop 72 hours before surgery</p>	<p>Do NOT restart until patient resumes a normal diet; until then utilize insulin</p> <p>Preferred inpatient treatment is insulin management. Mild hyperglycemia (BG < 180) may be treated with saxagliptin +/- basal insulin</p>	<p>Potential for hypoglycemia</p> <p>It is imperative that patient eats regular meals when this medication is resumed</p> <p>A step-up approach can be used for patients on high dose sulfonylureas, starting at low doses and adjusting them until the usual dose is reached</p>
Thiazolidinedione “Glitazones”	Rosiglitazone (Avandia®) Pioglitazone (Actos®)	Discontinue on the morning of surgery	<p>Continue once patient can tolerate oral medications</p> <p>Preferred inpatient treatment is insulin management. Mild hyperglycemia (BG < 180) may be treated with saxagliptin +/- basal insulin</p>	<p>Will not cause hypoglycemia when used as monotherapy; improves insulin sensitivity at peripheral sites and in the liver, but does not stimulate insulin release</p> <p>Avoid use if patients develop congestive heart failure or problematic fluid retention, or if there are liver function abnormalities</p>

Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
Glucagon-like Peptide (GLP-1) analogs	Exenatide (Byetta®), Bydureon®), Liraglutide (Victoza®), Dulaglutide (Trulicity®), Albiglutide (Tanzeum®), Lixisenatide (Adlyxin®)	Discontinue on the morning of surgery for daily dosing GLP-1 analog Once weekly GLP-1 based therapy should be withheld for a week prior to surgery at least or longer if known gastroparesis	Do NOT restart until patient resumes a normal diet; until then utilize insulin Preferred inpatient treatment is insulin management. Mild hyperglycemia (BG < 180) may be treated with saxagliptin +/- basal insulin. Can only be restarted when post-anesthesia nausea/vomiting has resolved	May cause hypoglycemia when combined with a sulfonylurea It is imperative that patient eats regular meals when this medication is resumed May alter gastrointestinal (GI) motility and worsen postoperative state. Avoid use in patients with severe GI disease.
Dual GIP/GLP-1 receptor agonist	Tirzepatide (Mounjaro®)	Plan surgery around dosing schedule Once weekly GIP/GLP-1 medication should be withheld for a week prior to surgery at least or longer if known gastroparesis	Resume normal schedule post surgery Preferred inpatient treatment is insulin management. Mild hyperglycemia (BG < 180) may be treated with saxagliptin +/- basal insulin	Steady-state plasma tirzepatide concentrations were achieved following 4 weeks of once-weekly administration. The elimination half-life of tirzepatide is approximately 5 days. May alter gastrointestinal (GI) motility and worsen postoperative state
Dipeptidyl Peptidase-4 Inhibitor (DPP4i)	Sitagliptin (Januvia®), Saxagliptin (Onglyza®), Alogliptin (Nesina®), Linagliptin (Tradjenta®)	Discontinue on the morning of surgery	May resume after surgery. Preferred inpatient treatment is insulin management. Mild hyperglycemia (BG < 180) may be treated with saxagliptin +/- basal insulin	May alter gastrointestinal (GI) motility and worsen postoperative state Avoid in acute or chronic pancreatitis or in patients with elevated liver enzymes. Alogliptin and saxagliptin may be associated with increased risk of HF hospitalization. Avoid in patients with HF or CVD.

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
α-Glucosidase Inhibitors	Acarbose (Precose®) Miglitol (Glyset®)	Discontinue on the morning of surgery	Do NOT restart until patient resumes a normal diet; until then utilize insulin Preferred inpatient treatment is insulin management. Mild hyperglycemia (BG < 180) may be treated with saxagliptin +/- basal insulin	MUST be taken with meals for efficacy May cause hypoglycemia with combination therapy (e.g. sulfonylureas, insulin, metformin) Use with caution with patients with hepatic impairment or significant renal impairment (CrCl < 25 ml/min)
Amylin Analog	Symlin (Pramlintide®)	Discontinue on the morning of surgery	Do NOT restart until patient resumes a normal diet; until then utilize insulin Preferred inpatient treatment is insulin management. Mild hyperglycemia (BG < 180) may be treated with saxagliptin +/- basal insulin	Combination use with insulin increases risk of severe hypoglycemia.
Sodium-Glucose Co-Transporter 2 (SGLT2) Inhibitor “gliflozin”	Dapagliflozin (Farxiga®) Canagliflozin (Invokana®) Empagliflozin (Jardiance®) Bexagliflozin (Brenzavvy®) Ertugliflozin (Steglatro®) Sotagliflozin (Inpefa®)	Discontinue at least three days before scheduled surgery Discontinue at least four days before scheduled surgery	Do NOT restart until patient resumes a normal diet; until then utilize insulin Preferred inpatient treatment is insulin management. Mild hyperglycemia (BG < 180) may be treated with saxagliptin +/- basal insulin SGLT2 inhibitors may be continued inpatient for patients with concomitant HF and/or CKD.	Monitor renal function postoperatively. If patient's eGFR <45 (or <30 for Invokana and Jardiance), therapy should be held. Reduced doses of Jardiance can be used for CKD/HF (eGFR < 20) Not recommended in volume-depleted or prolonged NPO (e.g. greater than 12 hours) patients. Increase risk of urogenital infections, AKI, and hypotension. Recommend holding temporarily during treatment of serious genitourinary fungal infections or urinary tract infections.

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
Anti-CD3 antibody	teplizumab-mzwv (Tziel®)	Plan surgery around dosing schedule Given 14 day course, avoid starting treatment overlapping with a planned surgery.	Discuss with prescribing provider	Tziel is given daily for 14 days,
	Talquetamab-tgvs (Talvey)	Have not been thoroughly studied during preoperative and postoperative phases of care.		Can cause serious, life-threatening, or fatal infections.
	Elranatamab-bcm (Elrexio)			
Insulin	**See Perioperative Glycemic Control Guidelines **			
DIURETICS				
Potassium-sparing diuretics	Triamterene Amiloride Spironolactone	May continue without interruptions if clinically appropriate	Oral diuretics should be restarted if needed for control of hypertension, volume overload or when a normal diet is resumed. IV diuretics are good options until oral intake is adequate	The conversion from oral diuretics to IV diuretics is not equal (example: furosemide 80 mg PO daily = furosemide 40 mg IV daily)
Thiazide diuretics	HCTZ Metolazone	May continue without interruptions if clinically appropriate		Consider refraining from taking diuretics the morning of the procedure due to concern for hypovolemia or hypokalemia. Quick diuresis can be obtained via IV route if the need is discovered during surgery.
Loop diuretics	Furosemide (Lasix®) Torsemide (Demadex®) Bumetanide (Bumex®) Ethacrynic Acid (Edecrin®)	Continue without interruption if patient is on potassium supplement		Hypokalemia caused by select diuretics can theoretically increase the risk of perioperative arrhythmia, potentiate the effects of muscle relaxants, or provoke paralytic ileus.

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
ELECTROLYTES				
	Potassium supplements	Consider checking potassium level Continue the day of surgery	Restart when patient on oral liquids May use IV riders to correct electrolyte disturbances if patient is unable to tolerate PO intake	Hypokalemia can theoretically increase the risk of perioperative arrhythmia, potentiate the effects of muscle relaxants, or provoke paralytic ileus. Discontinue on the day of surgery if potassium-wasting diuretics are held (i.e. furosemide, HCTZ, torsemide, budesonide, chlorthalidone, indapamide, ethacrynic acid)
HEMATOLOGIC AGENTS				
Hemoglobin S polymerization inhibitor	Voxelotor (Oxbryta®)	Continue until time of surgery	Resume postoperatively	Patients with sickle cell disease should be assessed for serum hemoglobin levels prior to surgery. Half-life of this drug is 35.5 hours, so minor interruptions in therapy will not impact treatment. Voxelotor may interfere with high-performance liquid chromatography measurement of Hb subtypes (HbS, HbF, HbA).
Monoclonal antibody; Anti-P-selectin	Crizanlizumab (Adakveo®)	Can continue up to the month of surgery	Resume postoperatively on regularly scheduled administration day	This drug is administered IV over 30 minutes once a month, so surgeries should ideally be planned around infusion days. Crizanlizumab may falsely decrease platelet counts, particularly when collected in tubes with ethylenediaminetetraacetic acid (EDTA). Collect blood samples in citrate-containing tubes and run samples within 4 hours of collection. Half-life of

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
				the drug is 7.6 days.
HEMATOPOIETIC AGENTS				
Activin Receptor Ligand Trap	Luspatercept (Reblozyl®)	Consult with hematology specialists.	Resume postoperatively	Non-formulary. Thromboembolism risk – use with caution in patients with known thrombotic risk. Monitor closely.
Anti-Von Willebrand Factor; Monoclonal Antibody	Caplacizumab (Cabliivi®)	Hold for 7 days prior to invasive procedure, dental procedures and elective surgeries.	Resume postoperatively after the risk of surgical bleeding has resolved	Caplacizumab increases the risk of bleeding; bleeding events are common. Severe bleeding events (epistaxis, gingival bleeding, UGIB, metrorrhagia) were reported in clinical trials. Monitor closely for signs and symptoms of bleeding if caplacizumab is restarted.
Colony-Stimulating Factors	Lusutrombopag (Mulpleta®) efbemalenograstim alfa-vuxw (RYZNEUTA®)	Begin medication 8 – 14 days prior to scheduled procedure. 3 mg daily for 7 days Undergo procedure 2-8 days after the last dose	Not indicated postoperatively	Do not use to normalize platelet counts in patients with chronic liver disease. Obtain platelet count prior to therapy administration and no more than 2 days before procedure Thromboembolism risk – use with caution in patients with known thrombotic risk and patients with chronic liver disease. Monitor closely. Thrombocytopenia has been reported in patients receiving rhG-CSF products. Thrombocytopenia occurred in 11% of RYZNEUTA-treated patients.
Oral Iron Replacement	Ferric maltol (Accrufer®)	Continue during perioperative period	Continue during postoperative period	If patient is NPO, can consider IV iron formulations, if necessary for iron deficiency anemia and concerns for surgery recovery:

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
				<ul style="list-style-type: none"> • Ferric carboxymaltose • Ferric gluconate • Iron sucrose
Tyrosine Kinase Inhibitor	Fostamatinib (Tavalisse®)	Continue during perioperative period	Continue during perioperative period	Fostamatinib is utilized for chronic immune thrombocytopenia. Monitor CBC and ensure patient's platelet levels are adequate to proceed with surgery.
	Pirtobrutinib (Jaypirca®)	Consider the benefit-risk of withholding JAYPIRCA for 3 to 7 days pre- and post-surgery depending upon the type of surgery and risk of bleeding.	Consider the benefit-risk of withholding JAYPIRCA for 3 to 7 days pre- and post-surgery depending upon the type of surgery and risk of bleeding.	Fatal and serious hemorrhage has occurred with pirtobrutinib.
	Momelotinib (Ojjaara)		Has not been extensively studied. However, it may potentially increase risk of thrombosis. Caution when resuming during recovering period where risk of thrombosis is high after major surgeries	May increase risk of thrombocytopenia and neutropenia. Monitor CBC and platelet counts.
	Fruquintinib (Fruzaqla)	Withhold for 2 weeks prior to major surgery	Do not administer for at least 2 weeks following major surgery and until adequate wound healing.	Impaired wound healing
	Quizartinib (Vanflyta)			Vanflyta has not been thoroughly studied during perioperative and postoperative phases of care. However, TKI in general can cause delay in wound healing

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	<p>Repotrectinib (Augtyro)</p> <p>Capivasertib (TRUQAP™)</p>			<p>Many drug interactions: Strong and Moderate CYP3A Inhibitors: Avoid concomitant use. P-gp inhibitors: Avoid concomitant use. Strong and Moderate CYP3A Inducers: Avoid concomitant use. Certain CYP3A Substrates: Avoid concomitant use with CYP3A substrates, where minimal concentration changes can cause reduced efficacy.</p> <p>Can cause hyperglycemia. Many drug interactions.</p>
Thrombopoietin receptor agonist	Avatrombopag (Doptelet®)	Begin therapy 10 to 13 days prior to the scheduled procedure for 5 days. Patients should undergo a procedure 5 to 8 days after the last dose.		Platelet count should be obtained prior to therapy initiation and on the day of the procedure.
HERBAL SUPPLEMENTS				
Ephedra (ma huang)		Discontinue at least 24 hours before surgery	Avoidance of use during recovery period to minimize the risk of cardiovascular complications (e.g hypertension, arrhythmias, MI)	Ephedra may increase the risk of heart attack, seizure, stroke, and psychosis.
Garlic		Discontinue at least 14 days before surgery	Herbal supplements are not part of hospital formulary. Patients must bring their own supply if continuation after surgery is indicated	<p>Garlic irreversibly inhibits platelet aggregation in a dose-dependent manner, which may increase risk of bleeding</p> <p>Garlic may lower blood pressure, along with fasting blood glucose levels in patients with diabetes</p>

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
Gingko biloba				Gingko may cause inhibition of platelet-activating factor, which increases risk of bleeding after surgery
Ginseng				Ginseng may cause hypoglycemia, tachycardia, and hypertension. It may also irreversibly inhibit platelet aggregation.
Kava				Kava may increase sedative effect of anesthetics by potentiating GABA inhibitory neurotransmission.
St. John's Wort			No specific recommendation. However, St. John's Wort interacts with a large number of medications. It is best practice to check drug interactions and resume use with caution	St. John's Wort is known to cause an increase in metabolism of certain perioperative medications such as cyclosporine, midazolam, lidocaine, and CCB.
Valerian		Discontinue at least 14 day before surgery Ideally tapered weeks before surgery; if not withdrawal is treated with benzodiazepines.	Insufficient studies for recommendation. Monitor patients closely for any signs of sedation and CNS depression if valerian is resumed postoperatively, especially when combined with other sedating medications	Valerian may increase the sedative effect of anesthetics and can be associated with benzodiazepine-like withdrawal.
All other unlisted herbals and Vitamin E supplements	Black Cohosh Chamomile CoQ10 Feverfew Ginger Goldenseal Saw Palmetto	Discontinue at least 14 days prior to surgery. There are some recommendations to avoid all supplements at least 7 days prior to surgery.	Insufficient studies for recommendation.	Various coagulation disorders, sedation, hemodynamic changes, electrolyte disturbances, and other unknown complications.

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
HIV MEDICATIONS				
Antiretrovirals	Abacavir Atazanavir Bictegravir Cabotegravir Cobicistat Darunavir Didanosine Dolutegravir Doravirine Efavirenz Elvitegravir Emtricitabine Enfuvirtide Etravirine Fosamprenavir Fostemsavir (Rukobia®) Ibalizumab-uiyk Indinavir Lamivudine Lopinavir Maraviroc Nelfinavir Nevirapine Raltegravir Rilpivirine Ritonavir Saquinavir Stavudine Sunlenca Tenofovir Tipranavir	<p>Continue through the perioperative period with as little interruption as possible.</p> <p>For patients who are not able to receive medications orally, a temporary period of holding ART will be necessary. If ART needs to be withheld, all components of the regimen should be stopped.</p>	<p>Resume all drugs together, in full doses, when the patient's GI tract is functioning properly</p>	<p>Prevention of drug-resistance is paramount and irregular dosing should be avoided. It is crucial to continue ART, particularly in patients who are co-infected and being actively treated with ART for hepatitis B virus (HBV).</p> <p>CYP3A4 inhibitors/inducers may affect the metabolism of both ART and commonly used anesthetic drugs. This can lead to increased or decreased drug concentrations allowing for potential ART drug resistance.</p> <p>Prolonged midazolam effects have been observed with some antiretroviral medications.</p> <p>Protease inhibitors (E.g., atazanavir, darunavir, indinavir, ritonavir) decrease midazolam metabolism, leading to prolonged sedation and respiratory depression</p>

Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Zidovudine			
HORMONES				
Oral Contraceptives (OCs)	Estrogen Progestin	<p>Final decision should be based upon the clinical judgment of the anesthesiologist, consulting surgeon, or prescribing physician.</p> <p>Low to moderate risk of VTE: May continue up to and including the day of surgery for procedures with low to moderate risk of venous thromboembolism.</p> <p>High risk of VTE: Discontinue 4 to 6 weeks before surgery for procedures with high risk of venous thromboembolism. Instruct on alternate forms of contraception and obtain serum pregnancy test immediately before surgery if OC is held.</p> <p>Consider DVT prophylaxis for major/high-risk surgery</p> <p>If the plan is to continue OC therapy during hospital stay, then patient must bring their own, since hospital will not provide OCs</p>	<p>If decision is not to discontinue OCs, then continue perioperatively without interruption; however, patient must bring own OCs (hospital will not supply OCs)</p> <p>If OCs were discontinued preoperatively, resume when the period of elevated risk or postoperative immobility has passed and patient experiences first menstruation cycle. Some OC manufacturer package inserts recommend restarting 2 weeks after major surgery.</p>	<p>The risk of thrombosis increases within four months of initiation and decreases to previous levels within three months of stopping treatment. Therefore, it may be wise to stop OCs at least 4-6 weeks before surgery – especially for high-risk surgeries (such as major orthopedic surgeries).</p> <p>Instruct on alternate forms of contraception and obtain serum pregnancy test immediately before surgery if OC is held.</p> <p>The medical risks of unanticipated pregnancy may outweigh the increased protection of VTE. Estrogen is the major hormonal risk for the increased risk of VTE, but progestin may also play a role.</p> <p>Oral contraceptives with greater estrogen content (≥ 35 mcg) have a higher risk of thromboembolism compared with those with lower estrogen content (≤ 30 mcg).</p>

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
Hormone Replacement Therapy (HRT)	Alora® Angeliq® Climara® Climara Pro® Combipatch® Delestrogen® Duavee® Estraderm® Estrasorb® Femring® Osphena® Prefest® Prempro® Premarin® Vivelle®	<p>Final decision should be based upon the clinical judgment of the anesthesiologist, consulting surgeon, or prescribing physician.</p> <p>Continue up to and including the day of surgery for procedures with low to moderate risk of venous thromboembolism.</p> <p>When possible, discontinue 4 to 6 weeks before surgery for procedures with high risk for thromboembolism.</p> <p>Consider DVT prophylaxis for major/high-risk surgery</p>	Resume when tolerating oral medications and the period of elevated risk or postoperative immobility has passed.	<p>Major concern related to the perioperative period is for increasing the risk of venous thromboembolism (VTE).</p> <p>It is most prudent to discontinue HRT since the risks of stopping therapy are very small, however, comfort issues can exist if HRT is discontinued preoperatively.</p> <p>May consider discontinuing therapy at least 4 weeks or more before any major surgery if patient is at high-risk for VTE.</p> <p>The Heart and Estrogen/progestin Replacement Study (HERS) convincingly demonstrated that hormone replacement therapy increases risk of VTE.</p> <p>Risks increase with lower-extremity fractures, inpatient surgery and non-surgical hospitalizations (increased risk for up to 90 days).</p>
Alpha-Melanocyte Stimulating Hormone Analog	Afamelanotide (Scenesse)	Do not administer on the same day of surgery	Patients may receive injection after recovery from procedure	Adamelanotide is administered as an implant every 2 months. Apparent half-life is 15 hours and may undergo hydrolysis, however its metabolic profile has not been fully characterized.
Growth hormone	Somapacitan-be co (Sogroya®) Lonapegsomatropin-tcgd (Skytrofa®) Somatrogen-ghla (Ngenla)	Recommend coordination of perioperative medication management plan with surgeon, anesthesiologist, and prescribing provider.	Recommend coordination of perioperative medication management plan with surgeon, anesthesiologist, and prescribing provider.	These medications are contraindicated in acute critical illness after open-heart surgery, abdominal surgery or multiple accidental trauma, or those with acute respiratory failure because of the risk of increased mortality with use of pharmacologic dose of somapacitan-beco or lonapegsomatropin-tcgd.

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
Melanocortin receptor antagonist	Setmelanotide (Imcivree®)	Can continue preoperatively	Resume postoperatively when appropriate	If a dose is missed, resume the once daily regimen as prescribed with the next scheduled dose.
HYPNOTICS & SLEEP AIDS				
Benzodiazepines (Short Acting)	Temazepam Triazolam	<p>If taken more than 8 hours prior to anesthesia or used chronically, patient may have a dose the night before surgery</p> <p>If elderly (greater than 65 years old) consult physician or anesthesiologist</p> <p>IV alternatives for benzodiazepines may be available if patient is NPO</p>	Resume when patient is hemodynamically stable postoperatively	<p>Abrupt withdrawal of chronic benzodiazepines may lead to consequences such as agitation, hypertension, delirium, and seizures; must evaluate risk vs. benefit in individual patients.</p> <p>Since hypnotics are sometimes dosed prior to surgery, anesthesiologist should be informed if patient has taken hypnotic the night before</p>
Benzodiazepines (Long Acting)	Estazolam Flurazepam Quazepam			
Non-Benzodiazepine Hypnotics	Eszopiclone Zolpidem Zopiclone Zaleplon			
Melatonin and Melatonin Receptor Agonists	Melatonin Bremelanotide (Vyleesi®) Ramelteon (Rozerem®) Tasimelteon (Hetlioz®)			
Orexin Receptor Antagonist	Suvorexant (Belsomra®)	Not enough data to support use prior to surgery. Recommend holding bedtime dose the night prior to operation		Medication has a half-life of up to 12 hours and residual levels of drug can remain in the blood well after waking
	Daridorexant (Quviviq®)			Medication has a half-life of up to 8 hours and residual levels of drug can remain in the blood well after waking

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
MYASTHENIA GRAVIS (MG) MEDICATIONS				
Acetylcholinesterase Inhibitors	Pyridostigmine (Mestnion®) Neostigmine (Prostigmin®)	Continue the morning of surgery to prevent muscle weakness that could impair weaning from mechanical ventilation and surgical recovery	Intravenous preparations of these drugs at 1/30 the oral dose are given every 4 to 6 hours when surgery begins and are continued until the patient resumes oral intake	Note: Acetylcholinesterase inhibitors may diminish effects of non-depolarizing NMBA while increasing effects of succinylcholine. Succinylcholine should be avoided due to risk of prolonged neuromuscular blockade.
Glucocorticoids	Prednisone Dexamethasone Prednisolone	Continue regimen if: any dose <3 weeks, morning prednisone <5 mg (or equivalent) for any duration, or <10 mg prednisone (or equivalent) every other day are not at risk for HPA suppression Stress-dose glucocorticoids should be administered prior to induction for patients who have been taking prednisone 20 mg or greater (or equivalent) for >3 weeks		Patients whose treatment for MG includes glucocorticoids may be at risk for hypothalamic pituitary axis suppression (HPA) and adrenal insufficiency in the perioperative period, and may require administration of stress-dose glucocorticoids, depending on the surgical procedure
Immunotherapy	Azathioprine Cyclophosphamide Cyclosporine Methotrexate Mycophenolate Rituximab Tacrolimus	No published data Consult patient's neurologist IV cyclosporine and azathioprine are available Perioperative therapy interruptions are not likely to have significant symptomatic effect for this	Consult patient's neurologist	Voclosporin is newly approved as of January 2021; currently no data to recommend perioperative management. These agents may cause immunosuppression and increase risk of infections

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Voclosporin (Lupkynis®) Belumosudil (Rezurock®)	indication		
OSTEOPOROSIS AGENTS				
Selective Estrogen Receptor Modulators	Tamoxifen Raloxifene (Evista®)	<p>Stop at least 4 weeks before surgery to prevent thrombotic risk, UNLESS these drugs are being used to treat breast cancer, if so – contact an oncologist. May be continued for low-risk surgeries.</p> <p>For tamoxifen (taken for breast cancer prevention), discontinue 2 weeks prior to surgery.</p> <p>For tamoxifen (taken for breast cancer treatment), continue while providing appropriate VTE prophylaxis. Consultation with oncology is advised.</p> <p>The manufacturers of raloxifene, however, recommend stopping it at least three days before surgery.</p>	<p>Resume when period of postoperative immobilization has passed (non-oncologic surgeries)</p> <p>For tamoxifen (taken for breast cancer prevention), resume once elevated risk of VTE has resolved.</p>	<p>Have either estrogen receptor agonist or antagonist effects, depending on the tissue in which they are acting</p> <p>Both quantitatively increase the risk of VTE, similar to estrogen</p>
Bisphosphonates	Alendronate (Fosamax®) Ibandronate (Boniva®) Risedronate	<p>Hold day of surgery</p> <p>Discontinue agents for 3 months before elective dental surgery, if bisphosphonate treatment</p>	<p>Recommendation to hold this medication postoperatively</p> <p>Dental surgery: hold 3 months following surgery</p>	Given the difficulty for hospitalized patients to comply with the requirement to remain upright for 30 min and take with a full glass of water, it is more practical to withhold this medication

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	(Actonel®)	exceeds 3 years or if glucocorticoids are used		
Calcitonin	Miacalcin® (nasal spray)	May be continued before surgery	No specific contraindications or interactions to using this drug in the perioperative period	
Monoclonal Antibody	Romosozumab (Evenity®) Denosumab (Prolia®)	Osteoporosis agents are generally recommended to be discontinued preoperatively due to the increased risk for perioperative adverse outcomes. May cause osteonecrosis of the jaw. Dentists or oral surgeons should be consulted prior to dental procedure and discontinue treatment based on risk / benefit assessment.		Administered subcutaneously once monthly for 12 months; anabolic effects wane after 12 months of use.
PSYCHIATRIC MEDICATIONS				
GABAA Receptor Positive Modulator	Brexanolone (Zulresso®)	No compelling reason to avoid brexanolone within a certain time frame of surgery. Postpone surgery until continuous infusion is complete Can interrupt infusion if needed and resume later. Lack of data on how long “interruption” can be.	May give brexanolone after surgery.	Brexanolone is given as a continuous IV infusion over 60 hours for postpartum depression. REMS program associated with use. Major side effects: Excessive sedation and hypoxia. Monitor patients closely.
Anorexiant	Bupropion/	Hold Contrave for at least 24	Resume Contrave 7 days after	Continue the bupropion component of Contrave

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	naltrexone (Contrave®)	hours prior to surgery (due to naltrexone's 5-hour half-life) but ideally for up to 48 hours prior to surgery to allow for complete cessation of opioid antagonism	cessation of opioid therapy	during the perioperative period. Naltrexone component is an opioid antagonist and there are case reports of patients on Contrave having inadequate pain control post-operatively. If Contrave is not held >24 hours prior to surgery, monitor patient's response to opioids and be prepared to decrease opioid doses once naltrexone is eliminated from body/opioid antagonism is overcome.
Tricyclic Antidepressants (TCAs)	Amitriptyline Nortriptyline Imipramine Desipramine	May be continued preoperatively with caution Continue therapy up to and including day of surgery for patients on high doses. Patients on low doses and in whom perioperative arrhythmia is a concern should be tapered off 7-14 days prior to surgery. May increase anesthetic requirement due to inhibition of reuptake of norepinephrine	May restart when patient is tolerating oral medications	If hypotension is encountered, and a vasopressor is needed, the response to therapy may be difficult to predict Most authors recommend cautious continuation of these agents through the perioperative period, since serious perioperative problems attributed to TCAs are rare. Increased risk of serotonin syndrome in patients who receive methylene blue intraoperatively. Combination should be avoided unless benefit outweighs risk. Continuation may increase the potential for arrhythmias. Close monitor of ECG for arrhythmias is recommended. Abrupt withdrawal can lead to insomnia, nausea, headache, increased salivation, and increased sweating.

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
SSRIs (including agents with partial SSRI activity), SNRIs	Fluoxetine (Prozac®) Escitalopram Sertraline Paroxetine (Paxil®) Venlafaxine Duloxetine Vortioxetine (Trintellix®)	No compelling indications to withhold SSRIs perioperatively Discontinue therapy 3 weeks prior to surgery in patients undergoing high bleed risk procedures (such as certain CNS procedures)	Restart once patient can take oral meds – mainly agents that may result in a withdrawal syndrome after discontinuation (i.e., paroxetine and venlafaxine) Recommend alternative therapy if patient requires antiplatelet agents as secondary prevention	There have been reports of serotonin syndrome after concurrent use with other serotonergic agents such as tramadol (Ultram®); may also increase INR if patients are on warfarin Increased risk of serotonin syndrome in patients who receive methylene blue intraoperatively. Combination should be avoided unless benefit outweighs risk.
Monoamine Oxidase Inhibitor (MAOIs)	Selegiline (Eldepryl®) Pargyline Phenelzine	Consult anesthesiologist & psychiatrist FLAG CHARTS to alert that patient is on an MAOI and place stickers on chart cautioning against the use of meperidine and indirect sympathomimetics (i.e. ephedrine) Make every effort to continue perioperatively since patients on MAOIs tend to have severe depression refractory to other agents In patients with severe, life-threatening depression, in whom the risk of suicide with discontinuation of MAOIs is significant, consideration should be given to continuing MAOI therapy perioperatively combined with an appropriate anesthetic technique		MAO inhibition becomes non-selective in doses greater than 10 mg/day AVOID meperidine and indirect sympathomimetics (i.e. ephedrine) may cause neuroleptic malignant syndrome and severe hypertensive crisis. (Doak GH) Patients should not be forced to discontinue these agents If discontinuation is warranted, taper off slowly over 2 weeks; but still follow recommended precautions above since discontinuation does not guarantee complete elimination Increased risk of serotonin syndrome in patients who receive methylene blue intraoperatively. Combination should be avoided unless benefit outweighs risk.
Antipsychotics	Olanzapine (Zyprexa®)	May continue perioperatively if QTc remains stable.	Make sure to restart medication once patient is able to take oral	Alpha-adrenergic blockade with risperidone can be significant

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Ziprasidone (Geodon®) Risperidone (Risperdal®)	May need to consider holding dose after consultation with a psychiatrist or utilizing agents with shorter half-life or reduced dose if medications that can prolong QTc are used during or after surgery.	medications Parenteral formulations are available for haloperidol, chlorpromazine, aripiprazole, olanzapine, and ziprasidone if therapy is needed but patient is NPO.	There have been reports of IV use of antipsychotics increasing risk of sedation, hypotension, or QTc prolongation. Atypical antipsychotics may increase risk of tachycardia Avoid ketamine use as this may decrease the seizure threshold
Combination Antipsychotics	Olanzapine + samidorphan (Lybalvi®)	Discontinue at least 5 days before opioid treatment and start olanzapine or another antipsychotic if needed.		The potential safety concerns related to samidorphan's opioid antagonist effects in various real-world settings of opioid use warrant careful consideration. Concerns include the potential for opioid withdrawal, inadequate analgesia, and opioid overdose.
Mood Stabilizer	Lithium (Lithobid®) Valproate (Depakote®)	May be continued preoperatively. If patient undergoing major surgery, consider discontinuation 2-3 days before. If medically indicated. If serum levels are not in toxic range, renal function is normal and fluid/electrolyte levels are stable, lithium may be continued before minor surgery.	Serum drug levels should be monitored before and after surgery and any time that renal clearance may be affected Lithium must be temporarily discontinued in patients who cannot take oral medications since no parenteral substitution is available. Restarting enteral lithium (with close monitoring of electrolytes) within 24 hours postoperatively should avoid the need for alternative pharmacologic coverage	Lithium may potentiate the effect of depolarizing and competitive neuromuscular blocking agents Assess risk vs benefit of holding medication in patients with a history of psychosis. If patient stable, may disrupt mental state Lithium may require increased monitoring of fluid, electrolyte, and thyroid hormone levels

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
Other Commonly Used Antidepressants	Bupropion (Wellbutrin®) Venlafaxine (Effexor®)	No compelling indications to withhold preoperatively	Restart once patient can take oral medications	These agents do not have any known interactions with anesthetic agents Venlafaxine is associated with withdrawal syndromes and should be restarted once patient is able to tolerate
Stimulants	Phentermine (Adipex-P®)	Hold medication 7 days prior to surgery	Restart when patient can take oral medications and is clinically stable	Phentermine may be associated with hypotension perioperatively due to catecholamine depletion. Hypertension was observed in patients using phentermine during the induction phase intraoperatively. Monitor blood pressure and body temperature for any autonomic impairment
Serotonin Receptor Agonist	Exxua (gepirone)	No specific recommendation	Has not been extensively studied. However, Exxua is a CYP3A4 substrate. Avoid concomitant use with CYP3A4 inducers/inhibitors. Monitor for serotonin syndrome when coadministered with certain medications	May increase risk of QTc prolongation; monitor ECG Monitor ECGs more frequently if Exxua is used concomitantly with drugs known to prolong the QT interval
PULMONARY MEDICATIONS				
PDE Inhibitor - Nonselective	Theophylline TheoDur®	Discontinue evening before surgery. Use nebulized or inhaled beta agonists or anticholinergics	Resume with PO intake.	There is no data indicating whether continuation of theophylline in the perioperative period decreases pulmonary complications. Theophylline has the potential to cause arrhythmias and neurotoxicity at a level beyond the therapeutic range, and theophylline metabolism is affected by many common perioperative medications.

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
				No known adverse effects but very narrow range between therapeutic and toxic level.
Inhaled Medications	Albuterol Duoneb® QVAR® Pulmicort® Symbicort® Breo Ellipta® Anoro Ellipta® Incruse Ellipta® Arnuity Ellipta® Flovent® Xopenex® Asmanex® Dulera® Serevent® Advair® Spiriva® Alvesco® Striverdi Respimat® Stiolto Respimat® Utibron Neohaler® Trelegy Ellipta® Yupelri®	Continue until day of surgery PLEASE have patient bring their inhalers (MDIs) to the holding area.	Continue through perioperative period May substitute nebulized treatments (i.e. albuterol and ipratropium) until patient can resume inhalers	PLEASE have patient bring their inhalers (MDIs) to the holding area **Some patients may require an increase in their steroid dose for 1-2 weeks preoperatively
Cystic Fibrosis Transmembrane Conductance Regulator Corrector	Symdeko® Trikafta®	Continue until time of surgery Consult with infectious disease specialists	Resume postoperatively	If a dose is missed ≤6 hours of the usual time it is taken, take the dose as soon as possible; if >6 hours has passed since the missed dose, skip the missed dose and resume the normal dosing schedule.
Oral Medications	Zafirlukast (Accolate®) Montelukast	Consider continuing through the morning of surgery	May be started after surgery following the patient's normal schedule for taking these drugs	Little is known about the implications of stopping treatment and there are no known drug interactions between these agents and anesthetics

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	(Singulair®) Zileuton (Zyflo®) Pirfenidone (Esbriet®) Nintedanib (Ofev®) Roflumilast (Daliresp®)			
RSV monoclonal antibody	Nirsevimab (Beyfortus)	Consult with provider	<p>In infants who undergo cardiopulmonary bypass after their initial dose: Administer additional dose as soon as patient is stable</p> <p><i>First RSV season:</i></p> <ul style="list-style-type: none"> - <5 kg: additional 50 mg IM dose - 5+ kg: <ul style="list-style-type: none"> - ≤90 days since initial dose: 100 mg IM - >90 days since initial dose: 50 mg IM <p><i>Second RSV season:</i></p> <ul style="list-style-type: none"> - ≤90 days since initial dose: 200 mg IM - >90 days since initial dose: 100 mg IM 	<p>For patients first RSV season: while dose is approved for all infants, ACIP and AAP recommendations specify infants <8 months old</p> <p>For patients second RSV season: FDA approved for patients up to 24 months old who have increased risk for severe disease, however ACIP and AAP recommendations include only patients 8-19 months old with increased risk for severe disease</p>
PULMONARY HYPERTENSION & ERECTILE DYSFUNCTION MEDICATIONS				
PDE-5 Inhibitors	Sildenafil	Erectile dysfunction: discontinue		PDE-5 Inhibitors increase concentration and

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	(Viagra®) (Revatio®) Tadalafil (Cialis®, Adcirca®) Vardenafil (Levitra®, Staxyn®)	at least 7 days before surgery Pulmonary Hypertension: continue during the perioperative period as discontinuation may be fatal. Benign prostatic hyperplasia (BPH): Coordinate use with anesthesiologist, surgeon, and prescribing provider preoperatively.		half-life of cGMP, which leads to relaxation of pulmonary arterial smooth muscle, and subsequently decrease pulmonary pressure PDE-5 Inhibitors are vasodilators, when combined with other vasodilators can result in life-threatening hypotension Patients with PAH are at high risk of complications and death when undergoing anesthesia, mechanical ventilation, and major surgery. There is not a clear standard but in general PAH medications should be continued without interruption.
Endothelin Receptor Antagonist	Bosentan (Tracleer®) Ambrisentan (Letairis®) Macitentan (Opsumit®)	Should be continued during perioperative period	Should be continued during the postoperative period	Patients with PAH are at high risk of complications and death when undergoing anesthesia, mechanical ventilation, and major surgery. There is not a clear standard but in general PAH medications should be continued without interruption.
Soluble Guanylate Cyclase Stimulator	Riociguat (Adempas®)	Discuss alternative treatment options to manage pulmonary hypertension preoperatively.		Phase 4 trials showed increase rates of non-surgical bleeds with possibility of fatal outcome. Risk versus benefit and alternative therapy preoperatively should be considered.
Prostacyclin receptor agonist (selective)	Selexipag (Uptravi®)	Continue during perioperative period	Continue during the postoperative period	Current adverse events do not show increased bleeding or hypotension with use. Does not appear to have drug interactions with typical anesthetic agents. If a dose of medication is missed, patients should take a missed dose as soon as possible unless the

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
				<p>next dose is within the next 6 hours.</p> <p>If treatment is missed for 3 days or more, restart UPTRAVI at a lower dose and then retitrate.</p>
RHEUMATOID ARTHRITIS MEDICATIONS				
Nonbiologic DMARDs	Methotrexate (MTX) Leflunomide (Arava®) Sulfasalazine Hydroxychloroquine Apremilast (Otezla)	Recommend to continue through surgery for all patients	Recommend to continue through surgery for all patients	Although a reasonable concern exists about the potential of nonbiologic disease-modifying antirheumatic drugs (DMARDs) to increase the risk of infection by affecting the immune response, stopping DMARDs prior to surgery may result in a flare-up of disease activity, which may adversely affect rehabilitation.
SLE-Specific Medications	Mycophenolate mofetil Azathioprine Cyclosporine Tacrolimus	Severe SLE: Continue medications in the perioperative period in consultation with treating rheumatologist Non-Severe SLE: withhold 1 week prior to surgery	For patients with rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis, or all SLE for whom antirheumatic therapy was withheld prior to undergoing total joint arthroplasty, antirheumatic therapy should be restarted once the wound shows evidence of healing, any sutures/staples are out, there is no significant swelling, erythema, or drainage, and there is no ongoing nonsurgical site infection, which is typically ~14 days.	
	Belimumab IV (Benlysta)	If dosed monthly, recommended timing of surgery since last medication dose is week 5		
	Belimumab SQ (Benlysta)	If dosed weekly, Recommended timing of surgery since last medication dose is week 2		
JAK inhibitors	Tofacitinib	Withhold 3 days prior to surgery		Recommendation pertains to infection risk and

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Drug Class	Examples	Preoperative Recommendations		Postoperative Recommendations	Considerations & Caveats
	(Xeljanz) Baricitinib (Olumiant) Upadacitinib (Rinvoq)				does not account for risk of cardiac events or venous thromboembolism.
Biologics	Medications to continue through surgery				For patients with rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis, or all SLE for whom antirheumatic therapy was withheld prior to undergoing total joint arthroplasty, antirheumatic therapy should be restarted once the wound shows evidence of healing, any sutures/staples are out, there is no significant swelling, erythema, or drainage, and there is no ongoing nonsurgical site infection, which is typically ~14 days.
		Dosing interval	Recommended timing of surgery since last medication dose		
	Rituximab (Rituxan)	IV every 4-5 months	Month 4-6		
	Belimumab (Benlysta)	Weekly SQ Monthly IV	Anytime Week 4		
	Anifrolumab (Saphnelo)	IV every 4 weeks	Week 4		
	Vaclosporin (Lupkynis)	Twice daily	Continue		
	Medications to withhold prior to surgery				
		Dosing interval	Recommended timing of surgery since last medication dose		
	Infliximab (Remicade)	Every 4, 6, or 8 weeks	Week 5, 7, or 9		
	Adalimumab (Humira)	Every 2 weeks	Week 3		
	Etanercept (Enbrel)	Every week	Week 2		
	Golimumab (Simponi)	Every 4 weeks (SQ) Every 8 weeks (IV)	Week 5 Week 9		
	Abatacept (Orencia)	Monthly (IV) or weekly (SQ)	Week 5 Week 2		
	Certolizumab (Cimzia)	Every 2 or 4 weeks	Week 3 or 5		
	Rituximab (Rituxan)	2 doses 2 weeks apart every 4-6 months	Month 7		

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Tocilizumab (Actemra)	Every week (SQ) or every 4 weeks (IV)	Week 2 Week 5	
	Anakinra (Kineret)	Daily	Day 2	
	IL-17-Secukinumab (Cosentyx)	Every 4 weeks	Week 5	
	Ustekinumab (Stelara)	Every 12 weeks	Week 13	
	Ixekizumab (Taltz)	Every 4 weeks	Week 5	
	IL-23 Guselkumab (Tremfya)	Every 8 weeks	Week 9	
Interleukin-6 Antagonist	Satralizumab-mwge (Enspryng®) Tocilizumab (Actemra®)	Recommend coordinating interleukin-6 blocker perioperative medication management plan with surgeon and prescribing provider	Recommend coordinating interleukin-6 blocker perioperative medication management plan with surgeon and prescribing provider	IL-6 antagonists may affect postoperative wound healing due to modulation of the immune system. Consult with specialist prior to use.
STIMULANTS or ANTI-NARCOLEPTICS				
Central Nervous System Stimulant	Pitolisant (Wakix®)	It has been reported that central nervous system stimulants can be used safely during the preoperative period.		Pitolisant is primarily used to increase wakefulness in patients with narcolepsy. Relevant adverse effects include prolonged QT interval and tachycardia.
Dopamine and Norepinephrine Reuptake Inhibitor	Solriamfetol (Sunosi®)	No compelling reason not to take up to the day of surgery.	No compelling reason not to resume the day after surgery if desired. Risk/benefit discussion should be had with patient; patient may be able to withhold drug while inpatient and can resume once recovered from	May cause dose-dependent increases in BP and heart rate

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
			surgery.	
ADRENAL MEDICATIONS				
Cortisol Synthesis Inhibitor	Osilodrostat (Isturisa®)	Consult endocrinologist or prescribing provider to devise a perioperative plan.	Consult endocrinologist or prescribing provider to devise a perioperative plan.	May cause adrenocortical insufficiency resulting in hypoglycemia, hyponatremia, hypotension, nausea, vomiting, weakness QTc prolongation may occur due to electrolyte imbalances.
THYROID MEDICATIONS				
Thyroid Products	Levothyroxine Synthroid® Levothroid® Levoxyl® Liothyronine (Cytomel®)	Continue medications during the perioperative period	Resume patient's usual schedule If NPO status is prolonged greater than 5 days, intravenous L-thyroxine may be administered	Levothyroxine has a long half-life (6-7 days), missing several doses is unlikely to adversely affect patient's thyroid status For patients with predicted NPO post-operatively may give a full week of PO levothyroxine as one dose the day prior to surgery.
Antithyroid Medications	Propylthiouracil Methimazole (Tapazole®)	Continue medications during the perioperative period	Resume patient's usual schedule May be given via the nasogastric tube, if necessary, during the perioperative period	Maintaining control of hyperthyroidism is necessary for safe surgery and recovery Methimazole has a longer duration of action and may be given once a day, making it preferable for patients undergoing long surgery β-blockers may be used to control the effects of hyperthyroidism In patients who exhibit thyroid storm, propranolol should only be administered with caution due to possibility of cardiovascular collapse

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
Insulin-like growth factor-1 receptor inhibitor	Teprotumumabtrbw (Tepezza®)	Contact prescribing physician		This medication is dosed every 3 weeks and has a long half-life of 20 days Infusion related reactions including hypertension, tachycardia, dyspnea, feeling hot, headache, and muscular pain have been reported with this medication.
Parathyroid	Recombinant human parathyroid hormone Natpara®	Continue medications during perioperative period	Continue during postoperative period	The manufacturer of Natpara recommends avoiding abrupt interruption or discontinuation.
MISCELLANEOUS				
COVID Agents	Nirmatrelvir, ritonavir (Paxlovid)	No specific perioperative recommendations exist. Recommend coordinating with surgeon and prescribing provider.		Paxlovid is a major 3A4 inhibitor. Assess for relevant DDIs.
Neurokinin 3 (NK3) Antagonist	Fezolinetant (VEOZAH™)	No specific perioperative recommendations exist. Recommend coordinating with surgeon and prescribing provider.		Contraindicated in concomitant use with CYP1A2 inhibitors, renal impairment, and cirrhosis
Retinoic Acid Receptor Gamma Agonist	Palovarotene (Sohonos)	Has not been thoroughly studied during preoperative and postoperative phases of care		CYP3A4 substrate that interacts with both inducers and inhibitors of CYP3A4 Concomitant use with tetracyclines may increase risk for benign intracranial hypertension Associated with increased risk for skin and soft tissue infections
Complement Inhibitor	Pozelimab-bbfg (Veopoz)	Has not been thoroughly studied during preoperative and postoperative phases of care		Contraindicated in patients with unresolved Neisseria meningitidis infection May increase risk for encapsulated bacterial infections, including Neisseria meningitidis, Streptococcus pneumoniae, and Haemophilus influenzae

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Iptacopan (Fabhalta)			Fabhalta is contraindicated in patients with unresolved serious infection caused by encapsulated bacteria.
Antineoplastic Agent, Gamma Secretase Inhibitor; Gamma Secretase Inhibitor	Nirogacestat (Ogsiveo)	Ogsiveo has not been thoroughly studied during perioperative and postoperative phases of care.		Ogsiveo is a CYP3A substrate so it would be best to avoid concomitant use of strong or moderate CYP3A inducers.

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Revision History

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