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## Revision History

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## Recommendations for the Management of Medications Perioperatively

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
<b>ANALGESIC AGENTS</b>				
<b>Non-selective NSAIDs</b>	<p><b>Short T1/2:</b> Ibuprofen Indomethacin Diclofenac Ketoprofen Etodolac Ketorolac</p> <p><b>Intermediate T/12:</b> Naproxen Sulindac Diflunisal Meloxicam</p> <p><b>Long T1/2:</b> Nabumetone Piroxicam</p>	<p>Short half-life (2 to 6 hours): discontinue on the day before surgery</p> <p>Intermediate half-life (7 to 20 hours): discontinue 3 to 4 days before surgery</p> <p>Long half-life (&gt;20 h): discontinue 10 days before surgery</p> <p><i>*Some physicians recommend stopping all NSAIDs 10 days before surgery</i></p>	<p>May resume when risk of bleeding is acceptable and intravascular volume status is normal</p>	<p>5 half-lives should be sufficient, except in individuals with hepatic or renal dysfunction</p> <p>Although some experts recommend discontinuing NSAIDs based on half-life, there's a poor correlation with COX inhibition and effects on platelet aggregation.</p> <p>May need to consider alternative analgesics or low-dose corticosteroids for arthritis patients who are NSAIDs dependent perioperatively</p>
<b>COX-2 Inhibitors</b>	Celecoxib (Celebrex®)	<p>Stop 1-2 days before surgery, unless elimination half-life warrants earlier discontinuation</p> <p><i>*Some physicians recommend stopping 1 week before surgery</i></p>	<p>May resume when volume status and renal function is stable</p>	<p>Have much less effect on platelet function than aspirin or non-selective NSAIDs</p> <p>Have similar effects on renal function as non-selective NSAIDs</p> <p>Because of lack of effect on platelet function, may not require discontinuation if benefit&gt;risk</p>
<b>Opioids</b>	<p>Morphine Oxycodone Fentanyl Methadone</p> <p>Buprenorphine</p>	<p>Continue with minimal interruption in the perioperative period</p> <p>Anticipated minimal post-op</p>	<p>Intravenous preparations are available; transdermal fentanyl (Duragesic®) can also provide flexible dosing and delivery</p>	<p>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 patients</p>

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
		<p>pain: continue buprenorphine</p> <p>Moderate-severe post-op pain: If elected surgery may consider discontinuing buprenorphine a week before surgery and transitioning to another opioid, if necessary</p>	<p>Maximize non-opioid analgesia. Resume buprenorphine once post-op pain has resolved.</p>	<p>Patients on buprenorphine may present a challenge for postoperative pain control due to antagonist effect at the kappa opioid receptor.</p>
<b>Urinary Analgesics</b>	<p>Pentosan polysulfate Sodium (Elmiron®)</p>	<p>Hold 12 to 24 hours prior to surgery</p>	<p>Depending on the type of surgery, Elmiron should be re-started at physician's discretion</p>	<p>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.</p>
<b>Antimigraine</b>	<p>Fremanezumab -vfrm (Ajovy®) Erenumab-aooe (Aimovig®) Galcanezumab-gnlm (Emgality)</p>	<p>Discuss with prescribing provider</p>	<p>Discuss with prescribing provider</p>	<p>Given monthly or every three months and can likely be held and given post-operatively when the patient is stable (non-formulary)</p>
<b>ANTICOAGULANTS</b>				
<p><b>Vitamin K Antagonists</b></p> <p><i>**See <a href="#">Perioperative Anticoagulation Management guidelines</a> under quick-links on FHS home page. Updated 2017</i></p>	<p>Warfarin (Coumadin®)</p>	<p>Should be stopped &gt;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 above 1.5 one to two</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><i>Considerations:</i></p> <ol style="list-style-type: none"> <li>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)</li> <li>2. Risk of bleeding if anticoagulant is continued (procedural risk and patient-specific risk)</li> <li>3. Effectiveness and safety of alternative</li> </ol>

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
		<p>days prior to surgery, 2.5 mg of oral vitamin K is suggested</p> <p><i>**See Vitamin K – INR Reversal Protocol for patients with elevated INR despite discontinuation of warfarin</i></p> <p><i>**Bridging recommendations: Use <b>therapeutic-dose SC LMWH</b> &gt; IV UFH in patients with mechanical heart valve, atrial fibrillation or VTE at moderate or high risk for thromboembolism</i></p>	<p>LMWH when an alternative is needed after oral anti-coagulant therapy is discontinued for several days</p> <p><i>**Bridging recommendations: see preoperative recommendations</i></p>	<p>anticoagulant interventions (i.e. “bridging” therapy)</p> <p>Please refer to: ACCP Evidence-Based Clinical Practice Guidelines (9<sup>th</sup> Edition) [Chest <b>2012;141(2)(Suppl):e326S-e350S</b>] and 2017 ACC Expert Consensus Decision Pathway for NVAF. <b>JACC 2017;69:</b></p>
<p><b>Thrombin Inhibitor</b></p> <p><i>**See <a href="#">Perioperative Anticoagulation Management guidelines</a> under quick-links on FHS home page. Updated 2017</i></p>	<p>Dabigatran (Pradaxa<sup>®</sup>)</p>	<p>Surgery with low risk of bleeding:</p> <p>CrCl &gt; 80: discontinue ≥24 hours before surgery</p> <p>CrCl 50-79: discontinue ≥36 hours before surgery</p> <p>CrCl 30 to 49: discontinue ≥48 hours before surgery</p> <p>CrCl 15-29: discontinue ≥72 hours before surgery</p> <p>CrCl &lt;15: discontinue ≥96 hours before surgery</p> <p>Surgery with moderate or high risk of bleeding:</p> <p>CrCl &gt; 80: discontinue ≥48 hours before surgery</p> <p>CrCl 50-79: discontinue ≥72 hours before surgery</p>	<p>Peak plasma level 6 hours post surgery.</p> <p>Once hemostasis has been established:</p> <p>Low post-procedural bleeding risk: resume DOAC within 24 hours following procedure (consider lower dose on evening of procedure)</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. <b>JACC 2017;69:</b></p>

Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
		CrCl 30 to 49: discontinue ≥96 hours before surgery CrCl 15-29: discontinue ≥120 hours before surgery CrCl <15: discontinue no data		
<b>Unfractionated Heparin (UFH)</b>  **See <a href="#">Perioperative Anticoagulation Management guidelines</a> under quick-links on FHS home page	Heparin	Stop heparin infusion 4 to 6 hours prior to surgery  Stop heparin infusion at least 6 hours before removing epidural catheter  Stop SQ heparin 6 hours prior to surgery	Restarting UFH should be done at the surgeon's discretion  For minor surgical/invasive procedures resume therapeutic dose UFH ~24 hours after procedure (or next day)  For major surgery or a high bleeding risk delay initiation for ~48 to 72 hours post-op OR administer low-dose UFH after surgery when hemostasis is secured	
<b>Low-molecular weight heparin (LMWH)</b>  **See <a href="#">Perioperative Anticoagulation Management guidelines</a> under quick-links on FHS home page	Enoxaparin (Lovenox®)  Dalteparin (Fragmin®)	<i>Enoxaparin and Dalteparin:</i> Hold prophylactic LMWH for at least 12 hours before anticipated neuraxial anesthetic  Hold LMWH for 24 hours if therapeutic dose being used prior to neuraxial anesthetic	Restarting LMWHs or Anti-Xa Inhibitors should be done at the surgeon's discretion  For minor surgical/invasive procedures: resume therapeutic dose LMWH ~24 hours after procedure (or next day) and Anti-Xa Inhibitors ~6-8 hours after procedure  For major surgery or a high	Please refer to: ACCP Evidence-Based Clinical Practice Guidelines (9 <sup>th</sup> Edition) [Chest 2012;141(2)(Suppl):e326S-e350S]

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
			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	
<b>Indirect Factor Xa Inhibitor</b>	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 neuroaxial anesthesia
<b>Direct Factor Xa Inhibitor</b>  **See <a href="#">Perioperative Anticoagulation Management guidelines</a> under quick-links on FHS home page. Updated 2017	Rivaroxaban (Xarelto®)  Apixaban (Eliquis®)  Edoxaban (Savaysa®)	Surgery with low risk of bleeding:rivaroxaban, apixabanCrCl > 30 ml/min: Discontinue ≥24 hours before surgery CrCl 15-29 ml/min: Discontinue ≥36 hours before surgery CrCl <15 ml/min: ≥48 hours before surgery  Surgery with moderate or high risk of bleeding: rivaroxaban, apixabanCrCl >30 ml/min: Discontinue ≥48 hours before surgery CrCl <30 ml/min: Discontinue ≥72 before	Once hemostasis has been established: Low post-procedural bleeding risk: resume DOAC within 24 hours following procedure (consider lower dose on evening of procedure)  High post-procedural bleeding risk: 48-72 hours following procedure	Avoid use in spinal injury or surgery patients  Extreme caution must be considered before performing neuroaxial anesthesia.  **The manufacturer of Edoxaban does not specify, the difference between standard and high risk surgery, but if high risk of bleed might consider holding ~48 hours prior to surgery due to T ½ of ~10-14 hours.  Please refer to: 2017 ACC Expert Consensus Decision Pathway for NVAf. <b>JACC 2017;69:</b>

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
		surgery  Edoxaban: discontinue 24 hours prior to procedure		
	Betrixaban	Due to half-life of > 72 hours, hold at least 7-10 days prior to major surgery		Neuroaxial anesthesia: In patients who receive both betrixaban and neuraxial anesthesia, avoid removal of epidural catheter for at least 72 hours following the last betrixaban dose; avoid administration of betrixaban for at least 5 hours following catheter removal
<b>ANTIPILEPTICS</b>				
	Phenytoin (Dilantin®) Carbamazepine (Tegretol®) Eslicarbazepim ee Valproic acid (Depakote®) Topiramate (Topamax®) Gabapentin (Neurontin®) Levetiracetam (Keppra®) Lacosamide Lamotrigine (Lamictal®) Suxilep® Aptiom® Felbamate Clobazam Zonisamide Pregabalin	Continue medications during the perioperative period  If patient will be admitted after surgery and will be NPO for 24 hours, consider obtaining baseline preoperative serum drug levels	Continue on patient's regular schedule; if oral intake is not possible utilize intravenous preparations	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  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  Antiepileptics increase the metabolism of some anesthetic agents, especially neuromuscular blocking agents  Patients with epilepsy have an increased risk for postoperative complications

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Ethosuximide Diacomit® Brivaracetam Epidiolex			
<b>ANTIHYPERLIPIDEMICS</b>				
<b>Bile Acid Resins</b>	Cholestyramine (Questran®) Colesevelam Colestipol (Colestid®)	Discontinue before surgery	Resume postoperatively when patient is stable and eating a full diet	Bile sequestrants can interfere with bowel absorption of medications that may be required perioperatively
<b>Fibric Acid Derivatives</b>	Gemfibrozil (Lopid®)  Fenofibrate	Discontinue before surgery	Resume postoperatively when patient is stable and eating a full diet	Niacin, fibric acid derivatives such as gemfibrozil, and the statins all have the potential to cause myopathy and rhabdomyolysis, especially if used in combination
<b>HMG-CoA Reductase Inhibitors (“statins”)</b>	Simvastatin (Zocor®) Atorvastatin (Lipitor®) Lovastatin (Mevacor®) Rosuvastatin (Crestor®) Pitavastatin (Pivalo®) Pravastatin (Pravachol®) Fluvastatin	Continue preoperatively and throughout the hospital stay without interruption, if possible	Resume postoperatively when patient is stable and eating a full diet	Muscle injury may occur during the perioperative period.  Evidence suggests that HMG CoA reductase inhibitors (statins) may prevent vascular events in the perioperative period.
<b>Supplements</b>	Niacin	Discontinue before surgery	Resume postoperatively when patient is stable and eating a full diet	
<b>Cholesterol absorption inhibitor</b>	Ezetemibe (Zetia)	Discontinue before surgery	Resume postoperatively when patient is stable and eating a full diet	
<b>PCSK9 Inhibitors</b>	Repatha®	Can continue preoperatively	Resume postoperatively when	SQ injections given q14 days, missed doses may

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	Praluent®	Repatha T <sub>1/2</sub> : 11-17 days Repatha T <sub>1/2</sub> : 10-20 days	appropriate	be administered within 7 days of scheduled administration date
<b>ANTIHYPERTENSIVES</b>				
<b>β-blockers</b>	Atenolol Metoprolol	Continue preoperatively and throughout the hospital stay without interruption, if possible	Resume postoperatively Several intravenous β-blockers are available for patients who have not resumed taking oral medications when postoperative doses are due	Beta blockers may have benefits when taken perioperatively by decreasing ischemia due to decreased oxygen demand and by preventing/controlling arrhythmias.  Potential adverse effects of perioperative beta blockage include bradycardia and hypotension
<b>Angiotensin-Converting Enzyme Inhibitors (ACE-Inhibitors)</b>	Lisinopril Enalapril Captopril Benazepril Ramipril Quinapril	If ACE-Inhibitors are indicated only for hypertension and the blood pressure is controlled, discontinue the day before surgery. If ACE-I is indicated for other indications or blood pressure is not controlled, contact anesthesiologist.	Resume postoperatively as long as the patient is not hypotensive and has not suffered acute renal injury  Intravenous Enalaprilat may be used if the patient becomes hypertensive before resuming oral medications	Exaggeration of hemodynamic lability after induction of anesthesia has been reported with patient taking ACE-Is/ARBs. While controversial, the evidence seems to support holding ACE-Is/ARBs in the morning of surgery for patient taking any of these agents indicated for hypertension
<b>Angiotensin Receptor Blockers (ARBs)</b>	Valsartan Irbersartan Losartan Candesartan Olmesartan	If ARBs are indicated only for hypertension and the blood pressure is controlled, discontinue 24 hour before surgery. If ARBs are indicated for other indications or if blood pressure is not controlled, contact anesthesiologist		
<b>Calcium Channel Blockers (CCBs)</b>	Diltiazem Verapamil Nifedipine Amlodipine	Continue preoperatively and throughout the hospital stay without interruption, if possible – as long as heart rate and blood pressure are	Resume postoperatively  Intravenous verapamil and diltiazem are available for patients who have not	*CCBs may interact with agents used in anesthesia; may prolong neuromuscular blockade have an additive hypotensive effect - use with caution. CCBs also act synergistically with β-adrenergic blockers and may cause

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		stable	resumed taking oral medications when postoperative doses are due	profound bradycardia and hypotension.  Withholding these agents for significant bradycardia or hypotension should not result in withdrawal effects
<b>Centrally Acting Sympatholytics</b>	Clonidine Methyldopa Quanabenz Guanfacine	Continue perioperatively to avoid withdrawal effects, most significant with clonidine  Will patient be able to take oral meds within 12 hours of preoperative dose? <i>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 <i>at least 3 days before surgery</i> may be wise	If prolonged NPO 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
<b>Direct Renin Inhibitors</b>	Aliskiren (Tekturna®)	For patients treated for hypertension, strongly consider holding direct renin inhibitors on the morning of surgery due to the increased risk of post-anesthetic induction hemodynamic lability	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
<b>Direct vasodilators &amp; Alpha adrenergic-blockers</b>	Hydralazine Prazosin, terazosin	Continue perioperatively when possible	Use intravenous preparations postoperatively if blood pressure is elevated and they are unable to resume oral intake	IV hydralazine is a potent arterial dilator and may cause reflex tachycardia  Observe caution with intravenous formulations because the dose required is less than the oral dose
<b>ANTIHYPERTENSIVES (COMBINATION)</b>				
<b>HCTZ/ACE-Inhibitors</b>	Benazepril/HCTZ (Lotensin®)	Refer to diuretics and ACE-Inhibitors	Refer to diuretics and ACE-Inhibitors	

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	Captopril/HCTZ (Capozide®)			
<b>HCTZ/ARBs</b>	Losartan/HCTZ (Hyzaar®)  Valsartan/HCTZ (Diovan®)	Refer to diuretics and ARBs	Refer to diuretics and ARBs	
<b>ACE-Inhibitors or ARBs &amp; CCBs</b>	Benazepril/Amlodipine (Lotrel®)  Enalapril/Felodipine (Lexxel®)  Trandolapril/Verapamil (Tarka®)  Valsartan/Amlodipine (Exforge®) Perindopril arginine/amlodipine (Prestalia®)	Refer to ACE-Inhibitors or ARBs and CCBs	Refer to ACE-Inhibitors or ARBs and CCBs	
<b>HCTZ/ARBs/CCBs</b>	Olmesartan/HCTZ/Amlodipine (Tribenzor®)  Valsartan/Amlodipine/HCTZ	Refer to diuretics, ARBs, and CCBs	Refer to diuretics, ARBs, and CCBs	

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	(Exforge HCT <sup>®</sup> )			
<b>HCTZ/ <math>\beta</math>-blockers</b>	Atenolol/ HCTZ  Bisoprolol/ HCTZ Ziac <sup>®</sup>  Metoprolol/ HCTZ Lopressor HCT <sup>®</sup>	Continue without interruptions  Refer to HCTZ and $\beta$ -blockers	Resume postoperatively  Refer to HCTZ and $\beta$ -blockers	
<b>ARBs/Direct Renin Inhibitor</b>	Aliskiren/ Valsartan (Valturna <sup>®</sup> )	Refer to ARBs and direct renin inhibitors	Refer to ARBs and direct renin inhibitors	
<b>CCBs/Direct Renin Inhibitor</b>	Aliskiren/ Amlodipine (Tekamlo <sup>®</sup> )  Aliskiren/ Amlodipine/ HCTZ (Amturnide <sup>®</sup> )	Refer to CCBs and direct renin inhibitors	Refer to CCBs and direct renin inhibitors	
<b>ARB/ARNI</b>	Sacubitril/ Valsartan (Entresto <sup>®</sup> )	Refer to ARBs	Refer to ARBs	
<b>ANTIINFECTIVE AGENTS</b>				
<b>Aminoglycoside</b>	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

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
				agents and/or with underlying neuromuscular disorders
<b>Antileishmanial Medications</b>	Miltefosine	Continue until the time of surgery	Resume when the patient's GI tract is functioning properly	Continue medication for duration of therapy
<b>Antiprotozoal and Anthelmintic</b>	Benznidazole Tafenoquine (Krintafel®) Moxidectin	Continue until time of surgery  Consult with infectious disease specialists  Monitor for anemia	Resume postoperatively  Tafenoquine: resume when GI tract is functioning properly	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.
<b>Antifungal Agent, Azole</b>	Isavuconazonium Sulfate	Continue until the time of surgery	Resume postoperatively	The mean plasma half-life of isavuconazole was 130 hours in trials. 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.
<b>Tetracycline derivatives</b>	Seysara® Nuzyra® Xerava®	Continue until the time of surgery.	Resume postoperatively.	Non-formulary. Will have to be given as patient own medication
<b>ANTINEOPLASTICS</b>				
<b>Oral Chemotherapy Medications</b>	Cyclophosphamide Gleevec® Hydroxyurea Mercaptopurine Revlimid® Sutent® Etoposide Xeloda®	Consult with patient's oncologist for all oral chemotherapy medications prior to surgery.	Consult with patient's oncologist.	All medications confer a risk of thrombocytopenia which may increase bleeding times.  Each medication should be carefully reviewed for contraindications due to surgery complications by the oncologist, surgeon, and pharmacist post-operatively once the patient is stable.

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Imbruvica <sup>®</sup> Mekinist <sup>®</sup> Pomalyst <sup>®</sup> Tafinlar <sup>®</sup> Gilotrif <sup>®</sup> Lenvatinib <sup>®</sup> Zydelig <sup>®</sup> Farydak <sup>®</sup> Lynparza <sup>®</sup> Zykadia <sup>®</sup> Alecensa <sup>®</sup> Cotellic <sup>®</sup> Ibrance <sup>®</sup> Lonsurf <sup>®</sup> Ninlaro <sup>®</sup> Odomzo <sup>®</sup> Tagrisso <sup>®</sup> Varubi <sup>®</sup> Tarceva <sup>®</sup> Rubraca <sup>™</sup> Afinitor <sup>®</sup> Calquence <sup>®</sup> Idhifa <sup>®</sup> Nerlynx <sup>®</sup> Rydapt <sup>®</sup> Verzenio <sup>®</sup> Zejula <sup>®</sup> Copiktra <sup>®</sup> Braftovi <sup>®</sup> Vitrakvi <sup>®</sup> Talzena <sup>®</sup> Mektovi <sup>®</sup> Erleada <sup>®</sup> Lorbrena <sup>®</sup> Vizimpro <sup>®</sup>			

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Daurismo <sup>®</sup> Asparlas <sup>®</sup> Xospata <sup>®</sup> Tibsovo <sup>®</sup> Vitrakvi <sup>®</sup>			
<b>Injectable Chemotherapy Medications</b>	Opdivo <sup>®</sup> Blincyto <sup>®</sup> Keytruda <sup>®</sup> Beleodaq <sup>®</sup> Entyvio <sup>®</sup> Darzalex <sup>®</sup> Empliciti <sup>®</sup> Imlygic <sup>®</sup> Onivyde <sup>®</sup> Portrazza <sup>®</sup> Unituxin <sup>®</sup> Yondelis <sup>®</sup> Tecentriq <sup>®</sup> Gazyva <sup>®</sup> Arzerra <sup>®</sup> Poteligeo <sup>®</sup> Libtayo <sup>®</sup> Elzonris <sup>®</sup> Lumoxiti <sup>®</sup> Lutathera <sup>®</sup> Libtayo <sup>®</sup> Elzonris <sup>®</sup> Lumoxiti <sup>®</sup>	Consult with patient's oncologist for all injectable chemotherapy medications prior to surgery.	Consult with patient's oncologist.	Many injectable chemotherapy medications are given in cycles and/or regimens, and it may be reasonable to schedule surgery after the completion of a cycle/regimen. However, one must always consult the patient's oncologist to prevent interruption in the appropriate management of the patient's disease.
<b>ANTIPARKINSON AGENTS</b>				
<b>Dopamine Precursor</b>	Carbidopa/ Levodopa (Sinemet <sup>®</sup> )	Continue during the perioperative period, discontinuation may cause parkinsonian crisis, no IV form available	Resume medications at same doses as soon as possible. If a patient has a nasogastric tube, a levodopa/carbidopa solution can be delivered to	Without treatment, muscle rigidity increases which may complicate medical care  Carbidopa/levodopa interacts with many drugs used in anesthesia, increasing the risk for

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
			<p>the duodenum via a weighted feeding tube.            Otherwise, for patients who are NPO, there are few effective alternatives that may be given IV/IM:</p> <ul style="list-style-type: none"> <li>- trihexyphenidyl</li> <li>- benztropine</li> <li>- diphenhydramine</li> </ul>	arrhythmias – but the benefits of continued therapy outweigh the risks
<b>Dopamine Agonists</b>	Bromocriptine Pramipexole Ropinirole	Dopamine agonists should be discontinued the evening before surgery to avoid postural hypotension in the perioperative periods	May be restarted when the patient resumes oral intake	
<b>Monoamine Oxidase Inhibitor (MAOIs) used in Parkinson's</b>	Selegiline (Eldepryl®)  Pargyline  Phenelzine  Safinamide (Xadago®)	<p>Consult anesthesiologist</p> <p>FLAG CHARTS to alert that patient is on an MAOI and place stickers on chart <i>cautioning against the use of meperidine and indirect sympathomimetics (i.e. ephedrine)</i></p>		<p>MAO inhibition becomes non-selective in doses greater than 10 mg/day</p> <p>AVOID meperidine and indirect sympathomimetics (i.e. ephedrine) may cause neuroleptic malignant syndrome. (Doak GH)</p> <p>Increased risk of serotonin syndrome in patients who receive methylene blue intraoperatively. Combination should be avoided unless benefit outweighs risk.</p> <p>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</p>
<b>COMT Inhibitors</b>	Entacapone	Continue up to the time of	For patients who are NPO,	Work by extending the duration of action of

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	(Comtan <sup>®</sup> ) Tolcapone (Tasmar <sup>®</sup> )	surgery	there are few effective alternatives that may be given IV/IM: <ul style="list-style-type: none"> <li>- trihexyphenidyl (Artane<sup>®</sup>)</li> <li>- benztropine (Cogentin<sup>®</sup>)</li> <li>- diphenhydramine (Benadryl<sup>®</sup>)</li> </ul>	levodopa  No specific contraindications regarding their use perioperatively  Abrupt withdrawal can cause a syndrome similar to neuroleptic malignant syndrome (as can carbidopa/levodopa)
<b>ANTIPLATELET AGENTS</b>				
<b>Salicylates</b>	Aspirin (ASA)	Preoperative decision regarding discontinuation of aspirin administered for antiplatelet effects should be individualized and based upon conversation between 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.  Stop 5-10 days prior to surgery.	Resume ~24 hours after surgery (next morning) assuming risk of bleeding has diminished  Prompt resumption of ASA should be considered for patients with or at high risk for atherosclerosis	Aspirin is continued preferentially in many cardiac surgeries because of its positive effects on mortality and cardiac morbidity  Widely published experience exists regarding the safety of aspirin and NSAID use in the setting of regional anesthesia  <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>

Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
<b>Other Antiplatelet Drugs</b>	Vorapaxar (Zontivity®)	<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>Significant inhibition of platelet aggregation remains <b>4 weeks</b> after discontinuation due to long half-life of parent drug and active metabolite (T<sub>1/2</sub> 72-96 hours; terminal T<sub>1/2</sub> 5-13 days)</p>	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 patient with history of stroke, TIA, ICH, or active pathological bleeding. The risk of bleeding is proportional to the patient's underlying bleeding risk.</p>
	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 5 days before 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><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>

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Clopidogrel (Plavix®)	Preoperative decision regarding discontinuation of antiplatelet agent should be individualized and based upon conversation between patient's surgeon, PCP, neurologist, or cardiologist.  Discontinue <i>at least</i> 5-10 days before surgery	Resume ~24 hours after surgery (next morning), when hemostasis is secured	Neuraxial anesthesia is relatively <i>contraindicated</i> if these antiplatelet agents are not discontinued 7-10 days preoperatively  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  <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>
	Prasugrel (Effient®)	Preoperative decision regarding discontinuation of antiplatelet agent should be individualized and based upon conversation between patient's surgeon, PCP, neurologist, or cardiologist.  Discontinue at least 7 days before surgery	Resume ~ 24 hours after surgery, when hemostasis is secured	
	Ticlopidipine (Ticlid®)	Preoperative decision regarding discontinuation of antiplatelet agent should be individualized and based upon conversation between patient's surgeon, PCP, neurologist, or cardiologist.  Discontinue 10 days before surgery	Resume ~24 hours after surgery (next morning), when hemostasis is secured	
<b>Combination Drugs</b>	Aspirin/dipyridamole	Stop 7-10 days before surgery	Resume after procedure or surgery when the risk of	

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	(Aggrenox <sup>®</sup> )		bleeding has diminished	
<b>Phosphodiesterase Inhibitor</b>	Cilostazol (Pletal <sup>®</sup> )	Stop at least 5 days before surgery  <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.
<b>BENZODIAZEPINES</b>				
	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
<b>CARDIOVASCULAR MEDICATIONS</b>				
<b>Antianginal Medications</b>	Nitrates Ca <sup>2+</sup> Channel blockers (CCBs) β-blockers Ivabradine (Corlanor)	<i>All</i> antianginal medications should be <i>continued</i> in the perioperative period  Ivabradine is used for angina as an off-label indication	Nitrates: Once-daily oral and transdermal nitrate formulations available  CCBs: IV verapamil and diltiazem available  β-blockers: IV form available  <b>Continue IV preparation until patient can resume regular PO medications</b>	<i>Nitrates:</i> Transdermal nitrates may lose effectiveness if skin perfusion decreases during or after surgery  <i>Calcium channel blockers</i> should be continued because there have been no major adverse reactions reported in the perioperative period – they appear safe and have theoretic benefit  <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
<b>Cardiac Glycoside</b>	Digoxin (Lanoxin <sup>®</sup> ) Digitek <sup>®</sup> )	Continue perioperatively to provide stability, especially for arrhythmias  Check serum digoxin and	Due to long half-life of digoxin, it is permissible to miss one dose  If patient is unable to resume	Patient is at risk for digoxin toxicity due mainly to physiologic stress effects, particularly acidosis, electrolyte abnormalities (especially hypokalemia), hypoxia and increased catecholamines

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		potassium levels preoperatively if clinically indicated	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)	If a pressing reason exists <i>or</i> if the physiologic status of the patient is significantly altered, a serum digoxin level should be measured preoperatively and/or postoperatively
<b>Antiarrhythmics</b>	Amiodarone Sotalol Procainamide Diltiazem Verapamil Dofetilide	Continue all antiarrhythmic agents	Cardiologist should be consulted if patient is taking an antiarrhythmic that has no alternative preparation, other than oral, and will be NPO for some time  Multiple IV preparations available (i.e. amiodarone, diltiazem, etc.)	Given the relative risk of therapy vs. that of rhythm disturbances, these drugs are usually prescribed for significant arrhythmias  Hypokalemia, hypomagnesemia, and hypocalcemia can all increase risk of dangerous dysrhythmias with certain antiarrhythmic agents
<b>Alpha/Beta- Agonist</b>	Droxidopa	At physician's discretion, however it is recommended that patients be evaluated for supine hypertension while on the medication. If persistent supine hypertension 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 <i>neurogenic orthostatic hypotension</i> 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.
<b>Neprilysin Inhibitor/ARB</b>	Sacubitril and	Refer to ARBs section above		

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	Valsartan (Entresto)			
<b>CORTICOSTEROIDS</b>				
	Prednisone  Methyl- prednisolone  Hydrocortisone	<p>At physician's discretion, however it is recommended that patients continue their usual dose through the day of surgery.</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  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</p>	<p>Minor to moderate surgical stress: resume home dose</p> <p>Major surgical stress: decrease prednisone dose by 50% per day to the usual daily dose</p>	<p><i>If a patient is taking <math>\geq 20</math> mg/day of prednisone or equivalent steroid for more than three weeks or on steroids for Cushing's Syndrome, perioperative coverage with hydrocortisone is necessary in accordance with magnitude of the stress.</i></p> <p><i>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.</i></p> <p><i>Suggested that the following groups do not need additional glucocorticoid coverage because of they do not have suppression of their HPA axis:</i></p> <ul style="list-style-type: none"> <li>• <i>On glucocorticoid for less than 3 weeks</i></li> <li>• <i>Morning doses of &lt;5mg/day of prednisone or its equivalent for any length of time</i></li> <li>• <i>Doses of &lt;10mg/day of prednisone or its equivalent every other day</i></li> </ul> <p><i>For patients currently off glucocorticoids but used them in the past year it is suggested to undergo preoperative assessment of their HPA axis beginning with morning serum cortisol, may consider withholding steroids, watching BP, and administering a dose of hydrocortisone if the patient develops hypotension.</i></p> <p>Steroid equivalencies:</p>

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		followed by 50 mg IV every 8 hours for 24 hours.		Prednisone 5 mg = Methylprednisolone 4 mg = hydrocortisone 20 mg = dexamethasone 0.75 mg
<b>DIABETIC MEDICATIONS</b>				
<b>Biguanide</b>	Metformin (Glucophage®)	Hold the morning of surgery.  Temporarily discontinue for 48 hours following the administration of iodine contrast media <b>only</b> in patients with acute kidney injury, severe chronic kidney disease (stage IV/V, eGFR < 30) or in those undergoing arterial studies D  Withhold metformin for cardiac cases and cases in which significant blood loss is expected.	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); until then utilize insulin. In high risk patients undergoing radiology procedures using contrast, wait 48 hours before resuming. Preferred inpatient treatment is insulin only management	Calculate eGFR, discontinue immediately or do not resume therapy if eGFR is < 30 mL/min/1.73 m <sup>2</sup> . Assess the benefit of continuing metformin treatment in patients whose eGFR falls below 45 mL/min/1.73m <sup>2</sup>  Metformin does not typically cause hypoglycemia unless combined with a sulfonylurea  Risk factors for developing lactic acidosis: <ul style="list-style-type: none"> <li>- Renal impairment</li> <li>- CHF</li> <li>- Inadequate renal perfusion/hypovolemia</li> </ul>
<b>Sulfonylureas</b>	<i>Short-acting:</i> Glyburide Glipizide Glimepiride  <i>Long-acting:</i> Chlorpropamide (rarely used)	<i>Short-acting:</i> Hold the day of surgery  <i>Long-acting:</i> Stop 72 hours before surgery	Resume when patient resumes a normal diet; until then utilize insulin  Do NOT resume until patient resumes a normal diet  Preferred inpatient treatment is insulin only management	May cause hypoglycemia  It is imperative that patient eats regular meals when this medication is resumed  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
<b>Thiazolidinedione</b>  “ <b>Glitazones</b> ”	Rosiglitazone (Avandia®) Pioglitazone (Actos®)	Discontinue on the morning of surgery	Continue once patient can tolerate oral medications  Preferred inpatient treatment is insulin only management	Will not cause hypoglycemia when used as monotherapy; improves insulin sensitivity at peripheral sites and in the liver, but does not stimulate insulin release  Avoid use if patients develop congestive heart

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				failure or problematic fluid retention, or if there are liver function abnormalities
<b>Glucagon-like Peptide (GLP-1) analogs</b>	Exenatide (Byetta <sup>®</sup> , Bydureon <sup>®</sup> ) Liraglutide (Victoza <sup>®</sup> ) Dulaglutide (Trulicity <sup>®</sup> ) Albiglutide (Tanzeum <sup>®</sup> ) Lixisenatide (Adlyxin <sup>®</sup> )	Discontinue on the morning of surgery	Resume when patient resumes a normal diet; until then utilize insulin  Do NOT resume until patient resumes a normal diet  Preferred inpatient treatment is insulin only management	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
<b>Dipeptidyl Peptidase-4 Inhibitor</b>	Sitagliptin (Januvia <sup>®</sup> ) Saxagliptin (Onglyza <sup>®</sup> ) Alogliptin (Nesina <sup>®</sup> ) Linagliptin (Tradjenta <sup>®</sup> )	Discontinue on the morning of surgery	Resume when patient resumes a normal diet; until then utilize insulin  Preferred inpatient treatment is insulin only management	May alter gastrointestinal (GI) motility and worsen postoperative state
<b><math>\alpha</math>-Glucosidase Inhibitors</b>	Acarbose (Precose <sup>®</sup> ) Miglitol (Glyset <sup>®</sup> )	Discontinue on the morning of surgery	Resume when patient resumes a normal diet; until then utilize insulin  Preferred inpatient treatment is insulin only management	

Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats																																												
<b>Amylin Analog</b>	Symlin (Pramlintide®)	Discontinue on the morning of surgery	Resume when patient resumes a normal diet; until then utilize insulin  Preferred inpatient treatment is insulin only management																																													
<b>Sodium-Glucose Co-Transporter 2 (SGLT2) Inhibitor</b>  “gliflozin”	Dapagliflozin (Farxiga®) Canagliflozin (Invokana®) Empagliflozin (Jardiance®)	Discontinue on the morning of surgery	Resume when patient resumes a normal diet; until then utilize insulin  Preferred inpatient treatment is insulin only management	Monitor renal function postoperatively. If patient’s eGFR <45, therapy should be held.  Not recommended during volume depletion.																																												
<b>Insulin</b>	<p>The following recommendations are for basic overview of insulin management perioperatively and do not represent comprehensive blood glucose management guidelines due to the wide variability of diabetic pathology and insulin responsiveness.</p> <ul style="list-style-type: none"> <li>Ideally consult anesthesiologist, endocrinologist, pharmacist or internist. <i>May refer to CHI Franciscan Health Perioperative Glycemic Control Guidelines</i></li> <li><u>Short procedure (for procedures less than two hours):</u></li> </ul> <table border="1" data-bbox="678 909 1801 1359"> <thead> <tr> <th data-bbox="678 909 777 1016">Day</th> <th data-bbox="777 909 861 1016"></th> <th colspan="2" data-bbox="861 909 1024 1016">Glargine Detemir Degludec</th> <th colspan="2" data-bbox="1024 909 1192 1016">70/30 70/25</th> <th colspan="2" data-bbox="1192 909 1396 1016">NPH or U-500</th> <th colspan="2" data-bbox="1396 909 1564 1016">Lispro Aspart Glulisine Regular</th> <th data-bbox="1564 909 1801 1016">Insulin Pump</th> </tr> <tr> <td colspan="2"></td> <td data-bbox="861 1016 940 1068">AM Dose</td> <td data-bbox="940 1016 1024 1068">PM Dose</td> <td data-bbox="1024 1016 1104 1068">AM Dose</td> <td data-bbox="1104 1016 1192 1068">PM Dose</td> <td data-bbox="1192 1016 1272 1068">AM Dose</td> <td data-bbox="1272 1016 1396 1068">PM Dose</td> <td data-bbox="1396 1016 1476 1068">AM Dose</td> <td data-bbox="1476 1016 1564 1068">PM Dose</td> <td data-bbox="1564 1016 1801 1068">All Day</td> </tr> </thead> <tbody> <tr> <td data-bbox="678 1068 777 1192"><b>Day before surgery</b></td> <td data-bbox="777 1068 861 1192"></td> <td data-bbox="861 1068 940 1192">Usual Dose</td> <td data-bbox="940 1068 1024 1192">80%</td> <td data-bbox="1024 1068 1104 1192">Usual Dose</td> <td data-bbox="1104 1068 1192 1192">Usual Dose</td> <td data-bbox="1192 1068 1272 1192">Usual Dose</td> <td data-bbox="1272 1068 1396 1192"><b>Dinner:</b> Usual dose <b>Bedtime:</b> 50%</td> <td data-bbox="1396 1068 1476 1192">Usual Dose</td> <td data-bbox="1476 1068 1564 1192">Usual Dose</td> <td data-bbox="1564 1068 1801 1192">Usual basal rate and boluses for carbs</td> </tr> <tr> <td data-bbox="678 1192 777 1359"><b>Day of surgery</b></td> <td data-bbox="777 1192 861 1359">Type 1 DM</td> <td colspan="8" data-bbox="861 1192 1564 1359">                     Give AM basal insulin dose as follows:                     <ul style="list-style-type: none"> <li>NPH or U-500 insulin: 50% of usual AM dose at home</li> <li>Glargine/detemir/degludec: 75% of usual AM dose at home</li> <li>Mixed insulin: 50% of usual AM dose at home</li> </ul>                     If correction scale: treat any BG &gt; 180 mg/dl                 </td> <td data-bbox="1564 1192 1801 1359">                     Usual basal rate no boluses.   <b>Check blood sugar q4h or sooner if you experience symptoms</b> </td> </tr> </tbody> </table>				Day		Glargine Detemir Degludec		70/30 70/25		NPH or U-500		Lispro Aspart Glulisine Regular		Insulin Pump			AM Dose	PM Dose	All Day	<b>Day before surgery</b>		Usual Dose	80%	Usual Dose	Usual Dose	Usual Dose	<b>Dinner:</b> Usual dose <b>Bedtime:</b> 50%	Usual Dose	Usual Dose	Usual basal rate and boluses for carbs	<b>Day of surgery</b>	Type 1 DM	Give AM basal insulin dose as follows: <ul style="list-style-type: none"> <li>NPH or U-500 insulin: 50% of usual AM dose at home</li> <li>Glargine/detemir/degludec: 75% of usual AM dose at home</li> <li>Mixed insulin: 50% of usual AM dose at home</li> </ul> If correction scale: treat any BG > 180 mg/dl								Usual basal rate no boluses.  <b>Check blood sugar q4h or sooner if you experience symptoms</b>						
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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
		Type 2 DM	Give AM basal insulin dose as follows: <ul style="list-style-type: none"> <li>• If on basal insulin and oral diabetes medications—give 50% dose of basal (NPH, U-500, glargine/detemir/degludec insulin).</li> <li>• If on basal insulin and meal-time insulin (with or without oral medications)—give 75% of basal insulin and hold prandial insulin.</li> <li>• Mixed insulin: 30% of usual AM dose at home</li> </ul> If on correction scale, treat any BG > 180 mg/dl	of hypoglycemia
		<ul style="list-style-type: none"> <li>• <u>Complex procedure (e.g., open heart, complex bowel surgery) or major surgery lasting greater than two hours:</u> <ul style="list-style-type: none"> <li>○ Hold previous insulin regimens. Continuous insulin infusion is recommended.</li> </ul> </li> <li>• <u>Other:</u> <ul style="list-style-type: none"> <li>○ For Type 1 diabetics an insulin infusion should be strongly considered.</li> <li>○ It is recommended to start dextrose containing IV fluids while patients are NPO</li> <li>○ For DM patients on nutritional or meal-bolus insulin, hold this insulin until after surgery; may resume when eating well.</li> <li>○ After surgery evaluate resuming basal insulin. If NPO, it is recommended to resume only 50% of total daily dose of insulin as basal. If on an insulin mix (e.g. 70/30), patients need to be eating well to resume. If not, convert them to a different basal insulin in the interim.</li> <li>○ As diet resumes, consider nutritional insulin when appropriate</li> </ul> </li> </ul>		
<b>DIURETICS</b>				
<b>Potassium-sparing diuretics</b>	Triamterene Amiloride Spironolactone	May continue without interruptions if clinically appropriate	Oral diuretics should be restarted if needed for control of hypertension or volume overload or when a normal diet is resumed	The conversion from oral diuretics to IV diuretics is not equal ( <i>example: furosemide 80 mg PO daily = furosemide 40 mg IV daily</i> )
<b>Thiazide diuretics</b>	HCTZ Metolazone	May continue without interruptions if clinically appropriate	IV diuretics are good option until oral intake is adequate	Hypokalemia, caused by select diuretics, can theoretically increase the risk of perioperative arrhythmia, potentiate the effects of muscle relaxants, or provoke paralytic ileus.  Consider refraining from taking diuretics the morning of surgery since quick diuresis can be obtained via IV route if the need is discovered

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
<b>Loop diuretics</b>	Furosemide (Lasix®)  Torsemide (Demadex®)  Bumetanide (Bumex®)  Ethychrinic Acid (Edecrin®)	Continue without interruption if patient is on potassium supplement		during surgery.
<b>ELECTROLYTE</b>				
	Potassium supplements	Consider checking potassium level  Continue on 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, ethychrinic acid)
<b>HEMATOPOIETIC AGENTS</b>				
<b>Colony Stimulating Factors</b>	Lusutrombopag (Mulpleta®)	Begin medication 8 – 14 days prior to scheduled procedure.  <b>3 mg daily for 7 days</b>	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.

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
<b>Tyrosine Kinase Inhibitor</b>	Fostamatinib	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
<b>Thrombopoietin receptor agonist</b>	Doptelet®	Begin therapy 10 to 13 days prior to the scheduled procedure. Patients should undergo 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.
<b>HERBAL SUPPLEMENTS</b>				
<b>Echinacea</b>		No data on discontinuation		Echinacea is associated with allergic reactions and immune stimulation
<b>Ephedra (ma huang)</b>		Discontinue at least 24 hours before surgery		Ephedra may increase the risk of heart attack and stroke
<b>Garlic</b>		Discontinue at least 7 days before surgery	Herbal supplements are not part of hospital formulary. Patients must bring their own supply if continuation after surgery is indicated.	Garlic irreversibly inhibits platelets aggregation in a dose-dependent manner, which may increase risk of bleeding  Garlic may lower blood pressure
<b>Ginkgo</b>		Discontinue at least 36 hours before surgery		<b>Ginkgo may cause inhibition of platelet-activating factor, which increase risk of bleeding after surgery</b>
<b>Ginseng</b>	American Ginseng  Asian Ginseng	Discontinue at least 7 days before surgery		<b>Ginseng may cause hypoglycemia</b>  Ginseng may irreversibly inhibit platelet aggregation  Ginseng may cause tachycardia and hypertension

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
<b>Kava</b>		Discontinue at least 24 hours before surgery		Kava may increase sedative effect of anesthetics by potentiating GABA inhibitory neurotransmission
<b>St. John's Wort</b>		Discontinue at least 5 days before surgery		St. John's Wort is known to cause an increase of certain perioperative medications such as cyclosporine, midazolam, lidocaine, and CCB
<b>Valerian</b>		Ideally tapered weeks before surgery; if not withdrawal is treated with benzodiazepines		Valerian may increase the sedative effect of anesthetics and associated with benzodiazepine like withdrawal
<b>All other unlisted herbals and Vitamin E supplements</b>	Black Cohosh Chamomile CoQ10 Feverfew Ginger Goldenseal Saw Palmetto	Discontinue at least 14 days prior to surgery		Various coagulation disorders, sedation, hemodynamic changes, electrolyte disturbances, and other unknown complications
<b>HEPATITIS C MEDICATIONS</b>				
<b>NS3/4A Protease Inhibitors (PIs)</b>	Sofosbuvir (Sovaldi®) Boceprevir (Victrelis®) Telaprevir (Incivek®) Simeprevir (Olysio®) Ledipasvir/Sofosbuvir (Harvoni®) Ombitasvir/Paritaprevir/Ritona	Discuss with prescribing provider.	Discuss with prescribing provider.	Elective surgeries should not be performed on patients with active HCV medications indicating active HCV  Fatal drug interactions with steroids and other CYP3A4 metabolized drugs, consult pharmacist if concomitant use

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	vir/Dasabuvir (Viekira Pak®) Glecaprevir/pibrentasivir (Mavyret™) Sofosbuvir/velpatasvir/voxilaprevir (Vosevi®)			
<b>Pegylated Interferon Alfa</b>	Pegasys®	Discuss with prescribing provider.	Discuss with prescribing provider.	Elective surgeries should not be performed on patients with active HCV medications indicating active HCV
<b>Nucleoside Analogs</b>	Ribavirin	Discuss with prescribing provider.	Discuss with prescribing provider.	Elective surgeries should not be performed on patients with active HCV medications indicating active HCV
<b>HIV MEDICATIONS</b>				
<b>Antiretrovirals</b>	Abacavir Bictegravir Emtricitabine Diadnosine Dolutegravir Doravirine Lamivudine Stavudine Tenofovir Zidovudine	Continue through perioperative period when feasible. Otherwise stop all ART together	Resume all drugs together, in full doses, when the patient's GI tract is functioning properly	Prevention of drug-resistance is paramount and irregular dosing should be avoided  Prolonged midazolam effect have been observed with some antiretroviral medications  Protease inhibitors (E.g., Atazanavir, Darunavir, Indinavir, Ritonavir) will decrease metabolism of midazolam, leading to prolonged sedation and respiratory depression
<b>HORMONES</b>				

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
Oral Contraceptives (OCs)	Estrogen Progestin	<p><b>Final decision should be based upon the clinical judgment of the anesthesiologist, consult surgeon, or prescribing physician.</b></p> <p><u>Low to moderate risk of VTE:</u> May continue up to and including the day of surgery for procedures with low to moderate risk of venous thromboembolism.</p> <p><u>High risk of VTE:</u> 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 her own, since hospital will not provide OCs</p>	<p>If decision is <i>not</i> 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</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><b>Instruct on alternate forms of contraception and obtain serum pregnancy test immediately before surgery if OC is held.</b></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 (<math>\geq 35</math> mcg) have a higher risk of thromboembolism compared with those with lower estrogen content (<math>\leq 30</math> mcg).</p>

Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
<b>Hormone Replacement Therapy (HRT)</b>	Alora® Angeliq® Climara® Climara Pro® Combipatch® Delestrogen® Duavee® Enjuvia® Estraderm® Estrasorb® Femring® Osphena® Prefest® Prempro® Premarin® Vivelle®	<b>Final decision should be based upon the clinical judgment of the anesthesiologist, consult surgeon, or prescribing physician.</b> Continue up to and including the day of surgery for procedures with low to moderate risk of venous thromboembolism.  When possible, discontinue 4 to 6 weeks before surgery for procedures with high risk for thromboembolism.  Consider DVT prophylaxis for major/high-risk surgery	Resume when tolerating oral medications and the period of elevated risk or postoperative immobility has passed.	Major concern related to the perioperative period is for increasing the risk of venous thromboembolism (VTE).  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.  May consider discontinuing therapy <i>at least</i> 4 weeks or more before any major surgery if patient is at high-risk for VTE.  The Heart and Estrogen/progestin Replacement Study (HERS) convincingly demonstrated that hormone replacement therapy increases risk of VTE.  Risks increase with lower-extremity fractures, inpatient surgery and non-surgical hospitalizations (increased risk for up to 90 days).
<b>HYPNOTICS &amp; SLEEP AIDS</b>				
<b>Benzodiazepines (Short Acting)</b>	Temazepam Triazolam	If taken more than 8 hours prior to anesthesia or used chronically, patient may have a dose the night before surgery	Resume when patient is hemodynamically stable	Abrupt withdrawal of chronic benzodiazepines may lead to negative consequences, must evaluate risk vs. benefit in individual patients.  Since hypnotics are sometimes dosed prior to surgery, anesthesiologist should be informed if patient has taken hypnotic the night before
<b>Benzodiazepines (Long Acting)</b>	Estazolam Flurazepam Quazepam			
<b>Non-Benzodiazepine Hypnotics</b>	Eszopiclone Zolpidem Zopiclone Zaleplon	If elderly (greater than 65 years old) consult physician or anesthesiologist		
<b>Melatonin and Melatonin Receptor Agonists</b>	Melatonin Ramelteon	IV alternatives for		

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	(Rozarem®) Tasimelteon (Hetlioz®)	benzodiazepines may be available if patient is NPO		
<b>Orexin Receptor Antagonist</b>	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
<b>MULTIPLE SCLEROSIS MEDICATIONS</b>				
<b>Disease Modifying Agents</b>	Aubagio® Avonex® Betaseron® Copaxone® Extavia® Gilenya® Glatopa® Lemtrada® Mitoxantrone® Novantrone® Ocrevus® Rebif® Tecfidera® Tysabri® Plegridy® Zinbryta® Baricitinib (Olumiant®)	Consult prescribing doctor to devise a perioperative plan.	Consult prescribing doctor to devise a postoperative plan.	<p>Cardio toxicity and liver toxicity are possible side effects with Gilenya, mitoxantrone. Novantrone, Rebif, and Tysabri, and Zinbryta monitor closely surrounding surgery</p> <p>Lemtrada can cause severe, life-threatening autoimmune conditions, such as immune thrombocytopenia and anti-glomerular basement membrane disease. Monitor CBC with differential and SCr closely</p> <p>Respiratory function decreases have been reported with Gilenya</p> <p>All drugs decrease immune function and increase risk for infections</p>
<b>MYASTHENIA GRAVIS MEDICATIONS</b>				
<b>Acetylcholinesterase Inhibitors</b>	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: response to NMBAs may be variable in such patients

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
<b>Glucocorticoids</b>	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
<b>Immunotherapy</b>	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 indication	Consult patient's neurologist	
<b>OSTEOPOROSIS AGENTS</b>				
<b>Selective Estrogen Receptor Modulators</b>	Tamoxifen  Raloxifene (Evista®)	Stop at least 4 weeks before surgery, UNLESS these drugs are being used to treat breast cancer, if so – contact	Resume when period of postoperative immobilization has passed (non-oncologic surgeries)	Have either estrogen receptor agonist or antagonist effects, depending on the tissue in which they are acting

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		oncologist May be continued for low-risk surgeries.		Both increase the risk of VTE quantitatively similar to estrogen
<b>Bisphosphonates</b>	Alendronate (Fosamax®)  Ibandronate (Boniva®)  Risedronate (Actonel®)	Discontinue at least 7 days before surgery  Discontinue agents for 3 months before elective dental surgery, if bisphosphonate treatment exceeds 3 years or if glucocorticoids are used	Best to withhold this medication postoperatively	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
<b>Calcitonin</b>	Miacalcin® (nasal spray)	May be continued before surgery	No specific contraindications or interactions to using this drug in the perioperative period	
<b>PHARMACOLOGIC CHAPERONE</b>				
<b>Fabry's Disease</b>	Migalastat	Discuss with prescribing provider	Discuss with prescribing provider	
<b>PSORIASIS MEDICATIONS</b>				
<b>DMARDs, PDE-4 Inhibitors</b>	<b>Otezla® (apremilast)</b>	May be continued before surgery	May restart when patient is tolerating oral medications	
<b>Topical Corticosteroid</b>	Calcipotrien and betamethasone dipropionate (Enstilar®)	May be continued before surgery	No specific contraindications or interactions to using this drug in the perioperative period. Avoid surgery site.	
<b>IgG monoclonal antibody</b>	Secukinumab (Cosentyx®) Ustekinumab (Stelara) Brodalumab	Discuss with prescribing provider.	Discuss with prescribing provider.	Most are given weekly to monthly and can likely be held and given post-operatively when the patient is stable

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	(Siliq <sup>®</sup> ) Guselkumab (Tremfaya <sup>®</sup> ) Tildrakizumab (Ilumya <sup>®</sup> )			
<b>Please see Rheumatoid Arthritis section for other medications used for psoriasis</b>				
<b>PSYCHIATRIC MEDICATIONS</b>				
<b>Tricyclic Antidepressants (TCAs)</b>	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 discontinue for 7 days prior to surgery.	May restart when patient is tolerating oral medications	<b>If hypotension is encountered, and a vasopressor is needed, the response to therapy may be difficult to predict</b>  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. Abrupt withdrawal can lead to insomnia, nausea, headache, increased salivation, and increased sweating.
<b>SSRIs (including agents with partial SSRI activity), SNRIs</b>	Fluoxetine (Prozac <sup>®</sup> )  Paroxetine (Paxil <sup>®</sup> )  Brintellix <sup>®</sup>	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 PO meds – mainly agents that may result in a withdrawal syndrome after discontinuation (i.e., Paxil <sup>®</sup> )  Recommend alternative therapy if patient requires antiplatelet agents as secondary prevention	There have been reports of “serotonin syndrome” after concurrent use with tramadol (Ultram <sup>®</sup> ); 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.

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
<b>Monoamine Oxidase Inhibitor (MAOIs)</b>	Selegiline (Eldepryl®)  Pargyline  Phenelzine	Consult anesthesiologist  FLAG CHARTS to alert that patient is on an MAOI and place stickers on chart <i>cautioning against the use of meperidine and indirect sympathomimetics (i.e. ephedrine)</i>  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.
<b>Antipsychotics</b>	Olanzapine (Zyprexa®)  Ziprasidone (Geodon®)  Risperidone (Risperdal®)	May continue perioperatively if QTc remains stable.  May need to consider holding dose or utilizing agents with shorter half-life if medications that can prolong QTc are used during or after surgery.	Make sure to restart medication once patient is able to take oral medications  Parenteral formulations are available for haloperidol, chlorpromazine, aripiprazole, olanzapine, and ziprasidone if therapy is needed but patient is NPO.	Alpha-adrenergic blockade with risperidone can be significant  There have been reports of IV use of antipsychotics increasing risk of sedation, hypotension, or QTc prolongation.
<b>Mood Stabilizer</b>	Lithium (Lithobid®)  Valproate (Depakote®)	May be continued preoperatively. If patient undergoing major surgery, consider discontinuation 2-3 days before If medically	Serum drug levels should be monitored before and after surgery and any time that renal clearance may be affected	Lithium may potentiate the effect of depolarizing and competitive neuromuscular blocking agents  Assess risk vs benefit of holding medication in

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
		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.		patients with a history of psychosis. If patient stable, may disrupt mental state  Lithium may require increased monitoring of fluid, electrolyte, and thyroid levels
<b>Other Commonly Used Antidepressants</b>	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
<b>Stimulants</b>	Phentermine (Adipex-P®)	Hold medication 7 days prior to surgery	Restart when patient can take oral medications and is clinically stable	
<b>PULMONARY MEDICATIONS</b>				
<b>PDE Inhibitor - Nonselective</b>	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. No known adverse effects but very narrow range between therapeutic and toxic level.
<b>Inhaled Medications</b>	Albuterol Duoneb® QVAR® Pulmicort® Symbicort® Breo Ellipta®	Continue until 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	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

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
	Anoro Ellipta <sup>®</sup> Incruse Ellipta <sup>®</sup> Arnuity Ellipta <sup>®</sup> Flovent <sup>®</sup> Xopenex <sup>®</sup> Asmanex <sup>®</sup> Dulera <sup>®</sup> Serevent <sup>®</sup> Advair <sup>®</sup> Spiriva <sup>®</sup> Alvesco <sup>®</sup> Striverdi Respimat <sup>®</sup> Stiolto Respimat <sup>®</sup> Utibron Neohaler <sup>®</sup> Trelegy Ellipta <sup>®</sup> Yupelri <sup>®</sup>		resume inhalers	
<b>Cystic Fibrosis Transmembrane Conductance Regulator Corrector</b>	Symdeko <sup>®</sup>	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.
<b>Oral Medications</b>	Accolate <sup>®</sup> Singulair <sup>®</sup> Zflo <sup>®</sup> Esbriet <sup>®</sup> Ofev <sup>®</sup> Daliresp <sup>®</sup>	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
<b>PULMONARY HYPERTENSION &amp; ERECTILE DYSFUNCTION MEDICATIONS</b>				
<b>PDE-5 Inhibitors</b>	Sildenafil (Viagra <sup>®</sup> ) (Revatio <sup>®</sup> ) Tadalafil (Cialis <sup>®</sup> , Adcirca <sup>®</sup> ) Vardenafil (Levitra <sup>®</sup> , Staxyn <sup>®</sup> )	Erectile dysfunction: discontinue at least 7 days before surgery  Pulmonary Hypertension: should be continued during perioperative period		PDE-5 Inhibitors increase concentration and 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.
<b>Endothelin Receptor Antagonist</b>	Bosentan (Tracleer <sup>®</sup> ) Ambrisentan (Letairis <sup>®</sup> ) Macitentan (Opsumit <sup>®</sup> )	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.
<b>Soluble Guanylate Cyclase Stimulator</b>	Riociguat (Adempas <sup>®</sup> )	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.
<b>Prostacyclin receptor agonist (selective)</b>	Selexipag (Uptravi <sup>®</sup> )	Continue during perioperative period	Continue during the postoperative period	New drug with limited data. Current adverse events did not show increased bleeding or hypotension with use. Does not appear to have drug interactions with typical anesthetic agents.

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
<b>REVERSAL/ANTIDOTES</b>				
<b>Potassium Antidote</b>	Lokelma® Patiomer (Veltassa®) Sodium Polystyrene Sulfonate (Kayexalate®)	May continue through day before surgery if clinically appropriate	Resume on outpatient basis as clinically appropriate	Oral medications should not be administered 2 hours before or after Lokelma  Oral medications should not be administered 6 hours before or 6 hours after Veltassa®  Avoid use in patients with abnormal post-operative bowel motility disorders.
<b>Alpha<sub>2</sub>-Adrenergic Agonist</b>	Lucemyra	Discuss with prescribing provider	Discuss with prescribing provider.	<i>Discontinuation of therapy:</i> Decrease dose gradually over 2 to 4 days. Abrupt discontinuation may cause marked rise in blood pressure, anxiety, chills, and diarrhea.  Patients who have been treated with lofexidine may respond to lower opioid doses than previously used.
<b>Monoclonal antibody</b>	Takhzyro®	Discuss with prescribing provider.	Discuss with prescribing provider.	It is critical to develop definitive perioperative plans for angioedema prophylaxis, intraoperative management, and rescue if indicated for patients with hereditary angioedema (HAE) or acquired angioedema (AAE).  Takhzyro is dosed every 2 weeks to every 4 weeks. Other agents can be dosed as frequent as every other day or twice weekly and have short-term/pre-procedural prophylaxis dosing.
<b>RHEUMATOID ARTHRITIS MEDICATIONS</b>				

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
<b>Antimetabolite</b>	Methotrexate (MTX)	<p>Recommended to continue perioperatively in patients with normal renal function and held for 2 weeks preoperatively in patients with renal impairment, infection, or bone marrow suppression</p> <p>**Contact patient's rheumatologist</p>	<p>Physician's discretion whether to continue or not—check serum creatinine</p> <p>Some physicians hold MTX for 2 weeks postoperatively to ensure appropriate wound healing</p> <p>Some physicians restart MTX ASAP after surgery to avoid a rebound flare in arthritis</p>	Concerns exist regarding the effect of MTX on wound healing. Recent data suggests that MTX did not cause significant problems with wound healing
<b>Antirheumatic (dihydroorotate dehydrogenase inhibitor)</b>	Leflunomide (Arava®)	<p>Some physicians recommend stopping 2-3 weeks before surgery given the long half-life, however lack of known risk increase suggests it is reasonable to continue the drug up until surgery</p> <p>Contact patient's rheumatologist</p>		Use caution in patients with renal failure or sepsis
<b>TNF-alpha inhibitors</b>	Etanercept (Enbrel®) Infliximab (Remicade®) Adalimumab (Humira®)	<p>Stop at least 2 weeks before surgery</p> <p>Contact patient's rheumatologist</p>	<p>Resume once the wound is fully healed.</p> <p>Contact patient's rheumatologist</p>	
<b>Antirheumatic</b>	Sulfasalazine, azathioprine	Hold for one week prior to surgery	Resume after surgery	
<b>Antirheumatic</b>	Hydroxy-chloroquine	Continue without interruption	May continue when able to tolerate oral medications	
	colchicine, gold, cyclophosphamide	Discontinue the night before surgery		

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Drug Class	Examples	Preoperative Recommendations	Postoperative Recommendations	Considerations & Caveats
<b>THYROID MEDICATIONS</b>				
<b>Thyroid Products</b>	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.
<b>Antithyroid Medications</b>	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  <b>In patients who exhibit thyroid storm, propranolol should only be administered with caution due to possibility of cardiovascular collapse</b>
<b>Parathyroid</b>	Natpara®	Should be continued during perioperative period	Continue during postoperative period	The manufacturer of Natpara recommends avoiding abrupt interruption or discontinuation

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