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Title: Medication Management After Malabsorptive Bariatric Surgeries Guidelines	

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Purpose:

This guideline aims to provide evidence-based recommendations for safe and effective medication use in patients who have undergone malabsorptive bariatric surgeries. It addresses altered drug absorption, formulation selection, dose adjustments, and alternative therapies to optimize pharmacologic care in this unique population. The goal is to support clinicians in making informed, individualized medication decisions across different therapeutic classes.

Definitions:

Malabsorptive bariatric surgeries (MSB) – includes Roux-en-Y Gastric Bypass (RYGB), Biliopancreatic Diversion with Duodenal Switch (BPD/DS), and Single Anastomosis Duodeno-Ileal Bypass with Sleeve Gastrectomy (SADI-S).

Background:

Malabsorptive bariatric surgeries (MBS) are weight loss procedures that include weight reduction primary by altering the normal digestion and absorption processes. These surgeries achieve this effect by bypassing a significant portion of the small intestine thereby reducing the surface area available for nutrient absorption especially fats and calories. This anatomical alteration leads to significant changes in drug pharmacokinetics.

- **Reduced Stomach Size & Acid:** A small gastric pouch (≈30 mL) with limited acid production accelerates gastric emptying and raises upper GI pH. Drugs requiring an acidic environment or prolonged stomach contact (e.g., **enteric-coated** tablets, **delayed/extended-release** formulations) may not dissolve or absorb fully.
 - *Guidance:* Prefer **immediate-release** formulations; avoid **slow-release (SR)** or **enteric-coated** pills post-MBS. If an SR formulation is critical, monitor closely for efficacy or switch to alternative dosing.
- **Decreased Absorptive Surface:** Bypassing the duodenum and proximal jejunum reduces the surface area and transit time for absorption. Drugs primarily absorbed in the upper small intestine (e.g., calcium, iron) may have **lower bioavailability**. Rapid transit can also cause incomplete release of extended-release drugs.

- *Guidance:* Use **liquid, crushable, or chewable** formulations especially in the early post-op period. In the first few weeks, medications should be given in **liquid or crushed** form (low-sugar liquids to avoid dumping syndrome). After ~6–8 weeks, patients can usually resume swallowing tablets, but may need to **split doses** or take pills one at a time due to the reduced pouch capacity.
- **Altered pH and Bile Flow:** Reduced gastric acid and bile flow can impair the dissolution of **hydrophobic or pH-dependent drugs**. For example, **azole antifungals** or **dabigatran** (which requires acid) may have decreased absorption. Similarly, malabsorption of fats and bile salts can reduce absorption of **lipophilic drugs** (e.g., cyclosporine, phenytoin, rifampin, levothyroxine) – close monitoring is advised. Conversely, bypassing proximal CYP3A4-rich segments may **increase bioavailability** of some drugs due to reduced first-pass metabolism. For instance, metformin’s bioavailability increases ~50% after MBS, requiring dose reduction to avoid toxicity ([Tham & Lee \(2023\)](#)).
- **Weight Loss and Distribution:** Dramatic weight loss (30%+ of body weight) alters volume of distribution and protein binding. Less adipose tissue can **raise plasma levels** of lipophilic medications (as there is less fat for distribution). Rapid weight loss and low caloric intake can also reduce plasma protein (albumin) and vitamin levels, affecting drugs like warfarin (via vitamin K deficiency) and highly protein-bound drugs (increasing free fractions).
 - *Guidance:* Titrate doses based on clinical response and levels for narrow-index drugs; anticipate that weight-based dosing may need recalculation as the patient’s weight changes.
- **General Formulation Preferences:**
 - Avoid effervescent formulations (they release CO₂ that can distend the gastric pouch and are high in sodium).
 - Avoid medications high in simple sugars (e.g., syrups) to prevent dumping syndrome. – use sugar-free liquids if available.
 - Large pills (>10 mm) risk getting stuck; if necessary, split or find alternative forms. If a required medication has no immediate-release alternative, consult a pharmacist for strategies (e.g., switching classes, therapeutic drug monitoring, or using patches/injectables).
- **Drugs to Avoid:** Lifelong avoidance of certain medications is recommended:
 - **NSAIDs** and **oral bisphosphonates** are ulcerogenic and can cause serious harm to the gastric pouch or anastomosis. If absolutely needed, use gastroprotection (e.g., PPI) or parenteral routes (IV bisphosphonate infusion).

- Avoid drugs that **increase appetite or cause weight gain** (e.g., certain antipsychotics, mirtazapine, systemic steroids if possible) as they counteract the goals of surgery.
- Avoid **oral contraceptives** for pregnancy prevention (discussed below) due to reduced efficacy; use alternative contraception methods.
- **Close Monitoring:** Rather than preemptively stopping all medications, monitor patients for signs of **decreased efficacy or toxicity** and adjust as needed. Medications with a **narrow therapeutic index** (e.g., lithium, digoxin, anticonvulsants) should have levels or clinical effects monitored frequently for any signs of under- or overdosing. **Annual reviews** should reassess chronic medications (for conditions like diabetes, hypertension, hypothyroidism) since requirements may decrease with weight loss.

In summary, profound physiological changes after MBS necessitate proactive medication management. Below we detail perioperative considerations and specific recommendations for major drug classes, with tables summarizing formulation advice, dose adjustments, and monitoring.

Perioperative Medication Management Considerations

Pre-Surgery Optimization:

In the weeks leading up to MBS, review medications and adjust to reduce surgical risk. Discontinue **estrogen-containing contraceptives** at least one month pre-op to lower thromboembolism risk. Taper off or switch **NSAIDs** to acetaminophen or other safer analgesics to reduce bleeding and ulcer risk (surgeons often require no NSAIDs 1–2 weeks pre-op). If the patient is on **weight-loss medications** (GLP-1 agonists, phentermine, etc.), coordinate with the bariatric team; GLP-1 RAs are often stopped shortly before surgery to minimize nausea/vomiting, though this is case-dependent. Phentermine interacts with anesthesia so it is advised to taper it down a month before surgery to be off two weeks before surgery.

Diabetes Medications:

On the day of surgery, **hold oral hypoglycemics** (especially sulfonylureas, SGLT-2 inhibitors) to prevent hypoglycemia or dehydration/ketoacidosis during NPO status [Tham & Lee \(2023\)](#). Insulin secretagogues (e.g. glipizide) and SGLT-2 inhibitors (e.g. empagliflozin) are generally stopped just before surgery [Tham & Lee \(2023\)](#). If the patient uses insulin, give a reduced basal dose the night before and hold prandial insulin while NPO; use IV insulin infusion or sliding-scale short-acting insulin in the perioperative period to maintain glucose <180 mg/dL ([guidelinecentral.com](#)). Tight glycemic control is less critical than avoiding hypoglycemia – aim for moderate control (e.g., 140–180 mg/dL). Resume a conservative insulin regimen post-op only if needed (see long-term section).

Antihypertensives:

The morning of surgery, many centers hold diuretics and ACE inhibitors to avoid intraoperative hypotension or electrolyte disturbances, while continuing beta-blockers to prevent rebound tachycardia (this is similar to other surgeries). **Diuretics** (e.g. HCTZ) should be used cautiously post-op – **delay restarting until oral intake is adequate to avoid dehydration** ([guidelinecentral.com](#)). ACEis/ARBs can usually be resumed early if blood pressure allows ([guidelinecentral.com](#)). Frequent BP monitoring is needed, as patients often have rapid reductions in blood pressure after surgery.

Anticoagulation:

Preoperatively, discontinue **warfarin** ~5 days prior and **DOACs** ~2–4 days prior (depending on agent and renal function) in consultation with hospital guideline. Provide bridging anticoagulation if indicated (e.g., enoxaparin) up until surgery. Postoperatively, all patients should receive VTE prophylaxis. Typically, this means **mechanical prophylaxis** (compression devices) **plus pharmacologic prophylaxis** (usually low molecular weight heparin) starting soon after surgery, unless bleeding risk is high ([guidelinecentral.com](#)). In high VTE-risk patients, **extended prophylaxis** for 2–6 weeks with LMWH may be given after discharge ([guidelinecentral.com](#)). Therapeutic anticoagulation (for patients with AFib, DVT/PE, mechanical valves, etc.) is usually managed with **heparin or LMWH injections in the immediate post-op period**, switching to oral

agents once the patient can tolerate oral intake and absorption is assured. Avoid resuming oral anticoagulants until the patient is able to maintain nutrition/hydration to ensure consistent absorption.

Other Medications:

Continue critical medications via IV or alternate routes if oral is not possible (e.g., **thyroid hormone** IV if the patient is NPO for a prolonged time > 5days – though most can tolerate oral meds within 24–48h post-op).

- **Immunosuppressants** for transplant patients should be managed in conjunction with specialists – absorption of drugs like tacrolimus or cyclosporine may decrease, so plan on close level monitoring and possibly temporary IV formulations.
- **Psychiatric meds:** most antidepressants and antipsychotics can be continued through surgery, but watch for sedation with anesthetics.
- **Lithium** may need dose adjustment if perioperative fluids are erratic – ensure good hydration and monitor levels.
- **Chronic opioids:** anticipate higher pain management needs (tolerance) but also risk of respiratory depression; patient-controlled analgesia (PCA) can help titrate IV opioids post-op.

Immediate Post-Op Period:

For the first few days, the patient is on a clear/full liquid diet, so use **liquid, crushable, or parenteral** medication formulations.

- **Proton-pump inhibitor (PPI) prophylaxis** is started immediately to promote ulcer healing at the gastro-jejunal anastomosis – typically a **PPI for at least 3 months** is recommended (guidelinecentral.com). Use IV or liquid PPI in hospital if needed, then oral capsule (opened and sprinkled) on discharge.
- **Pain management** should use multimodal strategies: IV acetaminophen, short-acting opioids, and possibly a short course of IV ketorolac (if no contraindications) to reduce opioid use (guidelinecentral.com). Avoid NSAIDs beyond the immediate post-op period due to ulcer risk.
- **Antiemetics** (ondansetron ODT or IV, promethazine PR or IM) are used liberally to control nausea/vomiting, which can stress the surgical sutures.
- Ensure **nutritional supplements** (chewable or liquid multivitamins, calcium, vitamin D, etc.) are started as per protocol once the patient tolerates oral intake, since MBS patients require lifelong supplementation.

Patient Education:

Upon discharge, instruct patients on their new medication regimen: emphasize avoiding NSAIDs, how to take crushed or liquid meds for a few weeks, and the importance of **daily vitamins**. Advise separating **iron or calcium supplements** from thyroid or certain other meds to avoid interaction.

Reinforce using non-pill contraception and avoiding pregnancy for 12–18 months. Schedule an early follow-up (1–2 weeks) to check incision, review toleration of medications, and adjust doses of diabetes or blood pressure meds as needed.

The sections below provide **class-specific recommendations** for chronic medication management after MBS, in both the **early post-op phase and long-term**:

- [Antidiabetics](#)
- [Antihypertensives](#)
- [Anticoagulants and Antiplatelets](#)
- [Psychotropics](#)
- [Stimulants for ADHD](#)
- [Hormonal Therapies](#)

Antidiabetics After MBS

MBS has profound metabolic effects, often inducing remission of type 2 diabetes. Many patients rapidly reduce or even discontinue diabetes medications within days to weeks post-op. **Mechanisms** include enhanced GLP-1 secretion, caloric restriction, and weight loss improving insulin sensitivity. Key management principles for antidiabetic drugs post-MBS:

- **Insulin & Secretagogues:** Immediately after MBS, insulin requirements drop precipitously. **Sulfonylureas (e.g. glimepiride)** and **mealtime insulins** are generally **avoided** in the immediate post-op period due to high hypoglycemia risk with drastically reduced caloric intake [Tham & Lee \(2023\)](#). A common approach is to stop all insulin secretagogues at surgery and use a sliding-scale rapid insulin only if needed for BG control [Tham & Lee \(2023\)](#). If persistent hyperglycemia occurs (> 200 mg/dL), a low dose of basal insulin can be reintroduced (e.g. 10–20% of pre-op dose) with careful monitoring [Tham & Lee \(2023\)](#). On the other hand, **prandial insulin** is usually unnecessary while intake is minimal. As oral intake advances, continue to reassess insulin needs – many patients can come off insulin entirely, especially if they achieve remission.
- **Metformin:** Metformin is often continued (or restarted) after surgery if the patient has residual hyperglycemia, as it does not cause hypoglycemia and has weight-neutral/weight-loss effects. Interestingly, metformin absorption may **increase** post-MBS (possibly due to altered transit or gut transporters), with one study showing ~50% higher bioavailability [Tham & Lee \(2023\)](#). Thus, consider using a **lower dose** initially (if the patient was on high-dose metformin, e.g., 2 g/day pre-op, you might restart at 500–1000 mg/day and titrate up). Extended-release metformin should be **avoided**; use immediate-release tablets split twice daily for better absorption and tolerance. If patients achieve remission (A1c <6.5% off meds), metformin can be tapered off. Metformin may cause metabolic acidosis though it is rare but it may be exacerbated with dehydration post malabsorptive bariatric surgeries due to nausea/vomiting therefore, we may need to wait few weeks to establish good hydration then we may restart metformin if needed. There are no studies to evaluate benefits of resuming metformin post malabsorptive bariatric surgeries in terms of macrovascular protection of metformin vs weight loss itself.
- **GLP-1 Receptor Agonists:** GLP-1 RAs (e.g., liraglutide, semaglutide) are injectable and not affected by absorption issues. However, early after MBS they are often **withheld** because MBS itself raises GLP-1 levels substantially and the additive effect can cause excess nausea or hypoglycemia. In patients who *do not* achieve diabetes remission or who experience weight regain, GLP-1 RAs can be introduced in the late post-op phase to improve glycemia and augment weight loss. Clinical trials have shown **liraglutide** remains effective for glycemic control and additional weight loss in post-MBS patients with recurrent diabetes [Tham & Lee \(2023\)](#). Use GLP-1 RAs as needed for long-term metabolic control, but monitor for gastrointestinal side effects which might overlap with post-bypass GI symptoms.
- **DPP-4 Inhibitors:** DPP-4 inhibitors (e.g., sitagliptin) are oral agents that can be continued or restarted post-op if mild hyperglycemia persists. They have low hypoglycemia risk and are weight-neutral. Some protocols preferentially continue **metformin and DPP-4i** immediately post-op (while stopping other agents) [Tham & Lee \(2023\)](#). Absorption of DPP-4 inhibitors is usually not significantly impaired by MBS; no formulation change is needed. Use DPP-4 inhibitors as adjuncts if A1c remains above target and other agents are not suitable.

- **SGLT2 Inhibitors:** SGLT2 inhibitors (e.g. dapagliflozin) should be **held in the perioperative period** due to dehydration and euglycemic DKA risk [Tham & Lee \(2023\)](#). Once the patient is a few weeks out and reliably hydrated, an SGLT2i could be resumed if there's persistent diabetes, especially if there's comorbid heart failure or CKD benefit to be gained [Tham & Lee \(2023\)](#). However, many post-bypass patients will not need SGLT2i therapy if glycemic targets are met with metformin ± other agents. If used, ensure the patient maintains good fluid intake and monitor for urinary infections or ketones (FDA, 2015)
- **Thiazolidinediones:** TZDs (e.g., pioglitazone) are rarely needed post-surgery (they promote weight gain and have delayed onset). Most centers discontinue TZDs around surgery due to fluid retention and weight considerations. It's preferable to avoid restarting TZDs unless absolutely required; use other classes first for persistent diabetes.
- **Monitoring: Hypoglycemia** can occur late (reactive hypoglycemia or hyperinsulinemia hypoglycemia is a known complication post-MBS), especially if patient is on insulin or sulfonylureas. If problematic, preferentially use agents like metformin or DPP-4i which don't cause hypoglycemia. Ensure patients have home glucose monitors if they remain on insulin or sulfonylureas. In the long term, some patients develop recurrent type 2 diabetes years after surgery (especially if weight is regained), so maintain appropriate **diabetes screenings** (HbA1c yearly if initially in remission) and resume medications as needed.

The table below summarizes recommendations for common **antidiabetics** post-MBS:

Medication	Can be used post-MBS	Formulation Advice	Dose Adjustment	Clinical Notes & Monitoring
Metformin (biguanide)	Yes, after few weeks if hydration is adequate	Prefer immediate-release tablets; crush if needed in early phase. Avoid XR (risk of incomplete absorption).	Due to ~50% ↑bioavailability post-MBS, consider lower starting dose <u>Tham & Lee (2023)</u> (e.g. restart at 500 mg BID even if higher pre-op). start with 50% of pre-surgery dose.	Watch for GI side effects (which may overlap with post-op GI changes). Vitamin B12 levels periodically (metformin + MBS both risk B12 deficiency). Watch for metabolic acidosis.
Sulfonylureas (e.g., glipizide)	Yes, but not preferred. Do not use XL formulation	Avoid use initially post-op (high hypo risk with low intake) <u>Tham & Lee (2023)</u> . If needed later, use immediate-release (no XR) and take with meals.	If reintroduced, start very low dose (e.g., glipizide 2.5 mg) and titrate carefully. Often can be discontinued if diabetes remits.	Monitor for hypoglycemia (especially neuroglycopenic symptoms). Emphasize regular small meals if on sulfonylureas. Consider switching to non-secretagogue if possible.
Insulin – Basal (e.g., glargine)	Yes, if needed	Use as injectable (no absorption issue). Consider temporary use of NPH (intermediate) for more adjustable dosing.	Reduce dose drastically post-op. If pre-op dose was, e.g., 80 units, might start ~20% of that if needed <u>Tham & Lee (2023)</u> . Taper based on fasting BG. Many patients can discontinue insulin entirely within days to weeks.	In-hospital, use sliding scale for coverage. Monitor fasting and pre-meal glucose at home if on insulin. Avoid hypoglycemia – hold insulin if patient not eating well (e.g., vomiting).
Insulin – Prandial (e.g., lispro)	Reintroduce only if significant carb intake resumes and BG levels dictate.	Hold while on liquids and minimal intake <u>Tham & Lee (2023)</u> . Reintroduce only if significant carb intake resumes and BG levels dictate.	If needed, use conservative correction doses (e.g., 1 unit for each 30–50 mg/dL > target). Patients often do not require prandial insulin after MBS due to low carb intake and improved insulin sensitivity.	Close BG monitoring when re-feeding. Educate on signs of hypoglycemia. Prandial insulin may be re-added in long term if diabetes relapses with normal eating habits.
GLP-1 RA (e.g., liraglutide)	Hold post-surgery to avoid exacerbation of N/V	Injection (SC) – unaffected by malabsorption. Hold in immediate post-	No direct dose change needed (use standard doses if initiated). If patient was on pre-op for weight loss,	Monitor for GI side effects (nausea, vomiting) which can exacerbate dehydration. Consider using for suboptimal weight loss or diabetes

Medication	Can be used post-MBS	Formulation Advice	Dose Adjustment	Clinical Notes & Monitoring
		op period to avoid additive nausea. If needed long-term, no formulation issues.	typically pause around surgery and reassess need 1-2 months post-op.	relapse post-op <u>Tham & Lee (2023)</u> . Benefits in post-MBS similar to nonsurgical patients.
DPP-4 Inhibitor (e.g., sitagliptin)	Can be continued. No XR formulation issues	Oral tablet – small size, OK to swallow even early (can crush if needed). No XR formulation issues.	No specific dose changes; use standard dosing. Often continued if patient was on it.	Minimal side effects. Monitor A1c. Weight-neutral (preferred if avoiding weight gain). Can be continued long-term if tolerated and needed for glycemic control.
SGLT-2 Inhibitor (e.g., empagliflozin)	Not recommended in the first few weeks due to risk of dehydration and Euglycemic DKA	Oral tablet. No absorption issue per se, but ensure adequate hydration if used (to avoid AKI). Avoid in early phase due to DKA risk <u>Tham & Lee (2023)</u> .	Hold until at least a few weeks post-op. Restart at lower end of dose range and only if persistent diabetes and patient can maintain fluid intake.	Monitor for dehydration, signs of ketosis . Use with caution if patient has frequent vomiting or poor oral intake. May aid glycemic control and have CV/renal benefits, but often unnecessary if diabetes is in remission.
Thiazolidinediones (pioglitazone)	Not recommended	Oral tablet. Use is discouraged post-MBS due to potential weight gain and fluid retention.	If needed (unusual), use lowest dose. Generally, try alternative classes first.	Monitor weight and edema. Liver enzymes periodically. TZDs rarely indicated post-bypass; avoid unless compelling reason.

Antihypertensives After MBS

Weight loss and improved cardiac output after MBS can lead to dramatic improvements in blood pressure. Many patients require fewer or no antihypertensive medications in the months after surgery ajmc.com. Key points for managing blood pressure meds post-MBS:

- **Frequent Monitoring and Down-Titration:** During the active weight loss phase (first 6–12 months), blood pressure should be checked often (every few weeks initially). The **need for antihypertensives must be re-evaluated repeatedly** during this phase (guidelinecentral.com). It is common to reduce dosages or discontinue medications to avoid hypotension. Patients may experience dizziness or syncope if blood pressures drop too low – these symptoms should prompt medication review.
- **Diuretics:** Use caution with diuretics (thiazides, loop diuretics) early post-op. Fluid intake is restricted (goal ~1.5–2 L/day in small sips), so even a small diuretic dose can precipitate dehydration and electrolyte imbalances. It's advised to **delay restarting diuretics** until the patient is tolerating adequate oral fluids (guidelinecentral.com). If a patient was on a diuretic for hypertension, consider holding it in the first 1–2 weeks and monitoring BP. If needed for heart failure or edema, use the lowest effective dose and closely watch renal function and electrolytes. Encourage patients to aggressively hydrate if they must be on diuretics.
- **ACE Inhibitors / ARBs:** ACEIs (like lisinopril) and ARBs (like losartan) do not have absorption issues (they are immediate-release, small pills). They can generally be **continued or restarted early** after MBS, as long as the patient's blood pressure is in a safe range (guidelinecentral.com). These agents have renal protective effects which might be beneficial in diabetic patients post-op. However, be prepared to lower the dose if the patient develops low BP (e.g., if pre-op lisinopril was 40 mg, it might be reduced to 10–20 mg post-op). Studies show decreased activation of the renin-angiotensin–aldosterone system due to surgery. Monitor **serum creatinine and potassium** after reintroducing ACEIs/ARBs, as rapid changes in weight and diet (low sodium intake) can potentiate their effect.
- **Beta-Blockers:** Beta blockers (e.g., metoprolol, atenolol) can be **safely resumed** after surgery, especially if indicated for heart conditions (A-fib rate control, CAD, etc.). There's no absorption issue with immediate-release forms. If the patient was on an **extended-release beta-blocker** (e.g., metoprolol XL), **consider switching** to an immediate-release formulation (metoprolol tartrate) divided BID, as the shortened gut may reduce extended-release absorption. Beta-blockers should not be abruptly discontinued in the perioperative period due to risk of rebound tachycardia; ensure continuation or timely resumption. Monitor heart rate and blood pressure; as weight decreases, the dose may need reduction to avoid bradycardia or hypotension. **Bisoprolol is a better choice than carvedilol post-MBS** due to its high oral bioavailability, minimal first-pass metabolism, and lack of food effect. It's generally safe and effective to continue standard dosing with usual clinical monitoring.
- **Calcium Channel Blockers:** CCBs (e.g., amlodipine, nifedipine) are generally well-tolerated post-MBS. Amlodipine is long-acting but not an XR pill (intrinsic long half-life), so absorption is usually fine. No dose adjustment is needed specifically for absorption, but patients often require lower doses over time as their blood pressure improves. Extended-release *formulations* like nifedipine ER should be monitored and better to avoid especially the XL osmotic formulation due to reduce time of transition. If continued and blood pressure control is erratic, use immediate-release or switch agents.

- **Others:** Alpha-1 blockers (doxazosin) can be continued (monitor for orthostatic hypotension, which may worsen with dehydration). Centrally acting agents: **Clonidine** – if a patient is on a clonidine patch or oral clonidine, continue it to avoid rebound hypertension, but watch for low blood pressure. The transdermal clonidine patch absorption is unaffected by surgery; ensure the patch adheres well (skin changes from weight loss might affect placement). **Hydralazine** and **minoxidil** can be used if needed for BP, as normal. Essentially, none of these have specific absorption issues, but dosing should be dynamically adjusted to the patient's new physiology.

The table below summarizes recommendations for common **antihypertensives** post-MBS:

Medication	Formulation Advice	Dose Changes	Clinical Notes & Monitoring
Lisinopril (ACE inhibitor)	Small tablet, no absorption issue. OK to split for lower doses. Continue as needed post-op.	Often reduce dose post-op (e.g., if 20 mg pre-op, start 10 mg) since BP may drop. Titrate based on BP readings.	Monitor BP and renal function (Scr/K). Effective for renal protection in diabetic patients even post-op. Watch for dizziness or hypotension, especially if dehydrated.
Losartan (ARB)	No formulation issues. Continue if indicated	Lower dose may suffice (e.g., 50→25 mg) given improved BP. Titrate to response.	Monitor BP, renal function, K+. ARBs can be resumed early; low-sodium diet post-op may amplify effect, so adjust accordingly.
Metoprolol (beta-blocker)	If on ER (succinate) , switch to IR tartrate form BID for reliable absorption. Bisoprolol is a better choice than carvedilol post-MBS due to its high oral bioavailability, minimal first-pass metabolism, and lack of food effect. It's generally safe and effective to continue standard dosing with usual clinical monitoring.	Weight loss may reduce needed dose. If HR <60 or BP low, cut dose (e.g., from 100 mg to 50 mg/day). Avoid abrupt withdrawal.	Monitor HR and BP. Beta-blockers blunt tachycardia – use carefully if patient has orthostatic symptoms.
Amlodipine (CCBs)	No change needed (not an XR pill; inherent long action). Can swallow normally. Do not use XL formulation of CCBs	Titrate down as needed. Many patients on amlodipine can decrease from e.g., 10 mg to 5 mg or stop if BP normalizes.	Amlodipine is unaffected by bypass; effective for BP control if needed.
HCTZ (thiazide diuretic)	Continue only when patient is euvolemic and taking adequate fluids. Tablet is small; can split.	Hold initially; reintroduce at low dose (e.g., 12.5 mg) if BP remains high. May ultimately discontinue if BP normal off meds.	Ensure hydration – thiazides can cause dizziness in low-volume patients. Consider alternate antihypertensive if recurrent dehydration. Bariatric surgery can increase uric acid levels, especially in the short-term after surgery and HCTZ can increase uric acid too.
Furosemide (loop diuretic)	If needed for heart failure, use cautiously. Absorption may be somewhat reduced (needs gut	Resume only if clear volume overload. Start low (e.g., 20 mg) and titrate. Post-op reduced edema often lessens loop diuretic need.	Monitor daily weight, urine output, electrolytes. Risk of dehydration high – educate patients to drink fluids and call if lightheaded.

Medication	Formulation Advice	Dose Changes	Clinical Notes & Monitoring
	absorption), but IV route is available if urgent.		
Clonidine (central alpha-2)	If on patch pre-op, ensure it remains on during peri-op (to avoid rebound HTN). Clonidine absorption needs large area of intestine so the absorption may be affected post R&Y. Clonidine is not affected by first-pass metabolism. Effect on blood pressure may not be predicted. Continue same doses and follow up	No change in dose due to surgery, but may need reduction if other meds stopped and BP falls. Taper rather than abrupt stop if discontinuing.	Monitor BP closely; clonidine can cause sedation and orthostasis, which may worsen with post-op caloric restriction. Consider tapering off if possible once BP controlled with other agents. For patch, the skin may change due to weight loss so choose good area to maintain absorption
Hydralazine (vasodilator)	Hydralazine is absorbed at small intestine and undergoes extensive first pass metabolism which is reduced in R&Y. so the effect of PO hydralazine may not predictable.	May require lower doses as overall BP improves. Use PRN for elevated BP in early post-op if other meds held.	Monitor for reflex tachycardia

Anticoagulants and Antiplatelets After MBS

Managing anticoagulation in MBS patients is challenging due to altered drug absorption and the high stakes of thrombotic vs. bleeding risks. Key considerations:

- **Warfarin (Vitamin K Antagonist):** Warfarin is an oral anticoagulant whose absorption occurs in the proximal small intestine. After MBS, warfarin's absorption might be modestly reduced, but more importantly, **vitamin K absorption is reduced** (bypass of duodenum) and dietary vitamin K intake drops acutely after surgery. This often makes patients **temporarily more sensitive to warfarin**. In fact, studies indicate **warfarin dosing requirements decrease in the first 3–4 weeks post-bypass** (Strong et al., 2018). After that initial period (as diet normalizes somewhat), warfarin dose needs may increase again and return near pre-op levels (Strong et al., 2018).
 - **Management:** Warfarin is often the preferred oral anticoagulant in MBS patients because its effect can be *monitored* (INR) and dose adjusted precisely. Start at a lower dose post-op (if patient was on warfarin pre-op, consider restarting ~25–50% lower dose) and check INR frequently (e.g., twice weekly initially). Expect that very low doses may be needed early on (due to vitamin K deficiency from low intake). As the patient's oral intake expands (≥ 1 month), INR may drift down, requiring higher warfarin doses – so continue close INR monitoring and adjust. Usually, we do not combine vitamin K1 supplement with warfarin however it may not be avoidable (included in different bariatric multivitamins) therefore, monitoring warfarin and INR and vitamin K1 intake is recommended in patients on warfarin. Ensure the patient is on **consistent** vitamin K supplementation if prescribed by nutrition (most bariatric multivitamins have vitamin K to prevent severe deficiency). Monitor for any bleeding (melena, bruising) as the GI tract is still healing – any unusual bleeding should prompt an urgent evaluation.
- **Direct Oral Anticoagulants (DOACs):** DOACs (apixaban, rivaroxaban, dabigatran, edoxaban) have more variable absorption and limited data in MBS patients. The **International Society on Thrombosis and Hemostasis (ISTH)** in 2021 recommended **avoiding DOACs in the immediate post-bariatric period**, instead using parenteral anticoagulation followed by warfarin or a DOAC in the stable phase. If a DOAC is used, certain agents are preferred:
 - **Apixaban** is least affected by GI changes (absorbed throughout small intestine and colon, pH-independent) (acforum-excellence.org). Gastric bypass can still reduce its overall absorption, but apixaban is considered the *most reliably absorbed DOAC* post-MBS. If using apixaban, use standard dosing for the indication, but strongly consider checking drug levels (if available) or at least monitoring anti-Xa activity qualitatively. ISTH suggests measuring **peak and trough levels** for DOACs post-bypass, recognizing that therapeutic ranges aren't well-established but any undetectable level would be concerning. [Murtha et al., \(2022\)](#) discussed apixaban PK post bariatric surgery and although there were changes in apixaban PK and PD post-operatively, the authors concluded that the degree of these changes were unlikely to affect apixaban efficacy. However, given the risk of VTE post bariatric surgery, unless we have tight monitoring for apixaban level, it is advisable to use warfarin in the first few months post-surgery. It is worth noting that Factor X activity decreases in parallel with the amount of weight loss post-operatively.

- **Rivaroxaban** absorption is more problematic: it's primarily absorbed in the stomach/proximal gut and requires food for optimal absorption (acforum-excellence.org). Early post-op, patients have strict caloric restriction, which can significantly impair rivaroxaban absorption. Thus, rivaroxaban should be used with **extreme caution**, if at all, in MBS patients. After 6 to 8 months of surgery, rivaroxaban exhibits comparable AUC to those at pre-op levels ([Kroll et al, 2018](#)) therefore, it is possible to use rivaroxaban post 6 to 8 month of surgery and once the patient maintain good calories intake.
- **Dabigatran** (a prodrug) needs an acidic environment – it's formulated with tartaric acid to aid absorption, but bypass patients have higher pH and bypassed duodenum, which can reduce absorption (acforum-excellence.org). Generally, **dabigatran is not recommended** post-MBS as first-line. If used, one might expect reduced effect; do not use via feeding tube that bypasses stomach.
- **Edoxaban** is absorbed in the proximal small intestine, so absorption likely drops with MBS. Use caution or avoid. Evidence is scarce.

In practice, if a patient strongly prefers a DOAC over warfarin, **apixaban** is typically chosen. Wait at least a few months post-op before transitioning to a DOAC, since the early period is when absorption is most erratic. Use bridging (LMWH) in the interim or warfarin. Once on a DOAC, dose per standard guidelines but arrange a drug-specific assay at steady state, if possible, to confirm absorption. If drug level testing isn't available, weigh risks/benefits – some clinicians will still prefer warfarin in this scenario for safety.

- **LMWH and Heparin:** Low molecular weight heparins (e.g., enoxaparin) are safe and effective anticoagulants post-surgery because they bypass the GI tract (given subcutaneously). Use LMWH for VTE prophylaxis in all patients as noted. For therapeutic anticoagulation (e.g., treating a PE), LMWH is a good choice in the immediate post-op weeks. Some patients (e.g., with mechanical heart valves or very high-risk VTE) may remain on therapeutic enoxaparin until it's deemed safe to switch to oral. Dosing of LMWH in obesity is weight-based; as the weight drops, adjust the dose accordingly. Anti-Xa levels can be measured if on long-term LMWH to ensure dosing is in range. **Unfractionated heparin (UFH)** IV infusion is an alternative if very high bleeding risk (short half-life and reversible), but less convenient for discharge.

Antiplatelet Agents (Aspirin, Clopidogrel):

- **Aspirin (ASA)**, even at low dose, is an NSAID and poses a risk for marginal ulcers at the anastomosis. If a patient has a strong indication (e.g., coronary stents, prior MI, stroke), **continue aspirin** but take precautions: use **enteric-coated low-dose aspirin** and co-prescribe a **PPI for gastroprotection**. Note that enteric-coated aspirin still eventually releases in the GI tract; with higher pH and altered anatomy, it might actually start dissolving near the jejunal anastomosis, potentially causing local irritation. Therefore, many bariatric centers still consider even EC aspirin risky. **Monitoring:** Watch for any signs of GI bleeding (melena, occult blood). Consider periodic endoscopy if the patient has risk factors for ulcer or if any GI symptoms. Discuss risk/benefit: for primary prevention, aspirin might be dropped entirely due to ulcer concern; for secondary prevention, it's usually continued with protection.
- **Clopidogrel** and other P2Y12 inhibitors (e.g., ticagrelor) are not direct mucosal irritants like NSAIDs, so they may be safer for the gastric pouch. If dual antiplatelet therapy is needed (e.g., post-stent, ASA + clopidogrel), continue it, **but be aggressive with PPI use and avoid adding NSAIDs or steroids that heighten ulcer risk**. There is no strong evidence that MBS alters clopidogrel absorption significantly; it's a prodrug activated in the

liver, so as long as it's absorbed, it should work. Absorption of clopidogrel occurs in the intestine and should be adequate, but if there's concern (e.g., patient develops stent thrombosis), one might test platelet function or switch to an alternate agent. **Clopidogrel remains generally safe and effective post-MBS.** While absorption could theoretically be reduced due to bypassed gut segments, there is **no compelling clinical evidence of loss of efficacy** in most patients. Consider P2Y12 test to monitor efficacy given the fact that we co-administer it with high PPIs dose. **Ticagrelor** (Brilinta) is not a prodrug; direct-acting; better efficacy but **higher bleeding risk. It is** absorbed mainly in the small intestine; limited data post-MBS, but it should still be effective – use if indicated, with the same ulcer precautions ([Kingma et al., 2021](#))

- **Monitoring:** For warfarin, monitor **INR** closely (at least weekly initially). For DOACs, if feasible, check drug levels or at least coagulation surrogate tests (e.g., prothrombin time for rivaroxaban, anti-Xa for apixaban – though standard PT/INR is not reliable for DOAC monitoring). Monitor CBC for any drops in hemoglobin that could indicate occult bleeding. If on aspirin or dual antiplatelets, monitor for bleeding signs. Long-term, assess bone health if on long-term heparin (risk of osteoporosis). Also, warfarin patients should have periodic checks of liver enzymes and ensure they keep up with vitamin K-containing multivitamins to avoid excessive swings in INR.

The table below summarizes recommendations for **anticoagulants and antiplatelets** post-MBS:

Medication	Formulation Advice	Dose/Management Changes	Clinical Notes & Monitoring
Anticoagulants			
Warfarin (vitamin K antagonist)	Oral tablet (small, OK to cut). Preferred oral anticoagulant post-MBS for many patients especially in the first few months	Decrease initial dose post-op (sensitivity ↑ from low vit K). Titrate by INR: likely need ~30-50% dose reduction for first few weeks, then increase later as diet expands.	Monitor INR at least weekly initially. Expect low warfarin dose requirement first month (vit K malabsorption). Watch for bleeding. Ensure consistent intake of vit K via supplements to stabilize INR. Long-term, warfarin remains effective if managed carefully; preferred in patients > 120 kg or malabsorptive surgery per guidelines.
Apixaban (DOAC)	Oral tablet. Best DOAC option post-MBS due to pH-independent absorption across GI tract. Can be crushed if needed. Can be used after few months of surgery.	Avoid in immediate post-op period; No dose adjustment specific to MBS but consider lower threshold for dose reduction if borderline (e.g., for AFib stroke prevention in low-risk, might favor lower dose).	Measure anti-Xa levels (or apixaban-specific level) if available after starting to ensure absorption. If levels subtherapeutic or lab not available, strongly consider warfarin instead. Monitor for thromboembolic events and bleeding as usual. Apixaban does not require food intake for absorption (advantage in low appetite patients).
Rivaroxaban (DOAC)	Oral tablet. Requires food for proper absorption (doses ≥15 mg). Avoid splitting (uneven distribution in tablet).	Avoid use in early post-op until month 6 or 8 post surgery (patient can't eat enough to ensure absorption). If used later, ensure dose taken with a substantial meal; if patient's intake remains small, prefer alternate anticoagulant.	Caution: cases show ↓plasma levels post-MBS. If on rivaroxaban, monitor anti-Xa if possible, at peak. Any sign of therapeutic failure (clot occurrence) should prompt switch to warfarin. Monitor LFTs and renal function periodically.
Dabigatran (DOAC)	Avoid. Oral capsule (cannot crush or open – the pellets are in acid matrix). Needs acidic environment. Not ideal post-MBS.	Not recommended as first-line after MBS. Better to avoid dabigatran in bypass patients.	If used, check diluted thrombin time or ecarin clotting time for drug effect, if available. Monitor for GI side effects; risk of gastritis from capsule acid. Prefer other agents; switch to warfarin or LMWH if any doubt about effect.
Enoxaparin (LMWH)	Subcutaneous injection – bypasses GI entirely. Use for bridging and for patients who cannot absorb oral agents.	Dose by actual body weight (use ideal body weight if BMI >50 per some protocols, or anti-Xa guided dosing). Adjust dose as weight decreases to avoid over-anticoagulation.	Monitor anti-Xa levels for treatment dosing especially as weight changes. Ensure patient/caregiver can perform injections. Watch for injection site bruising. Good option for first month post-op for high-risk patients.

Medication	Formulation Advice	Dose/Management Changes	Clinical Notes & Monitoring
			Long-term use can cause osteoporosis (rarely); supplement calcium/vit D.
Antiplatelets			
Aspirin	Oral tablet. Use enteric-coated 81 mg to reduce local irritation, but note absorption may occur distal to stomach. Can consider chewable baby aspirin (improves absorption but loses EC protection).	Continue if secondary prevention indication (stents, etc.) – do not stop indefinitely without cardiology input. However, if primary prevention, consider stopping to eliminate ulcer risk. Always pair with PPI prophylaxis when aspirin is used.	Monitor for GI ulcer symptoms (epigastric pain, melena). If patient tolerates, continue long-term with gastroprotection. If intolerance or ulcer, consider switch to clopidogrel for comparable antiplatelet effect (if appropriate). Educate patient: avoid NSAIDs and high-dose aspirin products.
Clopidogrel	Oral tablet. Prodrug. No known absorption issues specific to MBS; absorbed in intestine, unaffected by modest pH changes. Can be used as alternative to aspirin or in dual therapy.	No dose change (75 mg daily standard). If dual therapy (with ASA), maintain both unless ulcer or bleeding occurs – then reassess with cardiologist if one can be held.	Less direct mucosal damage than ASA, but still monitor for bleeding. Clopidogrel's effect can be assessed with P2Y12 assay if concern. If on dual antiplatelets, strongly advise daily PPI. Ensure patient avoids NSAIDs.
Ticagrelor	Oral tablet, BID dosing. Absorption primarily mid-gut; likely adequate post-MBS. Does not require hepatic activation (unlike clopidogrel).	No dose adjustment. Use 90 mg BID (or 60 mg BID if >1 year post-MI) as usual. If combined with ASA, keep ASA ≤100 mg per ticagrelor guidelines (which also suits ulcer prevention).	Monitor for dyspnea (ticagrelor side effect) and bleeding. Provide PPI cover. Ticagrelor may be chosen over clopidogrel in ACS patients – no evidence MBS diminishes its efficacy, but data are limited. Watch for any signs of GI intolerance.

Psychotropics After MBS

- **SSRIs and SNRIs:** Studies have shown that MBS can lead to **reduced antidepressant levels in the early post-op period**. For example, the AUC (exposure) of SSRIs dropped to ~54% of pre-op levels one month after MBS in one study ([Hamad et al., 2013](#)) with some patients experiencing a transient worsening of depression until levels normalized by 6–12 months. This suggests that **antidepressant absorption is impaired initially**, likely due to reduced surface area and changes in metabolism.
 - **Monitor mental status closely** in the first 1–3 months. Ideally, arrange a psychiatric follow-up 1-month post-op to assess for recurrence of depressive or anxiety symptoms. Alert patients and families that mood changes could occur as drug levels fluctuate, and encourage adherence (don't assume the med isn't working and stop it—rather, dose adjustments may be needed).
 - **Sertraline:** there is evidence of decreased levels by ~50% post-MBS ([Hamad et al., 2013](#))([Lee et al., 2024](#)). One might consider increasing the dose by a small increment if signs of relapse appear, or splitting the dose (morning and evening) to improve absorption if using a high single dose.
 - **Fluoxetine** has a long half-life and is fairly lipophilic; it might be somewhat buffered against abrupt changes. Unclear, possible increase or decrease (~10%). Monitor clinical effects.
 - **Citalopram/Escitalopram:** studies show reduction in serum levels after post-surgery months and a year. Both are absorbed in the small intestine. Watch for any loss of efficacy, may require increase dose post-operative ([Maass et al. 2024](#))
 - **Paroxetine:** mixed data post-surgery. Unfavorable pharmacologic properties. Risk of discontinuation symptoms.
 - **Vortioxetine:** significant decrease post-surgery. Unfavorable pharmacologic properties. May need to increase dose post-surgery.
 - **Venlafaxine:** AUC of IR formulation may reduce few weeks post-surgery but it is maintained at 12 months post-surgery. The changes are not significant. For XR formulation, it was unaffected by changes in the gastrointestinal environment.
 - **Desvenlafaxine:** Mixed data. Need close clinical monitoring.
 - **Duloxetine:** Significant decrease in AUC post-surgery due to pH dependent delayed release formulation. Risk of discontinuation symptoms. Consider switch to different SNRI or double the dose and monitor for adverse events and efficacy ([Lee et al., 2024](#))
- **Bupropion:** Data shows decrease in plasma concentration between 17% to 46% when IR formulation used. So, dose needs to be increased post-surgery. For XL/SR formulation, studies show mixed data and it is recommended to switch to IR formulation with multiple daily doses.
- **Mirtazapine:** significant decrease in serum concentration post-surgery (41%). Increase the dose and watch for efficacy and adverse events.

- **Amitriptyline & clomipramine:** mixed data. Amitriptyline had moderately impaired dissolution in the post-MBS environment which decreases absorption. Recommend to monitor clinical efficacy. Increase dose gradually to evaluate clinical effect ([Wallerstedt et al. 2021](#)).
- **Trazodone:** Significant decreases in postoperative serum plasma. May increase the dose depending on clinical efficacy and adverse events ([Maass et al. 2024](#)).
- **Antipsychotics:** Many antipsychotics are lipophilic and have long half-lives. The main issues are formulation and metabolic side effects:
 - **Quetiapine IR & XR:** Quetiapine is absorbed in the duodenum and jejunum which explain the low absorption post-surgery. However, it may also help bypass the first pass hepatic metabolism. For XR formulation, it is unpredictable dissolution. Therefore, it is recommended to switch to **quetiapine IR** with 2 to 3 times frequency daily ([Wallerstedt et al. 2021](#)).
 - **Paliperidone:** Invega oral ER might not be fully absorbed. Advised to switch to different agent (risperidone) or switch to injection.
 - **Ziprasidone and lurasidone** must be taken with food typically – early post-op, patients eat very little, so absorption of ziprasidone/lurasidone might be reduced. If patients are on these, try to schedule doses around whatever meal they do have.
 - **Olanzapine:** dissolvable sublingual is a preferred if nausea/vomiting though case reports show no changes in serum level with oral formulation
- **Mood Stabilizers and Antiseizure Medications**
 - **Lithium:** Lithium is a small molecule, absorbed primarily in the small intestine. MBS can alter its pharmacokinetics; reduced fluid volume and potential dehydration can increase lithium reabsorption in the kidneys, raising levels. Also, any vomiting or diarrhea post-op can quickly cause lithium levels to spike (due to volume contraction). **Management:** Monitor **serum lithium levels** frequently post-op (e.g., 4-5 days after surgery, then weekly until stable). Educate the patient to stay well-hydrated. There's no specific evidence that MBS reduces lithium GI absorption, but the margin of safety is narrow, so vigilance for signs of toxicity (tremor, confusion, ataxia) is needed. **No formulation issues** (lithium ER can be used if needed, as it's a matrix that should still release, but if in doubt, use lithium IR and give TID).
 - **Valproate (Divalproex):** no significant changes in serum level post-surgery for IR formulation. Valproate is absorbed in the small intestine and bioavailability is around 80%. **Avoid extended-release divalproex** ([Waters et al. 2025](#)); instead use **immediate-release** divalproex (available as 125 mg sprinkle capsules that can be opened and mixed with food, or regular tablets if patient can swallow). Monitor **valproic acid levels** after surgery when on a stable dose – levels may drop due to absorption issues ([Brown et al. 2021](#)).
 - **Carbamazepine/Oxcarbazepine:** both are lipophilic and affected by malabsorptive surgery. Both need bile salts for absorption. **Avoid extended-release formulation** (Tegretol XR, Carbatrol). Switch to IR formulation and give 3–4 times daily. **Monitor levels** ([Brown et al. 2021](#)) ([Triplett et al. 2021](#))

- **Lamotrigine:** hydrophilic. Cases report mixed data. Extended-release formulation may be used with monitoring ([Wallerstedt et al. 2021](#)). It is recommended to monitor serum level ([Triplett et al. 2021](#))
- **Phenytoin:** decrease serum levels post-surgery due to reduction in drug absorption. Need close level monitoring. **Avoid extended-release formulation** ([Pournaras et al. 2011](#)), ([Triplett et al. 2021](#))
- **Levetiracetam:** Mixed data. Cases show decrease in serum level and increase in seizure activity which required increasing of the doses. Watch for drug accumulation especially after 6 months of surgery. Monitor level ([Triplett et al. 2021](#)).
- **Anxiolytics and Sedatives:**
 - **Benzodiazepines:** Most benzos (lorazepam, alprazolam) are well absorbed in the small intestine, though a faster transit may lead to slightly delayed or blunted peak. Continue usual dosing but caution that with weight loss, the volume of distribution is smaller, so some patients might feel stronger effects (fat can store some benzo, so less fat might mean higher active levels).
 - **Non-benzodiazepine sleep meds:** Zolpidem. No change, but watch for increased sensitivity due to smaller body mass.
 - **Buspirone:** no data. it is absorbed in the small bowel. Do not expect changes but if the patient was on a high dose once daily, better to split it BID to ensure steady levels.

The table below summarizes recommendations for **psychotropics** post-MBS:

Medication	Formulation Advice	Dose Changes	Clinical Notes & Monitoring
Sertraline (SSRI)	Use standard tablets; can be cut/crushed if needed. No XR form. Ensure daily dosing with fluid.	May need dose increase (e.g., +25-50%) if depression/anxiety worsens post-op, due to ~50% ↓bioavailability initially. Reassess at 1–3 months.	Monitor mood closely. If signs of relapse, check adherence and consider dose adjustment. Often levels/improvement return by 6–12 months as body adapts
Fluoxetine (SSRI)	Lipophilic. Buffered against abrupt changes	Not necessary	Possible increase or decrease absorption. Watch for symptoms
Citalopram/Escitalopram (SSRI)	Absorption is at small intestine	May need to increase dose post-surgery up to a year.	
Paroxetine (SSRI)	Unfavorable pharmacological properties post R&Y	Mixed data. Advice to switch to different SSRI or evaluate the need to increase/decrease dose	Risk of discontinuation symptoms due to low absorption
Vortioxetine (SSRI)	Unfavorable pharmacological properties	May need to increase dose post-surgery due to significant decrease in level.	Risk of discontinuation symptoms due to low absorption
Venlafaxine (SNRI)	Both formulation (IR and XR) may be used. The changes are not significant. For XR formulation, it was unaffected by changes in the gastrointestinal environment.	AUC of IR formulation may reduce few weeks post-surgery but it is maintained at 12 months post-surgery so may need to increase the dose post-surgery. For XR formulation, it was unaffected by changes in the gastrointestinal environment.	Monitor for withdrawal symptoms or emergent depression if absorption issues (venlafaxine has short half-life). The XR formulation has enteric coated mini pellets that does not dissolved in the stomach and start to dissolve in the small intestine. So, it is a pH-dependent release formula.
Desvenlafaxine (SNRI)	Mixed data	Keep same dose and monitor for symptoms	Close monitoring for symptoms of depression or adverse events
Duloxetine (SNRI)	Significant decrease in AUC post-surgery due to pH dependent delayed release formulation.	Consider switch to different SNRI or increase dose by 50% to 100% depending on improvement	Risk of discontinuation symptoms due to low absorption
Bupropion (NDRI)	XL formulation is different than SR formulation. XL formulation depends on matrix diffusion-controlled system	May need to increase dose after surgery by 25% to 50%. Use IR in multiple daily dose (TID) or SR twice daily.	Monitor for effectiveness (energy, mood) and side effects (anxiety, insomnia). Be mindful of seizure risk – maintain consistent dosing

Medication	Formulation Advice	Dose Changes	Clinical Notes & Monitoring
	while SR depends on hydrophilic system. IR and SR forms can be used. XL form should be avoided due to unpredictable contact time for tablet to release the drug.		schedule, avoid abrupt high peaks (no crushing).
Mirtazapine	Significant decrease in absorption (~40%)	May need to increase dose post-surgery	
Amitriptyline/Clomipramine	Mixed data. Amitriptyline had moderately impaired dissolution in the post-MBS environment which decreases absorption	Increase dose gradually to evaluate clinical effect	Monitor clinical efficacy
Trazodone	Significant decreases in postoperative serum plasma.	May increase the dose depending on clinical efficacy and adverse events	
Quetiapine (antipsychotic)	Quetiapine is absorbed in the duodenum and jejunum which explain the low absorption post-surgery. Avoid quetiapine XR. Use immediate-release tablets given 2–3 times daily or switch to alternative agent if appropriate.	IR quetiapine often requires split dosing (e.g., 100 mg TID instead of 300 mg XR QHS). Adjust based on symptom control and sedation. Overall dose might remain similar, but monitor efficacy.	Monitor psychiatric symptoms (sleep, mood, hallucinations). Quetiapine causes some sedation and hypotension so advise patient for risk of orthostatic hypotension especially with dehydration–caution post-op when patients are vulnerable (especially at night when getting up, risk of falls). Also has moderate weight gain risk
Paliperidone (antipsychotic)	Invega ER oral may not fully absorbed.	Advise to switch to injection formulation	If injection is not feasible, switch to risperidone (more stable absorption)
Risperidone (antipsychotic)	Oral form is fine (no XR). ODT available.	No major absorption issues post-op	Watch orthostatic BP (risperidone can cause).
Ziprasidone/Lurasidone (antipsychotics)	Absorption depends on meals. If patient is not eating well post-surgery, then we expect low absorption		Advise patient to take doses with meals
Olanzapine (antipsychotic)	No change with oral formulation	If any loss of efficacy, may switch to dissolvable sublingual formulation	

Medication	Formulation Advice	Dose Changes	Clinical Notes & Monitoring
Lithium (mood stabilizer)	Tablet or capsule (IR or ER). Can use same form as before, but monitor levels closely . Ensure hydration.	No fixed dose change; however, anticipate that with reduced GFR from dehydration, lithium levels can rise. You may empirically reduce dose ~25% post-op and re-titrate to level.	Check serum lithium 5-7 days post-op and then weekly until stable in mid-therapeutic range. Monitor for toxicity signs (tremor, confusion) – can occur if patient becomes dehydrated from vomiting or poor intake. Educate patient to drink >1.5 L/day and get labs regularly. Avoid NSAIDs, and caution with ACEi/diuretics which can raise lithium.
Valproate (mood stabilizer)	Use IR forms (e.g., divalproex sodium sprinkles or regular tablets) instead of ER. Can also use liquid valproic acid. Give in 2–3 divided doses/day. Avoid ER formulation	After switching to IR, check valproate level after ~4–5 days. Levels may be lower; might need to increase total daily dose by 10-20% to get same level that ER provided. Adjust slowly to avoid toxicity.	Monitor for mood stability or seizure control. Check valproic acid trough levels and LFTs. Ensure patient supplements with multivitamins (folate) as needed.
Carbamazepine/Oxcarbazepine	Avoid CR (controlled-release Tegretol); Use immediate-release split TID-QID	Expect possible lower levels post-MBS due to absorption changes. Titrate dose based on levels and clinical effect. If patient was on 600 mg XR daily, you might use 200 mg IR TID and then adjust.	Monitor carbamazepine levels 1–2 weeks after surgery and after any dose change. Watch for breakthrough seizures or mood swings. Carbamazepine auto-induces metabolism, so separating the effect of surgery vs autoinduction can be tricky – just follow levels and symptoms. Also monitor sodium (risk of hyponatremia). Consider consulting neurology/psychiatry for alternative mood stabilizers if absorption is too erratic.
Lamotrigine	Hydrophilic. Cases report mixed data. Extended-release formulation may be used with monitoring	No changes	Recommended to monitor serum level. It may take 5 to 7 business days to receive level results.
Phenytoin	Avoid extended-release formulation	Decrease serum levels post-surgery due to reduction in drug absorption	Need close level monitoring.

Medication	Formulation Advice	Dose Changes	Clinical Notes & Monitoring
Levetiracetam	Mixed data	Cases show decrease in serum level and increase in seizure activity which required increasing of the doses post-surgery	Watch for drug accumulation especially after 6 months of surgery. Monitor level
Benzodiazepines (e.g., lorazepam)	No changes	No specific dose change from surgery; however, with weight loss, some patients need less doses for same effect. Use lowest effective dose.	
Zolpidem	No changes		Watch for increased sensitivity due to smaller body mass
Buspirone	No data. It is absorbed in the small bowel. Do not expect changes	If the patient was on a high dose once daily, better to split it BID to ensure steady levels	
Gabapentin	Capsules can be opened and mixed with water for easier ingestion. Needs multiple daily dosing.	Possibly decrease absorption post-MBS (due to saturable L-amino transporters) May need to increase dose or frequency (from TID to QID).	Monitor for efficacy (neuropathic pain relief). If inadequate, consider pregabalin which has more linear absorption.
Pregabalin	Capsule – take as usual. Better bioavailability than gabapentin	No change in dosing schedule. If switching from gabapentin due to poor absorption, start low.	
Phenobarbital	Tablets or elixir. Long half-life so timing less critical. Likely absorbs okay	Possibly slight dose reduction may be needed if sedation increases with weight loss.	Monitor sedation, cognitive function. Ensure vitamin D and calcium supplementation.

Stimulants for ADHD After MBS

Absorption of immediate-release stimulants (methylphenidate, amphetamine) is typically okay, but extended-release capsules might not fully absorb. Some ER formulations (like Adderall XR, which has beads) might still work, but others that rely on long GI transit may not. If a patient notices loss of effect, consider switching to immediate-release dosed more frequently or newer formulations designed for shorter GI tracts. Monitor for weight changes – stimulants suppress appetite, which might be either helpful or harmful post-bypass (some patients need appetite suppression to stick to diet; others might not get enough protein if too anorectic). (Krabseth et al., 2024), (Ludvigsson & Haenni, 2016), (Azran et al., 2017), (Steffen et al., 2020)

The table below summarizes recommendations for **stimulants** post-MBS:

Drug (Brand Name)	Formulation Advice	Dose Changes	Clinical Notes & Monitoring
Methylphenidate (Ritalin IR, SR, LA)	IR is the best for absorption. SR and LA may be variably affected by surgery but can be used. LA uses SODAS beads (Spheroidal Oral Drug Absorption System) somewhat preserved in MBS patients	Minimal	Short duration, may need multiple daily doses for IR.
Methylphenidate ER (Concerta)	Extended release with osmotic pump (OROS). Needs gastric fluids and pressure to activate OROS. Absorption is significantly affected due to reduce contact time. Not recommended	High; requires stomach fluid/pressure	Poor release and absorption post-MBS
Dexmethylphenidate IR (Focalin IR, XR)	XR is enteric coated delayed release beads and it dissolves in higher pH. It is programmed to release 50% of the dose immediately and 50% upon transition to higher pH.	No changes for IR. XR may be affected and less release of drug	Split capsules may help; consider IR instead or monitor for efficacy with XR. May switch to Vyvanse or Daytrana (patch)
Lisdexamphetamine (Vyvanse)	Prodrug, capsule, absorption may increase post-surgery	No changes unless adverse events due to increase absorption	Lisdexamphetamine is absorbed from the small intestine by active transport, likely via the peptide transporter 1 (PEPT1) which the expression of PEPT-1 is increased during undernutrition (post-surgery)
Mixed amphetamine salts IR (Adderall IR)	Immediate-release	Possible reduction in doses post-surgery	GI pH change (higher pH) may facilitate higher absorption and potential peak effect due to increase free drug absorption theoretically. No large scale studies. Caution is required and evaluate for adverse events.
Adderall XR	Extended-release capsule	Varies; beads with delayed absorption	Consider splitting capsule or using IR

Atomoxetine (Strattera)	Absorption may be affected and reduced	May need dose increase or monitoring	Proximal small intestine
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Hormonal Therapies After MBS

This category includes thyroid medications, sex hormones (estrogen/progestin therapies), and others like adrenal hormones. MBS can affect these mainly via absorption changes and altered enterohepatic circulation.

- **Thyroid Hormone (Levothyroxine):** Levothyroxine (T4) requires an acidic environment and is primarily absorbed in the duodenum and jejunum. After MBS, reduced stomach acid and bypassed duodenum can decrease T4 absorption. Additionally, weight loss will reduce the dose requirement in some hypothyroid patients (since dosage is weight-dependent to a degree), but malabsorption might counteract that.

Management: Monitor TSH levels ~6 weeks post-op and adjust the levothyroxine dose accordingly. Many patients need an increased dose of T4 to maintain euthyroidism post-bypass (cases of needing 20-30% dose increases have been reported, presumably due to malabsorption). On the other hand, if a patient was on a weight-based high dose pre-op (e.g., for obesity-related high-volume distribution), as they lose weight, they might be slightly over-replaced. So, it really requires monitoring. One approach is to **keep the same dose initially** and check TSH in 6 weeks – if TSH rises (hypothyroid trend), increase dose. Alternatively, some practitioners empirically increase the dose by ~25 mcg after MBS for known hypothyroid patients, anticipating malabsorption, then fine-tune after labs ([Barzin et al., 2024](#)), ([Juiz-Valina et al., 2021](#)), ([Trimboli et al., 2023](#))

Emphasize to patients: take levothyroxine separate from calcium, iron, and other supplements by at least 4 hours (this is even more important post-MBS because the margin for absorption is thinner)

- **Female Contraception (Birth Control):** *Oral contraceptive pills (OCPs)* are **not reliably absorbed after MBS**. This is a well-known caution: due to the malabsorptive component, blood levels of ethinyl estradiol and progestins can be lower, risking contraceptive failure. Additionally, bariatric patients are hyper-fertile as they lose weight (fertility often improves), and pregnancy is contraindicated in the first 12–18 months after surgery due to risks to mother and fetus ([Schlatter J. 2017](#)), ([Graham et al., 2014](#)) ([Eakin et al., 2017](#))

Guidance: Strongly recommend **non-oral contraceptive methods** for women of childbearing potential post-MBS. Ideal options include:

- **Intrauterine devices (IUDs):** Either copper IUD or levonorgestrel IUD (Mirena/Kyleena) are top choices, as they bypass GI absorption entirely and are highly effective.
- **Implants:** Etonogestrel implant (Nexplanon) provides 3 years of contraception; it's systemic but not oral, so absorption is not an issue. One caveat: efficacy in very high BMI is slightly less clear, but after MBS the BMI is dropping. Also, as noted, **loose skin or adipose** might make insertion technique important (ensure it's in subdermal fat, which should be fine in the arm).
- **Injectables:** Depot medroxyprogesterone (Depo-Provera) IM every 3 months is an option; it's effective and avoids GI absorption. However, Depo is associated with weight gain in some, which is counterproductive, and can cause bone loss (on top of any bariatric bone loss). Use with caution; if weight control is a concern, an IUD might be preferable.

- **Transdermal low estrogen patch (such as Xulane, Climara and Vivelle):** Not first-line after MBS – besides slight reduced effectiveness in women over 90 kg (as per general guidance), adhesive may be an issue if patient has excess skin or sweating. But it's an option if others are unsuitable, delivering estrogen/progestin through the skin.
- **Transdermal estrogen-combination patch (such as Ortho Evra):** Should be removed at least a month before surgery and not applied for few weeks post-surgery.
- **Vaginal ring (NuvaRing):** Bypasses GI; absorption is via vaginal mucosa. Could be a viable option for some women if they prefer it. Should be as effective as usual, though data specifically in MBS patients is limited.

Avoid oral birth control pills – even progestin-only “mini pills” are not reliable due to strict timing needs and absorption issues and by that it may not provide enough protection of pregnancy. Document counseling on this. If a patient insists on OCPs, they need to accept the higher failure risk and ideally double up with condoms or another method.

Also important: **Stop any ORAL estrogen therapy pre-op** (one cycle before) and do not resume until at least a month or two post-op to reduce VTE risk. The hypercoagulable state after bariatric surgery (from obesity and surgery itself) plus exogenous estrogen significantly increases clot risk. The general rule: no combined OCP until the patient is up and mobilizing well post-op (usually at least a few weeks, and ideally after prophylactic anticoagulant is finished). If needed, use other forms temporarily.

The table below summarizes recommendations for **hormonal therapies** post-MBS:

Medication	Formulation Advice	Dose Changes	Clinical Notes & Monitoring
Levothyroxine (T4)	Use oral tablet. Consider liquid T4 or soft-gel if malabsorption suspected. Separate from supplements by 4hours	Monitor TSH ~6 weeks post-op; adjust dose as needed. Often requires higher dose post-MBS due to decreased absorption. However, weight loss might reduce need – so dose changes are individualized.	Check TSH, FT4 every 6–8 weeks until stable. Aim for TSH in target range
Combined Oral Contraceptive (ethinyl estradiol + progestin)	Avoid oral route – malabsorption leads to failure risk. Do not rely on OCP for contraception post-MBS.	N/A – switch to non-oral method. If patient insists on using, must use backup contraception.	Educate that pregnancy must be avoided for 12–18 months post-op. Document counseling. If patient was on OCP for non-contraceptive benefits (cycle regulation, PCOS), use alternatives (IUD for endometrial protection, etc.).
Progestin-only pill (mini-pill)	Not recommended as sole method of contraception	You may need to add additional methods with it.	Suggest IUD or implant instead for those who can't take estrogen (e.g., history of clot). Mini-pill efficacy likely too low post-MBS.
Depot medroxyprogesterone (Depo shot)	Parenteral (IM) – unaffected by GI. Can use as temporary or long-term method.	No dose changes.	Ensure patient takes calcium + vitamin D (Depo can reduce bone density, and MBS already predisposes to bone loss).
Levonorgestrel IUD (e.g., Mirena)	Device. Highly recommended as first-line post-MBS.	N/A. Provides 5 years of localized hormone (minimal systemic absorption).	Follow up with gyn to check placement at 6 weeks.
Copper IUD	Device. No hormones, so no clot risk or weight effect.	N/A. 10-year duration.	Can cause heavier menses which means more loss of iron storage.
Transdermal estrogen patch (e.g., Xulane, Climara, and Vivelle)	Apply to intact skin (back, buttock, arm). May have adhesion issues if skin is loose – press firmly.	Efficacy might be reduced if patient still >90 kg, but as weight drops it improves.	Avoid in first 1–2 months post-op due to VTE risk. If used, ensure patient is mobile and perhaps use prophylactic anticoagulants
Transdermal estrogen-combination patch (such as Ortho Evra)	Should be removed a month at least before surgery and not applied for few weeks post-surgery.		Risk of VTE is similar to OCP. Do not use for the first few weeks after surgery and until patient can move adequately and hydration is good.

			If used after surgery, be sure to start pharmacological DVT prophylaxis for extended duration. No data about safety or efficacy.
Estradiol (for HRT)	Use transdermal (patch, gel) rather than oral.		
Testosterone (male HRT)	Use IM injections or transdermal gel . Avoid oral formulations.	Weight loss might improve endogenous testosterone a bit; some men can decrease dose	Monitor testosterone levels and hematocrit
Corticosteroids (chronic use)	Oral prednisone/prednisolone are absorbed in stomach & upper small bowel	No specific change	Monitor for usual steroid side effects. Use PPI prophylaxis if on chronic steroids, or at least H2 blocker at bedtime (unless contraindicated)
Desmopressin (DI)	Prefer intranasal or SL forms to bypass gut. Oral DDAVP has low bioavailability	Better to switch to intranasal.	

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