Medication After Gastrectomy

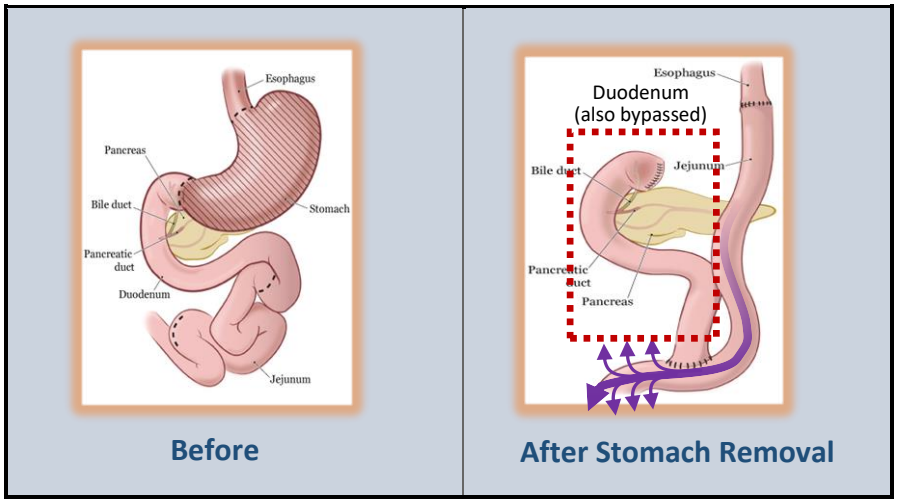


Image adapted from: https://www.mskcc.org/cancer-care/patient-education/about-your-gastrectomy-surgery

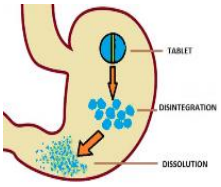
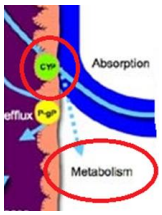
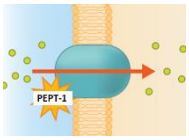
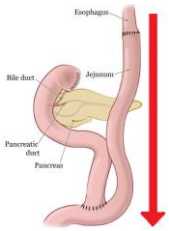
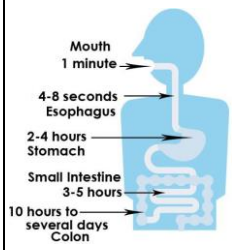
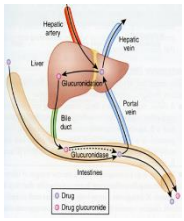
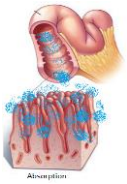
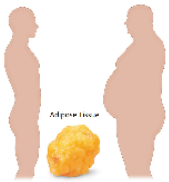
"Your tablet will be OK to take as it is not absorbed in the stomach anyway." = INCORRECT

"Your iron levels are low. Take some iron tablets." = INCORRECT

The following is not a substitute for independent professional medical advice regarding your health care. This handout is a tool to arm you with information, teach you to be vigilant with your medications and give you the confidence to discuss medication related issues with your primary health care provider.

Written Feb. 2020 by Kirsty Harris: Clinical Pharmacist, CDH1 Mutation Carrier & Total Gastrectomy Patient

TEN (10) Reasons for Altered Absorption:

Reason	Consequence	Reason	Consequence
 **1. Bypass Stomach**	• No gastric mixing to break down tablet/capsule. • Some medicines absorbed through the stomach. → Less medication entering blood stream e.g. aspirin.	 **6. Intestinal enzymes**	• Enzymes metabolise some medicines within the wall of the intestine. • Number of enzymes altered due to surgery. → More medication may cross into blood stream e.g. some cholesterol medication.
2. No stomach acid	• Strongest acid present in the stomach. • Significantly affects the amount of medication absorbed. → Can decrease or increase the amount of medication entering blood stream. E.g. iron, calcium & anti-inflammatory meds.	 **7. Intestinal transporters**	• Proteins which transport medications from intestine into blood stream. • Number of transporters altered due to surgery. → Less medication entering blood stream e.g. some antibiotics via PEPT-1 transporters.
 **3. Faster onset**	• Medications deposit immediately into small intestine. → Faster absorption e.g. alcohol, caffeine.	**8. Bile acid secretion**	• Delayed mixing of bile acids with medicines. • Changes solubility of some medicines. → Less medication entering blood stream e.g. some heart medication.
 **4. Faster transit**	• Medications bypass parts of the GI tract (stomach, duodenum, proximal small intestine). • Less time for absorption. → Less medication entering blood stream e.g. controlled/extended release medications.	 **9. Cycling of medicines**	• Some medicines cycle continuously between intestine and liver to maintain drug levels. → Less medication entering blood stream e.g. oral contraceptive pill and unintended pregnancies.
 **5. Decreased surface area**	• Less GI tract. • Less absorptive area. → Less medication entering blood stream e.g. potentially ALL medications.	 **10. Weight loss**	– Medications can readily distribute into fat cells. →Altered drug levels e.g. some antidepressants.

Sources: 1,6,9, 10, 12

What Can We Do?

- **Use alternatives to capsules/tablets:**

  - ✓ Sublingual, patch, injections, intranasal, etc.
  - ✓ Liquid dosage forms (caution: sugar content & dumping syndrome).
  - ✓ Chewable/dispersible tablets (caution: effervescent tablets & bloating/discomfort due to gas bubbles).
  - ✓ Powders, Granules.
  - ✓ Crush tablets or open capsules **when SAFE** to do so. Check with a pharmacist first!

- **Avoid:**

  - × Controlled release/time dependent medications e.g. XR/MR/CR capsules.
  - × The oral contraceptive pill. Use an implant or intrauterine device.
  - × Drugs harmful to the GI tract e.g. anti-inflammatory medication (ibuprofen), oral bisphosphonates (alendronate), aspirin, certain antibiotics (doxycycline).
  - × Drugs known to cause gallstones e.g. gemfibrozil.
  - × Medications requiring highly acidic environment for absorption e.g. carbamazepine, azole antifunfal agents, phenytoin, selegiline, etc.

- **Supplement:**

B12: No stomach to produce intrinsic factor for B12 absorption. Must supplement via sublingual or injectable B12.

IRON: Take **iron polymaltose** as it better absorbed without stomach acid. Liquid is preferred but beware staining of teeth. Monitor for constipation. Black stools common. If low iron (anaemia) – require iron INFUSION. Anemia common as:

- stomach acid is needed to convert ingested iron → usable iron.
- duodenum is primary site of absorption (now bypassed).
- decreased food intake.
- food intolerances e.g. meats.

CALCIUM & VITAMIN D: Calcium absorption mostly occurs in the duodenum and proximal small intestine (now bypassed). To prevent osteoporosis supplement with chewable **calcium citrate** & vitamin D. Monitor for constipation. Separate calcium and iron supplements by 4hours.

MULTIVITAMIN: Vitamin and mineral deficiencies exist due to decreased food intake, vomiting, food intolerances, decreased intestinal secretions and decreased surface area for absorption. A high potency, liquid or chewable multivitamin with minerals is recommended indefinitely.

Vitamin & Mineral Supplementation

Recommendations below to be discussed with your healthcare provider and adjusted according to blood test results.

Multivitamin (high-potency = 100% of daily recommended dose for at least two thirds of nutrients)	1-2 chewable tablets daily *Ensure contains folic acid, vitamin A, magnesium, zinc, copper.
Calcium (citrate)	1200mg-1500mg daily.
Vitamin D (liquid)	800-1000iu daily.
Iron Polymaltose	370mg (=100mg elemental iron) once-twice daily, as per blood tests.
Vitamin B12	1000microg sublingually daily or 1000microg injected every 1-3months, as per blood tests.
Optional: Vitamin B1 (thiamine)	50-100mg daily if persistent vomiting.
Sources: 4, 11.	

▶ Monitor:

- ❖ Bone density (baseline, at 2years post-op, then every 2-5years thereafter according to age & results). IV or SC treatments only if therapy needed.
- ❖ Bloods (every 3-6months during first year and then annual testing **lifelong** once bloods stable):

→ Chemistry Panel, Protein (albumin/pre-albumin), Complete Iron studies, Thiamine, B12, Calcium/PTH, Folate, Fat Soluble Vitamins (A,D, K), Zinc. Copper if persistent iron-deficient anaemia. Vit E & Selenium optional.

- ❖ Blood tests for high-risk medications, if available.

- ❖ Check desired clinical outcomes are achieved by your medicines and be alert for side effects. Discuss with your Primary Care Doctor.
- ❖ General health for signs of deficiencies/anaemia e.g. fatigue, hair loss, tingling, muscle pain/cramps, poor wound healing, altered mood, palpitations, etc.

▶ Medications known to be affected by surgery:

Observed Changes in Medication Absorption

After Similar Surgery (data obtained post RYGB)

Increased Absorption	Decreased Absorption		Variable Absorption	Theoretical Risk of Decreased Absorption
Ethanol Furosemide Linezolid Metformin Morphine Moxifloxacin Phenoxy-methylpenicillin	Amoxycillin Ampicillin Antituberculosis Medication Azithromycin Citalopram Cyclosporin Duloxetine Erythromycin Escitalopram Hydrochlorothiazide Imatinib Itraconazole Levothyroxine	Mycophenolic Acid Nitrofurantoin Oral Contraceptives Phenytoin Posaconazole Propranolol Ramipril Sertraline Sirolimus Tacrolimus Tamoxifen Venlafaxine Valproate	Atorvastatin Warfarin	Enalapril: hydrolysed in stomach to active form. Ketoconazole: pH dependent. Lamotrigine: absorbed primarily in stomach. Metoprolol: stomach & duodenum likely sites of absorption. Niacin/Vit B3: absorbed primarily in duodenum. Olanzapine: tablets & wafers absorbed in stomach. Quetiapine: stomach & duodenum likely sites of absorption. Simvastatin: hydrolysed in stomach to active form. Zolpidem: delayed effect may occur due to increase in absorption time. Other Medication requiring acidic environment or food for sufficient absorption e.g. carbamazepine, phenytoin & selegiline.

RYGB: Roux-en-Y Gastric Bypass. Sources: 1, 6, 9-12.

References

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