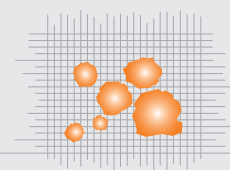


# Bariatric surgery—what happens to medicines absorption?

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## Types of bariatric surgery

The type of bariatric surgery is important for whether medicines will be absorbed. A gastric bypass is the most common type of bariatric surgery, involving a restrictive process (reducing the size of the stomach) and a malabsorptive process (bypassing the duodenum, jejunum and much of the small intestine). This is usually the Roux-en-Y Gastric Bypass, but may also be a jejunoileal bypass or biliopancreatic diversion. Gastric banding or sleeving is a restrictive procedure only, reducing the stomach size and having less impact of the absorption of medicines and nutrients.<sup>1</sup>

## Effects on medicines absorption

There are very few studies of medicine absorption after bariatric surgery, particularly of commonly used medicines. Most case reports or studies, involving only about 50 medicines, have been in people with a gastric bypass rather than gastric banding or sleeves. Many studies are only single-dose studies.

Absorption of medicines depends on the pH of the environment, site of absorption, drug solubility and surface area for absorption. Many medicines require an acidic environment to 'uncoat' the tablet and/or aid dissolution of the tablet and/or aid absorption. Restrictive bariatric surgery reduces gastric acidity and so potentially reduces the absorption of some medicines.<sup>2-4</sup>

Most medicines are absorbed from the small intestine, either through active transport systems or through passive absorption over the extensive

surface area of the small intestine. The area over which medicines may be absorbed, and specific transport systems may be bypassed through surgery.<sup>3,4</sup>

## Gastric bypass surgery (restrictive + malabsorptive surgery)

Absorption is reduced due to a dramatic reduction of surface area and avoidance of the active medicine-transport systems.

## Advice to prescribers

Use liquid or immediate release formulations whenever possible. Avoid enteric-coated or modified-release formulations (slow release, controlled release, extended release). Also avoid non-steroidal anti-inflammatory drugs (NSAIDs) and oral bisphosphonates due to direct gastric irritation.

## Effect of gastric bypass surgery on absorption of specific drugs

The following content provides summary information about absorption of specific drugs following gastric bypass surgery.<sup>4-6</sup>

Some evidence of reduced absorption:

- cyclosporine
- tacrolimus
- thyroxine
- phenytoin
- rifampicin
- amoxicillin
- iron.

## KEY POINTS

- A gastric bypass is a restrictive and malabsorptive bypass.
- Liquid or immediate-release medicines should be used if possible.
- Gastric banding or sleeves are restrictive-only bariatric surgeries, not bypassing the small intestines.
- There are few studies on the absorption of medicines.
- Close clinical monitoring for effectiveness of medicines is required.

J PRIM HEALTH CARE  
2013;5(4):339–340.

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**NUGGETS of KNOWLEDGE** provides succinct summaries of pharmaceutical evidence about treatment of common conditions presenting in primary care and possible adverse drug reactions.

Conflicting information/case studies:

- digoxin
- combined oral contraceptives
- ethambutol
- haloperidol
- acetaminophen.

No apparent effect on absorption:

- ranitidine
- isoniazid.

### **Banding or sleeving (restrictive surgery)**

Most medicines have limited absorption from the stomach and so medicines absorption after this type of surgery is less problematic, although those medicines that require an acidic environment may be less well absorbed (e.g. ketoconazole, digoxin, rifampicin).<sup>2</sup>

### **Nutrients with reduced absorption**

People with a gastric bypass require supplementation with calcium, iron, Vitamin B<sub>12</sub>, folic acid, Vitamin D and a multivitamin.<sup>3</sup> Prescribers should note that the funded multivitamin tablet has minimal vitamins other than thiamine (B<sub>1</sub>), riboflavin (B<sub>2</sub>), nicotinamide (B<sub>3</sub>), Vitamin A, Vitamin C and Vitamin D<sub>3</sub>.

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### **ACKNOWLEDGEMENTS**

The author would like to thank Professor Gil Hardy of The University of Auckland for reviewing this article prior to publication.