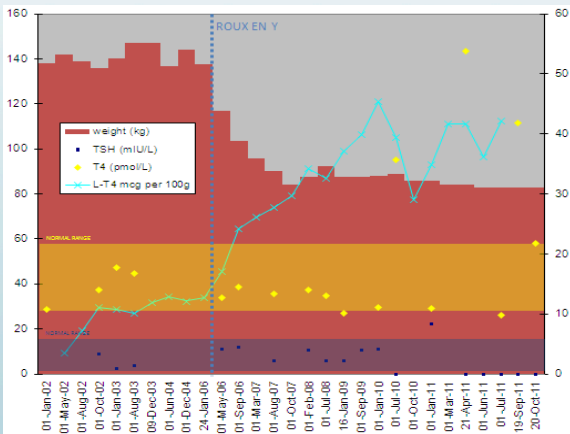


# Too low, too high. Is it the Roux-en-Y?

## Fluctuating thyroid function post obesity surgery

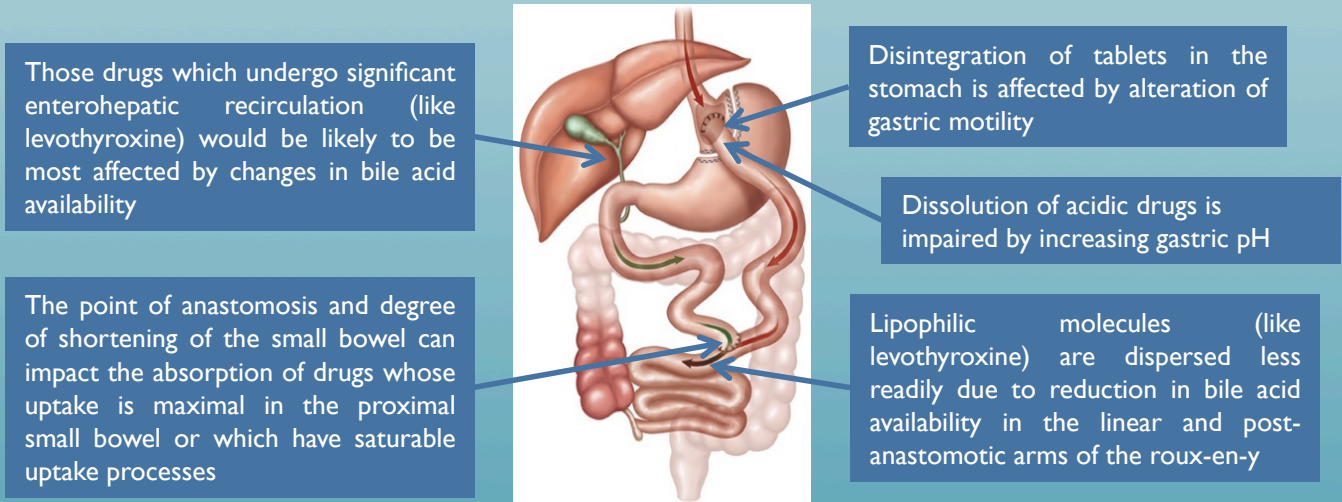
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Morbid obesity (body mass index  $>40\text{kg/m}^2$ ) is a growing global epidemic afflicting approximately 3% of the UK population. Hypothyroidism is a common hormone deficiency with a prevalence of approximately 2%. With obesity surgery remaining the only intervention with the ability to bestow long term, significant reduction in excess body weight, there are increasing numbers of patients undergoing such procedures while on thyroid hormone replacement.



Our patient is a young woman in her 30's with autoimmune hypothyroidism and coexistent super-morbid obesity with a peak BMI of  $54.9\text{kg/m}^2$ . Euthyroidism was maintained with a levothyroxine dose  $175\text{mcg}$  daily ( $1\text{mcg/kg/day}$ ). After failure of conservative measures, she underwent weight loss surgery (proximal roux-en-y gastric bypass). She subsequently achieved massive weight loss to reach a new stable BMI of  $32\text{kg/m}^2$ . Following surgery, levothyroxine requirements rapidly increased to fluctuate between  $250$  and  $400\text{mcg}$  ( $2.9$ - $4.5\text{mcg/kg/day}$ ) with no single dose achieving a stable TSH. She reported near-perfect adherence with appropriate separation of levothyroxine and other medications including new nutritional supplements. The presence of heterophile antibodies was assayed and excluded.

Previous studies looking specifically at the bioavailability of levothyroxine following gastric bypass are limited. Reduced bioavailability was known to be a problem in older and more severely malabsorptive distal gastric bypass procedures [1,2], but reports of patients undergoing modern, proximal procedures have been mixed with at least one series demonstrating no difference [3]. On the other hand, gastric bypass is known to clearly impair bioavailability of certain other pharmaceuticals [4] with many different mechanisms being implicated:



The population of post-bariatric surgery patients in the endocrine clinic is growing. Issues with previously stable drug regimens are likely to become a more frequent feature of our practice. Awareness of and vigilance for such problems are key to preventing drug administration errors. When problems arise the mechanisms outlined above should be considered. Switching to liquid preparations or crushing tablets may mitigate inadequate disintegration. Dose increases, particularly of lipophilic drugs, may be necessary following bypass surgery. Following severely malabsorptive procedures, alternative administration routes (e.g. nasal, topical or rectal where available for individual drugs) should be considered.

### References

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4. Padwal R, Brocks D, Sharma AM. A systematic review of drug absorption following bariatric surgery and its theoretical implications. *Obes Rev* 2010; **11**:41-50.