

Roux-en-Y gastric bypass

- clinical outcome and mechanisms of action

Akademisk avhandling

som för avläggande av medicine doktorsexamen vid
Sahlgrenska Akademin vid Göteborgs Universitet
kommer offentligen försvaras i Sahlgrenska aulan, Blå stråket 5,
Sahlgrenska Universitetssjukhuset/Sahlgrenska,
Göteborg, torsdagen den 13 juni 2013, kl 13.00
av

Malin Werling

Fakultetsopponent:

Professor Donal O'Shea

St. Vincent's University Hospital, Dublin, Irland

Avhandlingen baseras på följande arbeten:

- I. Long-term results of a randomized clinical trial comparing Roux-en-Y gastric bypass with vertical banded gastroplasty. Werling M, Fändriks L, Björklund P, Maleckas A, Brandberg J, Lönroth H, le Roux CW, Olbers T.
Br J Surg. 2013 Jan;100(2):222-30.
- II. Gut hormones as mediators of appetite and weight loss after Roux-en-Y gastric bypass. le Roux CW, Welbourn R, Werling M, Osborne A, Kokkinos A, Laurenus A, Lönroth H, Fändriks L, Ghatei MA, Bloom SR, Olbers T.
Ann Surg. 2007 Nov;246(5):780-5.
- III. Preoperative assessment of gut hormones does not predict weight loss after Roux-en-Y gastric bypass surgery. Werling M, Fändriks L, Vincent RP, le Roux CW, Olbers T
In manuscript
- IV. Increased postprandial energy expenditure may explain superior long term weight loss after Roux-en-Y Gastric Bypass compared to Vertical Banded Gastroplasty. Werling M, Olbers T, Fändriks L, Bueter M, Lönroth H, Stenlöf K, le Roux CW.
PLoS One. 2013;8(4):e60280. doi: 10.1371/journal.pone.0060280. Epub 2013 Apr 3.



UNIVERSITY OF GOTHENBURG

Roux-en-Y gastric bypass

– clinical outcome and mechanisms of action

Malin Werling

Department of Gastrosurgical Research and Education, Institute of Clinical Sciences,
Sahlgrenska Academy at the University of Gothenburg, Sweden

ABSTRACT

Roux-en-Y gastric bypass (gastric bypass) is an effective surgical technique for treating morbid obesity. The objective of this thesis is to increase knowledge of long-term outcomes of gastric bypass surgery and to elucidate some of the associated mechanisms of action. Changes in BMI, needs for revisional surgery and influences on body composition as a result of a gastric bypass are compared with the results of the restrictive vertical banded gastroplasty (VBG) technique. This thesis further explores the role of gastrointestinal hormonal signalling by GLP-1, PYY and ghrelin as well as postoperative energy expenditure as representing potential weight-reducing mechanisms of action after gastric bypass surgery.

A long-term follow up of a clinical randomized study demonstrated that gastric bypass patients had lower BMI, better preservation of muscle mass and greater loss of fat mass compared to VBG patients six years after surgery. Nine years after primary surgery 90% of VBG patients required revisional surgery to gastric bypass due to severe discomfort in relation to food intake. Two days after gastric bypass surgery postprandial levels of GLP-1 and PYY were significantly higher and this pattern was maintained over time. Furthermore, the magnitude of weight loss was directly related to the magnitude of hormonal response. After gastric bypass levels of GLP-1 and PYY in patients correlated to energy intake as well as to satiety sensations, in contrast to patients after gastric banding procedures. No changes in ghrelin levels were noted as a consequence of either surgical technique. Nine years after surgery 24-hour indirect calorimetry revealed that meal-induced thermogenesis was significantly higher in gastric bypass patients than in weight-matched VBG patients.

The results of this thesis project show that the gastric bypass technique has a favourable long-term clinical outcome in comparison to VBG in terms of superior weight control, less need for revisional surgery and advantageous body composition. The better weight-reducing effect of gastric bypass can be partly explained by the augmented postprandial response of GLP-1 and PYY, both known to mediate satiety and decrease food intake, and which could be observed only days after surgery. These positive post-operative results remained for over nine years. Gastric bypass surgery is also associated with both higher postprandial energy expenditure and with generally increased energy expenditure throughout the day. These mechanisms may account for the maintenance of lower body weight.

Keywords: Roux-en-Y gastric bypass, gastric bypass, Vertical banded gastroplasty, VBG, Bariatric surgery, weight loss, clinical outcome, mechanisms of action, body composition, DEXA, GLP-1, PYY, ghrelin, predictive tool for weight loss, energy expenditure, indirect calorimetry, energy chamber

ISBN: 978-91-628-8719-3

<http://hdl.handle.net/2077/32563>