

ROUX-en-Y GASTRIC BYPASS
AS TREATMENT FOR MORBID OBESITY

Studies of dietary intake, eating behavior and meal-related symptoms

Akademisk avhandling

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av

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Avhandlingen baseras på följande arbeten:

- I. Laurenius A, Larsson I, Melanson KJ, Lindroos AK, Lönroth H, Bosaeus I Olbers T. Decreased energy density and changes in food selection following Roux-en-Y gastric bypass. *Eur J Clin Nutr* 2013; 67:168-173
- II. Laurenius A, Larsson I, Bueter M, Melanson KJ, Bosaeus I, Berteus Forslund H, Lönroth H, Fändriks L, Olbers T. Changes in eating behavior and meal pattern following Roux-en-Y gastric bypass. *Int J Obes* 2012; 36:348-355
- III. Laurenius A, Olbers T, Näslund I, Karlsson J. Dumping syndrome following gastric bypass: validation of the Dumping Symptom Rating Scale *Obes Surg* 2013; [epub ahead of print]
- IV. Laurenius A, Werling M, Le Roux CW, Fändriks L, Olbers T. Oral carbohydrate provocation in patients with history of hypoglycemia-like symptoms after Roux-en-Y gastric bypass *In manuscript.*



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ABSTRACT

Background and aims: Roux-en-Y gastric bypass (RYGB) is now a common treatment for obesity with well-documented effects on long-term weight reduction, health-related quality of life, obesity-related morbidity and mortality. There is a need for a better understanding of changes in dietary intake and meal-related symptoms after RYGB. The aim of this thesis was to study these phenomena and to improve current treatment protocols.

Methods: Forty-three adults (31 women, 12 men; mean age 42.6 years, mean BMI 44.5 kg/m²) were followed in a longitudinal cohort study and examined preoperatively and at six weeks, one and two years after surgery (Paper I and II). They completed the Three-Factor Eating Questionnaire (TFEQ-R21) on attitudes to food, and questionnaires on dietary intake and meal pattern; in addition, a test meal ad libitum was administered and portion size and eating rate were assessed. A Dumping Symptom Rating Scale (DSRS) was developed and evaluated for its reliability and construct validity over two years on 124 respondents of whom 43 adults from Paper I and II and in addition 81 adolescents (Paper III). Thirty-one non-obese subjects served as reference group (Paper II and III). Another eight RYGB patients with hypoglycemia-like symptoms and eight patients with no hypoglycemia-like symptoms ingested a liquid carbohydrate meal. Insulin, plasma glucose, glucagon-like peptide 1 (GLP-1) and glucagon were measured intermittently up to 180 minutes after the meal.

Results: The dietary questionnaire showed decreased energy intake, Food weight fell initially but was not lower two years after surgery resulting in a significantly decreased dietary energy density at two years after surgery. The meal test showed decreased portion size despite meal duration remaining constant, resulting in a reduced eating rate. Number of meals increased, with more meals in the mornings. TFEQ-R21 revealed decreased emotional and uncontrolled eating, whereas there was a transient increase in cognitive restraint six weeks after surgery. Most subjects reported mild or no dumping symptoms, although 6–12% had persistent problems – in particular, postprandial fatigue, need to lie down, nausea, and feeling faint – two years after surgery. The result of the validation process of DSRS was satisfactory overall. The patients with a history of hypoglycemia-like symptoms after RYGB demonstrated neither lower plasma glucose nor greater insulin response compared to asymptomatic patients in response to a liquid carbohydrate meal, but they perceived more symptoms.

Conclusion: After RYGB, patients displayed major changes in eating behavior and meal pattern, suggesting that RYGB drives the individual to an eating behavior that promotes weight loss. Despite lack of association between the reduction in dietary energy density and percentage weight loss, changes in food choice were overall nutritionally beneficial. Dumping symptoms were rarely evident, but some patients reported persistent problems up to two years after surgery. DSRS is a reliable clinical screening instrument to identify patients with pronounced dumping symptoms. The mechanisms of action behind the origin of hypoglycemia-like symptoms remain obscure and need further exploration.

Keywords: Roux-en-Y gastric bypass, dietary energy density, food choice, meal size, eating rate, meal pattern, eating behavior, dumping syndrome, construct validity, hypoglycemia

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