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Obesity and Weight-Loss Treatment: Long-Term Outcomes and Predictors of Treatment Response

Akademisk avhandling

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av Ala Mejaddam

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Avhandlingen baseras på följande delarbeten

I. Mejaddam A, Krantz E, Höskuldsdóttir G, Fändriks L, Mossberg K, Eliasson B, Trimpou P, Landin-Wilhelmsen K. Comorbidity and quality of life in obesity-a comparative study with the general population in Gothenburg, Sweden. PLoS One. 2022 Oct 4;17(10):e0273553.

II. Mejaddam A, Höskuldsdóttir G, Lenér F, Wallenius V, Trimpou P, Fändriks L, Mossberg K, Eliasson B, Landin-Wilhelmsen K. Effects of medical and surgical treatment on vitamin D levels in obesity. PLoS One. 2023 Dec22;18(12):e0292780.

III. Mejaddam A, Carlsen HK, Larsson I, Eeg-Olofsson K, Lugner M, Ottosson J, Stenberg E, Höskuldsdóttir G, Eliasson B. Long-term effects of gastric bypass and sleeve gastrectomy in type 2 diabetes: a matched retrospective cohort study from Sweden. Lancet Reg Health Eur. 2025 Aug 30;58:101430.

IV. Mejaddam A, Lugner M, Carlsen HK, Rawshani A, Larsson I, Ottosson J, Stenberg E, Eeg-Olofsson K, Höskuldsdóttir G, Landin-Wilhelmsen K, Eliasson B. Exploring predictors for long-term clinical benefit after gastric bypass and sleeve gastrectomy in type 2 diabetes: A Machine Learning Approach. (*Under revision, Metabologia*)

SAHLGRENSKA AKADEMIN
INSTITUTIONEN FÖR MEDICIN

GÖTEBORGS UNIVERSITET

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Abstract

Background: The benefits and risks of Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG) vary between individuals, and evidence on long-term outcomes remains limited in individuals with obesity and type 2 diabetes. This thesis examined underlying risk profiles and long-term clinical outcomes in individuals with obesity following RYGB and SG.

Methods: Four observational studies using real-world data on individuals with obesity were conducted. *Study I* assessed health-related quality of life (HRQoL) and disease burden in individuals accepted for weight-loss treatment. *Study II* examined vitamin D deficiency before and two years after RYGB and SG compared with a lifestyle intervention. *Study III* compared long-term outcomes of RYGB and SG in individuals with type 2 diabetes with matched unexposed individuals. *Study IV* applied machine learning to identify predictors of a multidimensional net clinical benefit five years after RYGB and SG in individuals with type 2 diabetes.

Results: Individuals seeking weight-loss treatment had impaired HRQoL, greater disease burden, and poorer vitamin D status than the general population. Vitamin D status improved after treatment but remained below recommended levels. RYGB was associated with sustained reductions in all-cause mortality and obesity-related comorbidities, but also with increased risks of micronutrient deficiency, alcohol use disorder, and gastrointestinal complications. In contrast, SG showed no significant effects on mortality or major comorbidities. Across machine learning models, the most consistent predictors reflected psychiatric and somatic disease burden, metabolic function, and sociodemographic characteristics.

Conclusion: RYGB, rather than SG, provides important cardiometabolic benefits, but pre-existing psychiatric and somatic vulnerabilities may worsen, and new lifelong risks may emerge. These findings support a shift toward precision-based obesity care, integrating broader assessments of individuals before treatment allocation and structured long-term follow-up that addresses mental, nutritional, and lifestyle factors.

Keywords: obesity, type 2 diabetes mellitus, weight-loss, metabolic bariatric surgery, Roux-en-Y gastric bypass, sleeve gastrectomy, HRQoL, nutritional deficiency, mortality, cardiovascular disease, psychiatric disorders

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