nature reviews endocrinology

https://doi.org/10.1038/s41574-024-01012-9

Supplementary information

The challenges of assessing adiposity in a clinical setting

In the format provided by the authors and unedited

Supplemental material

The challenges of assessing adiposity in a clinical setting

Emma Börgeson[†1-3], Saeideh Tavajoh[1-3], Stephan Lange[1,2,4] and Niels Jessen [1,2]

[1] Department of Biomedicine, Aarhus University, Aarhus, Denmark

[2] Steno Diabetes Center Aarhus, Aarhus University Hospital, Aarhus, Denmark

[3] Department of Clinical Immunology and Transfusion Medicine, Sahlgrenska University Hospital, Gothenburg, Sweden

[4] Department of Cardiology, School of Medicine, UC San Diego, La Jolla, USA

[†]Email: emma.borgeson@biomed.au.dk

Supplementary Box 1: Therapeutic and surgical weight-loss interventions

For individuals living with obesity, weight loss of >10% is required to decrease cardiovascular disease events.[1] Unfortunately, lifestyle interventions often have limited effect on weight loss,[2] and therefore therapeutic or surgical interventions are often utilised.

Bariatric surgery provides a sustained weight loss of 20–30%, and 30–40% reduced mortality risk.[3,4] With a low surgery-related mortality risk of >0.1%, the socioeconomic gain of surgically-induced weight loss is thus substantial. Current inclusion criteria are based on age (18–65 years), adiposity (BMI > 40, or > 35 BMI combined with comorbidity) and the patient's readiness for lifestyle change. However, the field has expressed a need to reformulate the guidelines to enable a substantial expansion of the pool of patients that can be offered these procedures.[5] We propose that reformulated guidelines should include consideration of ethnicity, gender, age, adipose distribution, and systemic markers of elevated cardiometabolic disease. The need for a pre-surgical low-calorie diet is also questionable, given the lack of evidence that pre-operative weight-loss actually reduces peri-operative risks and improves post-operative weight loss.[6] Indeed, nutritional supplements, appetite suppressive drugs or intragastric balloons are more effective in reducing liver volume than low-calorie diets,[6,7] which might mean that a pre-surgical diet is only needed in rare cases, for example, for individuals with BMI >50 kg/m^2.

Weight-reducing drugs are also important tools to achieve weight loss. For instance, subcutaneous injections of the long-acting glucagon-like peptide 1 (GLP1) receptor agonist semaglutide (2.4 mg, once weekly), result in up to 16% weight loss, which is associated with reduced hyperglycaemia, insulin resistance, blood pressure, dyslipidaemia, body weight, waist circumference, fatty liver and inflammatory markers in patients with type 2 diabetes mellitus (T2DM).[8,9] Interestingly, GLP1 receptor agonists might also positively affect adipose tissue distribution in patients with T2DM.[10]

References

1 Gregg, E. W. *et al.* Association of the magnitude of weight loss and changes in physical fitness with long-term cardiovascular disease outcomes in overweight or obese people with type 2 diabetes: a post-hoc analysis of the Look AHEAD randomised clinical trial. *Lancet Diabetes Endocrinol* **4**, 913-921 (2016). https://doi.org:10.1016/s2213-8587(16)30162-0

2 Zucatti, K. P. *et al.* Long-term Effect of Lifestyle Interventions on the Cardiovascular and All-Cause Mortality of Subjects With Prediabetes and Type 2 Diabetes: A Systematic Review and Meta-analysis. *Diabetes care* **45**, 2787-2795 (2022). https://doi.org:10.2337/dc22-0642

3 Tang, B. *et al.* Effect of bariatric surgery on long-term cardiovascular outcomes: a systematic review and meta-analysis of population-based cohort studies. *Surgery for obesity and related diseases : official journal of the American Society for Bariatric Surgery* **18**, 1074-1086 (2022). https://doi.org:10.1016/j.soard.2022.05.007

4 Abdelaal, M., le Roux, C. W. & Docherty, N. G. Morbidity and mortality associated with obesity. *Annals of translational medicine* **5**, 161 (2017). https://doi.org:10.21037/atm.2017.03.107

5 Aarts, E. O. & Mahawar, K. From the Knife to the Endoscope-a History of Bariatric Surgery. *Current obesity reports* **9**, 348-363 (2020). https://doi.org:10.1007/s13679-020-00382-1

6 Tabesh, M. R. *et al.* Nutrition, Physical Activity, and Prescription of Supplements in Pre- and Post-bariatric Surgery Patients: An Updated Comprehensive Practical Guideline. *Obesity surgery* **33**, 2557-2572 (2023). https://doi.org:10.1007/s11695-023-06703-2

7 van Wissen, J. *et al.* Preoperative Methods to Reduce Liver Volume in Bariatric Surgery: a Systematic Review. *Obesity surgery* **26**, 251-256 (2016). https://doi.org:10.1007/s11695-015-1769-5

8 Ajabnoor, G. M. A. *et al.* The Possible Effect of the Long-Term Use of Glucagon-like Peptide-1 Receptor Agonists (GLP-1RA) on Hba1c and Lipid Profile in Type 2 Diabetes Mellitus: A Retrospective Study in KAUH, Jeddah, Saudi Arabia. *Diseases* **11** (2023). https://doi.org:10.3390/diseases11010050

9 Patti, A. M., Giglio, R. V., Papanas, N., Rizzo, M. & Rizvi, A. A. Future perspectives of the pharmacological management of diabetic dyslipidemia. *Expert Rev Clin Pharmacol* **12**, 129-143 (2019). https://doi.org:10.1080/17512433.2019.1567328

10 Duan, K. *et al.* Effect of glucagon-like peptide-1 receptor agonists on fat distribution in patients with type 2 diabetes: A systematic review and meta-analysis. *Journal of diabetes investigation* **13**, 1149-1160 (2022). https://doi.org:10.1111/jdi.13775