Homocysteine in bariatric patients following laparoscopic roux-en-Y gastric bypass surgery
Department of surgery
Medical university of Vienna
An exploratory study in 708 consecutive patients.

EK1143/2013

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Translation of the original study protocol document approved by the local ethics committee in 2014.
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1 Background

Hyperhomocysteinaemia defined as serum levels above 15 µmol/l is associated with numerous risks. There is an elevated risk in suffering from cardiovascular events (myocardial infarction, stroke, acute limb ischemia, deep venous thrombosis) who are today’s number one cause of death in the industrialized world (1). Furthermore, Homocysteine was found to be a mediator in dementia, Alzheimer’s disease (2), osteoporosis induced pathological fractures (3) and diabetic retinopathy (4). The role of homocysteine in metabolic diseases is indisputable. Obesity is also associated closely with cardiovascular disease events, therefore it is necessary to provide a systematically analysis of changes in homocysteine levels following weight loss surgery.

Changes in homocysteine levels following bariatric surgery remain controversially discussed. Where some authors found postoperatively lower values (5, 6), others reported elevated values (7-10). Even some found no difference at all between preoperative and postoperative values of homocysteine (11-13). Some of these studies used outdated bariatric surgery procedures (7, 9, 13).

In literature the postoperative changes of homocysteine after bariatric surgery remain unrevealed. Therefore, we designed this survey to assess timeline changes of homocysteine with a long-time and high follow-up. This could be of importance to postoperative prophylaxis of cardiovascular disease events.

For homocysteine being only a surrogate parameter for cardiovascular events, we decided to reveal changes in homocysteine being of clinical relevance via assessing the actual cardiovascular disease events (stroke, myocardial infarction, deep veinous thrombosis, ...).

2 Outcome

The primary outcome is to assess timeline changes of the peri and postoperative values of homocysteine in µmol/l via the CMIA (chemiluminescent microparticle immunoassay) through study completion. Secondary outcomes include
demographic parameters like weight, height, folate, and vitamin B12. Furthermore, for determining clinical relevance we assessed the postoperative newly-onset number of cardiovascular events.

3 Patients

All patients received laparoscopic roux-en-Y gastric bypass at the department of surgery at the medical university of Vienna over a six-year period. All patients met the criteria for bariatric surgery: BMI of above 40 kg/m² without comorbidities or BMI of above 35 kg/m² with comorbidities including diabetes mellitus, arterial hypertonia, hyperlipidaemia, obstructive sleep apnea syndrome, arthritis and others. Minimal age was 18 years and highest age was 75 years for inclusion. Both female and male participants were eligible.

4 Parameters

4.1 Primary outcome

Homocysteine in µmol/l assessed by CMIA technique at the timepoints preoperatively, 3, 6, 9, 12, 18, 24, 36, 48, 60, 72, 84 and 96 months postoperatively. Timeframe: through study completion.

4.2 Secondary outcomes

Secondary outcome measurements include folate, vitamin B12 being well known to have impact on homocysteine metabolism. Furthermore, all standard laboratory parameters and demographic data will be assessed also. The postoperative incidence of newly-onset cardiovascular disease events will be reported.

5 Methods
Retrospective analysis of existing records of the department of surgery, medical university of vienna will be performed. To extract laboratory values out of the database the Archimed software will be utilized.

To reveal clinical relevance of changes in homocysteine values we will perform postal screening utilizing a questionnaire in all 708 participants. In the same step the informed consent form will be sent to each patient and they will be questioned if they have experienced any cardiovascular disease event after surgery (see IC form and questionnaire). An encrypted form of these lists is only available to the principal investigator and the study nurses.

Finally, the data will be compared to two state wide databases (AKIM and Webokra) to verify cardiovascular events.

6 Statistics

Descriptives

Case number strategy: the number of participants include all patients undergoing roux-en-Y gastric bypass consecutively over a six year period. We expect 708 cases. For this study being only exploratory we forwent a formal Power analysis.

To reveal statistical relevant postoperative changes of homocysteine we performed paired t-tests between preoperatively. Pearson’s or Spearman’s Correlations will be performed to reveal the influence of folate and vitamin B12 on the homocysteine metabolism.

The results of the postal screening section will be evaluated descriptively and compared to general incidences of cardiovascular disease events.

7 Data privacy protection

All patients will be numbered continously and anonymized for further evaluation. Only authorized personnel will be able to access original names and data.
Furthermore, data will be stored and evaluated on personal computers at the medical university of Vienna with restricted access.

8 Risk-benefit analysis

The included participants have no direkt benefit of the survey. The proposed study is only a retrospective evaluation of preexistant data, therefore, no risk is anticipated. The only relevant risk being emerging of sensitive health data will be minimized by anonymous evaluation and restricted access to the data. Results of this study can be used as a basis of generating further hypothesis of other surveys.

9 References