Effects of bariatric surgery on rapid remission of NAFLD: an exploratory metabolomics and validation study: a prospective cohort study

Mengyi Li, MD, PhD[1]*, Xinyu Wang, BM[2]*, Na Zeng, MSc[2]*, Zhiyu Wu, MSc[2], Canqing Yu. PhD[2,3,4], Dianjianyi Sun, PhD[2,3,4], Yang Liu, MD, PhD[1], Di Cao, MD, PhD[5], Peng Zhang, MD, PhD[1], Ling Yang, PhD[6,7], Yiping Chen, DPhil[6,7], Zhengming Chen, DPhil[6,7], Liming Li, MD[2,3,4], Zhongtao Zhang, MD, PhD[1], Jun Lv, PhD[2,3,4], Yuanjie Pang, DPhil[2,3]

1. Department of General Surgery, Beijing Friendship Hospital, Capital Medical University; State Key Lab of Digestive Health; National Clinical Research Center for Digestive Diseases, Beijing 100050, China
2. Department of Epidemiology & Biostatistics, School of Public Health, Peking University, Beijing 100191, China
3. Key Laboratory of Epidemiology of Major Diseases (Peking University), Ministry of Education
4. Peking University Center for Public Health and Epidemic Preparedness & Response, Beijing 100191, China
5. Department of Radiology, Beijing Friendship Hospital, Capital Medical University, Beijing 100050, China
6. Medical Research Council Population Health Research Unit at the University of Oxford, Oxford, United Kingdom

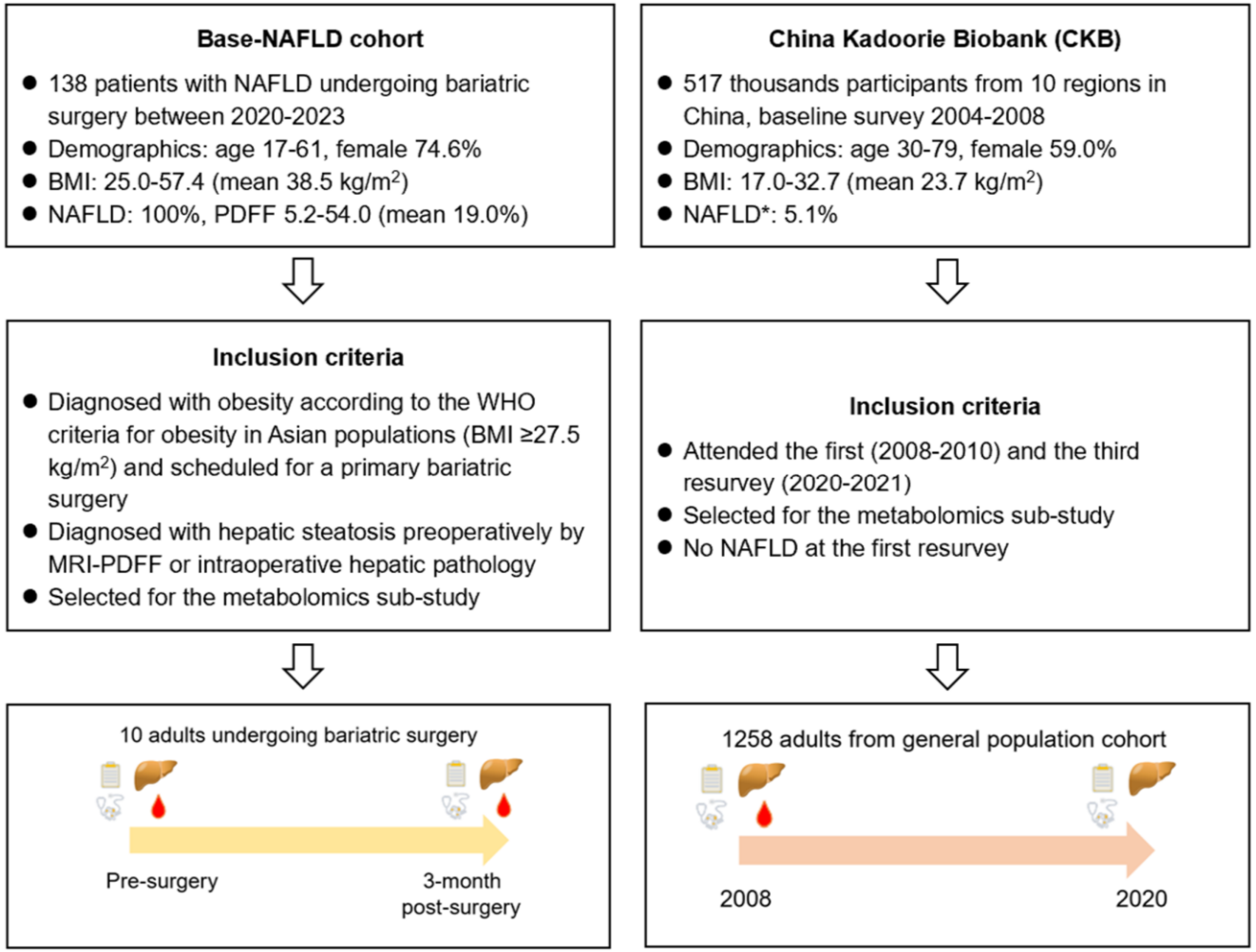
Clinical Trial Service Unit & Epidemiological Studies Unit (CTSU), Nuffield Department of Population Health, University of Oxford, United Kingdom

[√] I have no potential conflict of interest to report.

Objective: To examine the associations between alteration of plasma metabolites and the effects of bariatric surgery on rapid remission of non-alcoholic fatty liver disease (NAFLD), and to further validate the results in a general population-based cohort.

Summary of Background Data: Bariatric surgery is a promising procedure to induce substantial weight loss and to alleviate NAFLD in short post-surgical period, but the underlying causal associations related to metabolomics are unclear.

Methods:


Base-NAFLD cohort
138 patients with NAFLD undergoing bariatric surgery between 2020-2023
Demographics: age 17-61, female 74.6%
BMI: 25.0-57.4 (mean 38.5 kg/m2)
NAFLD: 100%, PDFF 5.2-54.0 (mean 19.0%)
China Kadoorie Biobank (CKB)
517 thousands participants from 10 regions in China, baseline survey 2004-2008
Demographics: age 30-79, female 59.0%
BMI: 17.0-32.7 (mean 23.7 kg/m2)
NAFLD*: 5.1%
Inclusion criteria
Diagnosed with obesity according to the WHO criteria for obesity in Asian populations (BMI ≥27.5 kg/m2) and scheduled for a primary bariatric surgery
Diagnosed with hepatic steatosis preoperatively by MRI-PDFF or intraoperative hepatic pathology
Selected for the metabolomics sub-study
Inclusion criteria
Attended the first (2008-2010) and the third resurvey (2020-2021)
Selected for the metabolomics sub-study
No NAFLD at the first resurvey
10 adults undergoing bariatric surgery
Pre-surgery
3-month post-surgery
1258 adults from general population cohort
2008
2020

Results:

Figure 2. Conceptual framework and key results of the current study

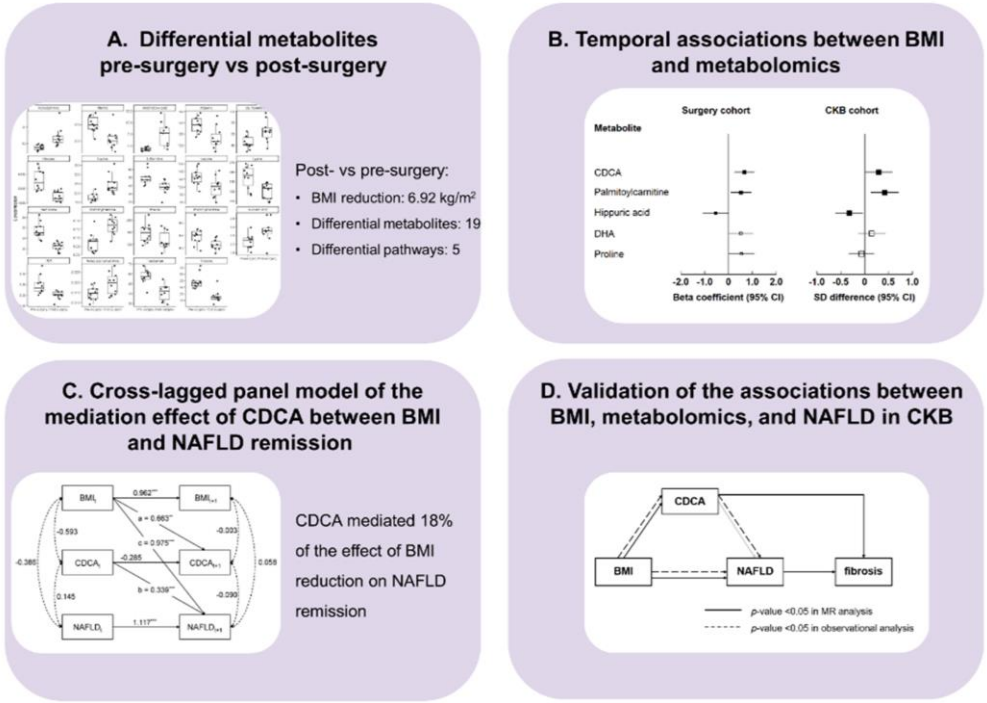
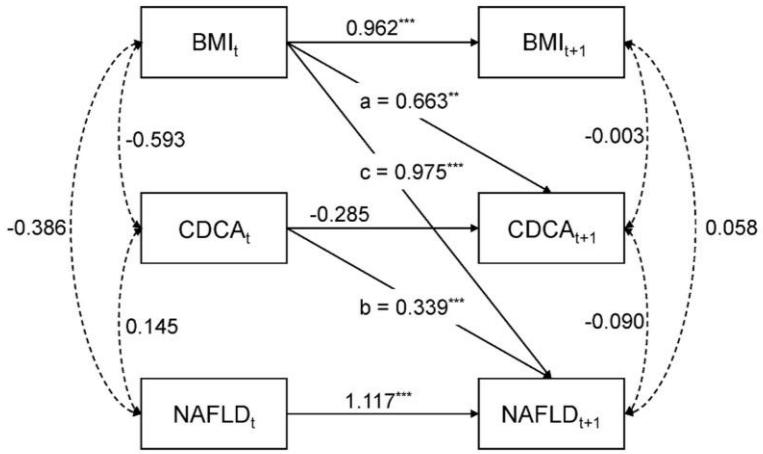


Figure 3. Cross-lagged panel model of the mediation effect of CDCA between BMI and NAFLD remission



Conclusions: CDCA, a bile acid metabolite, mediated causal effects of bariatric surgery on the rapid remission of NAFLD. It may also predict liver fibrosis improvement following bariatric surgery.