

Newly Diagnosed Nonalcoholic Fatty Liver Disease After Bariatric Surgery: A Study of Electronic Medical Record Data

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Background & Objective

- Higher body mass index (BMI) has been related to increased risk of nonalcoholic fatty liver disease (NAFLD)/nonalcoholic steatohepatitis (NASH).¹
- It is unclear if risk of NAFLD/NASH in obesity is altered upon bariatric surgery.
- The objective of this study was to assess the association between bariatric surgery and newly diagnosed NAFLD/NASH in individuals with obesity.

Methods

- Data used were from the TriNetX “Analytics” network (TriNetX, Cambridge, MA, USA), a live electronic medical record (EMR) database of >50 million anonymous patients, predominantly from the US treated in hospitals, primary care providers and specialty treatment sites.
- Patients had to have a record of bariatric surgery (1 of 11 CPT codes predominantly for gastrectomy and gastric banding; codes available upon request) or cholecystectomy (control surgery), and a record of obesity (BMI measurement ≥30 kg/m² or ICD-10 code) within 6 months prior to surgery.
- A third cohort consisted of obese patients without bariatric surgery or cholecystectomy (“non-surgery cohort”).
- The index event was the date of surgery in the two surgery cohorts and the first record of obesity in the non-surgery cohort.
- All patients had to have EMR data at least 1 year before and at least 2 years after index event.
- Patients with a history of NAFLD/NASH or gastrointestinal cancer were excluded.
- Risk and risk ratios of newly diagnosed NAFLD/NASH (ICD-10 K76.0/K75.81) were calculated before and after propensity-score 1:1 matching based on age, sex, race and type 2 diabetes (nearest neighbor without replacement, caliper 0.1 SD).
- The analysis was conducted on 13 May 2019 with TiNetX’s browser-based real-time analytics tools.

Results

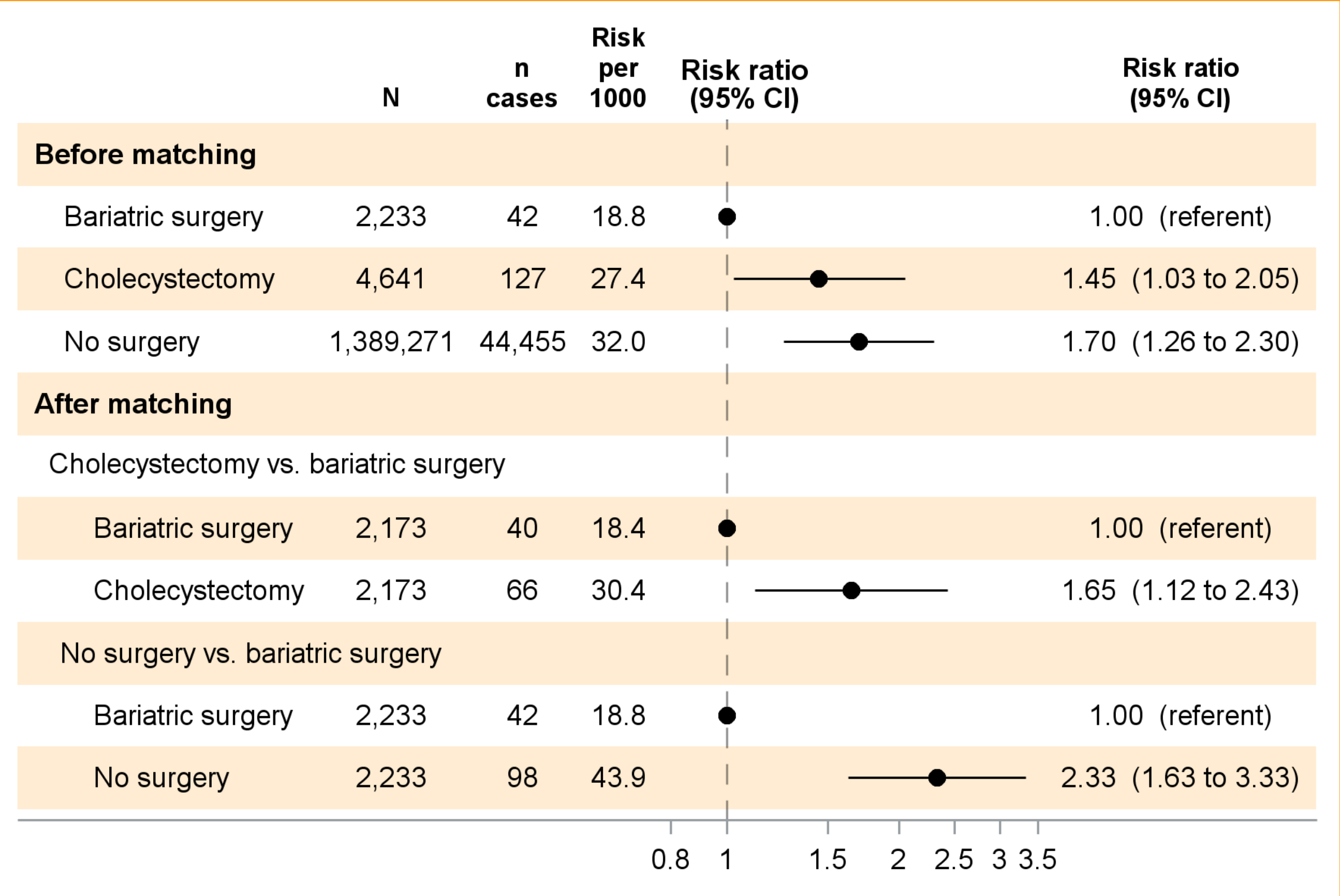
- The analysis included data of 1,396,145 patients, essentially all from the US.
- The study cohorts were roughly similar in respect to key characteristics with the exception of the percentage of females, which was lower in the non-surgery cohort, and the percentage of patients with type 2 diabetes, which was higher in the bariatric surgery cohort (see **Table**).

Table. Characteristics of the three study cohorts before propensity-score matching

Characteristic	Bariatric surgery cohort N=2,233	Cholecystectomy cohort N=4,641	Non-surgery cohort N=1,389,271
Mean (SD) age – y	48.6 (12.1)	47.9 (16.9)	48.9 (18.3)
Female sex – %	79	79	62
Race – %			
African-American	17	20	21
White	70	68	69
Other	13	12	10
History of type 2 diabetes – %	39.3	25.2	24.0

- Number of patients with newly diagnosed NAFLD/NASH per 1000 population in the period after surgery, or after the first record of obesity in non-surgery patients, varied from 18.8 in the bariatric surgery cohort, to 27.4 in the cholecystectomy cohort, to 32.0 in non-surgery cohort.
- As shown in the **Figure**, risk ratios estimated before matching showed higher NALFD/NASH risk in the cholecystectomy and non-surgery cohorts compared to the bariatric surgery cohort.
- In propensity-score matched analysis, risk was ~1.7-fold higher in cholecystectomy patients and ~2.3-fold higher in non-surgery patients, compared to bariatric surgery patients.

Figure. Newly diagnosed NAFLD/NASH in the study cohorts



- The proportion of patients with newly diagnosed NAFLD/NASH did not differ in patients who underwent cholecystectomy compared to non-surgery patients – the risk ratio (95% CI) was 0.86 (0.72 to 1.02) before and 0.89 (0.70 to 1.24) after propensity-score matching.

Conclusions

- In obesity, NAFLD/NASH is less often diagnosed after bariatric surgery than after cholecystectomy or in patients without surgery. This may indicate that weight loss associated with bariatric surgery may interrupt the underlying pathophysiology leading to NAFLD/NASH.
- Nonalcoholic fatty liver disease frequently goes undiagnosed, and the rate of diagnosis will be affected by the use of imaging techniques and diagnostic biopsies in each study cohort.