Human Gut Microbiome Before and After Bariatric Surgery in Obese Patients with and Without Type 2 Diabetes

Original Contributions •

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Abstract

Background

Bariatric surgery, a significant intervention for obesity, may influence weight loss through changes in gut microbiota, particularly the Firmicutes and Bacteroidetes. This study explores these potential shifts and their metabolic implications.

Materials

We conducted a cross-sectional study involving patients who had undergone bariatric surgery. Stool samples were collected at baseline, 3 months, and 6 months post-operation. We performed DNA extraction and quantified the bacterial phyla Firmicutes and Bacteroidetes to assess changes in the gut microbiota over time.

Results

Our research revealed a significant alteration in the gut microbiota following bariatric surgery. In diabetic individuals, there was a marked increase in the average number of Firmicutes bacteria at both 3 and 6 months post-operation, compared to pre-surgery levels. In contrast, non-diabetic subjects experienced a notable decrease in Firmicutes during the same timeframe. Regarding

Bacteroidetes bacteria, the trend was reversed; diabetic patients showed a significant reduction, while non-diabetics exhibited an increase after the surgery. These findings highlight the dynamic changes in gut microbiota composition associated with bariatric surgery and its potential link to metabolic changes post-operation.

Conclusion

These findings suggest that obesity alters the gut's microbial composition. The observed bacterial fluctuations, particularly in the dominant Firmicutes and Bacteroidetes groups, are likely contributors to the weight loss experienced post-surgery. This alteration in gut bacteria underscores the complex interplay between microbiota and metabolic health, highlighting potential avenues for therapeutic intervention.

Data Availability

The data that support the findings of this study are available on request from the corresponding author.

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Ethics declarations

Ethical Approval

The Ethical Committee of Rafsanjan University of Medical Science, Rafsanjan, Iran, has approved the protocol of the study (Ethical code: IR.RUMS.REC.1396.135 at RUMS).

Consent to Participate

Informed and written consent was obtained from all participants.

Conflict of Interest

The authors declare no competing interests.

Additional information

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Highlights

• Obesity alters the gut’s microbial composition.

• Roles of Firmicutes and Bacteroidetes bacteria are crucial in the study of obesity.

• People with obesity show a higher proportion of Firmicutes compared to Bacteroidetes.

• Impact of bariatric surgery on the gut microbiome of individuals afflicted with obesity.

• Alteration in gut bacteria and the interplay between microbiota and metabolic health.

About this article

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