Bariatric surgery reverses cardiac morphology and metabolism to reduce cardiovascular disease burden

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Results

1. Bariatric surgery reduced heart failure scores in patients after surgery, indicating an improvement in cardiovascular function

2. Mass, volume, and shape of the left ventricle and cardiac myocytes decreased and changed after surgery indicating a reversal in cardiac morphology

3. Metabolic markers of obesity decreased and stabilized months after surgery, correlating with a decrease in LV mass

4. Bariatric surgery in rats increased expression of proteins involved in insulin signaling to control levels, showing a decrease in insulin resistance

5. Bariatric surgery in rats was shown to increase Ca²⁺ levels in cardiomyocytes and increased levels of myocardial Ca²⁺ regulatory proteins

6. A potential model of how bariatric surgery’s impact on body weight impacts metabolism

Discussion

- Bariatric surgery effectively relieves cardiovascular disease in patients, through reversal of cardiac remodeling
- Decreases in insulin resistance and fatty acid utilization were seen in cardiac myocytes of rats, along with improved Ca²⁺ homeostasis, providing a mechanism that can explain these changes
- Future studies should further investigate the connection between cardiac metabolism and gut changes after bariatric surgery
- One topic to investigate is how diabetogenic intestinal signals can be transmitted in blood and may impact cardiac myocyte metabolism

Abstract

- Bariatric surgery leads to reversal of left ventricular hypertrophy and improved systolic/diastolic function
- The impacts of bariatric surgery on metabolism included a decrease in fatty acid use by myocytes, with improved Ca²⁺ homeostasis and a decrease in insulin resistance

Introduction

- Cardiovascular disease remains a major burden in the US, with over 48% of adults having some form of it in 2019
- Obesity introduces changes in cardiac morphology, leading to increases in left ventricular (LV) mass and LV hypertrophy, causing diastolic and systolic dysfunction
- Long term effects of these changes lead to an increased risk of cardiovascular diseases, such as non-ischemic dilated cardiomyopathy
- Bariatric surgery, used to produce major weight reduction, also lowers the risk of cardiovascular disorders in these patients

Methods

- A literature review was conducted using PubMed on the topics of bariatric surgery and cardiovascular disease
- MESH terms ‘cardiac myocyte’ and ‘bariatric surgery’ were used to focus literature on morphological effects of the surgery, along with other keywords to further guide the search
- Filters used: Free full text, Last 10 years, English
- Search results: 19 articles

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