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Effects of Bariatric Surgery on Metabolic Insulin Resistance

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Effects of Bariatric Surgery on Metabolic Insulin Resistance

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Pathophysiological Processes

Underlying Pathophysiology and significance

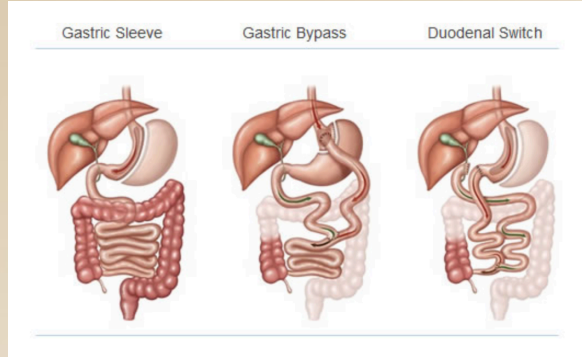
Bariatric surgery changes the structure of the stomach and creates changes in many gastric hormones

Signs & Symptoms of Insulin Resistance

Insulin resistance leads to the development of type 2 diabetes there are no physical symptoms of insulin resistance. Indicators include:

- high blood sugar levels
- high triglycerides
- high LDL cholesterol
- low HDL cholesterol
- High HOMA-IR levels
- Large waist circumference

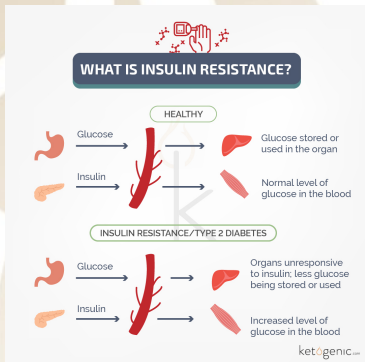
(CDC, 2019)



(Malone 2020)

Theories of Insulin resistance change after bariatric surgery include:

1. A decrease in Ghrelin which is a hormone produced in the stomach. Ghrelin suppresses the insulin suppressing hormone adiponectin, blocks hepatic insulin signaling and inhibits insulin secretions. Removal of a portion of the stomach would reduce the amount of Ghrelin produced in the body. (Catoi et al., 2016)
2. An increase in YY peptide (PYY) and glucagon-like peptide 1 (GLP-1) is noted after surgery. GLP-1 is released from the gut in response to nutrient indigestion and can enhance insulin secretions. PYY is also released from the gut and can effect metabolic energy consumption. (Catoi et al., 2016)
3. Insulin stimulates the uptake of glucose in the intestine. Intestinal insulin resistance is reversed after bariatric surgery. Changes in intestinal glucose metabolism after surgery can change the process in the gut and the entire body system. The exact mechanism is unknown, but glucose reuptake is majorly altered. (Mäkinen et al., 2015)
4. Decreased uric acid levels after surgery could cause an increase in insulin sensitivity. High uric acid levels have been shown to lead to insulin resistance. High uric acid levels contribute to a gluconeogenesis disruption which changes the metabolic makeup of an individual (Palau-Rodriguez et al., 2018)
5. Amino acid remodeling after surgery. Specific branch chained amino acids change after surgery. Specific amino acids can be used as biomarkers for obesity and type 2 diabetes. These amino acids change after surgery and resemble leaner individuals. (Palau-Rodriguez et al., 2018)

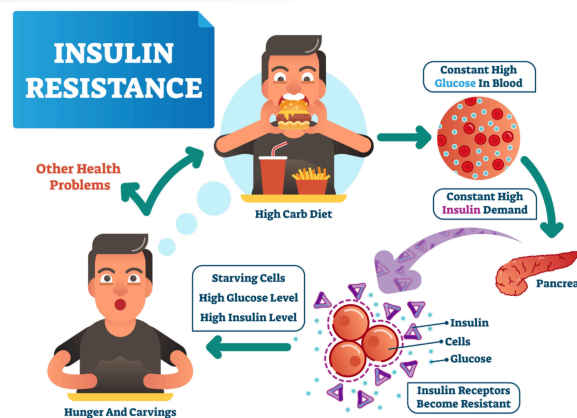


(Malone 2020)

Bariatric surgery has an immediate change in metabolic insulin resistance that is independent of weight loss.

Introduction

This topic was chosen due the wide range of patients that could possibly benefit from a permanent treatment of diabetes. Many patients will deal with obesity and type 2 diabetes in their lifetime. Weight loss and physical activity are proven methods to reverse Insulin resistance (CDC, 2019). Patients who struggle with weight loss may choose to undergo bariatric surgery as a tool to assist in their weight loss. Bariatric surgery is a beneficial treatment for patients who have type 2 diabetes. The American Society for Metabolic and Bariatric Surgery states that 78% of patients with type 2 diabetes that undergo bariatric surgery note a remission in the disease (ASMBS, 2020). Many patients see an immediate metabolic change in Insulin resistance. Insulin resistance is when over time cells and tissues stop responding to the body's natural insulin (CDC, 2019). More research is needed on the exact pathophysiology of insulin resistance after bariatric surgery.



(Tower Health, 2020)

Nursing Implications

- Closer monitoring of post operative glucose levels
- Changes to diabetic medications upon discharge
- Educating patient before discharge on hypoglycemic episodes.
- Teach patients safe foods to eat to control blood sugar levels after surgery

Reversal of Insulin Resistance

- Weight loss
- Adequate sleep
- Stress reduction
- Avoiding high blood sugars
- Physical Activity
- Bariatric Surgery

(CDC, 2020)



(National PTA, 2020)

Conclusion

Obesity and Type 2 diabetes are two major disease processes that are prevalent in American society (Dejeu et al., 2019). Bariatric surgery is traditionally utilized for weight loss. The surgery changes the structure of the stomach and the digestion process (Dejeu et al., 2019). Bariatric surgery has been shown to help reverse type 2 diabetes over time (Dejeu et al., 2019). A rapid change in insulin resistance has been noted in the body after bariatric surgery almost immediately (Mäkinen et al., 2015). The pathology of the change is unknown, but many theories exist. The change is metabolic and independent of long-term weight loss (Palau-Rodriguez, et al., 2018). Further research is needed in this area of health care.

References



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