Nutrient Delivery and Handling Following Bariatric Surgery in Obese Rats

MC Gropler, AP Chambers, & RJ Seeley

Obesity Research Center and the Metabolic Diseases Institute, University of Cincinnati, Cincinnati, OH USA

Introduction: The most effective treatment for obesity is bariatric surgery; however, the mechanism by which these benefits are produced is poorly understood. Traditionally, bariatric surgeries have been viewed as restrictive, malabsorptive, or both. More recently, it has been hypothesized that many benefits of bariatric surgery may actually be a consequence of accelerated intestinal transit.

Aims/Hypothesis: The aim of the study was to test the hypothesis that faster transit times would improve metabolic outcomes using a novel bariatric procedure in which transit is accelerated through a single intestine-intestine anastomosis.

Methods: A rat model of diet-induced obesity was used. Two versions of the surgery were tested. In the first, a side-to-side anastomosis was made prior to the ligament-of-trietz with a segment of gut that was 30 cm away from the ileal-cecal valve. Continuity with the rest of the alimentary tract was maintained. A second surgery in which the same anastomis was made 30 cm distal to the ligament-of-treizt was performed to assess how faster transit times would alter surgical outcomes. Food intake, body weight, glucose tolerance were assessed and facile fat absorption measured to determine whether either surgery resulted in malabsorption. Comparisons were made with sham operated rats that received identical cuts on corresponding regions of the intestine. A naïve group of rats was used to control for the effect of surgery per se.

Results: Both surgical groups had sustained weight loss in comparison to Sham and Naïve controls, $P<0.05$. Reductions in body weight were the result of decreased fat mass, $P<0.05$. Effects on lean tissue mass were non-significant, $P>0.05$. Glucose tolerance was also significantly improved relative to Sham and Naïve rats, $P<0.05$. Long-loop, $P<0.05$, but not Short-loop, $P>0.05$, rats showed evidence of fat malabsorption compared with Sham operated and Naïve rats. However, differences in body weight and glucose tolerance among Long- and Short- loop versions were non-significant, $P>0.05$.

Conclusion: These studies demonstrate that accelerating intestinal transit alone produces significant reductions in body weight and improvements in glucose tolerance that are comparable to other animal models of traditional bariatric approaches.

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Contact Information: Matt Gropler – groplemc@mail.uc.edu