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Title: Comment on: Temporal Changes in Plasma Markers of Oxidative
Stress Following Laparoscopic Sleeve Gastrectomy in Subjects with
Impaired Glucose Regulation

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Obesity is a state of chronic low-grade inflammation with increased levels of inflammatory markers. Inflammation and oxidative stress are pathophysiological mechanisms linking obesity to the development of insulin resistance. A number of proteins secreted from adipose tissue, known as adipokines, are involved in the inflammatory process. Dysregulation of these adipokines leads to a pro-inflammatory state and peripheral insulin resistance. Bariatric surgery decreases the low grade inflammation associated with obesity as well as oxidative stress, and beneficially changes the levels of several adipokines. In 2010, Cabrera *et al* studied a few markers of oxidative stress and inflammation in 20 obese patients following laparoscopic Roux-en-Y gastric bypass (RYGB). In the preoperative period, the obese group individuals showed higher oxidation and inflammation levels and lower indices of antioxidant defense than the control group. One year after RYGB, an improvement in antioxidant protection, associated with a reduction in inflammatory and oxidative markers, was observed, indicating that these individuals presented a lower degree of oxidative stress.¹ One year later, Miller *et al* examined the changes in the biomarkers of inflammation, including leptin, adiponectin, C-reactive protein, interleukin-6, and tumor necrosis factor- α after RYGB in morbidly obese and found a reduction in pro-inflammatory biomarkers and an increase in the anti-inflammatory mediators of obesity.² In 2014, Mallipedhi *et al* offered the first study to examine the detailed changes in inflammatory cytokines after sleeve gastrectomy and discovered significant improvements in the inflammatory biomarkers after surgery in patients with impaired glucose homeostasis and type 2 diabetes.³ There remains a lack of literature elucidating the effects of sleeve gastrectomy (SG) on inflammatory biomarkers.

The authors offer a study of the systemic inflammatory effects of excess adiposity in patients with impaired glucose tolerance following laparoscopic sleeve gastrectomy (LSG). They chose 2 plasma markers to determine the change in oxidative stress with weight loss after sleeve gastrectomy. These two markers included Thiobarbituric Acid Reactive Substances (TAOS), a product of lipid peroxidation, and Total Antioxidant Status (TBARS), which is inversely related to oxidative stress. These measures provide a global plasma measure of oxidative stress (TAOS) and a specific measure of lipid peroxidation (TBARS). TBARS is an easily measured global plasma marker of lipid peroxidation, a process dependent on oxidative stress and damage. Patients were recruited prospectively and evaluated at 1 and 6 months post-operatively following sleeve gastrectomy. The study observed a significant reduction in TBARS after short term follow up after sleeve gastrectomy in this patient population and, therefore, suggested that global oxidative stress was lower.

The manuscript attempts to determine the systemic inflammatory effect of excess adiposity by measuring two specific plasma markers to measure oxidative stress, namely TAOS and TBARS. The strength of this study is the novelty of measuring the inflammatory stress changes after sleeve gastrectomy. However the current literature includes numerous adipokines and inflammatory proteins and the relevance of the author's choice remains unclear. Longer-term prospective studies are required to examine the effects of LSG alone and versus other bariatric procedures in relation to biomarkers of inflammation and oxidative stress in relation to the inflammatory mediated complications of obesity in patients with and without impaired glucose regulation.

Disclaimer: The views expressed herein are those of the authors and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense or the United States Government.

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¹ Joao Cabrera E, Valezi AC, Delfino VD, et al. Reduction in plasma levels of inflammatory and oxidative stress indicators after Roux-en-Y gastric bypass. *Obes Surg*. 2010;20:42-9.

² Miller GD, Nicklas BJ, Fernandez A. Serial changes in inflammatory biomarkers after Roux-en-Y gastric bypass surgery. *Surg Obes Relat Dis*. 2011;7:618-24.

³ Mallipedhi A, Prior SL, Barry JD, et al. Changes in inflammatory markers after sleeve gastrectomy in patients with impaired glucose homeostasis and type 2 diabetes. *Surg Obes Relat Dis*. 2014;10:1123-8.

SURGERY FOR OBESITY AND RELATED DISEASES (SOARD)
Author Disclosure of Relevant Financial Relationships

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