

Title: Plasma Magnesium Zinc, Copper And Selenium Concentrations In Obese Patients Before And After Bariatric Surgery

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Obesity enhances the risk of type-2 diabetes, cardiovascular disease and inflammatory conditions and leads to metal dyshomeostasis, which contributes to the negative health aspects associated with the disease. In severe cases, bariatric surgery can enable sustained weight loss and improvement in health. Here, magnesium, zinc, copper and selenium concentrations were examined in 24 obese patients (7 males and 17 females) before and 9-months after undergoing Roux-en-Y gastric bypass surgery. All patients lost weight over this period, with the mean BMI reducing from 51.2 ± 7.1 kg/m² to 37.2 ± 5.5 kg/m². Moreover, whole-blood glycated haemoglobin (HbA1c), as a marker of average glycaemia, was also measured and a correlative analysis of this parameter with metal concentrations performed. Significant alterations in the plasma concentrations of magnesium, zinc (both increased by 13.2% and 25.2% respectively) and copper (decreased by 7.9%) were observed over this period (plasma selenium concentration was unchanged), with BMI values correlating with plasma magnesium ($p=0.004$) and zinc ($p=0.022$) concentrations. At 9 months post-surgery, an increase in mean zinc/copper ratio was observed (0.86 ± 0.29 compared to 0.63 ± 0.14 pre-surgery). Comparison of whole-blood HbA1c concentrations pre- and post-surgery revealed a reduction from $6.50 \pm 1.28\%$ pre-surgery to $5.51 \pm 0.49\%$ post-surgery. Differences in plasma HbA1c and magnesium pre- and post-surgery correlated significantly, as did HbA1c and magnesium levels when pre- and post-surgery values were analysed together. Collectively, this

work reveals that bariatric surgery, in conjunction with lifestyle/dietary changes, lead to improvements in the nutritional status

Biography

Dr. Alan J. Stewart is a Reader in Molecular Medicine at the University of St Andrews. His research is focused upon how metal ions are handled in the body and the roles they play in regulating medically/physiologically relevant processes. Collectively, it provides detailed and reliable data relating to the transport and speciation of metal ions (particularly Zn²⁺) in the circulation and new insights into their cellular functions and role in disease states. To date his work has attracted grant funding from UK Research Councils (Biological and Biotechnological Sciences Research Council (BBSRC)), British Heart Foundation, Fight for Sight and The Leverhulme Trust. He has published >70 peer-reviewed publications, many in world class and field-leading journals. He is currently a member of the BBSRC Pool of Experts and sits on the Editorial Boards of the journals, Scientific Reports, Frontiers in Endocrinology, Nutrients and BioMetals.