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Evaluation of antioxidant systems (coenzyme Q10 and total antioxidant capacity) in morbid obesity before and after biliopancreatic diversion

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Abstract

Biliopancreatic diversion (BPD) is a surgical procedure performed in patients with untreatable obesity and insulin resistance. The demonstrated metabolic and hormonal results of this procedure include the reversal of insulin resistance; an increase in diet-induced thermogenesis; and modifications of gut hormones, such as gastrin, enteroglucagon, neurotensin, and cholecystokinin. On the other hand, obesity is a condition of increased oxidative stress; however, few studies have investigated antioxidant systems in obese persons with BPD. To evaluate the metabolic status and antioxidant systems in such patients, we studied a group of 11 morbidly obese patients, aged 28 to 62years, with a mean body mass index (BMI) of 54.71 ± 2.52 kg/m^2, before and after successful BPD (mean post-BPD BMI, 44.68 ± 1.51 kg/m^2). A control group composed of 10 slightly overweight women, with a mean BMI of 28.5 ± 0.72 kg/m^2, was also studied. Coenzyme Q_{10} (CoQ_{10}) levels (also normalized for cholesterol levels) and total antioxidant capacity in blood plasma were assessed in these populations. The most striking datum was the extremely low level of CoQ_{10} in postoperative period (0.34 ± 0.16 vs 0.66 ± 0.09 μg/mL, P = .04); also, the data corrected for cholesterol levels presented the same pattern, with a more marked significance (152.46 ± 11.13 vs 186.4 ± 17.98 nmol/mmol, P = .001).This could be due to lipid malabsorption after surgery. In fact, the pre-BPD data present all the metabolic and hormonal characteristics of severe obesity; and after BPD, there was a net improvement in the metabolic parameters. The first pathophysiologic phenomenon seems to be lipid malabsorption that has been argued to be the cause of insulin resistance reversion. This metabolic interpretation is also confirmed by the absence of significant variations of total antioxidant capacity (57.5 ± 5.3 vs 66 ± 5.3). The mechanisms of these phenomena remain to be established. These data suggest the importance of correcting postsurgical metabolic complications, in these clinical populations, with CoQ_{10} supplementation.

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