

Letters to the Editor

Total antioxidant status before and after bariatric surgery for type 2 diabetes mellitus

To the Editor:

We write with reference to the recently published article by Mancini et al [1]. They observed a marked reduction in levels of the lipophilic antioxidant CoQ₁₀ after biliopancreatic diversion surgery in a sample of 11 morbidly obese patients, despite there being no parallel decrease in total antioxidant capacity. Levels of CoQ₁₀ significantly decreased 3 to 6 months postsurgery (0.66 ± 0.09 and $0.34 \pm 0.16 \mu\text{g/mL}$), whereas no significant difference was noted in lag time for total antioxidant capacity before and after surgery (66 ± 5.3 and 57.5 ± 5.3 seconds). The authors gave no explanation for this phenomenon. They also described the diabetes status of the sample, although the mean presurgery fasting glucose was $146.91 \pm 22.61 \text{ mg/dL}$ (8.2 mmol/L).

We have also examined total antioxidant status (TAOS) in morbidly obese patients with type 2 diabetes mellitus (T2DM) undergoing bariatric surgery (4 restrictive and 5 malabsorptive surgery). Samples were obtained at baseline and at 1 and 6 months postsurgery. Plasma TAOS was measured in 9 subjects with a mean age of 47 ± 9.4 years, body mass index (BMI) of $56 \pm 15 \text{ kg/m}^2$, fasting glucose of $9.2 \pm 4.3 \text{ mmol/L}$, and hemoglobin A_{1c} (HbA_{1c}) of $7.0\% \pm 1.9\%$. The mean BMI at 1 and 6 months postsurgery was 48 ± 12 and $43 \pm 9 \text{ kg/m}^2$, respectively. As shown in Table 1, we observed that, compared

with baseline plasma TAOS ($55.0\% \pm 5.7\%$), no difference was seen at 1 month ($57.6\% \pm 7.4\%$, $P = .39$), but a significant increase was seen at 6 months ($58.2\% \pm 4.8\%$, $P = .03$). Other clinical benefits were observed at 6 months in HbA_{1c}, low-density lipoprotein, triglycerides, systolic blood pressure, diastolic blood pressure, and fasting glucose ($P = .04$).

In summary, we observed a significant improvement in plasma TAOS at 6 months postsurgery. This is also associated with a reduction in other risk factors linked to the complications associated with T2DM. Because diabetes is associated with increased oxidative stress, we suggest that the improvement seen in plasma TAOS in our sample (contradictory to the observation by Mancini et al [1]) may be related to the baseline characteristics of the group undergoing surgery. It may be that subjects with morbid obesity and T2DM might get greater benefit from surgery in terms of reducing oxidative stress. Further examination is required in other samples of morbidly obese patients (with and without T2DM) undergoing bariatric surgery.

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Table 1
Baseline measurements before and after bariatric surgery

Variable	Baseline	1 mo	6 mo
BMI (kg/m^2)	55.6 ± 15.7	$48.4 \pm 12^\dagger$	$43.0 \pm 9^\dagger$
TAOS (%)	55.6 ± 5.9	57.6 ± 7.4	$58.2 \pm 4.8^*$
HbA _{1c} (%)	7.0 ± 1.9	6.4 ± 0.9	$5.4 \pm 0.9^\dagger$
Fasting glucose (mmol/L)	9.2 ± 4.3	6.3 ± 1.1	$5.1 \pm 0.6^*$
LDL (mmol/L)	2.5 ± 0.7	$1.7 \pm 0.7^\dagger$	$1.8 \pm 0.5^\dagger$
TG (mmol/L)	2.5 ± 1.0	1.8 ± 0.5	$1.4 \pm 0.3^*$
SBP (mm Hg)	155 ± 29	141 ± 9	$127 \pm 9^*$
DBP (mm Hg)	93 ± 22	83 ± 9	$72 \pm 8^*$

Mean and SD shown. Paired t tests performed. LDL indicates low-density lipoprotein; TG, triglycerides; SBP, systolic blood pressure; DBP, diastolic blood pressure.

* $P < .05$.

† $P < .01$.

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Reference

- [1] Mancini A, Leone E, Festa R, Grande G, Di Donna V, De Marinis L, et al. Evaluation of antioxidant systems (coenzyme Q10 and total antioxidant capacity) in morbid obesity before and after biliopancreatic diversion. *Metabo Clin Exp* 2008;1384-9.