

patients undergoing RYGB and SG, according to the time of surgery and percent weight loss. **Methods:** we studied 117 patients (91% female, 51% RYGB, mean age  $41.8 \pm 6.7$  years, mean time of surgery  $4.3 \pm 3.4$  years) who were divided into two groups according to the surgical procedure adopted (SG vs. RYGB). They were evaluated at different times after surgery (1–2 years, > 2 and <5 years and  $\geq 5$  years) and according to the percentage of weight loss (10–20%, >20% and <40%,  $\geq 40\%$ ). Anthropometric measurements, body composition and BMD, bone parameters (PTH, corrected serum calcium, 25OHD, alkaline phosphatase -AP, C-telopeptide - CTX), and biochemical tests were compared. **Results:** The prevalence of SHPT (PTH  $\geq 65$ pg/ml) was 26%, higher in the RYGB vs. SG (35% vs. 17%, respectively,  $p = 0.039$ ), despite no significant differences in serum 25OHD ( $28.5 \pm 7.3$  vs.  $27.6 \pm 7.7$  ng/ml,  $p=0.519$ ) and corrected serum calcium ( $9.8 \pm 0.6$  vs.  $9.8 \pm 0.5$  mg/dl,  $p = 0.466$ ) between the groups. Mean serum PTH, CTX and AP was higher in the RYGB vs. SG ( $61.3 \pm 29.5$  vs  $49.5 \pm 32.3$  pg/mL,  $p = 0.001$ ;  $0.596 \pm 0.24$  vs.  $0.463 \pm 0.23$  ng/mL;  $123.9 \pm 60.8$  vs.  $100.7 \pm 62.0$  U/L, respectively). There were 13.5% decreases in femoral neck BMD in all patients, over the study period. After 5 years of surgery, the RYGB group showed greater bone loss in total body BMD ( $1.016$  vs.  $1.151$ g/cm<sup>2</sup>, -8.1%,  $p = 0.003$ ) and total femur BMD ( $1.164$  vs.  $1.267$ g/cm<sup>2</sup>, - 11.7%,  $p = 0.007$ ). Mean serum leptin was lower in the RYGB group, when compared to SG ( $7.6 \pm 5.8$ ng/mL vs.  $14.0 \pm 9.9$ ,  $p = 0.001$ ), with no correlation with BMD in any site. There were no significant differences between the RYGB and SG regarding the other metabolic parameters. **Conclusion:** We found a more deleterious effect of RYGB on bone health up to 5 years postoperatively in comparison with SG.

## Bone and Mineral Metabolism

### VITAMIN D, DIABETES AND ENERGY METABOLISM

#### *The Effect of Vitamin D Supplementation on Severe COVID-19 Outcomes in Patients With Vitamin D Insufficiency*

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**Introduction:** Coronavirus Disease 2019 (COVID-19) deaths have surpassed one million worldwide with limited treatment modalities, and physicians are relying on alternative methods, such as Vitamin D supplementation, to prevent or halt disease progression without direct evidence. Research has proven that vitamin D supplementation can prevent inflammation based on its role in innate immune response; however, there have been limited studies regarding vitamin D supplementation in COVID-19. We

aimed to determine whether vitamin D supplementation in vitamin D insufficient patients was associated with fewer severe COVID-19 outcomes, defined as mechanical ventilation or death. **Methods:** Retrospective study that analyzed data from all adult patients admitted to our tertiary care center between March 2020 and July 2020 with a positive RT-PCR for SARS CoV-2 and a serum 25-hydroxyvitamin D (25[OH]D) level measured within 90 days prior to the index admission. Patients with 25(OH)D <30 ng/mL were considered vitamin D insufficient and patients ordered for at least one weekly dose of  $\geq 1,000$  units of ergocalciferol or cholecalciferol were considered supplemented. Supplemented vitamin D insufficient patients were compared to non-supplemented vitamin D insufficient patients in terms of severe COVID-19 disease as defined by mechanical ventilation or death. **Results:** 129 COVID-19 patients with a vitamin D level <30 ng/mL were identified, with a median vitamin D level of 21.4 ng/mL. A total of 43 patients (33.3%) had severe COVID-19 outcomes. 65 (50.4%) patients with vitamin D insufficiency were supplemented and 64 (49.6%) were not supplemented. Vitamin D supplementation with  $\geq 1,000$  units (OR 0.6, 95% CI 0.28 - 1.40;  $p=0.25$ ),  $\geq 5,000$  units (OR 0.5, 95% CI 0.26 - 1.23;  $p=0.15$ ), or  $\geq 50,000$  units (OR 1.0, 95% CI 0.42–2.20,  $p=0.92$ ) weekly had no statistically significant effect on severe COVID-19 outcomes. The odds of severe COVID-19 outcomes in supplemented patients were non-significantly reduced at lower cutoff values for vitamin D insufficiency (<20 ng/mL and <12 ng/mL) for all supplementation amounts. **Conclusion:** Vitamin D supplementation in patients with vitamin D insufficiency did not significantly reduce severe COVID-19 outcomes; however, vitamin D supplementation was associated with non-statistically significant reduced odds of severe COVID-19 outcomes at lower cutoff values of vitamin D level. These results demonstrate that Vitamin D supplementation may have a protective effect against severe COVID-19 outcomes in patients with lower baseline levels of vitamin D.

## Bone and Mineral Metabolism

### VITAMIN D, DIABETES AND ENERGY METABOLISM

#### *The Impact of Glucose Tolerance States on Bone Mineral Density and Fracture Rate*

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It is generally acknowledged that fracture rate is higher in diabetic subjects than non-diabetic subjects. However, the impact of diabetes on bone is less clear due to contradictory results of bone mineral density (BMD) and fracture rate. To date, most of reports were based on the studies