Title: Serum vitamin D levels are associated with markers of hypoxia in obstructive sleep apnea patients

Body: Background: Vitamin D (Vit. D) insufficiency has been associated with metabolic syndrome, diabetes and cardiovascular disease, conditions also related with obstructive sleep apnea syndrome (OSAS). Aim of the study was to examine serum levels of Vit. D in otherwise healthy OSAS patients and to explore associations between these levels and patients’ sleep and anthropometric characteristics. Methods: Patients with polysomnographically confirmed OSAS (AHI>15/h) were included. To all of them blood was drawn in order to examine Vit. D levels with radioimmunoassay (RIA). Additionally, PFTs and ABGs analysis were conducted. Results: Totally, 136 patients (94 males) with mean AHI 59.1/h, minimum SpO\textsubscript{2} 67.8±11.4%, and average SpO\textsubscript{2} 89±3.5% were included. PFTs and ABGs results were within normal range. Mean levels of Vit. D were 19.5±10.9 ng/ml. These levels were positively correlated with Total Sleep Time (p=0.003), Sleep Efficiency (p=0.008), S2%TST (p=0.006), and negatively with S1%TST (p=0.010). Additionally, a negative association was revealed with AHI (p=0.039), maximum apnea duration (p=0.001), and t<90% (p=0.004), and a positive association with averSpO\textsubscript{2} (p=0.001) and minSpO\textsubscript{2} (p=0.004) during sleep and PaO\textsubscript{2} (p=0.003). No association was found with age or BMI. OSAS patients with hypovitaminosis D (<20 ng/ml) had significantly lower minSpO\textsubscript{2} (p=0.022) and PaO\textsubscript{2} (p=0.010) levels, and higher maximum apnea duration (p=0.025) and t<90% (p=0.049), in comparison to patients with Vit. D >20ng/ml. Conclusions: Vit. D levels are negatively affected by OSAS. This association could be considered in interpreting the pathogenesis of cardiovascular and metabolic disorders in OSAS.