Association Between Sex Steroids, Ovarian Reserve, and Vitamin D Levels in Healthy Nonobese Women

Abstract

Vitamin D maintains calcium and phosphorous homeostasis and promotes bone mineralization; however, its nonskeletal functions are increasingly being recognized. Recent evidence supports a role for vitamin D in reproductive potential, but few studies have investigated the potential effects of vitamin D on reproductive hormone biosynthesis and ovarian reserve.

The aim of this study was to determine the relationships between the serum level of vitamin D, reproductive hormone levels, and ovarian reserve in healthy nonobese women. This was a cross-sectional study. The study was performed at the Fertility Center at CHA Medical Center. Seventy-three healthy women volunteers participated in this study. The participants were nonobese parous women with regular menstrual cycles and no history of infertility. We determined serum levels of vitamin D, steroid hormones, SHBG, ovarian reserve markers, homeostatic model assessment of insulin resistance index, and lipid profiles.

Results

In linear regression analysis adjusting for age, body mass index, homeostatic model assessment of insulin resistance, and lipid profile, serum vitamin D level positively correlated with total T ($P < .001$) and free androgen index ($P < .001$) but did not correlate with dehydroepiandrosterone sulfate or other steroid hormones. The spline regression-suggested relationship between 25-hydroxyvitamin D and total T was most pronounced at a 25-hydroxyvitamin D concentration greater than 13 ng/mL ($\beta$-coefficient 2.374, 95% confidence interval 1.435–3.313). The serum vitamin D level was not associated with the levels of ovarian reserve markers.

Conclusion

Our study revealed a positive correlation between serum vitamin D level and T level in healthy nonobese women, suggesting that vitamin D may increase fertility through the modulation of androgen activity. The possible causality of the relationship between vitamin D and T deserves further investigation.