

Vitamin D, Vitamin D Binding Protein, And Airflow In COPD

I. Berg¹, C. K. Hanson¹, H. R. Sayles¹, D. Romberger¹, A. J. Nelson¹, J. L. Meza¹, B. Miller², L. D. Edwards³, S. I. Rennard⁴, on behalf of the ECLIPSE Investigators

¹University of Nebraska Medical Center, Omaha, NE, ²GlaxoSmithKline, King of Prussia, ³GlaxoSmithKline, Research Triangle Park, PA, ⁴University of Nebraska Medical Ctr, Omaha, NE

Corresponding author's email: bruce.miller@gsk.com

RATIONALE: Several lines of evidence suggest a relationship between vitamin D, vitamin D binding protein (VDBP), and chronic obstructive pulmonary disease (COPD).

METHODS: We selected 498 subjects of the Evaluation of COPD Longitudinally to Identify Predictive Surrogate Endpoints study (ECLIPSE) for a pilot study. These included 75 smoker and 75 non-smoker controls and three groups of 116 subjects each with GOLD stage 2, 3, and 4 COPD. The latter three groups included the 58 subjects with the highest and lowest CT emphysema score (% of lung voxels <-950 Hounsfield units) in each GOLD stage. Serum samples from visit 7, which corresponded to 2 ½ years after study entry, were assessed. For this preliminary report, 25(OH)D and VDBP levels were assessed on 153 and 354 subjects, respectively. 25(OH)D was measured with liquid chromatography-mass spectroscopy and VDBP measured with competitive ELISA. FEV1 was measured concurrently with the serum sampling. CT-scan emphysema was assessed at year 3 for smoker controls and COPD subjects, and at study entry in non-smoker controls.

RESULTS: A range of serum levels for both 25(OH)D and VDBP were observed (Figure 1). With this limited sample set, single variant analysis demonstrated a significant inverse association between VDBP and 25(OH)D ($p=.01$) and a direct correlation between 25(OH)D and FEV1 % predicted ($p=.02$) (Table 1). The associations between VDBP and FEV1 and of both 25(OH)D and VDBP with emphysema did not achieve significance with the samples evaluated.

CONCLUSIONS: 25(OH)D levels correlate with lung function in COPD. VDBP levels in serum are inversely related to 25(OH)D levels. This supports the concept that free vitamin D levels will be more strongly related to lung function than total vitamin D.

Figure 1. Histogram for 25(OH)D (ng/mL), Vitamin D Binding Protein (mg/dL)

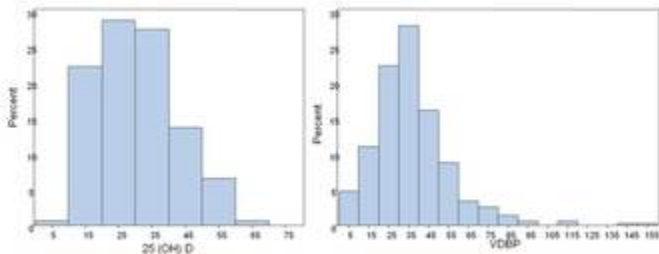


Figure 2. Plot of 25(OH)D vs. VDBP

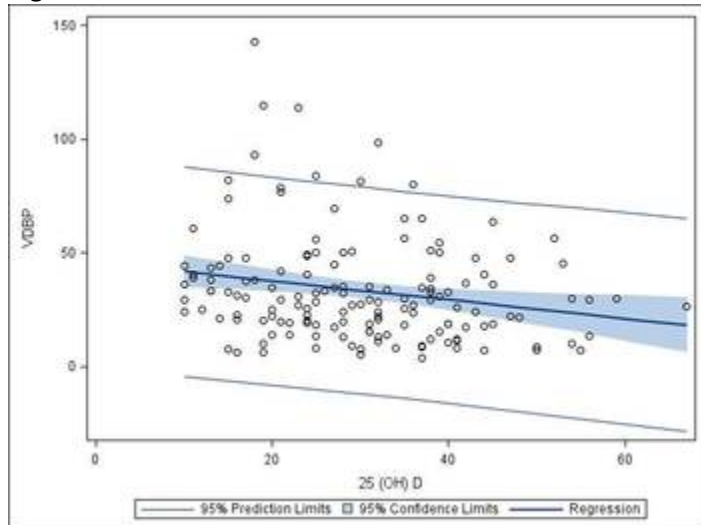


Table 1. Spearman Correlations among Variables of Interest

Spearman Correlation Coefficients

	Fractional Tissue Volume (-950 Hounsfield Units)	FEV1 (L)	FEV1 % Predicted	25(OH)D
FEV1 Forced expiratory volume (1 second) (L)	-0.657 p<.01 (n = 495)			
FEV1 % Predicted	-0.676 p<.01 (n = 495)	0.936 p<.01 (n = 494)		
Vitamin D (ng/mL)	-0.118 p=0.15 (n = 153)	0.122 p=0.14 (n=152)	0.190 p=0.02 (n=153)	
Vitamin D Protein (mg/dL)	-0.045 p=0.40 (n=354)	0.009 p=0.86 (n=352)	0.033 p=0.54 (n=352)	-0.223 p=0.01 (n=151)

Funding Sources:

Kuhl Respiratory Research Support Award, Pulmonary, Critical Care, Sleep and Allergy Division, University of Nebraska Medical Center.
Pilot Grant, Clinical Research Center, University of Nebraska Medical Center.
GSK funded the ECLIPSE study, ClinicalTrials.gov identifier: NCT00292552; GSK Protocol ID: SCO104960

This abstract is funded by: University of Nebraska Medical Center; GlaxoSmithKline

Am J Respir Crit Care Med 185;2012:A3749

Internet address: www.atsjournals.org

Online Abstracts Issue