

CIGARETTE SMOKING IS ASSOCIATED WITH DECREASED BGP LEVELS IN HEMODIALYSIS PATIENTS

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Introduction and Aims

Bone Gla protein (BGP or osteocalcin) is a vitamin K-dependent protein involved in the regulation of bone mineralization. Smoking is a risk factor for osteoporosis [1] and vascular calcifications [2]. Nicotine and non-nicotine tobacco smoke components have been shown to depress osteoblast activity.

We evaluated the effects of cigarette smoking on BGP levels in patients with end stage renal disease (ESRD).

Methods

Secondary analysis of the VIKI study, involving 370 hemodialysis patients from 18 dialysis centers in Italy. Study subjects were administered a questionnaire to ascertain smoking status (i.e., current, past, or never smoker). Potential associations of smoking, BGP levels, fractures, and vascular calcifications were evaluated.

Results

Among dialysis patients, smokers had significant lower BGP levels (152 vs. 204 mcg/L, $p=0.003$). Smokers also had lower levels of phosphate ([4.25 (3.7, 5.3)] vs. [4.86 (4.0, 5.6)] mg/dl, $p=0.008$) and albumin ([3.8 (3.5, 4.0)] vs. [3.9 (3.6, 4.2)] g/dL, $p=0.001$). Lower BGP levels were associated with aortic calcification ($p<0.001$), iliac calcification ($p=0.042$) and vertebral fractures ($p=0.023$) (Figure 1). Severe aortic vascular calcifications was significantly associated with lower BGP levels (218 mcg/L vs 165 mcg/L, $p=0.002$).

Stratification by gender showed lower median BGP levels in male smokers [147 mcg/L (83.8, 247)] compared to non smokers [206 mcg/L (97.2, 355.3)], $p=0.0055$. No significant differences of BGP levels were found in females: smokers 187 mcg/L (107, 361.9), non smokers: 204 mcg/L (115, 403.3) $p=0.7905$.

The regression model showed that cigarette smoking patients had a statistically significant reduction of 18% in the median values of BGP (parameter estimate -0,199; $p=0.0105$; $R^2=0.53$).

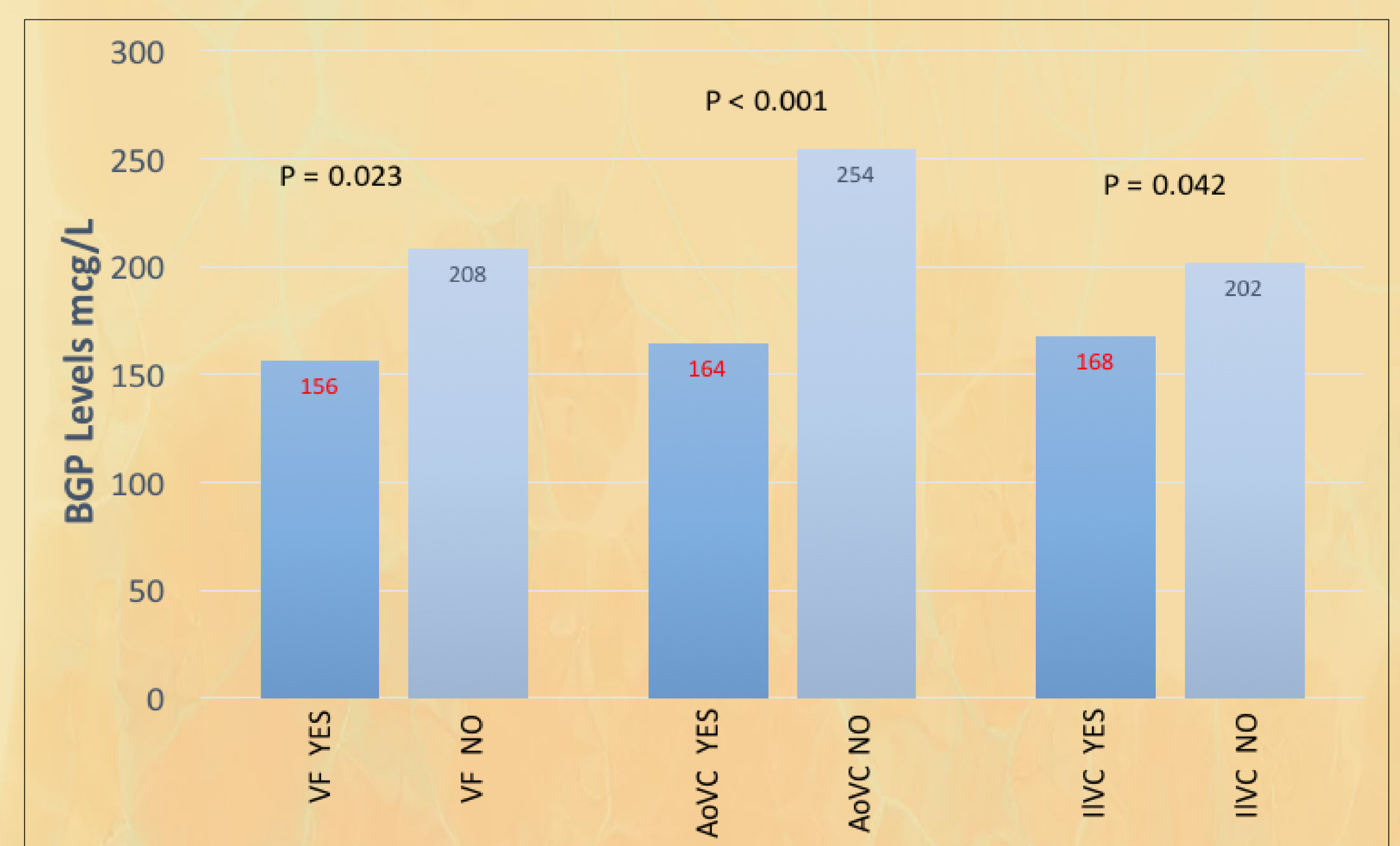
Conclusion

This is the first clinical study in the hemodialysis population which identifies cigarette smoking as a potential inhibitor of BGP activity, a protective agent in bone and vascular health.

Table 1. Main patients characteristics.

Data	Patients Smokers or Ex-Smoker (n=36)	Patients No-Smoker (n=234)	P value
Gender, female, n (%)	31 (22.8 %)	108 (46.2 %)	<0.001
Age, years, mean±SD	65.4±3.5	63.6±14.4	0.241
Weight, kg, mean±SD	72.7±14.9	68.8±14.0	0.012
Height, m, mean±SD	1.691±0.092	1.658±0.091	0.001
BMI, kg/cm ² , mean±SD	25.3±4.3	24.9±4.4	0.411
Phosphate, mg/dl, median	4.25 (3.72, 5.30)	4.70 (4, 5.58)	0.008
Albumin, g/dl, median	3.8 (3.5, 4.0)	3.9 (3.6, 4.2)	0.001
BGP total, mcg/L, median	152.00 (91.70, 251)	204.50 (111, 362)	0.003

Figure 1. Median total BGP levels and association with vertebral fractures, aortic and iliac calcifications.



References

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