

PIVKA II is a biomarker for predicting coronary calcification in hemodialysis patients with diabetes

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Background/Aims: Vascular calcification(VC) is common complication in ESRD. Vitamin K deficiency is well known cause of VC through the inactivation of Vitamin K dependent Proteins. Therefore, a marker that can easily predict the risk of VC due to vitamin K deficiency is needed. In this study, we aim to investigate whether the easily measurable vitamin K absence II(PIVKA II) can serve as a surrogate marker for predicting coronary a. calcification(CAC) in ESRD patient.

Methods: This study is an observational study conducted on ESRD patient. Patients with LC, HCC, or a history of coronary artery disease with stent placement, and patient with active infectious diseases were excluded. CAC score was measured by Non-enhanced CT, and before starting hemodialysis, blood samples were collected to measure PIVKA-II, osteocalcin(OC), and bone-specific alkaline phosphatase(BAP) among other bone markers. PIVKA-II was measured two times with 3 months interval, and average value was calculated. Ankle-brachial index(ABI) and DEXA bone densitometry were also performed.

Results: In this study, 69 HD patients participated. Among them, 34 patients had DM. The study compared two groups based on the presence of DM. Patients with DM had higher BMI($p=0.01$) and a higher frequency of vascular diseases($p=0.004$). The DM group also had higher LDL-c levels($p=0.03$), but there was no significant difference between the two groups in terms of PIVKA-II, BAP, and Osteocalcin levels(Table 1). When analyzing the factors that had a correlation with the CAC score in all 69 patients, LDL cholesterol($r=-0.37$, $p=0.002$) and CRP($r=0.28$, $p=0.03$) were found to have a significant correlation, but PIVKA-II($p=0.065$, Figure 1A), BAP($p=0.57$), and OC($p=0.45$) did not. In DM group, there was a correlation between CAC score and PIVKA-II($r=0.283$, $p=0.001$), but there was no correlation between CAC score(Figure 1B) and CaxP, LDL cholesterol, CRP, BAP, and OC($p=0.7$, $p=0.4$, $p=0.3$, $p=0.7$ and $p=0.4$).

Conclusions: The result suggest that in patient with DM who undergo HD, PIVKA-II can be useful marker for predicting CAC associated with vitamin K deficiency. This is because diabetic patients may have more pronounced VKDP inactivation and VC due to vitamin K deficiency

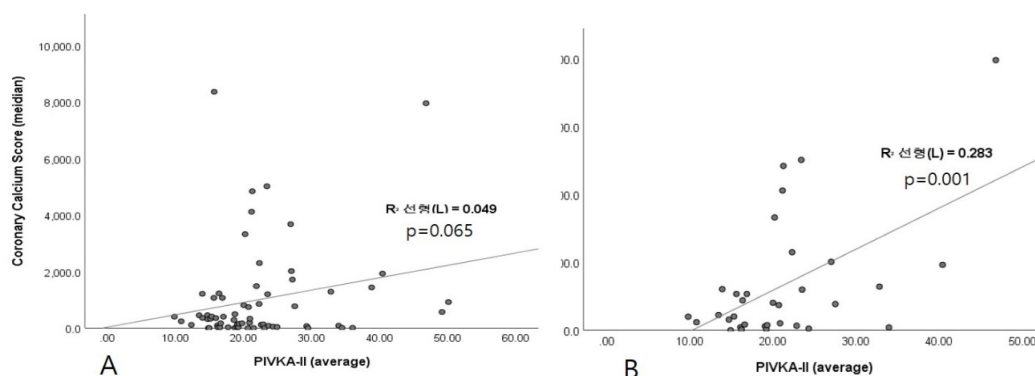


Table 1. Demographics

	Non-DM (N=35)	DM (N=34)	P-value
Gender (M/F)	17/18	16/18	NS
Age (yrs)	61±11	61±10	NS
BMI	21.2±3.7	24.2±3.8	0.01
Smoking	8 (22.9)	4 (11.8)	NS
SBP	146.1±22.1	153.1±21.2	NS
DBP	73.1±14.7	68.2±15.0	NS
HTN	31 (88.6)	31 (91.2)	NS
CAD or CVA	12 (34.3)	20 (58.8)	0.04
HD duration (months)	105.8±77.3	71.5±57.6	0.04
Phosphate binder			
Calcium based	3 (8.6)	1 (2.9)	NS
Sevelamer	27 (77.1)	29 (85.3)	NS
Fosrenol	2 (5.7)	7 (20.6)	NS
Calcitriol	16 (45.7)	11 (32.4)	NS
Cinacalcet	9 (25.7)	10 (29.4)	NS
Ca	9.1±1.0	8.8±0.6	NS
P	4.8±1.6	5.4±1.5	NS
CaxP	43.2±14.6	47.5±13.3	NS
Uric acid	6.0±1.6	5.7±1.5	NS
LDL	68.5±29.4	49.1±23.1	0.03
Intact PTH	316.0±363.2	254.8±255.8	NS
Vit D	24.9±18.8	23.3±17.3	NS
CRP	0.37±0.68	0.38±0.59	NS
PIVKA-II	23.1±9.1	20.9±8.0	NS
BAP	17.8±12.7	17.0±9.5	NS
Osteocalcin	201.9±78.5	107.5±57.5	NS
ABI	1.25±0.15	1.17±0.19	NS
Kt/V	1.65±0.26	1.57±0.25	NS

CAD, Coronary artery disease; CVA, Cerebrovascular accident; BAP, Bone specific alkaline phosphatase