Assessment of Vascular Calcification in the Context of Inhibitors in Chronic Kidney Disease.

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Vascular calcification is associated with chronic kidney disease and promotes one of the risks for major cardiovascular events or cardiovascular death[1,2]. A systematic review of vascular calcification inhibitors was designed and performed using data from PubMed and Web of Science (August 2023, November 2023, and March 2024). Altogether, 177 articles that presented serum levels of vascular inhibitors or substances with possible beneficial effects on vascular calcification were eligible. However, the correlation with an assessment of vascular calcification was relatively sparse and presented in this abstract as a valuable ground for further research. Estimating vascular stiffness remains a clinical challenge; although pulse wave velocity is the gold standard for assessing vascular stiffness, a few studies used the aortic augmentation index or carotid intima-media thickness test *(*CIMT*)*. The diversity of methods is presented in Table 1. For evaluating vascular stiffness, fetuin-A, FGF23, and dephosphorylated-uncarboxylated matrix GLA protein (dp-ucMGP) have been investigated as possible surrogate markers. This area could still be expanded in future research, especially in correlation with uremic toxins and vascular calcification inhibitors, as this could have a clinical impact on improved diagnostics and treatment of chronic kidney disease-related vascular damage.

Table 1: Assessment of Vascular Status

Aortic augmentation index (%)	***VC inhibitor correlation***	***Reference range***	***CKD Baseline***	***CKD HD***
Uhlin et al. [3]	*25(OH)D, dp-ucMGP, t-ucMGP, fetuin-A, Gla-rich protein (GRP), osteopontin (OPN), bone-specific osteoprotegerin (OPG)*	*30±9/35±9*	*26 (6 – 44)*	***HD 6 months*** *27 (1-43)* ***HD 12 months*** *24 (-4 – 37)* ***HD 24 months*** *17 (-3 – 35)*
Carracedo et al. [4]	*N/A*	*N/A*	*19 (15−57)*	*N/A*
Kitagawa et al.[5]***(abdominal aortic augmentation index)***	*Klotho*	*4.2 (0–16.4) %*	*N/A*	*N/A*
Pulse wave velocity m/s	***VC inhibitor correlation***	***Reference range***	***CKD Baseline***	***CKD HD***

Uhlin et al. [3] ***(carotid-femoral PWV)***	*25(OH)D, dp-ucMGP, t-ucMGP, fetuin-A, GRP,OPN, OPG*	*10.6 (4.7 – 27.5)*	*10.2 (4.7 – 27.5)*	*10.0 – 11.6 (4.8 – 21.7)*
Ford et al [6] ***(aortic PWV)***	*Fetuin-A*	*N/A*	13.0 6 2.6	*N/A*
Thamratnopkoon et al. [7]	*dp-ucMGP*	N/A	***CKD 3*** 8.7±1.5 ***CKD 4*** 8.7±1.5 **CKD 5** 9.2±1.6	*N/A*
Fain et al. [8]	*dp-ucMGP*	*N/A*	*9.3 ± 2.7*	*N/A*
Pateinakis et al. [9]	*Fetuin-A,OPG*	*N/A*	*N/A*	*9.91 ± 2.29*
Kitagawa et al. [5] ***(brachial PWV)***	*Klotho, FGF23,1,25D*	*N/A*	*15.60 (13.31–17.96)*	*N/A*
Smith et al. [10]	*Fetuin-A*	*N/A*	*12.2 ± 2.4 (13.9 ± 2.3)*	*N/A*
Salem et al. [11]	*Magnesium*	*9.1 ± 0.4*	*(high Mg)11.7 ± 0.6 (normal Mg) 9.6 ± 0.8*	
CIMT (mm)	***VC inhibitor correlation***	***Reference range***	***CKD Baseline***	***CKD HD***
Moghazy et al. [12]	*Sclerostin*	*0.26 ± 0.11*	*0.8 ± 0.23*	*0.93 ± 0.24*
Sevinc et al. [13]	*Fetuin-A, OPG,MGP*	*0.520 ± 0.052*	*0.786 ± 0.168*	
Pateinakis et al. [9]	*Fetuin-A,OPG*	*N/A*	*N/A*	0.833 ± 0.166
Kitagawa et al. [5]	*Klotho, FGF23, 1,25D*	*N/A*	0.85 (0.68–1.10)	*N/A*
Mutluay et al [14]	*Fetuin-A*	*N/A*	***CKD 3*** *0.61 ± 0.50* ***CKD 4*** *0.69 ± 0.43* ***CKD 5*** *0.95 ± 0.31*	*N/A*
Salem et al. [15]	*Magnesium*	*0.82-0,83 ± 0,02- 0.03*	***(low Mg)*** *0.93 – 0,97 .± 0.07-0,08* ***(high Mg)*** *0.74 - 0.78 ± 0.04-0.05*	*N/A*
Brachial artery FMD, % flow-mediated dilation		[5]	*CKD*	
Fain et al. [8]	dp-ucMGP	N/A	6.3 ± 4.3	*N/A*
Kitagawa et al. [5]	Klotho, FGF23, 1,25D	N/A	4.7 (3.1–7.6) %	*N/A*

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