Using Bone Biomarkers and Flow mediated dilatation to assess cardiovascular risk in CKD

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Aim

• To study the effect of CKD on bone biomarkers – OPG (Osteoprotegerin) and human RANKL (Receptor Activator of Nuclear Factor Kappa-B Ligand).
• To correlate bone biomarkers with vascular risk.
• To identify CKD patients at high cardiovascular risk using the flow mediated dilatation technique and FGF23.

Material and Methods

• Serum ALP - spectrophotometry,
• Intact PTH – Chemiluminescence,
• Vitamin D - Electrochemiluminescence,
• OPG, HuRANKL, FGF23 - Standard ELISA
• Flow mediated dilatation-Angiodefender

Principles of Angiodefender Flow Mediated Dilatation:
A sphygomanometer cuff is inflated to 50mm above systolic BP for 5 mins and released. The post release flow mediated dilatation of the brachial artery is recorded by ultrasound.
Flow → Arterial dilatation → NO release → Endothelial integrity
Change in arterial diameter:
>10% = healthy arteries, normal endothelial function
5-10% = Impaired endothelial function and increased arterial stiffness
<5% = Endothelial dysfunction, arterial stiffness, atherosclerosis

Results

Conclusions

• Bone biomarkers-OPG and RANKL have a significant correlation with FMD scores as a marker of high cardiovascular risk.
• OPG/RANKL is far more sensitive than intact PTH as a marker of endothelial integrity and hence cardiovascular risk.
• If OPG/RANKL indicates a low bone turnover state, our study suggests a high prevalence of low turnover bone disease in the dialysis population.