# Adipose Tissue Remodeling : The Link BetweenFGF23-Klotho-Vitamin D3 Axis and Renin-Angiotensin-Aldosterone Axis In The Development And Progression of Obesity Related Kidney Disease

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## OBJECTIVES

Obesity is established as an important contributor of increased diabetes mellitus, hypertension and cardiovascular disease, all of which can promote chronic kidney disease (CKD). Recently, there is a growing appreciation that even in the absence of these risks, obesity itself significantly increases CKD and accelerates its progression. The aim of this work is to evaluate the link between Renin-Angiotensin-Aldosterone System (RAAS) and FGF23-Klotho-1,25D3 axis and their impact in obese and non-obese CKD patients.

## References:

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## CONCLUSIONS

Obesity per se is an independent risk factor for the development and progression of chronic kidney disease specially in young age patients.

## METHODS

In a cross sectional randomized multi centers study ,two hundred twenty sixCKD patients stage III and IV ( eGFR20-60 ml/min/m2 ) have enrolled in this study as follows : group I ; 87 non diabetic CKD patients aged 20-40 years with body mass index (BMI) between 20-25 kgm/m2; group II ; 130 non diabetic CKD patients aged 20-40 years with (BMI) > 30 kgm/m2 and group III ; 89 CKD patients aged >60 years. All patient have been tested for plasma leptinlevels, 1,25dihydrocholicalciferole (1,25D3), plasmaparathormone (PTH) Serum calcium (Ca), serum phosphorus (PO4), and plasma FGF-23 , plasma renin activity (PRA), plasma angiotensinogen receptor 1 &2 (AT1 & AT2) and plasma aldosterone (ALD) .

| | Group I lean 20-40 y N = 87 | Group II Obese 20-40 y N = 130 | Group III Old Age > 60 y N = 89 | P value Group I Vs Group II | P value Group II Vs Group III | P value Group I vs Group III |
|---|---|---|---|---|---|---|
| eGFR ml/min/m2 | 49.3 ± 7.51 | 37.71 ± 13.6 | 41.0 ± 13.47 | P < 0.01 | P < 0.05 | P < 0.05 |
| Diabetes % | Nil | Nil | 36 % | --- | --- | |
| PRA  ng/ml/hr | 4.21 ± 2.07 | 2.08 ± 1.45 | 3.46 ± 1.36 | P < 0.05 | P < 0.05 | P = 346 |
| ALD pg/ml | 47.55 ± 21.8 | 89.91 ± 22.6 | 86.18 ± 16.8 | P < 0.001 | P = 0.34 | P < 0.05 |
| ALD/PRA ratio | 11.29 ± 4.1 | 43.23 ± 14.9 | 24.91 ± 12.1 | P < 0.001 | P < 0.01 | P < 0.01 |
| AT1 pg/ml | 290.3 ± 210.6 | 653.3 ± 352.6 | 407.1±370.4 | P < 0.001 | P < 0.01 | P < 0.05 |
| AT2 pg/ml | 25.46 ± 11.4 | 48.1 ± 4.8 | 33.68 ± 7.63 | P < 0.001 | P < 0.01 | P < 0.05 |
| PWV m/sec. | 9.48 ± 0.8 | 9.31 ± 0.9 | 10.21 ± 0.68 | P = 0.334 | P < 0.05 | P < 0.05 |
| S Ca mg/dl | 9.19 ± 0.64 | 9.27 ± 0.88 | 9.24 ± 0.49 | NS | NS | NS |
| S PO4 mg/dl | 3.85 ± 0.92 | 4.74 ± 1.61 | 4.09 ± 0.42 | P < 0.05 | NS | NS |
| PTH pg/ml | 59.18 ± 24.7 | 77.63 ± 32.4 | 70.9 ± 15.3 | P < 0.01 | P = 336 | P < 0.05 |
| 1,25 D ng/ml | 24.4 ± 4.51 | 19.85 ± 3.6 | 25.0 ± 5.81 | P < 0.05 | P < 0.05 | NS |
| S Leptinfg/l | 1.92 ± 1.61 | 24.13 ± 7.81 | 5.51 ± 3.21 | P < 0.001 | NS | P < 0.01 |
| FGF23 R u/ml | 132.8±126.1 | 259.6±138.6 | 179.3±237.4 | P < 0.001 | P < 0.01 | P < 0.05 |
| P insulin uU/ml | 5.59 ± 2.31 | 13.73 ± 2.38 | 10.7 ± 1.68 | P < 0.01 | P < 0.05 | P < 0.01 |
| S albumin gm/l | 37.53 ± 4.5 | 39.1 ± 3.81 | 37.48 ± 4.2 | NS | NS | NS |

*Table (2) : Mean ± SD; NS, non-significant; eGFR, estimated glomerular filtration rate; PRA, plasma renin activity; ALD, aldosterone; AT1 & AT2, angiotensing receptor1&2; PWV, pulse wave velocity; S. Ca, serum calcium; S.PO4, serum phosphate; PTH, parathormone; 1,25D3, 1,25 dihydrocholicalciferol; S.Leptin, serum leptin; FGF23, fibroplast growth factor 23; plasma insulin; serum albumin.*