"Fibroblast growth factor 23 and PTH are strong determinants of the bone mineral density changes occurring within the first post-renal transplantation year"

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Fibroblast Growth Factor 23 (FGF23) after Kidney Donation

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Aim: The circulating level of the phosphaturic factor FGF23 increases in chronic kidney disease (CKD) and is correlated with glomerular filtration rate (GFR). It is not known how FGF23 is regulated in CKD. Kidney donation offers an opportunity to examine the effect of a moderate decrease in GFR on FGF23. Study subjects and methods: Nine healthy kidney donors were included, six females and three males, of mean age 56 years (range 38-69), with an iohexol-clearance of 98.4±14 ml/min/1.73 m². We measured circulating levels of cystatin C, ionized calcium (Ca), phosphorus (Pi), bioactive parathyroid hormone (bioPTH), full length FGF23, and renal excretion of Pi and Ca, before laparoscopic nephrectomy, after one day, one week and six months.

Results: see table 1. Postoperatively plasma Ca decreased (p<0.001), and there was a trend to an increase in bioPTH (p=0.04), and to a decrease in FGF23 (p=0.1). After one week Ca levels where normalized while there was a significant rise in the FGF23 level. The Pi levels remained stable. At follow-up the GFR had recovered partially, and PTH, FGF23, Ca and Pi where not significantly different compared to before nephrectomy. Tubular reabsorption of Pi (TRPi) was decreased, while the excretion of Pi (du-Pi) where unchanged: 28.9 ± 7.4 mmol/day before nephrectomy and 33.0 ± 11.9 mmol/day after six months. The urinary Ca decreased from 6.1 ± 2 mmol/day to 3.6 ± 1.1 mmol/day (P<0.05) at six months.

table 1

<table>
<thead>
<tr>
<th>before surgery</th>
<th>after one day</th>
<th>one week</th>
<th>six months</th>
</tr>
</thead>
<tbody>
<tr>
<td>du-Pi (mmol/L)</td>
<td>31.8±12</td>
<td>28.6±11</td>
<td>36.3±13.8</td>
</tr>
<tr>
<td>Pi (mmol/L)</td>
<td>36.3±13.8</td>
<td>28.6±11</td>
<td>31.8±12</td>
</tr>
<tr>
<td>bioPTH (pg/ml)</td>
<td>20.0±7.0</td>
<td>28.0±12</td>
<td>14.5±8</td>
</tr>
<tr>
<td>FGF23 (pg/ml)</td>
<td>112±46</td>
<td>81±34</td>
<td>72±38</td>
</tr>
</tbody>
</table>

Pi and urine protein creatinine ratio (urPCR) levels were log transformed due to skewed distribution.

Mean 25(OH)D3 was 69.53 ± 29.09 nmol/L. 44 patients(39.3%) had 25(OH)D3 insufficiency as 40-75nmol/L. 1,25(OH)2D3 deficiency was defined as levels< 0.75nmol/L.

Disclosure of Financial Relationships: nothing to disclose

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Prevalence and Risk Factors for Vitamin D Deficiency in Patients with Chronic Kidney Disease in a Subtropical Climate

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Aims: Low 25-Hydroxyvitamin D3 (25(OH)D3) and 1,25-dihydroxyvitamin D3 (1,25(OH)D3) are frequently reported in the literature but has mainly represented patients from temperate climates. This study investigated the prevalence and predictors of vitamin D deficiency in a CKD population from southeast Queensland.

Methods: 25(OH)D3 and 1,25(OH)D3 levels and bone mineral parameters were measured in 112 patients with CKD stages 3 and 4. NKF/KDOQI guidelines were used to define 25(OH)D3 deficiency as < 40nmol/L, with 25(OH)D3 insufficiency as 40-75nmol/L. 1,25(OH)D3 deficiency was defined as levels< 0.75nmol/L.

Results: Mean 25(OH)D3 was 69.53 ± 29.09 nmol/L. 44 patients(39.3%) had 25(OH)D3 insufficiency and 16 patients(14.3%) had frank deficiency. Mean 1,25(OH)D3 levels were 70.82 ± 30.93 pmol/L with 42 patients(37.5%) being deficient. 25(OH)D3 and 1,25(OH)D3 levels were not different according to CKD stage.

Median iPTH level was 8.45±3.14 pmol/L with 68 patients(60.7%) having hyperparathyroidism (iPTH > 7.0 pmol/L).

25(OH)D3 levels were significantly associated with log iPTH levels. Independent predictors of low 25(OH)D3 were female gender (β = 0.19, P < 0.001) and log urPCR (β = 0.18, P = 0.05) but not age, eGFR, calcium and phosphate levels.

1,25(OH)D3 did not correlate significantly with 25(OH)D3. Independent predictors of lower 1,25(OH)D3 were Diabetes Mellitus (β = -0.22, P = 0.029) and log urPCR (β = -0.21, P = 0.027).

Hyperparathyroidism was best predicted by eGFR (β = -0.34, P < 0.001), 25(OH)D3 (β = -0.41, P < 0.001) and 1,25(OH)D3 (β = -0.18, P < 0.01).

Conclusion: Vitamin D deficiency and secondary hyperparathyroidism were highly prevalent even in a subtropical climate. 25(OH)D3 correlates better with secondary hyperparathyroidism than 1,25(OH)D3. Predictors of low 25(OH)D3 were female gender and proteinuria.

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Osteocalcabin-Like Multi-Nucleated Giant Cells Are Associated with Regression of Tumoral Calcification

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Introduction: Tumoral calcinosis is an ectopic calcification occasionally seen in hemodialysis patients, characterized by massive periarticular deposition of calcium and phosphorus. We sometimes encounter hemodialysis patients with tumoral calcinosis, which completely disappeared after appropriate medical treatment or parathyroidectomy. Recent studies have uncovered some aspects of the etiology of ectopic calcification, and some researchers have already pointed out the association of multinucleated giant cells with regression of tumoral calcification. However, the precise features of these multinucleated giant cells remain unclear.

Material and Method: We obtained the resected specimen of tumoral calcinosis around hip joint from a patient on hemodialysis, whose tumoral calcinosis around the other large joints disappeared after appropriate medical treatment without surgical removal. We examined the resected tissues of tumoral calcification by histology and immunohistochemistry (IHC). The IHC included CD68, tartrate acid phosphatase (TRACP), osteocalcin (OC), osteopontine (OP) and calcitonin receptor (CTR).

Results: Light microscopic examination of the resected tumoral calcification revealed recruitment of many multinucleated giant cells surrounded by mononuclear cells with fibrous tissues with Hematoxylin-Eosin staining. IHC revealed that both multinuclear cells and mononuclear giant cells were positive for CD68, TRACP and CTR. However, both cells are negative for OC and OP.

Conclusion: Multinuclear giant cells recruited to tumoral calcinosis might be derived from multinuclear cells of the nearby-limphage and have fibrous tissues with fibrous tissues with Hematoxylin-Eosin staining. This study confirmed that both multinuclear and mononuclear giant cells were positive for CD68, TRACP and CTR. However, both cells are negative for OC and OP. Although multinuclear giant cells are recruited to the calcification, osteoclastic activity is not important.