Fibroblast Growth Factor 23 and Iron Deficiency Anemia in Chronic Kidney Disease

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The leading cause of death in pediatric chronic kidney disease is cardiovascular disease.
FGF23 levels increase very early in pediatric CKD.

In CKD, higher FGF23 levels are associated with increased cardiovascular morbidity and mortality.

n=3879

Isakova et al, JAMA 2011.
Iron may affect FGF23 production.

### C57BL/6 Mouse Groups and Diets

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Dietary Adenine</th>
<th>Dietary Iron</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wild type</td>
<td>No</td>
<td>Low (4 ppm)</td>
<td>12</td>
</tr>
<tr>
<td>Wild type</td>
<td>No</td>
<td>Standard (335 ppm)</td>
<td>12</td>
</tr>
<tr>
<td>Wild type</td>
<td>No</td>
<td>High (10,000 ppm)</td>
<td>8</td>
</tr>
<tr>
<td>Wild type</td>
<td>Yes</td>
<td>Low (4 ppm)</td>
<td>12</td>
</tr>
<tr>
<td>Wild type</td>
<td>Yes</td>
<td>Standard (335 ppm)</td>
<td>14</td>
</tr>
<tr>
<td>Wild type</td>
<td>Yes</td>
<td>High (10,000 ppm)</td>
<td>15</td>
</tr>
</tbody>
</table>
Iron status affects FGF23 expression.

A) Urea Nitrogen

B) Liver Iron

C) Bone Fgf23 mRNA Expression

D) FGF23

n=8-15/group
In CKD, independent of serum phosphate, iron deficiency is associated with increased FGF23 levels.

Association of independent variables with FGF23 in CKD mice:

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Coefficient (95% CI)</th>
<th>p-value</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardized Serum Phosphate</td>
<td>0.23 (0.10, 0.36)</td>
<td>0.001</td>
<td>57</td>
</tr>
<tr>
<td>Standardized Liver Iron</td>
<td>-0.17 (-0.30, -0.04)</td>
<td>0.013</td>
<td></td>
</tr>
</tbody>
</table>
Erythropoietin may also be associated with increased FGF23 expression.
Thank You

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