EVALUATION OF TWO ROUTINELY USED 25OHD ASSAYS AND SERUM VARIABLES IN PATIENTS ON DIALYSES
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Background
The total 25-hydroxy-vitamin-D (t-25OHD) level can be routinely assessed by various methods and reflects vitamin D intake. Results are influenced by the serum variables affected by dialyses.

Aims: to examine t-25OHD and bioavailable vitamin D (bio-25OHD) by two most frequently used methods in patients on peritoneal- (PD) and hemodialysis (HD).

Investigated cases

We studied 37 HD (64±15 years, 17 females, 20 males) and 36 PD (63±18 years, 15 females, 21 males) patients without vitamin D substitution.

Methods

All 73 sera were analyzed for t-25OHD by two assays with different principles.
In addition the following biomolecules were measured: PTH biointact (Bio-PTHi) by immunoassay (ECLMA, Roche), vitamin D binding protein (DBP) by turbidimetry (Dako), and total protein (TP), albumin (Alb) and calcium (Ca) by colorimetry (Roche, Modular).
The bio-25OHD values were calculated (Vermeulen et al. 1999, Bhan et. al. 2012) The cutoff values for evaluation of Vitamin D supply or t-25OHD and bio-25OHD are summarized in the table.

<table>
<thead>
<tr>
<th>25OHD fractions</th>
<th>LIA</th>
<th>PBA</th>
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<tbody>
<tr>
<td>t-25OHD</td>
<td>&gt;75</td>
<td>&gt;75</td>
</tr>
<tr>
<td>bio-25OHD</td>
<td>&gt;6.1*</td>
<td>&gt;6.4*</td>
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</table>

* calculated from 64 healthy volunteers with >75 nmol/l t-25OHD, at 2.5 percentile.

Results

The frequency of undetectable t-25OHD level was higher by PBA (29%) than by LIA (1.4%).

All investigated cases had suboptimal vitamin D supply by both t-25OHD assays. However, the frequency of suboptimal supply decreased on the bases of bio-25OHD levels especially in HD.

Values of t- and bio-25OHD were significantly lower in PD than in HD, while Bio-PTHi levels were significantly lower in HD than in PD.

Albumin levels were lower in PD than in HD, but DBP levels were higher in PD than in HD (p<0.05).

Positive correlations were observed with both methods between t-25OHD and albumin levels in PD only (PBA: r=0.36; p<0.05; LIA: r=0.48; p<0.01).

Negative correlations were observed between Bio-PTHi and t-25OHD levels (PBA: r=-0.39; LIA: r=-0.42; p<0.05) in HD only; negative correlations observed between Bio-PTHi and bio-25OHD were similar in both HD and PD (LIA: PD r=-0.40, HD r=-0.54, p<0.01; PBA: PD r=-0.49, HD r=-0.44).

The correlations of t-25OHD levels assessed by LIA and PBA were different (HD: r=0.89; p<0.001; PD: r=0.47, p<0.01), but correlations of bio-25OHD values were similar in both groups (HD: r=0.85; PD: r=0.83, p<0.001).

Conclusions

- Assessment of vitamin D supply by LIA and PBA is influenced by lower albumin levels especially in PD.
- Estimation of bio-25OHD is more suitable in PD, while t-25OHD is a reliable measure with either method in HD.