Metabolic changes in vitamin D deficiency

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The improvement of vitamin D status is necessary to overcome an impaired calcium-phosphorus metabolism and disturbances in other tissues functioning; safety of medical intervention should include analysis of metabolic changes.

Methods

24 apparently healthy volunteers, 24.9±2 y.o. were included in the study: Group 1 (11/24) with blood serum levels of 25(OH)D <10ng/mL and Group 2 (13/24) with 25(OH)D levels 10-20 ng/mL. Assessments were made at baseline; 3 hours; 3, 7 and 28 days after intake of 200 000 IU of cholecalciferol oil solution.

<table>
<thead>
<tr>
<th>25(OH)D (ng/mL)</th>
<th>Group 1 (n=11)</th>
<th>Group 2 (n=13)</th>
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<tbody>
<tr>
<td>M ± SD (Min-Max)</td>
<td>7.3 ± 2.1 (4.0-9.9)</td>
<td>15.1 ± 3.0 (10.7-19.5)</td>
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Results

At baseline we observed significantly higher mean level of PTH (63.0±17.2 vs. 35.3±10.2; p<0.01) with elevation above the upper level of normal range (ULN) in 36.4% in Group 1 whereas in Group 2 levels met normal range in all individuals. Urine calcium/creatinine ratio (CCR), mmol/mmol M±SD (Min-Max): Group 1 - 0.25±0.13(0.12-0.58), Group 2 - 0.31±0.21(0.03-0.71); values were less than lower level of normal range (0.1) in 15.4% in Group 2. Blood serum Ca 2+tot, Ca 2+ion and P levels were not different between the groups and were within the normal range.

By 28th day 41.6% and 87.5% from all participants achieved 25(OH)D blood serum level >30ng/mL and >20ng/mL respectively. By 3d day we observed significant decrease of PTH level in Group 1 (by 27%, p<0.05). There was no significant changes in CCR during follow-up period, but in one individual we observed an increase higher than ULN (max CCR=0.89) which was transient. We also observed one case of hypercalcemia (max Ca 2+tot=2.65 mmol/L) which wasn’t associated with increase in Ca 2+ion.

Conclusion

High-dose oral cholecalciferol treatment for vitamin D deficiency is efficient and safe in young patients regardless of severity of vitamin D deficiency.