Kyra Borchhardt, J Kidney 2017, 3:3 (Suppl)
DOI: 10.4172/2472-1220-C1-002

Vitamin D repletion after kidney transplantation

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Objectives: Vitamin D deficiency has been associated with detrimental renal allograft outcome, yet interventional studies on vitamin d supplementation after kidney transplantation are not available. We aimed to test whether treatment of vitamin d deficiency improves renal allograft function by preventing infections and acute rejections, and improves bone mineral density one year after kidney transplantation.

Design: The study is a single-center randomized double-blind placebo-controlled clinical trial with one-year follow-up.

Setting: The study was conducted at the Medical University of Vienna, austria between may 2009 and august 2014. Participants: we studied 203 deceased-donor kidney-only transplant recipients with vitamin D deficiency (25-hydroxyvitamin D levels <20 ng/ml) at the time of transplantation. Patients who underwent re-transplantation more than twice, as well as immunologically high-risk patients were excluded.

Interventions: Participants were randomly assigned to receive daily treatment with oral vitamin D3 (6800 international units) or placebo for one year. Main outcome measures: primary outcome was renal allograft function at one year post-transplant (estimated by serum creatinine) with the combined event rate of acute rejections and infections as a co-primary endpoint. Secondary outcomes included time course analyses of serum creatinine and c-reactive protein levels, bone mineral density, serum levels of parathyroid hormone, 25-hydroxyvitamin D, 1,25-dihydroxyvitamin D, and cathelicidine. Besides intention-to-treat analyses, per-protocol analyses were performed at twelve (n=63 in the vitamin D3 and n=60 in the placebo group) and six months (n=70 in the vitamin D3 and n=65 in the placebo group), including patients who completed the follow-up.

Results: Out of 610 consecutively screened kidney transplant candidates, 203 were included and randomly assigned to vitamin D3 (N=103 with mean 25-hydroxyvitamin D levels of 11.6±4.9 ng/ml at baseline) or placebo (N=100 with mean 25-hydroxyvitamin D levels of 11.1±4.8 ng/ml at baseline). The novel supplementation regimen led to a fast and persistent increase in 25-hydroxyvitamin D levels (+22.6 (quartiles 7.5-36.9) ng/ml in the vitamin D3 group vs. -0.3 (-4.6-3.9) ng/ml in the placebo group at one year post-transplant, p<0.001). One-year serum creatinine levels were similar in the vitamin D3 and placebo group in the intention-to-treat analyses, but were higher in vitamin D3-treated patients in the per-protocol analyses at twelve (1.54 (1.32-2.17) mg/dl vs. 1.42 (1.20-1.73) mg/dl, p=0.03) and six months (1.61 (1.36-2.13) mg/dl vs. 1.43 (1.19-1.82) md/dl, p=0.01). There was no group difference in the monthly combined event rate of acute rejections and infections (0.25 (0.09-0.44) in the vitamin D3 and 0.33 (0-0.71) in the placebo group, p=0.73) or the course of C-reactive protein levels or serum levels of cathelicidin. Changes in lumbar and femoral bone mineral density over time were similar in both groups. Vitamin D3 therapy resulted in significantly lower serum levels of parathyroid hormone (median 96 (quartiles 61-139) pg/ml vs. 128 (89-172) pg/ml, p=0.02), and significantly higher serum levels of 1,25-dihydroxyvitamin D (50 (38-75) pg/ml vs. 35 (24-49) pg/ml, p<0.001). Hypercalcemia was more common during vitamin D3 supplementation (30% vs. 17%, p=0.04).

Conclusions: Given the lack of an overall benefit of vitamin D supplementation, as well as its potential adverse effect on renal allograft function and its hypercalcemic potential, vitamin D supplementation is not justified in kidney transplant recipients.

Biography

Kyra Borchhardt has completed her studies at Medical University of Vienna and Post-doctoral studies from Stanford University School of Medicine. She is the Medical Director of the Dialysis Institut of Klagenfurt, Austria.

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