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SHARING EXPERTISE

VITAMIN D DEFICIENCY IN DIALYSIS PATIENTS BEFORE AND AFTER NATIVE VITAMIN D SUPPLEMENTATION

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INTRODUCTION

The vitamin D supply status is well known to decrease in patients with chronic renal failure.

OBJECTIVE

We repeatedly determined the total 25-hydroxy vitamin D [t-25(OH)-D] level of the serum, after native vitamin D supplementation in different doses.

PATIENTS

Of the 66 (31 PD, 35 HD) patients tested in 2011, 49 patients (22 PD, 27 HD) remained by 2015. The patients received 1000 IU of native vitamin D daily for one year, then after the measurements in 2012 the dose was increased to 3000 IU.

In our studies conducted in 2015, the HD and PD patients had been on the programme for 8.9 years and 5.1 years, respectively.

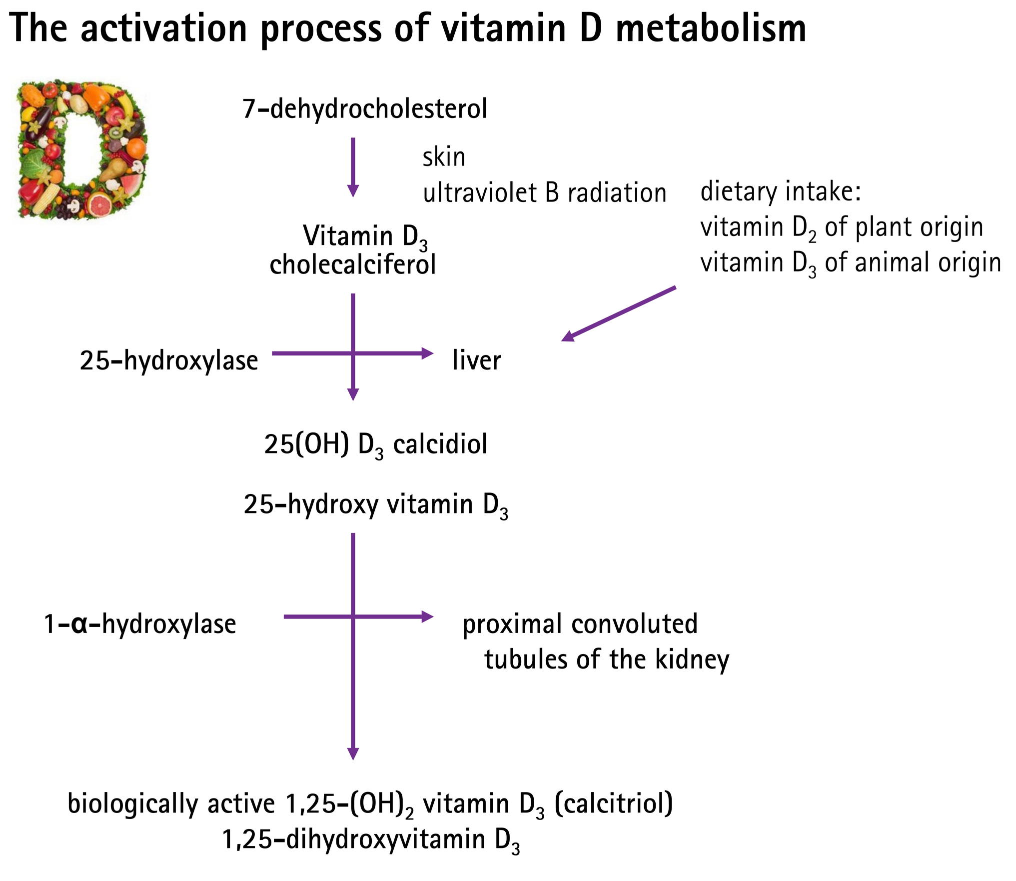
METHOD

2011: we assessed the vitamin D supply status of our patients by examining their total 25-hydroxy vitamin D [t-25OHD] level. From our HD and PD patients we made two matched groups. The inclusion criterion was to create two groups of similar composition regarding patient number, gender, age, DM ratio, and BMI.

2012: we again determined the t-25OHD level of patients that were still receiving dialysis therapy from the original group, after they had received 1000 IU of native vitamin D daily for an average of 6.5 months.

April 2015: we performed further laboratory tests to determine the t-25OHD level of patients that were still receiving dialysis therapy from the original group, after they had received 3000 IU of native vitamin D supplementation daily for 3.5 months.

The activation process of vitamin D metabolism



RESULTS

The first investigation

DECEMBER 2011

	PD n=31	HD n=35	differences between the two groups
average age (years)	64.2±14.3 (28.0-93.1)	65.9±13.8 (37.2-87.1)	ns
male average age (years) female average age (years)	n=18 65.6 (28.0-93.1) n=13 62.3 (36.2-78.8)	n=20 68.4 (37.3-87.1) n=15 62.6 (37.2-83.7)	ns ns
BMI	28.8±5.3 (20.8-40.4)	26.0±6.1 (15.8-44.6)	ns
Diabetes mellitus	n=14 (45%)	n=14 (37%)	ns
Time spent on dialysis (years)	**2.8±4.0**	**5.9±4.0**	**p<0.001**
ACEI/ARB	n=31 (100%)	n=35 (100%)	ns
active vitamine D	**n=18 (58.1%)**	**n=23 (65.7%)**	**ns**
phosphate-binder	n=12 (38.7%)	n=17 (48.6%)	ns

The second investigation

DECEMBER 2012

Out of the 66 patients enrolled in 2011, 5 patients had received a kidney transplant, 12 patients died, and thus 49 patients could be followed up.

	PD n=22	HD n=27	differences between the two groups
average age (years)	62.3±11.3	63.9±12.3	ns
male female	n=11 n=11	n=14 n=13	ns
BMI	29.1±5.3 (19.9-38.9)	25.5±6.5 (14.1-45.2)	ns
Diabetes mellitus	n=9 (41%)	n=9 (33.3%)	ns
Time spent on dialysis (years)	**2.8±0.9**	**6.4±4.2**	**0.001**
ACEI/ARB	n=22	n=27	ns
active vitamine D	**18 (81.8%)**	**8 (29.6%)**	**0.001**
phosphate-binder	8 (36.4%)	14 (51.8%)	ns

Average duration of native vitamin D supplementation: 6.5±3.5 months.

The third investigation

APRIL 2015

Since 2012, 8 patients have received a kidney transplant, 15 patients have died, and 26 patients could be followed up.

	PD n=12	HD n=14	differences between the two groups
average age (years)	65.7±10.5	67.1±12.7	ns
male female	n=5 n=7	n=6 n=8	ns
BMI	28.5±4.6 (20.9-37.2)	25.8±7.7 (14.9-44.8)	ns
Diabetes mellitus	n=5 (45.5%)	n=7 (46.6%)	ns
Time spent on dialysis (years)	**5.9±0.9**	**8.9±4.1**	**0.001**
ACEI/ARB	n=11	n=14	ns
active vitamine D	**9 (81.8%)**	**7 (46.7%)**	**0.001**
phosphate-binder	7 (63.6%)	9 (60.0%)	ns

Average duration of native vitamin D supplementation: 3.5±1.5 hónap.

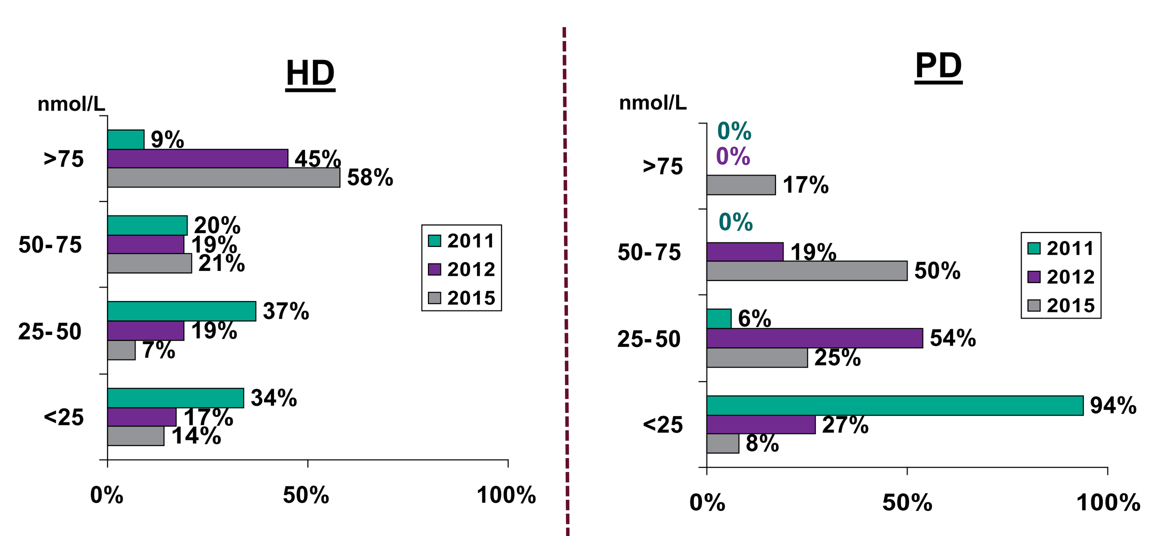
Vitamin D supply status:

SUFFICIENT
75 nmol/L t-25OHD level

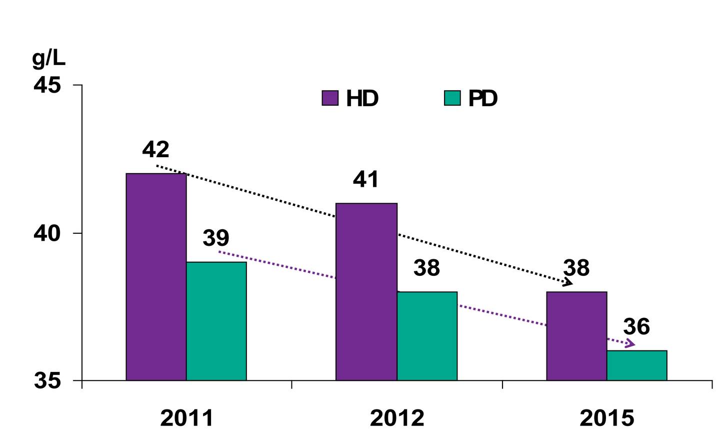
INSUFFICIENT
50-75 nmol/L t-25OHD level

SEVERE DEFICIENCY
< 25 nmol/L t-25OHD level

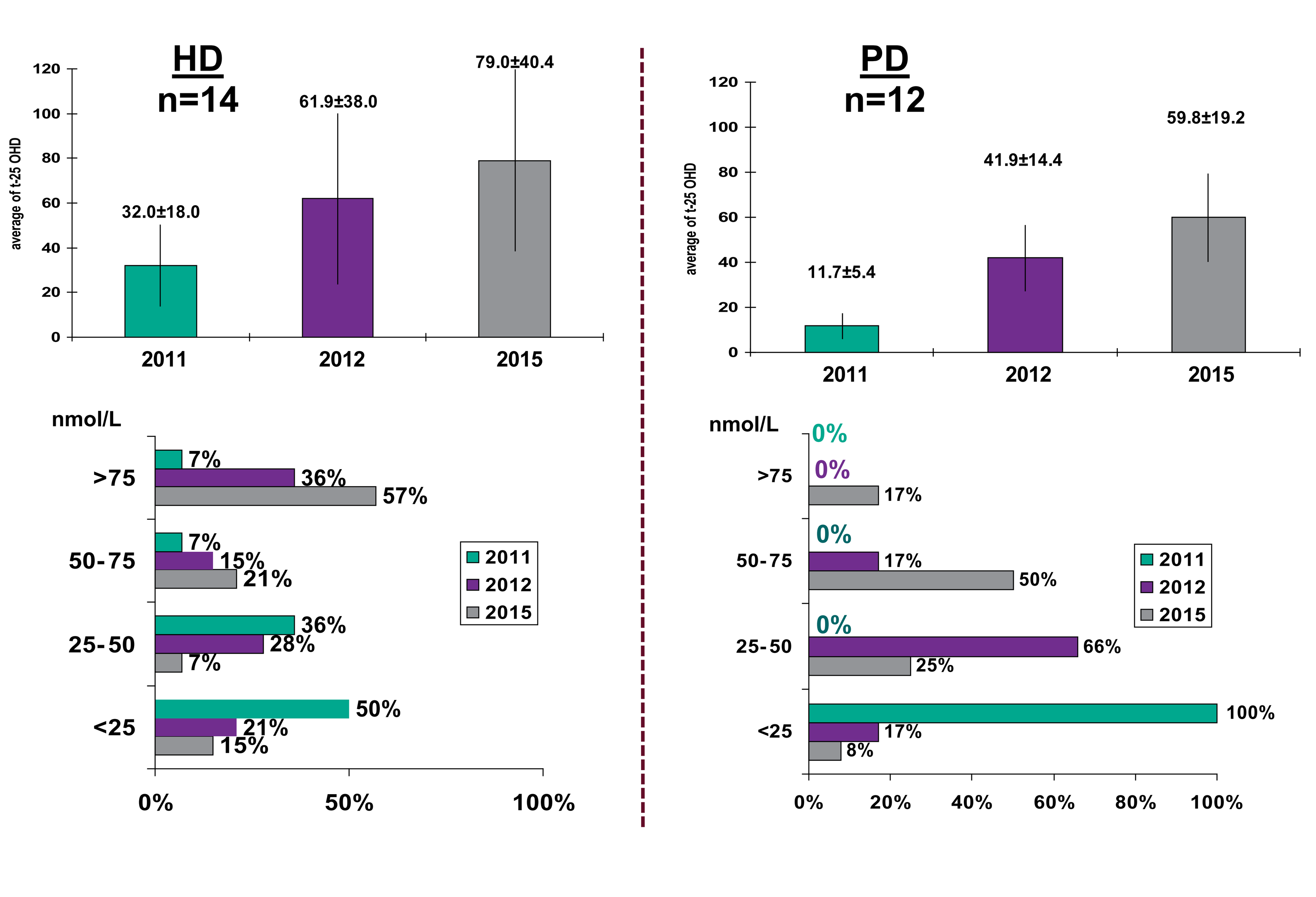
Vitamin D supply status based upon the t-25OHD levels



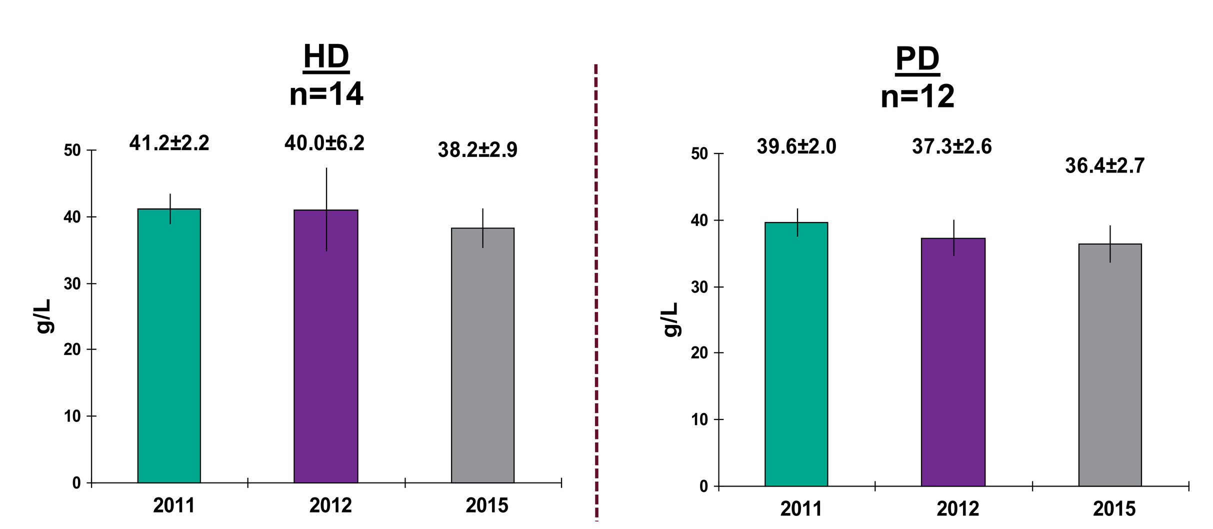
Mean serum albumin level changes in the study period with regard to the renal replacement therapy



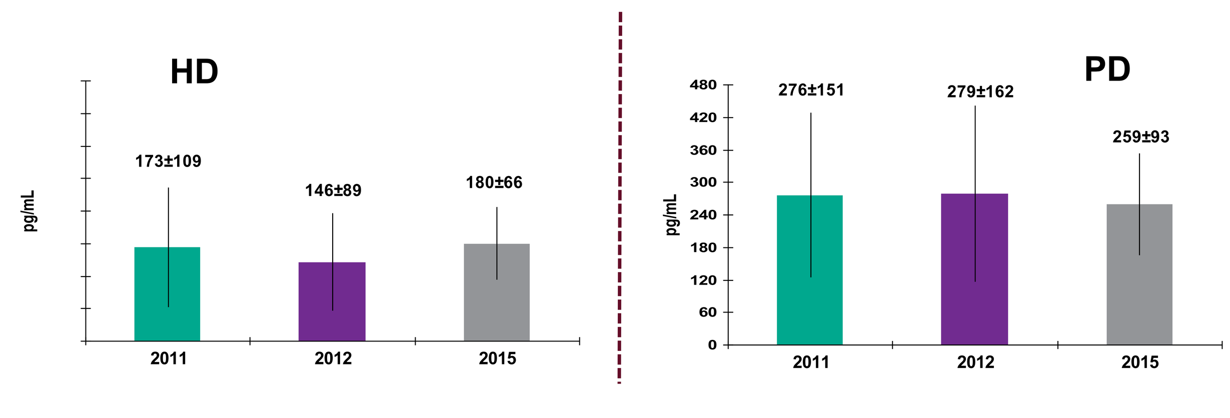
Evolution of the vitamin D supply status of 26 patients followed up in April 2015 based on determination of the t-25OHD level



Evolution of the albumin levels of the 26 patients currently followed up with regard to the renal replacement therapy



Evolution of parathyroid hormone (PTH) levels in HD and PD patients before and after vitamin D supplementationtiary



SUMMARY

- Both our HD and PD patients are suffering from vitamin D deficiency, but this is particularly true for our PD patients, 100% of whom have vitamin D deficiency.
- A daily vitamin D3 intake of 1000 IU is not sufficient for achieving the required t-25OHD-vitamin level in either patient group.
- **According to our observations, the much more severe vitamin D deficiency of PD patients could not be resolved in a reassuring manner even by the daily administration of 3000 IU of cholecalciferol; therefore, PD patients should be given a higher dose.**
- The high parathyroid hormone level found in PD patients was also influenced by the t-25OHD levels.
- As had been expected, the serum protein level of PD patients was lower because of the peritoneal protein loss. As 90% of the t-25OHD vitamin is bound to protein, this may explain the lower serum t-25OHD vitamin level found in PD patients.