Observational study of PTH secretion dynamics in patients with secondary hyperparathyroidism

N.Karlovich

Belarusian State Medical University, Minsk, Belarus

OBJECTIVES

The aim was to analyze dynamics of PTH secretion in dialysis patients during different period of observation and to determine factors of secondary hyperparathyroidism progression.

METHODS

We examined 92 patients, 52f, 40m; age 47.2±11.4yrs; dialysis duration 4.9±3.9yrs; mean observational period 8.9±4.3months (6-24). Serum PTH, 25(OH)D3, osteocalcin (OC), C-terminal telopeptide of type I collagen (beta-CTx), alkaline phosphotase (ALP), calcium (Ca) and phosphorus (P) were measured initially and at the end of observation. All patients were recommended to follow low-phosphate diet and 74.4% received calcium carbonate.

RESULTS

PTH level was 559.6±552.5 initially and 603.9±581.6pg/ml at the end of observation, p=0.251.

Frequency of high, normal uremic and low PTH levels was 55.4% vs 57.6%, 20.7% vs 21.7%, 23.9% vs 20.7%, respectively (p>0.05).

Serum phosphorus decreased from 2.34±0.67 to 2.14±0.60mmol/l, p=0.0003.

In patients with initial hypercalcemia PTH increased from 525.3±518.4 to 616.2±606.2pg/ml, p=0.03.

PTH level at the end of observation correlate with age (r=-0.25), OC (r=0.58), beta-CTx (r=0.76) and ALP (r=0.40). Strong correlation was found with the initial PTH (r=0.84).

At the end of observation PTH decreased in 40pts (43.5%), mean decrease 204.6±250.1pg/ml; increased in 52pts (56.5%), mean increase 235.6±274.5pg/ml.

Subgroups with decreased and increased PTH didn't show differences of demographic data, levels of Ca,P and bone turnover markers.

Comparison of initial and repeated PTH level in subgroups with duration of observation 6m, 9m, 12m, >12m didn't,, reveal significant changes

Comparative analysis of estimated parameters initially and at the end of observational period

parameter	normal range	M±SD (95% CI)		Wilkoxon paired test, p
		initially	at the end of observation	
PTH, pg/ml	150-300	559,6±552,5 (445,2-674,1)	603,9±581,6 (483,4-724,3)	0,251
Ca, mmol/l	2,10-2,37	2,48±0,29 (2,42-2,55)	2,51±0,28 (2,45-2,58)	0,727
P, mmol/l	1,10-1,78	2,34±0,67 (2,19-2,48)	2,14±0,60 (2,01-2,27)	**0,0003**
ALP, U/l	53-119	133,8±188,8 (90,9-176,6)	114,0±114,9 (86,4-141,6)	0,881
OC, pg/ml	F 11-46, M 14-70	645,7±646,5 (508,8-782,7)	709,2±861,3 (459,1-959,3)	0,340
β-cross laps, pg/ml	F 0,16-0,78, M 0,10-0,50	3,12±3,67 (2,33-3,91)	3,21±3,44 (2,11-4,30)	0,414
25(OH)D3, nmol/l	25-125	103,9±78,3 (79,9-128,1)	--	--

Frequency of high, normal uremic and low PTH
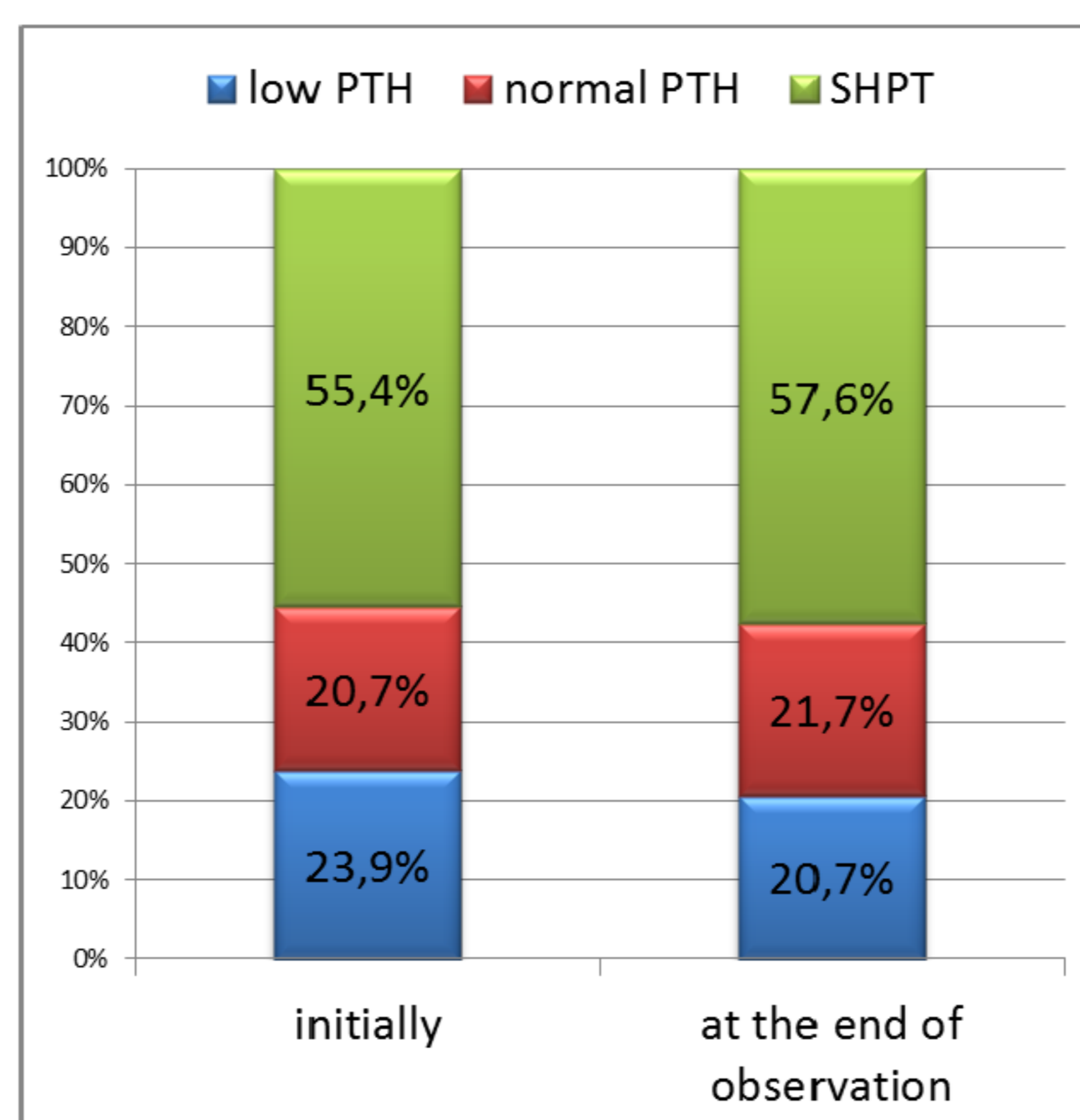
PTH level initially and at the end of observation in subgroups with different duration of observation

duration of observation	M±SD (95% CI)		Wilkoxon paired test, p
	initially	at the end of observation	
6 months	572,1±548,5 (279,9-864,4)	515,6±464,7 (267,9-763,2)	0,501
9 months	532,6±517,9 (369,1-696,1)	576,9±510,1 (415,9-737,9)	0,722
12 months	843,1±787,1 (494,2-1192,2)	828,4±816,7 (466,3-1190,6)	0,685
> 12 months	638,6±907,3 (155,1-1122,0)	448,4±340,8 (266,7-630,0)	0,717

CONCLUSIONS

1. In dialysis patients with stable parameters of Ca,P and bone turnover markers in the absence of therapeutic intervention of secondary hyperparathyroidism PTH level remains unchanged during period of observation up to 12 months and even more.
2. In such patients reasonable interval of PTH measurement should be 6-12 months.
3. Initial level of PTH is the most important predictor of parathyroid function dynamics.
4. Young age, high Ca,P and bone turnover markers levels are another factors influencing secondary hyperparathyroidism progression.

References

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