

Evaluation of the Relationship between Glomerular Filtration Rate (GFR) and Plasma Levels of Parathyroid Hormone

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The aim of this study was to evaluate the relationship between glomerular filtration rate (GFR) and plasma levels of parathyroid hormones.

One hundred and sixty-four adult renal patients, x males and y females, aged 18-83 years, affected by different chronic kidney disease with different degrees of renal function (serum creatinine 0.50-12.1 mg/dL, mean 2.00) participated in this study. All the patients had stable renal function, none of the patients was treated with hemo- or peritoneal dialysis; patients with advanced renal failure were conservatively managed with low-protein diets. GFR was measured in all patients as the renal clearance of 99m Tc-DTPA. Simultaneously to GFR measurement, plasma and serum samples were drawn and stored at -40 degrees C for the determinations of calcium, phosphate, and of whole and total PTH, and, from the difference between total and whole PTH, the value of inactive PTH fragment (CIP).

Patients were clustered in groups according to the value of GFR (mL/min/1.783 m².) The results are reported in the following table. The significance of the differences with the values found in patients with GFR > 60 mL/min/m² was tested with Student t-test.

	GFR <15	GFR 15-30	GFR 30-60	GFR >60 mL/min/1.73 m ²
Number	27	25	48	54
GFR mL/min/1.73 m ²	9.78±3.50***	23.21±4.50***	47.24±9.38***	77.01±13.49
Whole PTH	104.9±110.1***	57.2±41.5***	30.8±25.1NS	24.4±13.4
Total PTH	166.0±157.3***	96.9±62.3***	48.1±40.2*	36.3±21.2
CIP	61.06±49.51***	39.71±24.21***	17.32±16.46	11.87±9.76
Whole PTH/CIP	1.74±0.60**	1.63±0.73**	2.35±1.39*	4.09±4.60

*** p<0.001; **p<0.01, p<0.05

These data indicate that the reduction of renal function is accompanied by a progressive increase in the levels of total and whole PTH. The ratio between whole PTH and CIP decreases significantly already in the group of patients with GFR between 30 and 60 mL/min/1.73 m². Since it has been demonstrated that a low ration whole PTH/CIP is associated with low bone turnover, these data suggest that this renal bone disease could be present even in patients with a moderate degree of renal failure.

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