BONE HISTOMORPHOMETRY DATA IN RENAL TRANSPLANT PATIENTS WITH HYPERCALCEMIC HYPERPARATHYROIDISM WITH AND WITHOUT CINACALCET TREATMENT

Tiago J Carvalho[1], Catarina Carvalho[2,4], Teresa Adragão[1], Jorge Dickson[1], Cristina Jorge[1], Rita Birne[1], André Weigert[1], Margarida Bruges[1], Patrícia Matias[1], Regina Oliveira[1], Ana Casqueiro[1], João Frazão[3,4], Domingos Machado[1]

[1]Department of Nephrology, Santa Cruz Hospital, Carnaxide, Portugal; [2]Braga Hospital, Braga, Portugal; [3]Department of Nephrology, São João Hospital Centre, Porto, Portugal; [4]Instituto de Investigação e Inovação em Saúde, Porto University, Porto, Portugal

INTRODUCTION

At the moment of renal transplantation (RT), more than two thirds of end-stage renal disease (ESRD) patients have secondary hyperparathyroidism (HPT), with reduced bone mineral density and increased risk of fracture, aggravated by the concomitant immunosuppression[1,2]. One year after RT, 50% still have HPT, with elevated iPTH, hypercalcemia and hypophosphatemia[3,4].

The calcimimetic agent cinacalcet (CIN) corrects hypercalcemia in patients with HPT after RT, without significant adverse effects[5,6,7,8,9].

However, data on bone histomorphometry with cinacalcet usage is still lacking, with an eventual risk of adynamic bone disease as of yet not being evaluated.

OBJECTIVES

- ✓ Analyze histomorphometric data from bone biopsies (BB) in patients with hypercalcemic hyperparathyroidism after RT.

METHODS

We conducted a prospective observational study with a sample of 27 patients, with the following characteristics:

Sex	Number (n)	Percentage (%)
Male Female	15 12	56 44
Diabetes *mellitus*	2	7.4
Mean age: 55.4 ± 11 years		
Mean dialysis time: 88 ± 56.3 months		

- ✓ Bone biopsy was performed 81 ± 64 months after RT
- ✓ 15 patients (56%) were treated with cinacalcet (group CIN)
- ✓ CIN was initiated 8.0 (25th 4.9; 75th 55.2) months after RT
- ✓ CIN treatment duration at the time of bone biopsy was 38 ± 17 months
- ✓ CIN dose was 34 ± 14.4 mg/day, with a minimal dose of 15mg/day and maximum dose of 60mg/day

RESULTS

Calcium (Ca) levels in group CIN showed an increase between transplant date and CIN initiation and then a decrease between CIN initiation and BB (figure 1).

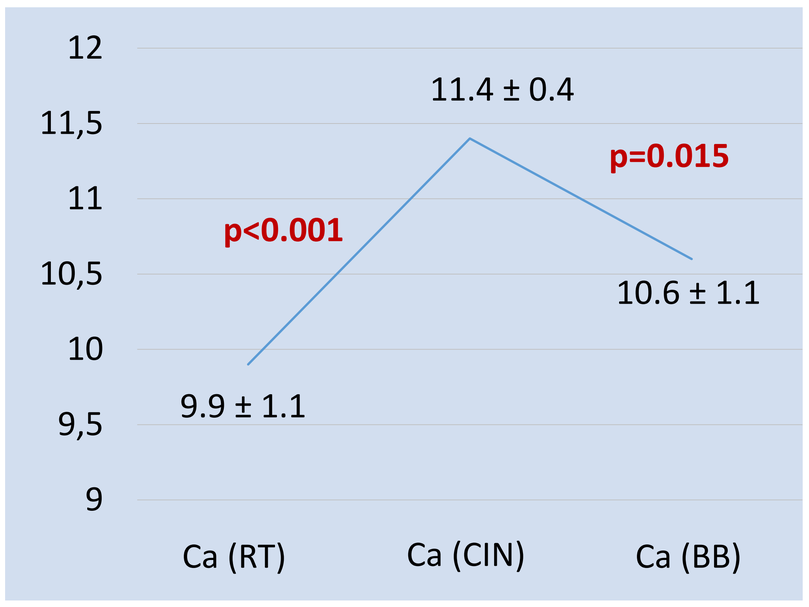

Figure 1: Ca levels evolution between RT, CIN initiation and BB (mg/dL).

iPTH levels showed a decrease between CIN initiation and BB (figure 2).

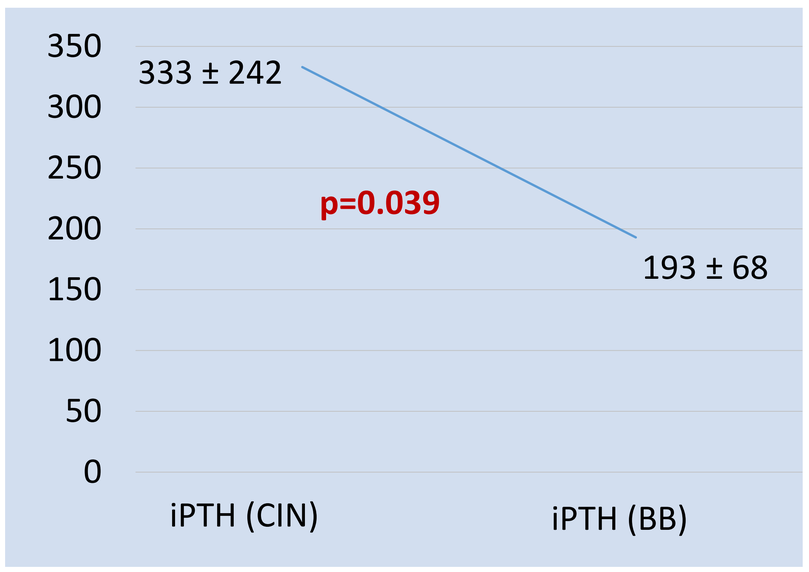

Figure 2: PTH levels evolution between CIN initiation and BB (pg/mL).

At the time of BB, the characteristics of the patients in group CIN compared with group no-CIN are indicated in table 1.

	Group CIN (n=15)	Group no-CIN (n=12)	p value
Age (years)	55.3 ± 8.4	55.5 ± 13.9	0.958
Dialysis time (months)	80.9 ± 37.8	96.9 ± 74.3	0.474
RT time (months)	67.5 ± 48.0	100.1 ± 79.4	0.199
eGFR (CKD-EPI) (mL/min/ 1.73m^2)	62.2 ± 25.5	56.7 ± 23.2	0.565
iPTH (pg/mL)	191.3 ± 66.4	151.2 ± 53.1	0.102

Table 1: Characteristics of group CIN vs group no-CIN at the time of BB.

RESULTS

Histomorphometric analysis of BB between groups CIN and non-CIN is shown in table 2.

	Group CIN (n=15)	Group no-CIN (n=12)	p value
Bone volume/Total volume <16%	33%	42%	0.656
Bone formation rate/Bone surface >3.8mm^3/cm^2/year	90%	71%	0.323
Osteoblast surface/Bone surface 0,2-10%	67%	25%	0.031
Osteoclast surface/Bone surface 0,15-1,2%	60%	58%	0.930
Trabecular thickness (µm)	107.20 ± 34.58	84.94 ± 20.86	0.047

Table 2: Histomorphometric analysis of BB (group CIN vs group no-CIN).

CONCLUSIONS

Despite the significant iPTH decrease in RT patients treated with CIN, higher bone formation rate was still present at the time of bone biopsy.

A higher percentage of patients treated with CIN had a normal osteoblast surface/bone surface and higher trabecular thickness: there was no evidence of low bone formation rate.

Despite the relatively small sample size and low CIN dose used (mean dose 34mg/day), our findings suggest that treatment of posttransplant hyperparathyroidism with CIN is safe and is not associated with adynamic bone disease.

Further prospective, randomized trials with larger samples evaluating bone histomorphometry are needed to confirm these findings.

BIBLIOGRAPHY

1. Evanepoel P, et al; Natural history of parathyroid function and calcium metabolism after kidney transplantation: a single-centre study; NDT 2004; 19: 1281.
2. Torres A, et al; Calcium metabolism and skeletal problems after transplantation. JASN 2002; 13: 551.
3. Dumoulin G, et al; No trend toward a spontaneous improvement of hyperparathyroidism and high bone turnover in normocalcemic long-term renal transplant recipients. AJKD 1997; 29: 746.
4. Covic A, et al. Systematic review of the evidence underlying the association between mineral metabolism disturbances and risk of all-cause mortality, cardiovascular mortality and cardiovascular events in chronic kidney disease. NDT 2009; 24: 1506.
5. Thiem U, Gessl A and Borchhardt K; Long-Term Clinical Practice Experience with Cinacalcet for Treatment of Hypercalcemic Hyperparathyroidism after Kidney Transplantation; BioMed Research International Volume 2015, Article ID 292654.
6. Evanepoel P, et al; A Randomized Study Evaluating Cinacalcet to Treat Hypercalcemia in Renal Transplant Recipients With Persistent Hyperparathyroidism; AJOT 2014; 14: 2545–2555.
7. Cohen JB, et al; Cinacalcet for the Treatment of Hyperparathyroidism in Kidney Transplant Recipients: A Systematic Review and Meta-analysis; Transplantation 2012;94: 1041-1048.
8. Torregrosa JV, et al; Cinacalcet for hypercalcaemic secondary hyperparathyroidism after renal transplantation: a multicentre, retrospective, 3-year study; Nephrology 19 (2014) 84–93.
9. Borchhardt K, Sulzbacher D, Benesh T, Haas M, Sunder-Plassmann G; Cinacalcet decreases bone formation rate in hypercalcemic hyperparathyroidism after kidney transplantation; American Journal of Nephrology 2010; 31(6): 482-9.

54 ERA
354--SP
CKD - MBD
Tiago Carvalho
DOI: 10.3252/pso.eu.54ERA.2017
ePosters supported by F. Hoffmann- La Roche Ltd.
PosterSessionOnline.com