BONE DISEASE CHARACTERIZATION IN A GROUP OF PREDIALYSIS PATIENTS

Ricardo Neto[1,2], Luciano Pereira[1,2], Catarina Carvalho[1,3], Juliana Magalhães[1], João Frazão[1,2]

[1] Nephrology and Infectious Diseases Research and Development Group, INEB-(I3S), University of Oporto, Porto, Portugal
[2] Nephrology Department, Centro Hospitalar São João, Porto, Portugal
[3] Nephrology Department, Hospital de Braga, Braga, Portugal

OBJECTIVES

Renal osteodystrophy (ROD) is an early and common complication of chronic kidney disease (CKD). The spectrum of ROD in pre-dialysis patients remains to be clarified.[1]

Histomorphometry is the gold-standard diagnostic tool for ROD, but there is little data on bone histological changes in pre-dialysis patients. Most studies are old and results are inconsistent.[1-3]

We report the results of bone biopsies performed on a cohort of Portuguese pre-dialysis patients.

METHODS

Transiliac bone biopsies were taken from 14 patients consecutively admitted to our pre-dialysis clinic, after double tetracycline labelling. Clinical and biochemical data were recorded at the same time.

Patients eligible for enrollment had to be capable of voluntary written informed consent, aged between 18 and 80 years old and with glomerular filtration rate (estimated by MDRD formula) between 15 and 60 mL/min/1.73 m2. We excluded patients with prior parathyroidectomy or on calcium salts, native or analog vitamin D agents, anticonvulsant or thyroid agents, corticosteroids, bisphosphonates or calcitonin.

Description of bone lesions was made according to KDIGO TMV classification. When tetracycline data was not available, turnover was evaluated according to osteoblast and osteoclast surface, whereas for mineralization osteoid thickness was used.

	BV/TV (%)	OV/BV (%)	OS/BS (%)	Ob.S/BS (%)	ES/BS (%)	Oc.S/BS (%)	O.Th (µm)	MAR (µm/d)	BFR/BS (µm³/µm²/yr)	Mlt (d)
1	21,20	0,86	8,67	0,00	3,21	0,45	4,32	NA	NA	NA
2	33,37	2,93	10,47	1,17	0,80	0,42	10,91	NA	NA	NA
3	16,38	1,32	14,28	1,64	4,72	0,67	4,98	0,95	19,00	13,66
4	9,97	2,22	11,75	0,58	1,77	0,17	7,75	2,04	159,04	2,09
5	16,61	5,68	41,91	0,61	3,42	0,00	6,83	NA	NA	NA
6	32,70	1,94	9,50	0,15	0,19	0,17	13,42	NA	NA	NA
7	14,55	2,88	16,12	0,00	0,98	0,40	8,58	NA	NA	NA
8	17,95	2,05	4,01	0,11	0,00	0,00	17,31	NA	NA	NA
9	18,17	5,76	54,44	0,00	0,00	0,15	12,25	NA	NA	NA
10	12,04	3,13	15,14	0,57	0,00	0,00	15,55	NA	NA	NA
11	14,57	8,41	51,11	0,00	4,14	0,00	9,24	NA	NA	NA
12	13,75	2,32	11,51	0,00	0,51	0,25	7,75	NA	NA	NA
13	27,13	20,62	106,68	2,34	1,97	1,69	23,33	NA	NA	NA
14	17,94	0,61	10,84	0,00	0,00	0,00	5,25	NA	NA	NA

Table 1. Bone histomorphometric parameters of a Portuguese pre-dialysis cohort.
BV/TV: bone volume. OV/BV: osteoid volume. OS/BS: osteoid surface. Ob.S/BS: osteoblast surface. ES/BS: eroded surface. Oc.S/BS: osteoclast surface. O.Th: osteoid thickness. MAR: mineral apposition rate. BFR/BS: bone formation rate. Mlt: mineralization lag time. NA: not available.

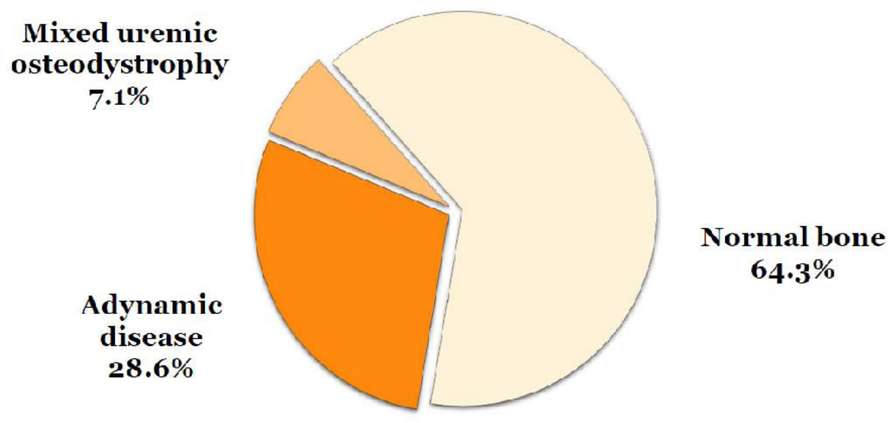

Figure 1. Bone disease types of a Portuguese pre-dialysis cohort.

RESULTS

Bone biopsy was performed on 14 patients. Ten (71.4%) were male and 4 (28.6%) female. Mean age was 69 ± 7.0 years. Mean serum creatinine and glomerular filtration rate were 2.4 ± 0.4 mg/dL and 25.0 ± 5.7 mL/min/1.73 m2, respectively. Mean serum calcium, phosphorus, intact parathyroid hormone (iPTH) and native vitamin D (VD) levels were 9.2 ± 0.6 mg/dL, 3.4 ± 0.8 mg/dL, 198.6 ± 167.2 pg/mL and 15.5 ± 12.1 ng/mL, respectively.

Histomorphometric parameters are presented in table 1. Nine patients (64.3%) had normal bone histology, 4 (28.6%) had adynamic disease and one (7.1%) had mixed uremic osteodystrophy (figure 1).

All patients with normal histology had normal calcium and phosphorus levels, but high iPTH levels, ranging from 79.4 to 457.6 pg/mL, mean 193.5 ± 137.7 pg/mL. All but one had low VD levels.

Three out of the 4 adynamic patients were diabetic. Two of them had high iPTH levels (120 and 242.7 pg/mL). Calcium and phosphorus levels were normal in all cases, but all were low on VD.

The mixed disease patient had the highest iPTH (626.1 pg/mL) and was mildly hypocalcemic (7.5 mg/dL). VD was very low.

CONCLUSIONS

In a small contemporary population of pre-dialysis patients, two thirds of the patients had normal bone histology and roughly a quarter had adynamic bone disease. There was one case of mixed disease. Neither hyperparathyroid bone disease nor osteomalacia were found.

The variability of our findings has been described by others and seems to reflect the natural history of bone histology in pre-dialysis patients. Our results also suggest that biochemical testing are not predictive of histological findings, thus highlighting the importance of bone biopsy as the gold-standard tool to evaluate ROD.

Further histomorphometric studies are needed to enlighten the spectrum of ROD in pre-dialysis CKD.

REFERENCES

[1] Gal-Moscovici, A. and S.M. Sprague, Role of Bone Biopsy in Stages 3 to 4 Chronic Kidney Disease. Clinical Journal of the American Society of Nephrology, 2008. 3(Supplement 3): p. S170-S174.

[2] Nordal, K.P. and E. Dahl, Low dose calcitriol versus placebo in patients with predialysis chronic renal failure. J Clin Endocrinol Metab, 1988. 67(5): p. 929-36.

[3] Hamdy, N.A., et al., Effect of alfacalcidol on natural course of renal bone disease in mild to moderate renal failure. BMJ, 1995. 310(6976): p. 358-63.

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