

3. Fang GD, Yu VL, Vickers RM. Disease due to Legionellaceae (other than *Legionella pneumophila*): historical, microbiological, clinical and epidemiological review. *Medicine (Baltimore)*. 1989;68:116-39.
4. Domínguez J, Galí N, Blanco S, Pedroso P, Prat C, Matas L, et al. Assessment of a new test to detect *Legionella* urinary antigen for the diagnosis of Legionnaire's Disease. *Diagn Microbiol Infect Dis*. 2001;41:199-203.
5. Fujita J, Touyama M, Chibana K, Koide M, Haranaga S, Higa F, et al. Mechanism of formation of the orange-colored sputum in pneumonia caused by *Legionella pneumophila*. *Intern Med*. 2007;46:1931-4.

Jordi Soler-Majoral<sup>a,b,\*</sup>, Anna Sánchez-Escuredo<sup>a,b</sup>, Cristina Prat Aymerich<sup>c,d</sup>, Esther Sanchis Vidal<sup>c,d</sup>, Alicia Marín-Tàpia<sup>d,e</sup>, Maria Sol Prats Bardají<sup>d,e</sup>, Mònica Pérez-Mir<sup>a,b</sup>, Francisco-Javier Juega Mariño<sup>a,b</sup>, Laura Cañas Solé<sup>a,b</sup>, Ricardo Lauzurica<sup>a,b</sup>

<sup>a</sup> Unidad de Trasplante Renal, Servicio de Nefrología, Hospital Universitari Germans Trias i Pujol, Universitat Autònoma de Barcelona, Badalona, Barcelona, Spain

<sup>b</sup> Red de Investigación Renal (REDINREN) ISCIII RD012/20021 REMAR, Madrid, Spain

<sup>c</sup> Departamento de Microbiología, Hospital Universitari Germans Trias i Pujol, Universitat Autònoma de Barcelona, Badalona, Barcelona, Spain

<sup>d</sup> CIBER Enfermedades Respiratorias (CIBERES), Instituto de Salud Carlos III, Madrid, Spain

<sup>e</sup> Departamento de Neumología, Hospital Universitari Germans Trias i Pujol, Universitat Autònoma de Barcelona, Badalona, Barcelona, Spain

\* Corresponding author.

E-mail address: [jsolermajoral@gmail.com](mailto:jsolermajoral@gmail.com) (J. Soler-Majoral).

2013-2514/© 2016 Sociedad Española de Nefrología. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Rare brown tumour location in chronic renal failure<sup>☆</sup>

## Rara localización de tumour pardo en paciente pediátrico

Dear Editor,

Brown tumours (BT) in chronic kidney disease (CKD) are the result of high bone turnover, one type of renal osteodystrophy (ROD), which is caused by secondary hyperparathyroidism (HPT). BT lesions are characterised by the presence of multinucleated cells and brown haemosiderin deposits; this differentiates BT from osteitis fibrosa cystica (OFC). BT has specific clinical presentation, with imaging and histopathology features that are different from other disorders caused by HPT or renal osteodystrophy.<sup>1</sup>

This is a case of a 13-year-old male patient from a rural area of Loja in Ecuador. He had a history of CKD and symmetrical growth retardation. His symptoms began with chronic nocturnal pain in his left knee that was exacerbated by trauma. Anthropometric measurements showed that, a short stature, low weight and severe thinness (below Z score -3 of the median on the weight/age, height/age and BMI/age curves).

Sexual infantilism was observed, in addition to little muscle mass in limbs and genu-valgus angular deformity (Fig. 1).

Further tests showed altered phosphorus/calcium metabolism (Table 1). Imaging and biopsy obtained with a Jamshidi<sup>®</sup> needle identified the BT (Fig. 1).

Treatment included intravenous calcitriol (0.5-1 µg) and dialysis. Once the parathyroid hormone (PTH) was reduced the patient had orthopaedic surgery.

The pseudoneoplasm is caused by proliferation of multinucleated giant cells and the mineral bone tissue is being replaced by fibrosis.<sup>2</sup>

The criteria used in diagnosis were: presence of hypocalcaemia and hyperphosphataemia and deficiency of 1,25(OH)3D related to secondary HPT (SHPT)<sup>3,4</sup>; multinucleated giant cells and haemosiderin coexistent with OFC<sup>5</sup>; thyroid and parathyroid gland with no structural alterations<sup>6</sup>; and no history of prolonged steroid therapy. His PTH values were greater than 120 pg/l and he had no

DOI of original article:

<http://dx.doi.org/10.1016/j.nefro.2016.03.017>

\* Please cite this article as: Alemán-Iñiguez JM, Mora-Bravo F, Bravo-Aguilar C. Rara localización de tumour pardo en paciente pediátrico. *Nefrología*. 2016;36:560-562.



**Fig. 1** – Description of the patient's brown tumour bone lesion. (A) Marked genu varus with mild left lower limb oedema. (B) AP X-ray of left knee, incomplete fracture zone of left femur distal epiphysis, with infiltrative radiopaque image. (C) CT of same anatomical area, solid osteolytic lesion 40 mm × 33 mm in the distal femoral epiphysis, cartilage growth seems to be unaffected. (D) Processed tissue sample, large quantity of multinucleated cells. (E) MRI of same anatomical area, metaphyseal, irregular, heterogeneous, space-occupying process with compromise of bone and cortical portion centred in the distal femoral metaphyseal portion 35 mm × 33 mm and with the presence of perilesional fluid; not compromising other structures. (F) Whole-body bone scan with  $^{99m}\text{Tc}$ -sestaMIBI shows uptake of radiotracer in distal metaphysis of left femur. (G) 3-Dimensional tomographic view, lateral and posterior view of distal epiphysis of left femur. (H) Precise identification of the multinucleated giant cell, characteristic of brown tumour of bone.

history of aluminium exposure, as opposed to a low-turnover ROD.<sup>3,4</sup>

Chronic pain triggered by trauma shows that the condition has gone unnoticed; when located in extremities it can cause night-time itching; in other cases, it starts with pathological fractures. The location is still the subject of much debate. SHPT does not follow a common pattern; lesions in the extremities, tend to affect hands phalanges.<sup>7</sup> There are no reports in the literature of location in the femur. The differential diagnosis according to the location are: primary malignant tumours (osteosarcoma, chondrosarcoma and Ewing's tumour); primary benign tumours such as aneurysmal bone cyst; others such as multiple myeloma, solitary bone plasmacytoma, giant cell granuloma (Langerhans disease) and polyostotic fibrous dysplasia; secondary to infectious such as multifocal osteomyelitis; and other HPT-related disorders such as osteomalacia and rickets.<sup>7</sup>

Radiographical findings include subperiosteal cortical bone resorption and cystic changes, in addition to extraskeletal calcification and bone sclerosis.<sup>5</sup> In our case, the subperiosteal lesion was limited to the bone and did not affect the soft tissue which is important to be different from osteosarcoma.

The coexistence of BT with CKD depends proportionally on PTH, and it is in stages 4 and 5 with PTH values greater than 250 pg/ml that it occurs more frequently.<sup>7</sup> While BT in adolescents with CKD 4 is poorly documented, the few cases reported involved children with primary HPT.<sup>5</sup>

Being a condition dependent on SHPT, management is focused on stabilising the PTH for subsequent orthopaedic correction. In cases of severe secondary HPT, surgical parathyroidectomy may be necessary to control PTH<sup>8</sup> and experimental studies have evaluated the possibility of more advance therapies.<sup>9</sup>

In our case, we combined calcitriol and tri-weekly haemodialysis. However, the best measure is kidney transplantation, as this can restore expression of the genes encoding the VD receptors that are sensitive to calcium in the cells of a parathyroid gland with advanced Parathyroid hyperplasia.<sup>2</sup>

The other stage in the management was the orthopaedic intervention once the PTH was stabilised, achieving a reduction of 150 pg/ml per month (Table 1). For the incomplete pathological fractures in the femur, surgical fixation and bone grafting are indicated.<sup>10</sup>

In conclusion, the atypical presentation presented is not only related with the location but also with the patient's age; in paediatric populations, bone lesion is a criterion for starting dialysis, regardless of the glomerular filtration rate. The patient's prognosis is favourable, but the possibility of renal transplantation to prevent relapse and the development of further BT will have to be considered.

**Source:** Prepared by Juan Miguel Alemán I; Taken from the Imaging Centre and Pathology Centre, Hospital José Carrasco Arteaga.

**Table 1 – Description of phosphocalcic metabolism in the patient.**

Indicator	Value prior to calcitriol therapy and dialysis	Interpretation	Value prior to orthopaedic surgery
<b>(A) Characteristics of phosphocalcic metabolism</b>			
Serum calcium corrected with albumin, mg/dl	6.1	Hypocalcaemia, mg/dl	5.6
Serum phosphorus, mg/dl	6.3	Hyperphosphataemia, mg/dl	6.1
Serum value of 1,25(OH) vitamin D3, ng/dl	18	Low serum levels, ng/dl	18.3
Parathormone, pg/dl	621	Severe hyperparathyroidism, pg/dl	123
Alkaline phosphatase, U/l	1110	High osteoclastic activity, U/l	250
Insulin-like growth factor 1, ng/ml (somatomedin C)	231	Values for a child of 10 years, ng/ml	233
Glomerular filtration rate MDRD	23 ml/min/1.73 m <sup>2</sup>	Severe functional stage 4 CKD	23 ml/min/1.73 m <sup>2</sup>
<b>(B) Characteristics of the CKD</b>			
		Mild microcytic hypochromic anaemia	
		Elevated nitrogenous compounds:	
		Urea 125 mg/dl	
		Creatinine 4.64 mg/dl	
		Proteinuria:	
		Macroalbuminuria: albumin/creatinine ratio of 301.25 mg/g	
		Proteinuria: protein/creatinine ratio of 0.54 mg/mg	
CKD: chronic kidney disease; MDRD: modification of diet in renal disease.			

## REFERENCES

- Ito H, Kinugasa E. Pathogenesis of secondary hyperparathyroidism and renal bone disease. *Clin Calcium*. 2004;14:720-5.
- Tokumoto M, Taniguchi M, Matsuo D, Tsuruya K, Hirakata H, Iida M. Parathyroid cell growth in patients with advanced secondary hyperparathyroidism: vitamin D receptor, calcium sensing receptor, and cell cycle regulating factors. *Ther Apher Dial*. 2005; Suppl. 1:S27-34.
- National Kidney Foundation. K/DOQI clinical practice guidelines for chronic kidney disease: evaluation, classification, and stratification. *Am J Kidney Dis*. 2002;39 Suppl. 1:S1-266.
- Kidney Disease Improving Global Outcomes (KDIGO) CKD-MBD Work Group. KDIGO clinical practice guideline for the diagnosis, evaluation, prevention, and treatment of chronic kidney disease-mineral and bone disorder (CKD-MBD). *Kidney Int Suppl*. 2009:S1-130.
- Rosenberg AE. Bones, joints, and soft tissue tumors. In: Kumar V, Abbas AK, Aster JC, Fausto N, editors. *Robbins and Cotran pathologic basis of disease*. 8th ed. Philadelphia: Saunders; 2009. p. 1205-56.
- Hyan Lee J, Chung S, Su Kim H. Osteitis fibrosa cystica mistaken for malignant disease. *Clin Exp Otorhinolaryngol*. 2013;6:110-3.
- Fatma LB, Barbouch S, Fethi BH, Imen BA, Karima K, Imed H, et al. Brown tumors in patients with chronic renal failure and secondary hyperparathyroidism: report of 12 cases. *Saudi J Kidney Dis Transpl*. 2010;21:772-7.
- Malberti F, Corradi B, Cosci P, Colecchia M, Leopardi O, Grossi L, et al. Different effects of calcitriol and parathyroidectomy on the PTH-calcium curve in dialysis patients with severe hyperparathyroidism. *Nephrol Dial Transplant*. 1996;11:81-7.
- Kanai G, Fukagawa M. CKD-MBD (Chronic Kidney Disease-Mineral and Bone Disorder). Gene therapy for secondary hyperparathyroidism. *Clin Calcium*. 2010;20:1052-9 [Article in Japanese].
- Khalil PN, Heining SM, Huss R, Ihrler S, Siebeck M, Hallfeldt K, et al. Natural history and surgical treatment of brown tumor lesions at various sites in refractory primary hyperparathyroidism. *Eur J Med Res*. 2007;29:222-30.

Juan Miguel Alemán-Iñiguez<sup>a,b,\*</sup>, Franklin Mora-Bravo<sup>c,d</sup>, Christian Bravo-Aguilar<sup>b,e</sup>

<sup>a</sup> Hospital José Carrasco Arteaga, Cuenca, Ecuador

<sup>b</sup> Docente de la Universidad de Cuenca, Facultad de Ciencias Médicas, Escuela de Medicina, Cuenca, Ecuador

<sup>c</sup> Jefe del Servicio de Nefrología, Hospital José Carrasco Arteaga, Cuenca, Ecuador

<sup>d</sup> Docente de la Universidad de Cuenca y Universidad del Azuay, Cuenca, Ecuador

<sup>e</sup> Jefe del Servicio de Traumatología, Hospital José Carrasco Arteaga, Cuenca, Ecuador

\* Corresponding author.

E-mail address: [juanmig\\_18@hotmail.com](mailto:juanmig_18@hotmail.com) (J.M. Alemán-Iñiguez).

2013-2514/© 2016 Sociedad Española de Nefrología. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<http://dx.doi.org/10.1016/j.nefro.2016.11.005>