BROWN TUMOR OF THE JAW: A RARE ENTITY
Ciofu Mihai Liviu¹, Andrada Raluca Doscas²*, Andrei Nicolau³, Christina Ungureanu⁵, Daniel Timofte⁶
¹,²,³,⁴ “Grigore T. Popa” U.M.Ph. - Iași, Romania, Oral and Maxillofacial Surgery Clinic
⁵ Grigore T. Popa” U.M.Ph. - Iași, Romania, Endocrinology Clinic
⁶ Grigore T. Popa” U.M.Ph. - Iași, Romania, General Surgery Clinic
*Corresponding author: Andrada Raluca Doscas
e-mail: andrada.doscas@gmail.com

ABSTRACT
Aim of the study The aim of this study is to present the development of brown tumors in the jaws as a consequence of secondary hyperparathyroidism (HPT). Material and methods We analysed 10 cases with brown tumor of the jaws developed in patients with HPT which presented in our Oral and Maxillofacial Clinic for evaluation and treatment of their disease. The patients were 7 females and 3 males, with ages between 13 and 58 years. Results All patients were symptomatic and bone deformation was noted in all cases. The mandible was involved in 5 patients, the maxillary bone in 4 cases and in one case the tumor was localized in both jaws. The PTH values ranged from 630 pg/ml to 2500 pg/ml. All patients were referred for parathyroidectomy and for 2 patients, local excision was performed. Conclusions Regression of brown tumors may be achieved by performing parathyroidectomy. Multidisciplinary follow-up is essential for the control of brown tumors in order to prevent rapid growth which may lead to severe deformities and functional alterations.

Key words: brown tumor, jaws, hyperparathyroidism, management

INTRODUCTION
Brown tumors are bony lesions caused by aggressive osteoclastic activity and trabecular fibrosis due to parathyroid gland dysfunction. Actually, they represent a reparative process rather than a true neoplasia [1]. They are known to be associated with the setting of hyperparathyroidism (primary or secondary) so they are considered to be a pathognomonic skeletal change that accompanies this disease [2]. Secondary hyperparathyroidism is a well-known complication of end stage renal disease and it is typically associated with serum hypocalcemia and hyperphosphatemia [2]. Long term secretion of parathyroid hormone enhances bone mobilization through rapid osteoclast turnover leading to the formation of brown tumors. In regions where bone is loss rapid, hemorrhages with accumulation of hemosiderin within the vascularized fibrous tissue are common, giving the lesion its reddish-brown color [3]. Common sites of the brown tumors are the ribs, clavicle, tibia, femur, pelvic gridle, and the extremities [4]. In the craniofacial region, there are reports of tumors involving the jaws, palatine, temporal and nasal bone, the orbit or paranasal sinuses [5].

MATERIAL AND METHODS
10 cases with brown tumor of the jaws developed in patients with secondary HPT, presented in our Oral and Maxillo-Facial Clinic between January 2007-August 2017 for evaluation and treatment of their disease. The patients were 7 females and 3 males, with ages between 13 and 58 years. The diagnose was suggested by the clinical history and confirmed by biochemical and radiological determinations.
RESULTS AND DISCUSSIONS

In this report, all patients were symptomatic and bone deformation was noted in all cases, with a mean evolution time of 10.33 months. The mandible was involved in 5 patients, the maxillary bone in 4 cases and in one case the tumor was localized in both jaws. All patients presented stage 5 chronic renal disease and were on regular maintenance hemodialysis for a mean period of 8.38 years. The PTH values ranged from 630pg/mL to 2500pg/ml. The radiologic features included monolocular or multilocular osteolythic lesions, with expanded, thinned or absent cortical bone. All patients were referred for parathyroidectomy. Due to the severity of local complications, surgical excision of the lesion was performed only in 2 cases. The histological examination showed many osteoclastic giant cells adjacent to hemosiderin granules, within a fibrovascular stroma.

Case Report

A 43-year-old women was referred to our Oral and Maxillofacial Surgery Clinic complaining of a swelling in the right mandibular body associated with lower lip hypoesthesia, that had been present for approximately 4 months. The patient’s medical history included chronic renal disease with secondary hyperparathyroidism for which she received hemodialysis 3 times per week, for the past 7 years. Clinical examination revealed a discrete facial asymmetry due to bone deformation from tooth 45 to 48, covered with intact mucosa and measuring approximately 3 cm (Fig.1). Panoramic radiograph showed osteolytic lesion and osteosclerosis in the right molars area, as well as general bone loss (Fig.2). On CT scans, intraosseous expansive radiolucent lesion was noticed (Fig.3,4). Serum chemistry revealed an elevated parathyroid hormone (1868pg/mL) and alkaline phosphatase (534 IU/L). The parathyroid technetium scan showed increased uptake by the right parathyroid gland. Based on the medical history, clinical manifestations and para-clinical tests the diagnose was brown tumor from secondary hyperparathyroidism. The patient was referred for parathyroidectomy in the General Surgery Clinic of “Sf. Spiridon” Hospital. Postoperatively, serum PTH decreased, the tumor mass started to regress and the hypoesthesia improved in the following 6 months.

Figure 1. Intraoral aspect of bone deformation in the right mandible

Figure 2. Panoramic radiograph showing radiolucent and radiopaque lesion
Brown tumors are considered the terminal stage of HPT, known as osteitis fibrosa cystica [2]. The pathogenesis can be classified in three stages. In the first stage, increased PTH stimulates bone resorption by osteoclast and in the same time collagen fibers are deposit in the bone marrow. In the second stage (osteitis fibrosa), trabecular bone is resorbed, the marrow is replaced by fibrous tissue and also areas of hemorrhage are present as well as reactive woven bone. As hyperparathyroidism continues, cystic degeneration can appear, and the cystic space is filled with giant cells, hemosiderin granules and fibroblasts [2,6].

The incidence of this bone lesion has recently declined from 80% to 15% due to early diagnose and to successful treatment of the underlying disease [7]. When located in the jaws, the mandible is more affected than the maxillary bone, and three times more common in women than men [1,8]. Resendiz-Colosia et al. have reported a series of 22 cases of maxillofacial brown tumor, showing that 91% of them were women. A possible explanation is that young women have greater susceptibility for PTH and a predisposition to brown tumors [9]. The typical symptom for brown tumours in the maxillary region is a growing mass, which at examination presents firm, tender and immobile [8,10,11]. When it has progressive growth they may cause severe deformities, discomfort, alteration of masticatory function, nasal obstruction, bleeding, tooth mobility or root resorption [12-14]. Brown tumors have also been described as evolving towards the orbital bone leading to the appearance of exophthalmos, a common sign related to other endocrine disorders like Basedow Graves’ disease [15, 16] or determined by benign lesions [17] or intraorbital foreign bodies [18]. Radiographically, brown tumors are well-defined lytic lesions that usually cause expansion of the affected bone, and there can be subperiosteal bone resorption and disappearance of the lamina dura surrounding the roots of teeth [12,19]. Neither CT or MRI exams provide specific changes. Brown tumors can be present as solid, mixed solid and cystic, or cystic lesions [20]. Histologically and radiologically, these lesions are indistinguishable from other giant cell tumors (giant cell granuloma, true giant cell tumors, fibrous dysplasia) [2]. On clinical examination and using only routine radiographs, the aspect may resemble osteosarcoma, bone metastases, Langerhan’s cell histiocytosis, Paget disease, cherubism, osteomyelitis or osteonecrosis secondary to bisphosphonate therapy [1,8,21]. The differential diagnosis is based on clinical findings and the presence of hyperparathyroidism confirmed by biochemical tests [10]. Preliminary reports in Romania on patients with secondary hyperparathyroidism and osteitis fibrosa cystica and also on rare thyroid malignancies did not include any cases of maxillary brown tumors, so, to our knowledge, this is one of the few cases encountered in our region [22,23,24].

The management of brown tumors involves control of hyperparathyroidism and the first intention treatment of secondary HPT is controlling the underlying end-stage renal disease or vitamin deficiency. Medical management (dialysis, calcimimetics, vitamin D derivatives and low phosphate diet) has been shown to be sufficient in controlling the disease and even resolve brown tumors, although the process is very slow [25]. Conversely, in cases of refractory disease, parathyroidectomy is required, and many authors reported complete resolution of the tumor as PTH level normalizes [26,27,28]. There are reports in the literature of persistent, large, disfiguring and symptomatic lesions, with no regression tendency even after parathyroidectomy [1,29,30]. In this case, especially when the lesions are located in the upper jaw, the simplest reconstruction method after surgery is the obturator prostheses [31].

In severe cases where the size of the tumor...
compromises normal function and aesthetics, it is generally recommended that parathyroidectomy should be associated with local osteoplasty [1,10,32] and reconstruction of the lost tissue by minimaly invasive methods like lipostructure or barbed threads [33,34].

CONCLUSIONS

Brown tumor is a rare entity and the differentiation between this lesion and others, particularly the giant cell granuloma, can be very difficult. Thus, the patients must be investigated for laboratorial alterations as well.

Regression of brown tumors may be achieved by performing parathyroidectomy. Additionally, larger lesions may require local surgical intervention.

Multidisciplinary follow-up is essential for the control of brown tumors in order to prevent rapid growth which may lead to severe deformities and functional alterations.

REFERENCES