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Photoclinic

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The pathology of brown tumor in a 36-year-old man on maintenance hemodialysis

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Implication for health policy/practice/research/medical education: The brown tumor is a rare benign tumor developed by autonomous osteoclastic activity in hyperparathyroidism. In this photo-clinic, we present a 36-year-old man on chronic hemodialysis presented with a jaw mass. Radiography of the mandible showed a soft tissue mass lesion. Neck computed tomography showed a lytic lesion. A needle biopsy of the mandible showed a lobular design comprised of groups and clusters of osteoclast-like multinucleated giant cells, hemorrhage, and hemosiderin deposits and vascular fibroblastic stroma that were indicative of the brown tumor.

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Case Presentation

A 36-year-old patient with a history of end stage renal disease, who has been undergoing hemodialysis three times per week for 10 years, was admitted to the nephrology department due to the catheter infection. In physical examination, a mass in the body of the mandible was detected (Figure 1).

Laboratory findings disclosed a raised intact parathyroid hormone (iPTH) plasma concentration; 1207 pg/mL (normal range, 15–65 pg/mL), serum calcium of 6.5 mg/dL (normal range, 8.8–11 mg/dL), phosphorus 2 mg/dL (normal range, 2.5–5.0 dg/mL), and alkaline phosphatase (ALP); 1,020 IU/L (normal range, 65–300 IU/L). The radiography of the mandible showed a jaw mass lesion (Figure 2).

A neck computed tomography scan showed parathyroid hyperplasia. Additionally, in the computed tomography scan of the neck, mandibular body lytic lesions with stippled calcified in favor of brown tumor were reported (Figure 3).

According to the above data, a needle biopsy of the lesion was conducted which showed a lobular design comprised of groups and clusters of osteoclast-like multinucleated giant cells, hemorrhage, and hemosiderin deposits and vascular fibroblastic stroma that were indicative of the brown tumor (Figure 4).

Discussion

In this case, we presented a brown tumor secondary to persistent secondary hyperparathyroidism in a patient who is on chronic hemodialysis.

The incidence of brown tumors in primary hyperparathyroidism is 4.5% and in secondary

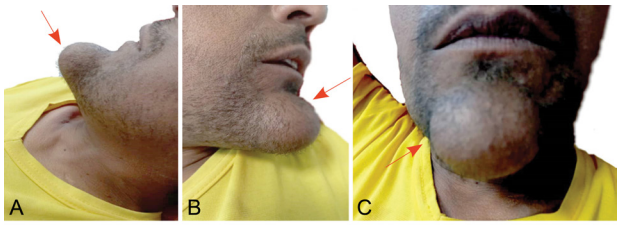

Figure 1. Mandibular mass lesion in anterior, oblique and lateral views (red arrow).

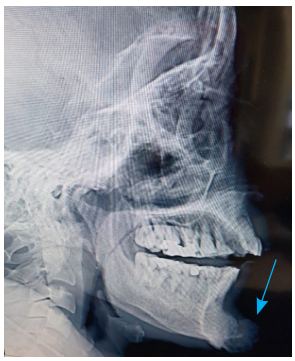

Figure 2. Lateral view radiography of the jaw showed the brown originated from the mandible bone (blue arrow).

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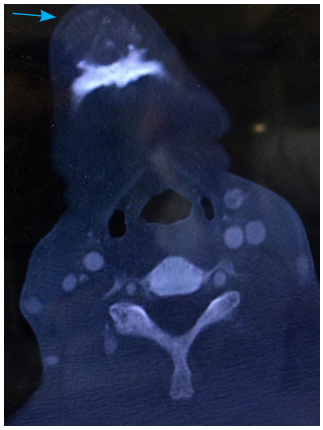

Figure 3. An axial computed tomography scan showed a mass lesion of the mandible (blue arrow).

hyperparathyroidism is 1.5-1.7% (1). The pathophysiology of renal hyperparathyroidism is complicated and is ill understood. When the glomerular filtration rate becomes less than 60 mL/min/1.73 m^2, PTH usually rises. In the primary stages of renal failure, increased parathyroid hormone levels increases kidney phosphorus excretion. However, as the glomerular filtration rate diminishes further, serum phosphorus levels begin to rise. An elevated level of phosphorus causes hypocalcemia; then, a low level of calcium results in an increase in PTH production indirectly. Furthermore, chronic kidney disease by reducing vitamin D synthesis in the kidney decreases the level of calcium (2).

Moreover, PTH activates osteoblast through the parathyroid hormone 1 receptor (PTH1R). Meanwhile, osteoclasts do not express PTH1R and become stimulated indirectly by PTH through the paracrine effects of osteoblast. Then, the autonomous osteoclastic activity formed a brown tumor (3). Medical treatment of brown tumors is useful in several cases, although most patients require parathyroidectomy. After correction of hyperparathyroidism if there was no regress in the brown tumor and if there was large destruction and nerve compression surgical resection should be considered (4,5).

Authors' contribution

Conceptualization: HN, DZ.
Validation: HN, DZ, EN, MAA, PB, AS, and MMD.

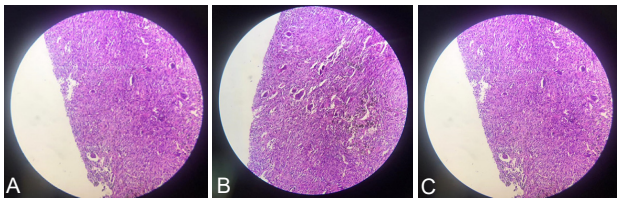

Figure 4. The needle biopsy pathology of the jaw mass showed a lobular design comprised of groups and clusters of osteoclast-like multinucleated giant cells, hemorrhage, and hemosiderin deposits and vascular fibroblastic stroma that were indicative of the brown tumor.

Investigation: HN, DZ, EN, MAA, PB, AS, and MMD.
Data curation: HN, DZ, EN, MAA, PB, AS, and MMD.
Writing–original draft preparation: NA and HN.
Writing–reviewing and editing: AHD NA and HN.
Visualization: DZ, NA, AHD and HN.
Supervision: DZ, NA and HN.

Conflicts of interest

The corresponding author of this photoclinic acts as the Editor-in-Chief of journal. The peer-review process of this piece has been done based on COPE and ICMJE guidelines. Other authors declare that they have no competing interests.

Ethical issues

The patients provided a verbal consent to publish this case as a photo-linic. Besides, ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors.

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