Case Report

A Case Report and Review on Mandibular Compact and Cancellous Osteomas

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ABSTRACT:

Osteomas are benign osteogenic tumors that are characterized by the proliferation of either cancellous, compact or a combination of both. Central and peripheral are two types of osteomas. In this article, we report two cases of osteomas that were clinically diagnosed as mandibular tori. The radiographic, computed tomography, three-dimensional computed tomography (3DCT) and histopathological investigations were employed in achieving final diagnosis. Both cases were managed by surgical excision. This article aims to discuss the cases presented with literature review on diagnosis and management.

Key-words: Osteoma, cancellous, compact, mandible, diagnosis, computed tomography, biopsy.

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Introduction

Osteomas are benign osteogenic lesions developing from proliferation of cancellous, compact bone or a combination of both. The osteomas are reported to be arising frequently from either endosteal or periosteal regions of the craniofacial bones such as temporal bone, pterygoid process, sinuses, maxilla and rarely from the mandible [1,2]. They can be classified as central (arising centripetally from the endosteum), peripheral (arising centrifugally from the periosteum) and extra skeletal (arising from the muscle or dermis of skin) types based on the site where the tumor originates in relation to the cortical bone [2,3]. The peripheral osteoma (also known as parosteal or periosteal or exophytic) are frequently encountered in the paranasal sinuses (frontal, ethmoid, maxilla) and the other locations include mandible, temporal bones, pterygoid process and orbital wall [1]. Mandible is affected more than the maxilla and the most prominent sites in the mandible being the angle, condyle and inferior border [4].Central osteomas are extremely rare and only very few cases have been reported so far in the literature. Kaplan et al (2008) described that similar to peripheral osteomas, central osteomas were also encountered in the mandible and common site being the premolar-molar region [5,6]. Osteomas can be histologically classified as compact or ivory osteoma characterized by the presence of compact bone (lamellar) with few marrow spaces and cancellous or spongy osteoma comprising of trabecular bone with plenty of marrow spaces and osteoblasts resembling mature bone. Also there is mixed type which consists of both compact and cancellous bone. [7,8].

Multiple osteomas of the jaws are a prominent feature that can be diagnosed in the early stage of Gardener's syndrome, an autosomal dominant disorder caused by the mutation of Adenomatous Polyposis Coli (APC) gene. It is usually characterized by gastrointestinal polyps, several osteomas, skin and soft tissue tumors and multiple impacted/supernumerary teeth [9]. Patients with multiple osteomas must be investigated for Gardener's syndrome since 100% of the intestinal polyps which are predominantly adenomas may progress to malignancy [9]. Here, we report two cases of mandibular osteomas of a young and an

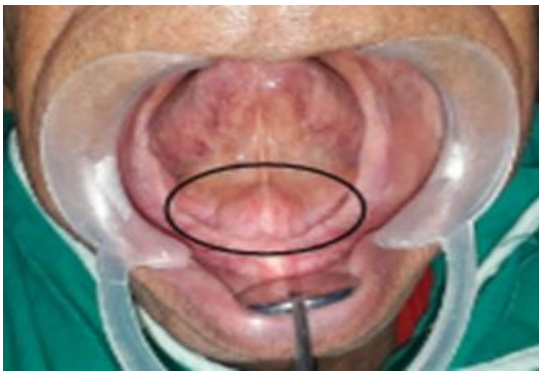
old patient based on clinical, radiological and histopathological findings which was provisionally diagnosed as mandibular tori. This case report also intends to discuss various differential diagnosis by exploring appropriate literature for the same.

2. Case report

2.1 Case 1

A 74-year-old male patient reported to our institution with a complaint of irritation in the denture wearing area associated with an ill-fitting denture for the past five to six months. He gave a history that he experienced mild intermittent pain on the lower anterior region with ulceration and swelling for the past six months. The medical history revealed that the patient underwent angioplasty with stent placement for acute myocardial infarction, before two years and is currently on medication. Extra oral examination revealed no significant changes. Intraoral examination revealed a solitary bony swelling on the lingual aspect of mandibular edentulous ridge extending from 33 to 43 region which measured approximately of 4×2 cms in size (Figure:1). On inspection, the patient was completely edentulous and the mucosa over the swelling was normal with no signs of ulceration or bleeding. On palpation, the swelling was bony hard in consistency, fixed and tender.

Figure: 1 Intraoral examination



Occlusal radiograph showed an increased radiopacity on the lingual border of the mandible with smooth borders (Figure:2). CT imaging showed homogenous well-circumscribed radiopaque mass arising from the periosteum of the bone. 3D reconstruction of the CT image revealed a uniform dense radiopaque sessile mass attached to the lingual cortex of the body of the mandible with a broad base (Figure 3). A provisional diagnosis of mandibular tori was made based on clinical, radiological and CT examination. Surgical excision was carried out under local anesthesia and the biopsy specimen was submitted for histopathological evaluation.

The submitted specimen was single bit of a hard tissue measuring about 5x2x1cm in 10% Neutral Buffered Formalin (Figure:4). The specimen was cut into two halves and one half was decalcified, sectioned and stained whereas the remaining bit was retained. Decalcification was done with 5% nitric acid and the end point of decalcification was achieved within four hours. The decalcified H &E stained sections revealed numerous sheets of lamellar bone with dispersed osteocytes and intervening scanty fibrocellular connective tissue stroma (Figure:5,6).

Figure:2. Occlusal Radiograph

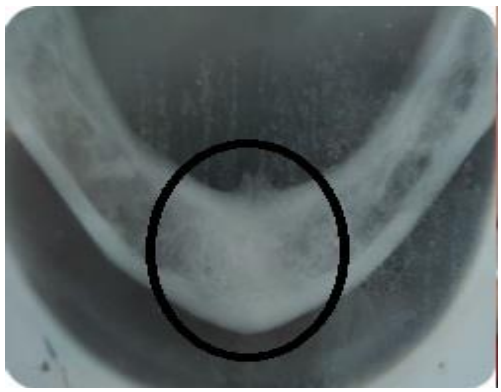


Figure 3: 3DCT

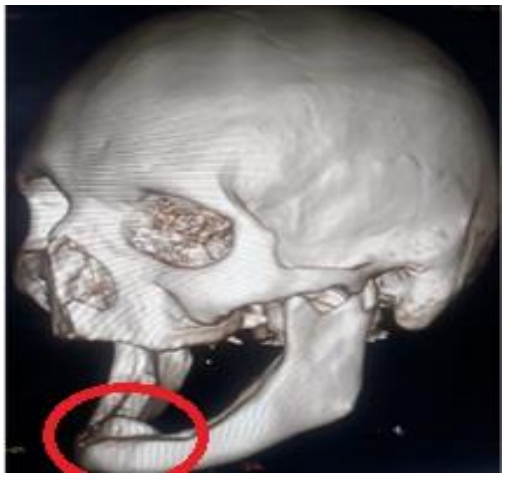


Figure 4: Excised specimen submitted for histopathological evaluation

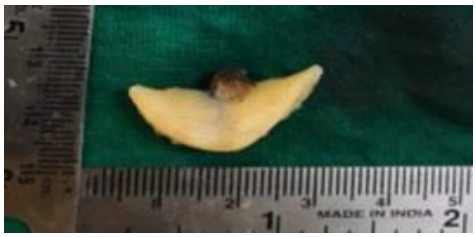


Figure: 5. Under scanner view, the decalcified section shows sheets of lamellar bone with few osteocytic lacunae, surrounded by scanty connective tissue

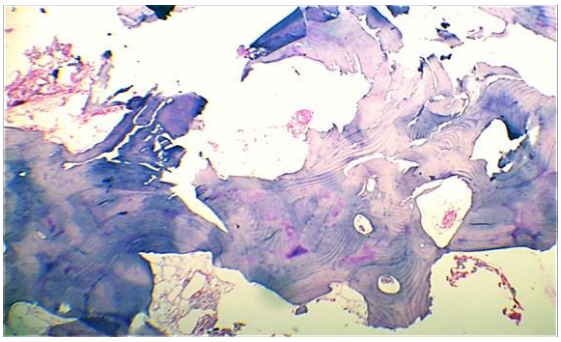
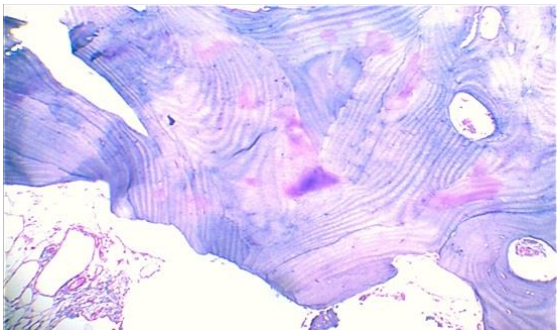


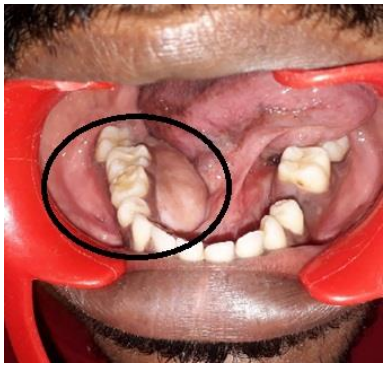
Figure: 6. showing sheets of lamellar bone, haversian canals, very few cellular lacunae with intervening scanty fibrovascular stroma under 10x magnification



2.2 Case 2

A 28-year-old male patient reported to our institution with a bony growth in the right lower jaw for the past 6 years. The history revealed that the growth was small initially which gradually increased to attain the present size. There was no relevant past medical or dental history and extra-oral examination revealed no significant findings. On intra oral examination a bony hard swelling was seen in the lingual aspect of 85, 46, 47 measuring about 4×2 cms extending superiorly to the lingual attached gingiva, inferiorly to the mylohyoid ridge, medially up to the distal aspect of 44 and posteriorly up to the distal aspect of 47 (Figure:7). The surface over the swelling appeared normal with no signs of ulceration or bleeding. The swelling was hard in consistency and tender on palpation. On further examination there was missing 15, 35, 45 and a retained deciduous 85.

Figure: 7. Intraoral examination



Increased radiopacity with smooth borders in the lingual aspect of 85, 46 and 47 was seen in the occlusal radiograph (Figure:8). Panoramic radiograph revealed impacted 28, 38, missing 15, 35, 45 and retained deciduous 85 with resorbed roots (Figure:9). Advanced investigations such as CT and 3DCT were performed due to the increased radiopacity in the right lingual aspect of the mandible. (Figure 10) CT images were vivid and showed a mixed radiolucent and radiopaque mass associated with the periosteum of the lingual surface of the mandible. Similar to the case 1, a provisional diagnosis of mandibular tori was made in accordance with the clinical, radiographic and CT findings. Surgical excision of the lesion was

performed under local anesthesia and the specimen was submitted for histopathological evaluation. The hard and soft tissue specimen was received in 10% Neutral Buffered Formalin and all the bits were processed, sectioned and stained. The hard tissue specimens were subjected to decalcification in 5% Nitric acid and the end point of decalcification was reached in four hours.

Figure: 8. Increased radiopacity on the floor of the mandible lingual aspect of 85, 46 and 47

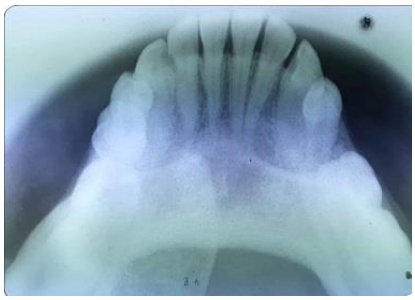


Figure:9. CT and 3DCT Image showing tumor mass

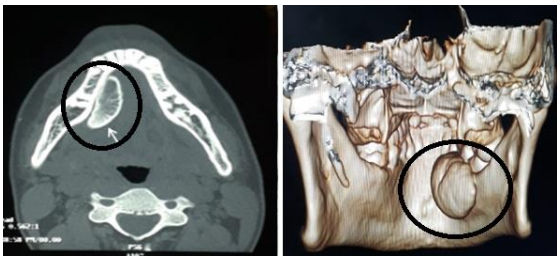
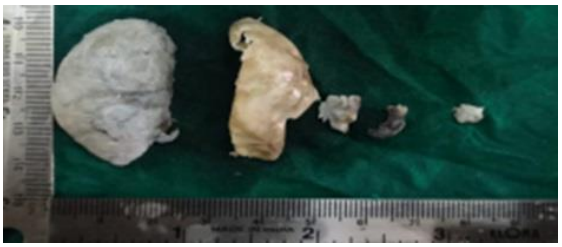
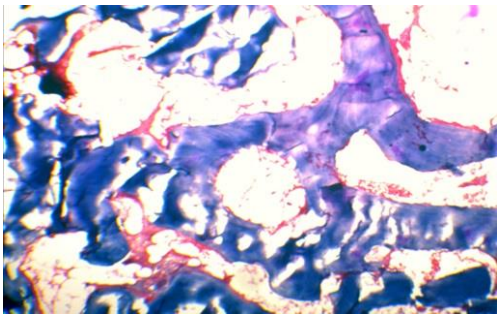


Figure:10. Bits of hard and soft tissue received



The soft and hard tissue sections were stained with routine Hematoxylin and eosin stains. The decalcified H & E sections revealed numerous thick interconnected bony trabeculae made up of lamellar bone with prominent resting lines and few areas showed small sheets of lamellar bone with few cells (Figure:11). The bony trabeculae were scattered within a delicate fibrovascular stroma along with areas of adipose tissue. Soft tissue sections revealed surface keratinized stratified squamous epithelium with an underlying fibrocellular stroma. Hence, a definitive diagnosis of Cancellous osteoma was made based on the histopathological features.

Figure 11: H and E - stained decalcified section revealed numerous interconnected trabeculae of lamellar bone with intervening abundant fibrofatty marrow tissue with numerous blood vessels under 4x magnification.



3. **Discussion**

Osteomas are rare osteogenic tumor which clinically manifests as bosselated, round to oval, polypoid or sessile, non-compressible, non-fluctuant, bony hard, slow growing masses that are usually asymptomatic that may occasionally enlarge in size resulting in facial deformity and occlusal dysfunction [10,11]. Although, the lesion can occur at any age, they usually occur between 2nd and 5th decade with no gender predilection. [3]. Osteomas have a lower incidence rate of 0.01-0.04% among general population and it constitutes 2.9% of all bone tumors and 12.1% of benign bone tumors [10]. Peripheral osteoma appear as a pedunculated mushroom like masses of 1-4 cms in size originating from the periosteum of the bone and are frequently encountered in the paranasal sinuses [3,7]. Peripheral osteomas of the jaws are reported more frequently in the mandible compared to maxilla with lingual aspect of the body and inferior border of the angle of the mandible being the common site [12]. Sayan et al (2002) in their study of 35 cases of osteomas reported that 28.57% of the lesion occurred in the frontal bone, 22.85% in the mandible, and 14.28% in maxillary regions [13]. Larrea-Oyarbide N et al in their retrospective study of 106 cases of osteomas reported that eighty-four cases were compact-type and the others were of cancellous type, whereas 49% were peripheral variety and only 29% were central. [14]. The majority of osteomas originating in mandible are reported to be of compact variety [10].

The etiopathogenesis of osteoma is still obscure. Some consider it as a true neoplasm, but developmental/embryological,

reactive/inflammatory causes have also been enunciated in the literature [10]. The developmental theory suggests that osteomas may originate from the sutures between bones of

different embryological origin [12]. But this theory is indistinct since osteomas are mostly seen in adults and rarely during childhood or adolescence [12]. Osteomas may be a reactive or inflammatory lesion which arise as a result of trauma or chronic infection in the paranasal sinuses leading to the proliferation of osteogenic cells [12]. The traction of medial pterygoid, lateral pterygoid and temporalis muscle may be a possible etiologic factor since peripheral osteomas are reported in areas of close proximity with these muscles [3]. In our cases, Case 1 revealed a history of chronic irritation due to the ill-fitting denture unveiling the possibility of osteoma occurring due to trauma. In Case 2, osteoma is seen in the lingual border of the body of the mandible which is a known site for muscular traction and hence explaining the development of osteoma.

Panoramic and computed tomography was used to demonstrate the lesion radiographically. In both cases, CT image revealed an oval, radiopaque, solitary, well-circumscribed, homogenous mass attached to the lingual cortical bone of the body of the mandible in case 1, whereas in case 2 attached to inferior lingual border suggesting a diagnosis of peripheral osteoma. Exostosis, peripheral ossifying fibroma, osteoblastoma, osteoid osteoma, osteochondroma, osteosarcoma were included in the radiological and histological differential diagnosis. [7].

A provisional diagnosis of torus mandibularis was considered in both our cases. Torus mandibularis (exostosis) are bosselated or multilobulated congenital bony protuberances seen normally bilateral on the lingual side of the mandible at the premolar region above the mylohyoid line and may extend distally to the third molar and medially to the lateral incisor [15,16]. The possible etiology of tori reported in the literature are environmental, dietary, genetic factors and masticatory stress. The typical location of mandibular tori is in accordance with our case 2, but the fact that tori usually stop growing after puberty and the unilateral location of the bony mass ruled out it's possibility [15].

Peripheral ossifying fibroma is a reactive lesion which presents radiologically as a radiopaque mass without intruding into the cortex and common site being the anterior portion of

maxilla.6 Peripheral ossifying fibroma are asymptomatic but can cause bone expansion, root resorption and displacement of teeth and none of these features were compatible with our case. The tumor is characterized histologically by dense bundles of collagen fibers in a cellular stroma comprised of plump fibroblasts, fibrocytes and areas of bone, cementum-like material or dystrophic calcifications [6]. Osteoid osteoma is a small (<1cm) benign osteoblastic tumor of the long bones (80%) that rarely develop in the jaws (1%) [17]. In contrast to peripheral ossifying fibroma, osteoid osteoma is often characterized by pain and does not cause resorption or displacement of teeth [17]. Histologically, osteoid osteoma can be distinguished from other lesions by the presence of mixtures of osteoid tissue, newly formed bone along with a high vascularity enclosed by a distinct area of reactive bone formation [18]. Osteoblastomas are benign osteogenic tumor that arises from the marrow and usually grows >1.5cm. Like osteoid osteoma, osteoblastoma also presents with pain and grows at a rapid rate than peripheral osteomas. Histologically it is comprised of numerous plump osteoblasts forming osteoid and bony trabeculae within a fibrovascular connective tissue stroma [19].

Osteosarcomas are malignant neoplasms affecting commonly the long bones characterized by distinct radiological and histological features. Radiographically, destruction of cortical or medullary bone and periosteal new bone formation resulting in characteristic sun ray appearance can be appreciated. Histologically, they are composed of malignant osteoblasts with hyperchromatic nuclei admixed with some spindle shaped cells producing atypical eosinophilic osteoid and giant cells in a rich fibrovascular connective tissue stroma [20]. Osteochondromas are benign tumors of osseous and cartilaginous origin arising from the cortical bone and characterized by the presence of bony trabeculae enclosed with a cartilaginous cap [21]. Thus, we ruled out the possibility of all the osseous lesions enlisted in our differential diagnosis on the basis of their unique radiological, CT and histological features to finally diagnose our both cases as osteoma.

4. Conclusion

We presented radiological and histological findings of mandibular osteoma of two cases with a detailed literature review. Small asymptomatic osteomas need not be surgically excised but in our cases since the growth was large, surgical excision was performed. The recurrence of osteoma was reported to minimal in the literature. Both cases were periodically reviewed for a year with no signs of recurrence.

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Ethical approval

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Patient consent

Obtained.

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Conflicts of interest

Authors declare no competing interest.

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