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Calcification in masseter muscle: A case report

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ABSTRACT

Biomineralization is a process by which living organisms produce minerals, often to harden the existing tissues. Defect in biomineralization occurring in soft tissues is defined as ectopic calcification. Dystrophic calcification is one of the types of ectopic calcifications. This soft tissue mineralization may develop in a wide variety of unrelated disorders and degenerative processes. It can occur in all soft tissues but cardiovascular tissues are particularly prone to calcification. Calcification in an isolated muscle like the masseter is rare, its pre-operative diagnosis pose a challenge in view of differential diagnosis. Here, we report a 55-year-old male who presented with swelling over right middle third of the face. Meticulous examination and selection of suitable investigations have helped us to arrive at an appropriate diagnosis.

Keywords: Ectopic Calcification, Dystrophic calcification, Masseter muscle, Soft tissue mineralization.

The radiologic evaluation of the soft tissue masses has changed dramatically in the last two decades. Before the advent of computer-assisted imaging, assessment of clinically suspicious soft-tissue masses was usually limited to radiographs. Although plain radiographs are sensitive to the identification of adipose tissue and soft-tissue mineralization, they provide limited diagnostic information. The cross-sectional and 3-D imaging provide a thorough insight of the lesion; thus, enhancing the diagnostic procedures. Ultrasound, CT, and particularly MR imaging have greatly improved the ability to evaluate soft tissue calcification [1]. This article describes a case of calcification within the masseter muscle diagnosed using a spectrum of imaging modalities.

CASE REPORT

A 55-year-old male who is clarinettist by profession presented to the Department of Oral Medicine and Radiology with swelling on right cheek region since 15 days. The patient had noticed the swelling incidentally. The swelling was small initially and progressed gradually to the present size. There was no history of trauma to the face. Patient was afebrile during the progression of the swelling. The swelling was of an esthetic concern; hence, he decided to consult. Medical and dental histories were non-contributory. Personal history revealed that patient was on a mixed diet, no deleterious and parafunctional habits.

On general physical examination, he had well-coordinated gait with erect posture, moderately built and nourished. On clinical examination, a diffuse swelling noted over the right lower third of the face measuring approximately 3.0 x 3.5 cm in diameter extending superioinferiorly from the right ala-tragus line up to 1 cm above the lower border of the mandible and mediolaterally from 1.5 cm posterior to the right corner of the mouth upto right angle of the mandible. Skin over the swelling and surrounding area appears normal (**Fig. 1**). On palpation, a well-defined mass noted over anterior border of masseter, firm to hard in consistency and non-tender. On clenching the jaw, the mass was neither adherent to the underlying tissue


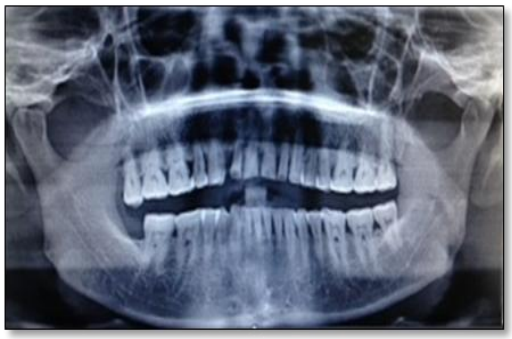
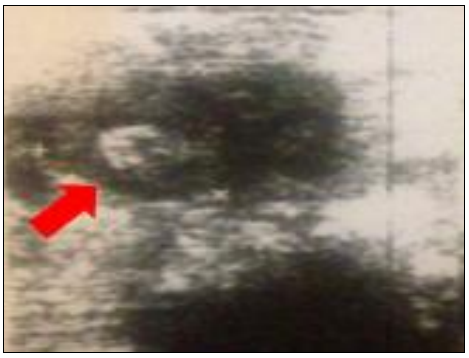

Figure: Figure 1 - Clinical picture of swelling over right masseter, Figure 2 - Panoramic radiograph reveals no abnormalities, Figure 3 - Ultrasonography showing ill defined, irregular, heterogenous, hyperechoic with internal echoes

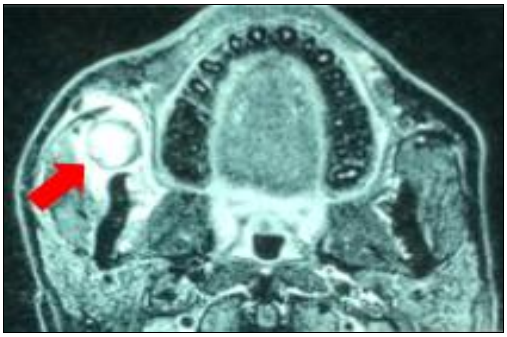

Figure 4 - MRI showing a well-defined heterogenous, normal signal intensity and perilesional edema within the masseter

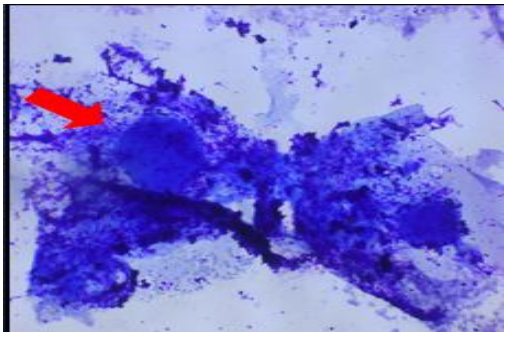

Figure 5 - Hemorrhage along with amorphous to globular hematoxiphillic deposits

nor to the overlying skin and was freely mobile. The right cheek over the masseter was bulky as compared to the left side. Facial nerve functions were normal. There was no restricted mouth opening. There was no regional cervical lymphadenopathy. Intraoral examination reveals generalized attrition and extrinsic stains. Opening of Stensen's duct was normal and milking of the right parotid gland produced seromucous saliva without pus and blood.

Considering his profession and the fact that the mass was within the masseter muscle, a provisional diagnosis of hypertrophy of right masseter muscle was given. Cysticercosis was considered as one of the differential diagnosis since the patient was on mixed diet and temporalis and masseter muscles are common location for occurance of larval infestation. His profession could have caused overuse and chronic microtrauma of the masseter muscle; hence, myositis ossificans was considered as another differential diagnosis. The patient being elderly, ectopic calcification associated with systemic disorders was also considered.

Panoramic radiograph revealed no odontogenic pathology (**Fig. 2**). Ultrasonography of the parotid region and neck showed an ill-defined, irregular, heterogenous, hyperechoic lesion measuring 2.1x1.2x1.9 cm with internal echoes and minimal peripheral vascularity giving an impression of calcification and unlikely of cysticercosis (**Fig. 3**). Blood profile was non-contributory with serum calcium and phosphorus levels within normal limits i.e. 10.4 mg/dl and 3.8 mg/dl respectively. This ruled out metastastic calcification. Plain and contrast MRI showed a heterogenous well defined lesion, 2x2 cm in size with perilesional edema. Lesion showed peripheral enhancement with restricted diffusion. Sections of parenchyma show normal signal intensities suggesting calcification within the masseter muscle (**Fig. 4**).

Fine needle aspiration cytology of the swelling yielded only hemorrhagic fluid along with amorphous to globular hematoxiphillic deposits suggesting calcium (**Fig. 5**). Considering the age, profession of the patient, absence of restricted mouth opening and based on the radiographic features of calcification, a final diagnosis of dystrophic calcification of right masseter muscle was made. Since the patient was apprehensive about the surgical treatment,

patient was kept under observation. Three months of follow up revealed mild decrease in size of the swelling and he remained asymptomatic.

DISCUSSION

Ectopic calcification is defined as inappropriate biomineralization occurring in soft tissues. They are typically composed of calcium phosphate salts such as hydroxyapatite. In the absence of a systemic mineral imbalance, ectopic calcification is referred to as dystrophic calcification. This soft tissue mineralization may develop in a wide variety of unrelated disorders and degenerative processes [2]. The pathogenesis of dystrophic calcification involves initiation and propagation, both of which may be either intracellular or extracellular; the ultimate end product is the formation of crystalline calcium phosphate [3]. The soft tissue may be damaged by the blunt trauma, inflammation, injections, and the presence of parasites, soft tissue changes arising from diseases and aging [4]. In our case, there could have been chronic microtrauma of the masseter muscle, which can be attributed to his profession.

Inflammatory disorders, such as scleroderma, dermatomyositis and systemic lupus erythematosus may result in dystrophic calcification. Dystrophic calcification has been reported at various sites by multiple researchers but the commonest site is heart muscle and valves [5,6]. Dystrophic calcification involving skeletal muscle, such as masseter muscle, pterygoid muscle, and anterior compartment of the leg has also been reported [7-9]. This calcification usually is localized to the site of injury. Other common soft tissue sites include the gingiva, tongue, lymph nodes, and cheek. Dystrophic calcifications may produce no signs or symptoms; although, enlargement and ulceration of overlying soft tissues may occur occasionally, and a solid mass of calcium salt can be palpated [10].

Diagnosis based on the clinical examination poses a challenge. Plain X-ray films are rarely helpful in diagnosing early ossification and the introduction of CT and MRI has aided in more timely recognition of the condition [11]. The radiographic appearance of certain lesions like myositis ossificans and muscle ossifications is unique and may be helpful in arriving at an appropriate diagnosis [1]. Blood examination and various imaging modalities may assist the clinician in analysing the cause of calcification. There is no established protocol for its treatment. With regard to the reported cases, excision has commonly been performed.

However, several investigators have recommended observation as calcification is a benign entity and surgical intervention is often followed by secondary infection [12-13]. Hence, management of dystrophic calcification still presents a challenge to the clinicians. Thorough review of literature revealed that dystrophic calcification in an isolated muscle like the masseter is rare, ours being the fourth reported case [5,7,14].

CONCLUSION

The dystrophic calcification in the masseter muscle is very rare and its preoperative diagnosis poses a challenge in the view of differential diagnosis. Meticulous examination and selection of appropriate imaging modality is essential for diagnosis and treatment planning.

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