A Unique Case of Dystrophic Calcification in Masseter: A Diagnostic Challenge

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Abstract The objective of this study was to present an unusual case of isolated dystrophic calcification in masseter and the diagnostic challenge it posed. A case report on a 14-year-old boy presented with swelling in left parotid region along with the review of literature was reported. Histopathological and biochemical analyses of the excised mass diagnosed this affliction as dystrophic calcification. Dystrophic calcification is deposition of calcium salt in degenerated tissues in the presence of normal calcium and phosphorous metabolism. It usually occurs in injured tissues. This is different from systemic mineral imbalance causing metastatic calcification and needs to be differentiated. On reviewing the literature, this appears to be the second reported case in the world wide literature. The unique presentation, diagnosis, and surgical management of dystrophic calcification have been described.

Keywords Calcification · Dystrophic · Ectopic · Masseter

Introduction

Inappropriate biomineralization occurring in soft tissues is defined as ectopic calcification. In absence of a systemic mineral imbalance ectopic calcification is typically called

dystrophic calcification and is commonly observed in association with injury, disease, and aging. It can occur in all soft tissues but cardiovascular tissues are particularly prone to dystrophic calcification [1].

The term metastatic calcification is used when a systemic mineral imbalance would elevate calcium levels in blood and all tissues. Mineralization of soft tissues can occur in hyperparathyroidism, hyperadrenocorticism, vitamin D toxicity, and hypervitaminosis. Dystrophic calcification in isolated muscle like the masseter is rare, its pre-operative diagnosis posing a challenge in view of differential diagnosis.

Case Report

A 14-year-old boy from rural part of Maharashtra (India) presented to the E.N.T. Outpatient Department of our tertiary care teaching hospital in June 2010 with swelling on left cheek region since 4 years. The patient noticed the swelling incidentally. There was gradual increase but no fluctuation in size. There was no history of any trauma to the face or any dental complaints. On clinical examination we found a firm non-tender bosselated swelling measuring 3.5 cm × 3 cm on left side of face anterior to parotid extending from angle of mandible forwards (Fig. 1). On clenching the jaws it was fixed suggesting that it was within the masseter muscle. Skin over it was freely mobile. Facial nerve functions were normal. Opening of Stensen's duct was normal. There was no trismus and no cervical lymphadenopathy. Rest of ear, nose, and throat examination was normal.

Patient was investigated thoroughly. Blood profile was non-contributory. Serum calcium was 8.7 mg/dl and serum phosphorus was 4.4 mg/dl, within normal limits. Ultrasonography of the parotid region and neck showed

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Fig. 1 Clinical picture of patient with swelling over left parotid region

Fig. 3 The MRI of the parotid region (sagittal) showing a heterogeneous well defined lesion 2.1 cm × 5.1 cm in size marked by black arrow

Fig. 2 Radiograph of the skull showing multiple circular radio-opaque lesions marked by arrow

Fig. 4 CT scan of masseteric region (axial) showing calcified masses with mild central enhancement marked by arrow

36 mm × 18 mm heterogeneous hypoechoic lesion with internal echoes and areas of calcification in the muscle plane of masseter. Parotid gland and submandibular gland were normal. Radiograph of the skull showed multiple circular radio-opaque lesions with double densities in periparotid area (Fig. 2). Suspicion of cysticercosis was raised.

Meanwhile repeated FNAC of the swelling yielded only hemorrhagic fluid and thus was inconclusive. The MRI of the parotid region showed a heterogeneous well defined lesion 2.1 cm × 5.1 cm in size hyperintense on T2W images and hypointense on T1W image within the plane of muscle (Fig. 3). CT scan showed calcified masses. Post-contrast images showed mild central enhancement (Fig. 4).

We again suspected cysticercosis of the masseter based on the findings of multiple calcified cysts like appearance on CT scan. MRI of brain was normal. We investigated him further with stool examination for helminth ova which was negative. The Elisa test for IgG antibodies to *Taenia solium* was negative (0.01 OD units). The USG abdomen showed no lesion in liver, spleen or kidneys. Radiograph of chest was clear.

Since all the investigations were inconclusive regarding the diagnosis of lesion it was decided to go ahead with excision of the mass under general anesthesia. A modified Blair's incision was taken to elevate skin and subcutaneous flap. Muscle fibers of masseter were longitudinally separated to expose the mass. Careful blunt and sharp dissection

Fig. 5 Excised mass showing matted round calcified egg like bodies of varying sizes

separated the lesion comprising of multiple calcified cysts matted together from the masseter muscle. The calcified mass was excised completely (Fig. 5). Hemostasis was achieved; wound sutured in layers and corrugated drain kept for 2 days. There was no facial weakness. Post operative recovery was uneventful.

Histopathological findings on gross inspection showed multiple, beadlike, round to oval white colored masses seen flimsily attached to muscle. These were hard in consistency and gritty on cutting. Their center shows chalky white appearance. Microscopically there were large hyaline bodies with irregular area of calcification in their center. They are surrounded by fibrous tissue and skeletal muscle with foreign body giant cell reaction and lymphohistiocytic inflammatory reaction. The giant cells show intracytoplasmic refractile, irregular crystalline structures. Biochemical analysis of the stones revealed calcium, phosphates, and ammonium salts.

Discussion

There are various conditions that can give rise to abnormal calcium deposition in various tissues. It may be related to abnormal calcium phosphate metabolism as seen in metastatic calcification or can also occur in normal calcium metabolism as in dystrophic calcification. Metastatic calcification occurs in conditions like primary hyperparathyroidism, sarcoidosis, renal failure, vitamin D intoxication due to faulty calcium phosphorus metabolism.

Dystrophic calcification, however, occurs in absence of a systemic mineral imbalance, and is commonly observed in tissue trauma, disease, and aging. Dystrophic calcification has been reported at various sites by multiple researchers but the commonest site is heart muscle and valves [1]. Dystrophic calcification involving skeletal muscle, such as masseter muscle, pterygoid muscle, and anterior compartment of the leg has also been reported [2–4]. Repeated trauma has been implicated as the major cause of dystrophic calcification. Inflammatory disorders, such as scleroderma, dermatomyositis and systemic lupus erythematosus may result in dystrophic calcification. Ectopic

ossification is seen in post surgery patient, burns, neurologic injury, and myositis ossificans.

Ours is the second reported case of dystrophic calcification of masseter muscle in the world literature [2]. In this patient etiology for calcification could not be ascertained as there was no history suggestive of trauma. Blood biochemical reports were normal and thus diagnosis of dystrophic calcification was made. It was not associated with imbalance of metabolism or any disease like cysticercosis which was confirmed on investigation.

It was difficult to diagnose this case clinically as all the tests done were normal except for the MRI and CT scan which showed multiple round calcified lesions in the masseter muscle. Fine needle aspiration test was not conclusive; therefore treating the condition posed a problem. Surgery was therefore planned to completely excise the lesion. The calcified lesion was found in the fibrous connective tissue of the masseter muscle and the plane between the calcified lesion and muscle could be easily found. There were no adhesions. Similar pattern of calcification has been documented in the dystrophic calcification of the cardiac muscle [1].

Histopathological findings in present case suggested that the specimen consisted of primarily calcified lesions along with few skeletal muscle fibers. The biochemical analysis of the calcified lesions showed compounds of ammonia and carbonate. There have been reports of analysis of calcified deposits in various tissues that were found to be calcium phosphate and magnesium ammonium phosphates [5].

Dystrophic calcification occurs locally involving heart muscle, skeletal muscle, etc. without any systemic metabolic disorder but the exact cause and pathogenesis for calcification is unelucidated. There is no established protocol for its treatment classification. Patient of dystrophic calcification presents a diagnostic challenge and therefore treatment of such patients becomes difficult.

Key Notes

Dystrophic calcification in an isolated muscle like the masseter is rare, ours being the second reported case, its

pre-operative diagnosis posing a challenge in view of differential diagnosis. Meticulous surgical excision and good follow up post-operatively is essential, especially since it is a muscle of mastication.

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