Soft Tissue Calcifications in the Orofacial Region

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Abstract

The main purpose of this article is to present a review of soft tissue calcification in Orofacial region. It can be systemically evaluated by using a simple algorithm based on the detailed clinical information and distribution pattern of these calcified lesions. The calcification of soft tissues belongs to a large group of lesions. Radiologists often detect calcifications in their daily work. For dental practitioners, this review should be of interest in encountering the soft tissue calcification in the orofacial region.

Keywords: *Soft tissue, Calcification, Orofacial, lesions.*

Introduction

Calcification of soft tissues in the orofacial area is unusual and is typically asymptomatic. Deposition of calcium salts in tissues other than osteoid or enamel is called pathologic or heterotrophic calcification. It occurs in an unorganized fashion in soft tissue. Three distinct types of heterotrophic calcification are recognized. They are dystrophic calcification, idiopathic calcification and metastatic calcification.[1]

Dystrophic calcification is the deposition of calcium salts, given normal calcium and phosphate levels, into the chief sites of long-standing inflammation and dying tissues. Examples are pulp stone, calcified lymphnodes, cysticercosis, arterial calcification. Idiopathic calcification results from calcium accumulation in human tissue given the regular calcium and phosphate levels in the serum. Examples are sialoliths, phleboliths, laryngeal cartilage calcification, antrolith/rhinolith. Metastatic calcification occurs when minerals accumulate, higher than usual serum levels of calcium and phosphate into the normal tissue. Examples are ossification of the styloid ligament, osteoma cutis and myositis ossificans.[2]

Pulp stone: Foci of calcification within the pulp chamberor root canalor reaching from pulp chamber into root canals without regularstructure or number. Asymptomatic in nature. Can occur as a result of increase in age or specific pathology. Often arises once the development of the tooth has been finished. Its histological types are true pulp stone, false pulp stone, free pulp stone, free pulp stone, attached pulp stone, embedded pulp stone. True pulp stone is composed of dentinal tubules. False pulp stones contain concentricalcalcified circles. Free pulp stones are freely placed inside the pulp tissue.Theattached pulp stone adheres to the surface of the dentin. Embedded pulp stone are covered by secondary dentin.[3]

Calcified lymphnodes: Calcification occurs in lymphnodes that have been chronically inflamed with often granulomatous disorders due to numerous diseases. Hydroxyapatite-like calcium salts takes the place of the lymphoid tissue,nearly obliterating all the nodal construction. The common disease that cause calcified lymphnodes are scrofula, sarcoidosis, catscratch disease, rheumatoid arthritis, lymphoma dealt with radiation treatment beforehand, systemic, sclerosis,infection by fungus, metastasis from specific neoplasm calcification.[4]

Calcified lymphnodes are asymptomatic, rigid, flabby, mobile and round to oval-shaped masses when

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palpated. Submandibular and cervical nodes (superficial and deep) are the most frequently affected nodes and less frequently the pre-auricular and submental nodes. The most frequent location is the submandibular area,between the posterior border of the ramus and cervical spine, and at or under the lower border of the mandible at just the angle. The node calcification may be single or a series of nodes called lymphnode chaining. The periphery may be well-defined, irregular and sometimes may even have a lobulated shape identical to the external cauliflower form, radiographically. The inner core can differ in the level of radiopacity, creating the appearance of rounded or uneven mass collection called eggshell calcification.[5]

Tonsillolith: Typically,they are rigid, circular, yellow or white structures projected from the tonsillar crypts. Prevalent in the older age group. The small calculi may not produce any signs or symptoms. In the case of larger calcifications, pain, swelling, fetor orisswallowing disorders and a foreign object discomfort on swallowing has been identified. In rare cases, they may be giant tonsilloliths, which stretch the lymphoid tissue, resulting in ulcerations and extrusions. They show on the panoramic view as single or multiple radiopacities which cross the middle section of the mandibular ramus.[6]

Cysticercosis: If pork tapeworm eggs are consumed by humans their coating is digested in the stomach and the larvae are hatched. Such larvae cross the mucous membrane,enter the blood and lymph vessels and are circulated in the tissues all around the body, but selectively associate to the skin, heart, muscle and brain. These are also present in oral and perioral tissue, particularly the muscles of mastication. When the larvae die, they are regarded as foreign bodies producing granuloma growth, bruising and calcification, this takes on average three months. Such sites in the tissueare termed cysticerci. Examination of the area of the head and neck may show palpable delicate fluctuating swelling, well-circumscribed. Symptoms usually seen are gastrointestinal discomfort, epigastric pain, extreme nausea, vomiting, seizures, headache, visual disturbances and irritability. They appear as multiple, well-defined elliptical, homogenous radiopacities which resemble grains of rice.[7]

Arterial calcification: Monckerberg's medial calcinosis (arteriosclerosis) and calcified atherosclerotic plaque are two different patterns of arterial calcifications. Arteriosclerosis is characterized by the breakdown,degeneration and subsequent loss of elastic fibre accompanied by calcium accumulation inside the vessel's medial cover. Often patient is first symptomless,but eventually they may develop cutaneous gangrene, peripheral vascular disease and myositis due to vascular disease and myositis due to vascular insufficiency. Patientwith Sturge-weber syndrome alsoexperience intracranial calcification of the arteries. On panoramic radiographs, seen as involving the facial or the carotid artery. Tram track appearance is seen from the side, seem as a parallel pair of slender, radiopaque rows that can be straight or tortuous.[8]

Calcified atherosclerotic plaque is located in the extracranial carotid vascular system and is a main leading factor of cerebrovascular embolic and occlusive disease. This first occurs as a result of enhanced endothelium destruction at certain locations at the arterial bifurcation. On a panoramic radiograph, the calcificationis visible in the neck located close to the greater cornu of the hyoid bone and the cervical vertebrae C3, C4 or the intervertebral gap between them, which are numerous and irregular in shape.[9]

Sialolith: Sialolithiasisis the development of calcified blockagein the salivary duct that contributes to persistent retrograde infection because of a decreased salivary flow. This is usual in middle-aged person with mild predilection for men. The Wharton's duct and the submandibular gland are mostly involved followed by the parotid and sublingual glands. Discomfort may intensify at mealtimes, when the salivary flow is stimulated. Non-calcified stones are diagnosed with sialogram. On routine plain films, it shows laminated appearance because of multiple layers of calcification.[10]

Phleboliths: In the head and neck area, phlebolithsoften suggest the existence of ahemangioma, in which the calcified thrombi contained invenulae, veins or the sinusoidal vessels. The associated soft tissue could be swollen, throbbing or discoloured by the involvement of veins or a soft tissue hemangioma, that frequently vary in size, along with the changein body posture or during a Valsalva manoeuvre. On application of pressure change in colour or blanching is seen. A radiolucent centre with appearance of lamination around its pattern is seen, hence called a target or bull's eye appearance. [11]

Laryngeal cartilage calcification: Thyroid and tristichouscartilagecomprises of cartilage of hyalin,

that tends to calcify with age. The calcified tracheal cartilages usually present a homogenous radiopacity, with an occasional outer cortex and they are generally asymptomatic. [12]

Rhyolith/Antrolith: In case of rhinolith the nidus is normally a foreign exogenous body. Whereas the nidus for an antrolith is usually endogenous. Hard calcified bodies those appear in the nostrils are called rhinolithand when in the antrum is called antrolith. Initially, the patient may be asymptomatic. When increase in size it impinges the mucosa, producing pain, congestion and ulceration. The patient may develop facial pain, fever, fetor, anosmia, nasal obstruction, epistaxis, headache, sinusitis, purulent rhinorrhea. They may be homogenous or heterogeneousradiopacity, based on the formof the nidus and occasionally has laminations.[13]

Ossification of styloidligament: Styloid ligament ossification generally progresses downwards from the base of the skull and usually develops bilaterally. The associated conditions are eagle's syndrome, styloid syndrome and styloid chain ossification. Most common signs and symptoms seen are throat pain, fishbone stuck in the throat, pain on swallowing, referred pain to the ear of the affected side, tinnitus, pain in anterior cervical triangle, pain on turning head, headache in the orbital area and cervical pain. In the panoramic image, it is seen as a linear, elongated, tapering, slenderradiopaque process that is wider at the base, extending from the area of the mastoid process and passing into theposteroinferiorpart of ramus in direction of hyoid bone.[14]

Osteoma cutis: Those are regular bone-forming areas in unusual sites. In a scar or long-standing inflammatory dermatosis, it can grow secondary to long-term acne. Histologically, those are seen as regions in the dermis or subcutaneous tissue of compact viable bone. Extraorally it may occur on the face in the cheek and lip region and intraorally it may occur on the tongue, where it may be calledosseous choristoma or osteoma mucosae. This induces no noticeable changes in the overlying skin, except in some areas, where the colour may change to yellowish-white. It varies in size from 0.1mm to 5cm. The particular osteoma can be palpable. Normally when a needle is injected through one of the papules experiences rock like obstruction. It is seen as finely outlined, washer-shaped images and single or multiple radiopacities of various sizes. Radiographically, it appears as a homogenous radiopacity with a radiolucent core which reflects natural fatty marrow, making the lesion to resemble a doughnut. Trabeculae typically grow in the marrow cavity of a bigger osteoma. Calcified cystic acne lesionmimic a snowflake radiopaque view that relates to a scar's clinical position.[1, 3]

Myositis ossificans: In this case, the fibrous tissuesand heterotopicbones in the interstitial tissues of the muscles and relatedtendon and ligament. There is secondary damage and atrophy of muscles. It is of two types, localised myositisossificans and progressive myositis ossificans. Localised myositis ossificanshappens due to acute or long-terminjury, tough strain in muscle and muscle injury that can result in haemorrhageinthe muscles or related tendon or fascia. During the healing process, heterotopic bone and in some cases cartilage is formed. The commonly involved oral sites are the masseter, sternocleidomastoid and lateral pterygoid muscle. The location of the precipitating injury stays tender, painful and swollenfor a long time. Due to the inflammation, the skin appears red. If there is an involvement of muscles of mastication in the lesion then the opening of the mouth will be a discomfort. The region of ossification can become evident only after 2-3 weeks as a solid, intra-muscular palpable mass that gradually expands and finally stops increasing. The lesion might be fixed or on palpation could be easily moveable. Most frequently involved muscles of the neck and head region are masseter and sternocleidomastoid. Radiographically, a radiolucent band could typically be seen between the ossification region and correspondingbone and the heterotopic bone can lie along the muscle'slong axis. Masses generally measure less than 6cm in greatest dimension. Generally, the exterior is more radiopaque than that of the inner structure. Pseudotrabeculae can be seen from irregular oval to straight lines going in the same direction as normal muscle fibres because of the shape variability.[2]

Progressive myositis ossificansgenerally affects children younger than 6 years and occasionally as early in childhood. Progressive heterotopic bone developmenttakes place inside the interstitial tissue of ligament, tendon,fasciaand muscle atrophies. This condition may be inherited or maybe a spontaneous mutation affecting the mesenchyme. It begins in the neck and upper back muscleand passes to the extremities. It begins as a tender and painful soft tissue swelling which could cause redness and heat including the appearanceof inflammation. As the severe symptoms disappear that tissue remains strong in density. Later phases of the same disorder give the petrified man like look.

Radiographic appearance is similar to that of localised myositis ossificans. The boneset down will not possess natural bone structure.[1-4]

Conclusion

The calcification of soft tissues belongs to a large group of lesions. Radiologists often detect calcifications in their daily work. For dental practitioners, this review should be of interest in encountering the soft tissue calcification in the orofacial region.

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