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Journal of Oral Medicine, Oral Surgery, Oral Pathology and Oral Radiology

Journal homepage: www.joooo.org

Case Report

Calcified triticeous cartilage in cone beam computed tomography: A radiographic observation

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ARTICLE INFO

Article history:

Received 03-10-2020

Accepted 05-11-2020

Available online 02-12-2020

Keywords:

Calcification

Triticeous cartilage

Cone beam computed tomography

ABSTRACT

Triticeous cartilage (TC) is a small, ovoid cartilage present within the lateral thyrohyoid ligament which may undergo calcification and becomes visible in the radiographic examination. Calcified triticeous cartilage (CTC) are confused with other soft tissue calcification in that region both symptomatically or radiographically. Although CTC are seen in panoramic radiographs, its exact location, shape and association with adjacent structures are difficult to discern. Objectives of this article is to report a case of CTC, which reported to our department with vague symptoms. Upon CBCT examination, CTC was evident and hence this article highlights the CBCT features of CTC and literature review.

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1. Introduction

Triticeous cartilage (TC) is a small, ovoid cartilage present within the lateral thyrohyoid ligament, may serve to reinforce the thyrohyoid ligament. The ligament extends from the superior horn of the thyroid cartilage to the greater horn of the hyoid bone. TC could be present unilaterally, bilaterally or be absent. TC may undergo calcification and becomes visible in the radiographic examination.^{1,2} Similar to other soft tissue calcifications, calcified triticeous cartilage (CTC), may be accidentally found during head and neck radiographic examinations and easily mistaken for other calcifications especially carotid artery calcification. These calcifications may occur due to physiological condition (age related) or pathological mineralization.¹

In panoramic radiograph, due to overlapping of structures, magnification and distortions, determining the exact location and relationship of these calcification is difficult. In this perspective, cone beam computed tomography (CBCT) allows accurate evaluation of anatomic

location, distribution and morphology of these calcification. Although CBCT has low soft tissue contrast, this imaging modality is superior to conventional radiography in terms of differentiating these calcifications from one another.

Objectives of this article is to report a case of CTC, which reported to our department with vague symptoms. Upon CBCT examination, CTC was evident and hence this article highlights the CBCT features of CTC and literature review.

2. Case Report

A 58-year old male patient presented for our dental OPD with a complaint of vague pain in right neck region, which radiates to angle of the mandible and TMJ of same side. Pain was intermittent, and aggravated on swallowing. Past dental and medical history did not reveal any significant history. Upon examination, the muscles of mastication and TMJ were normal. Intraorally, there were no odontogenic cause related to patient's complaint. Considering, vague pain in neck region, and pain on swallowing, elongated styloid process was considered clinical diagnosis.

Length of styloid process as measured in panoramic radiograph of patient revealed 23.2 mm on right side. But

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there was a well-defined radiopacity found near hyoid bone bilaterally at the level of the C3-C4 cervical vertebrae and immediately below the tip of the greater cornue of hyoid bone (GCHB) (Figure 1). Therefore, the patient was subjected to CBCT evaluation of this radiopacity in the hyoid bone region and the stylohyoid process.

A high-resolution scan (90 microns) CBCT scan was obtained using a Carestream CS9300 apparatus (Carestream Dental LLC, Atlanta, GA, USA). The length of styloid process in the right side as measured in CBCT was 28.4 mm (Figure 2). The volume rendering showed hyperdense oval radiographic lesion present bilaterally superior and medial to the GCHB (Figure 3). In the sagittal and coronal section, this was seen as homogenous radiodense structure at the level of C3 and medial aspect of GCHB (Figures 4 and 5). In axial section, hypodensity was observed in the centre with hyperdense ring at the periphery of the structure in right side, whereas on the left side, structure was homogeneously hyperdense (Figure 6). The lesion on the right side measured about 3.4X2.5X1.9 mm which was bigger than that of left side (0.9X1.5X1.3). Upper duodenal endoscopy was also done, but did not reveal any pathological changes. Therefore, based on the location and appearance in these radiographs and negative endoscopic features for the presence of any other internal pathologies, CTC was considered and advised for surgical removal of the calcification under general anaesthesia. But patient refused for any surgical intervention and lost for follow up.

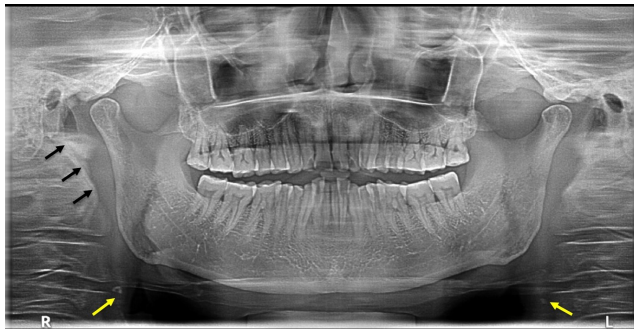


Fig. 1: Panoramic radiograph showing styloid process (black arrow); radiopacity bilaterally near hyoid bone (yellow arrow)

3. Discussion

TC was thought to provide attachment for a 'triticoglossus muscle (of Bochdalek) and to strengthen the thyrohyoid ligament. However, Wilson I et al. were neither found evidence of presence of this muscle, nor any disadvantage or disability reported by individuals without a TC. Alternatively, they opinionated that the TC has no function at all in humans.³ Embryologically, TC is a remnant of this hyothyroid cartilage, which separates hyoid and thyroid cartilage. Failure of this hyothyroid cartilage to separate



Fig. 2: CBCT showing styloid process: A: 3D reconstruction view; B: Sagittal section

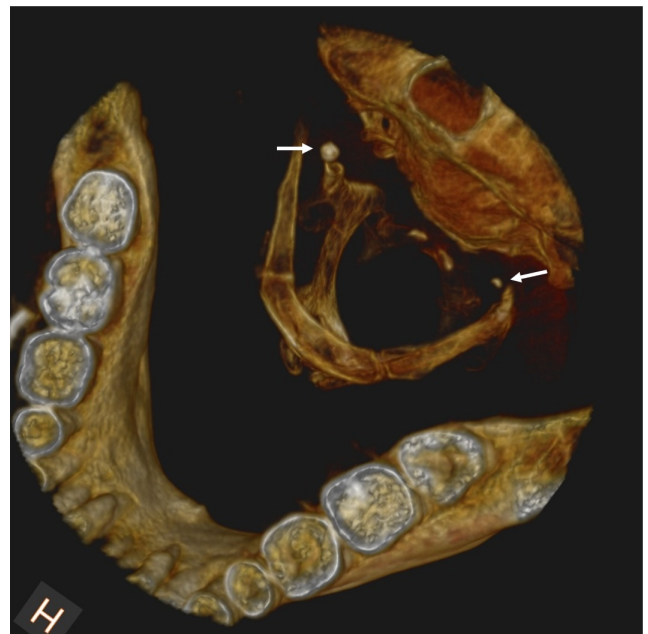


Fig. 3: 3D reconstruction showing bilaterally calcified TC (white arrow)

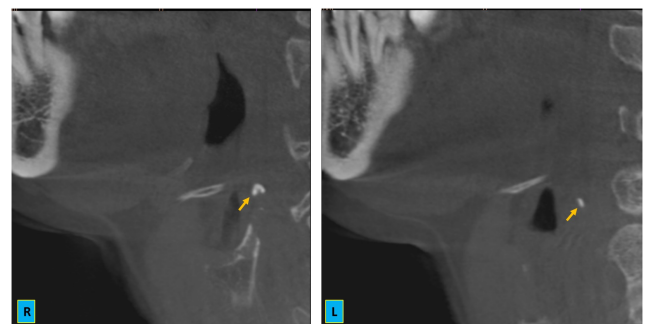


Fig. 4: Sagittal section of CBCT



Fig. 5: Coronal section of CBCT

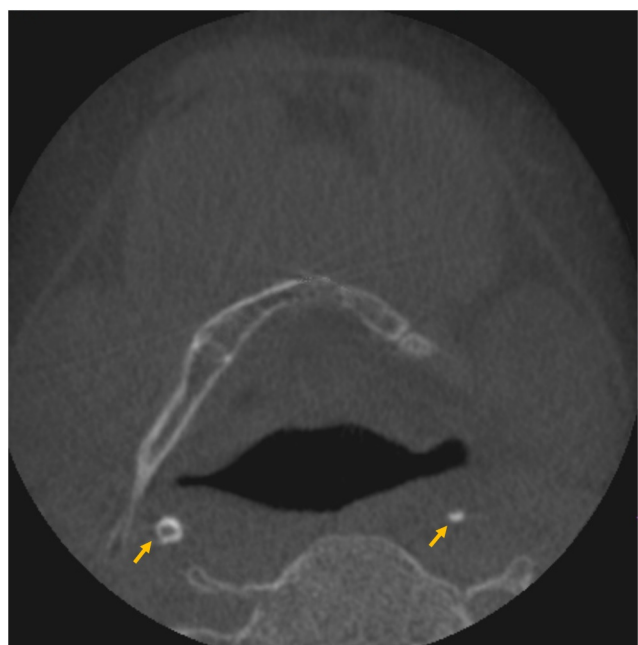


Fig. 6: Axial section of CBCT

these structures leads to the absence of a TC.³

The prevalence of TC is variable; it may be present (unilaterally or bilaterally) or absent. Wilson I et al., dissected 80 cadavers in his study and identified presence of TC in 28 cadavers (33%). Whereas, Vatansever A et al. examined 746 computed tomographic angiography images and found higher prevalence of CTC (68.1%).⁴ Aoun G et al. estimated the prevalence of CTC in digital panoramic radiographs of 500 Lebanese population and found that 10.6% (53 out of 500) of the radiographs examined presented CTC.²

When present, just like any other cartilages, the TC also demonstrates a tendency to calcify, and in some instances to ossify and as per the studies seen in 5–29% of individuals.^{4,5} This calcification has not been found to be related to age or sex as there is considerable variations observed between individuals. Clinically, CTC can be asymptomatic or may cause dysphagia and odynophagia or foreign body sensation owing to compression of CTC against the laryngopharynx or the nearby internal branch of the superior laryngeal nerve.³ Our patient gave a vague pain in neck region, pain on swallowing and foreign body sensation attributing to the CTC.

In panoramic radiograph, CTC appear as single faint opacification inferior to the GCHB at the level of C3-C4. In CBCT, CTC appears a single, ovoid opacification resembling “rice grain” located medio-posterior to greater cornue of the hyoid bone. In this location, other possible calcified structures, such as carotid artery calcification (CAC), CTC, calcified tonsillolith (CT) and calcified superior cornue of thyroid cartilage (CSCT) can also be located. CAC appears as single or multiple rice grains or linear or curvilinear opacification located always posterolateral to the pharyngeal airway space. Unlike CTC, CSCT appears as discontinuous perpendicular extension of terminal end of GCHB and appears posterior to the GCHB rather than medial as with CTC. CT appears as clustered rice grain like ovoid opacification in the lateral oropharyngeal airway, differentiating it from CTC. Thus, presence of oval hyperdense structure bilaterally and based on these differentiating factors from CT, CAC and CSCT, calcification in TC was most probable radiological diagnosis.^{6–9}

Because of the similar location, CTC could be misdiagnosed for atherosclerosis in common carotid artery which is a serious cardiovascular ailment, so distinguishing both the conditions are very important. Treatment of CTC depends on the patient’s symptoms and medical history.

4. Conclusion

CTC can be misdiagnosed with other soft tissue calcification especially with CAC. These calcifications may be incidentally found on panoramic radiograph, but exact location and relationship with adjacent structures may not

be apparent. Hence, CBCT evaluation of these opacities may help in differentiating CTC from other conditions.

5. Conflict of Interest

The authors declare that there is no conflict of interest.

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Cite this article: Shastri SP, Sham E, Kumar N, Kumar V. Calcified triticeous cartilage in cone beam computed tomography: A radiographic observation. *J Oral Med, Oral Surg, Oral Pathol, Oral Radiol* 2020;6(4):208-211.