

Supplemental Submandibular Salivary Gland: An Eye on CBCT

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Running Title: *Supplemental Submandibular Salivary Gland: A Case Report*

Abstract: *The oral physician, when confronted with pathoses of the salivary gland is often faced with the dilemma of choosing the apt investigation to confirm his suspicion. The myriad options available ranges from plain film radiography to advanced form of nuclear imaging. Sialography, a frequently used interventional imaging tool sustains its relevance based on the imaging technique to which it is coupled. CBCT sialography is a new and promising technique which overcomes the shortcomings of conventional and advanced sialography imaging with its high degree of accuracy, rapidity and cost effectiveness combined with improved patient safety. The aim of this paper is to discuss an unusual case of a supplemental submandibular salivary gland which was identified using CBCT sialography, thereby highlighting the importance of CBCT sialography in the identification of unusual anatomic variations.*

Keywords: Sialography, CBCT sialography, supplemental salivary tissue

1. Introduction

Sialography is the radiographic demonstration of major salivary glands by introducing a radiopaque contrast medium into their ductal system. Sialography is an excellent modality for demonstrating ductal anatomy, the presence of obstructions and strictures and for interventional intra glandular procedures. [1]

This is an unusual case of a supplemental submandibular salivary gland which was identified using CBCT sialography, thereby highlighting the importance of CBCT sialography in the identification of unusual anatomic anomalies.

This case report is rare because CBCT sialography is hardly conducted and there are only few case report in literature.

2. Case Report

Clinical findings

A 52 year old female patient reported to clinic with the chief complaint of dryness of mouth and swelling in the floor of mouth causing occasional discomfort since 2 years. On eliciting the history she gave the history of swelling of same size since 2 years. Medical history revealed the use of antidepressants like prothiadine and escitalopram since 8 years.

Intra oral examination reveals xerostomia and on palpation an single oval shaped swelling of size 3x1 cm seen

anterioposteriorly in the floor of mouth medial to the duct adjacent to the 43, 44, 45 region. Mediolaterally the swelling is present on the duct orifice. The swelling is freely moving, soft to firm in consistency and mildly tender. The color of the swelling is similar to adjacent mucosa.

Milking of the duct revealed a mucinous precipitate from the right Wharton's duct. A scout radiograph was taken, revealed an impacted 13 and no abnormality was noted in region of interest.

Sialography of right submandibular gland was performed using 2.5 ml of Urografin 760 contrast media, which was injected by hand and immediately a 2D sialogram was taken which didn't reveal any obstruction. Immediately a CBCT scan was conducted. CBCT was used to image the early emptying phase using a SIRONA ORTHOPHOS XG-3D CBCT unit. 10cm height, 20 s., 4 mm voxel scan of right submandibular gland was performed. CBCT data was displayed in galaxies galileus software and the image showed a supplemental salivary functional gland in the floor of mouth. Correlating the clinical examination and CBCT sialography findings we arrive at the diagnosis of Supplemental Submandibular Salivary Gland.

The medical history suggests serous gland destruction, and for treatment plan we referred the patient back to the physician for measures to reactivate the serous cells by discontinuing or altering the drugs and along with this supplement salivary substitutes/salivary stimulants were given. The physician replaced Prothiadine and escitalopram

Volume 11 Issue 2, February 2022

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with Maprotiline (ludiomil), Trazodone (desyrel) and the patient was recalled after two weeks for follow up. After two weeks the patient demonstrated good response and the swelling subsided.

3. Discussion

A brief discussion of the embryology of the oral cavity provides insight into the development of Supplemental salivary gland. Embryologically the mesenchyma of the developing mylohyoid muscle differentiate in close proximity to the developing and proliferating submandibular gland. The anterior part of mylohyoid muscle is superior to the posterior part, with slight degree of overlapping usually seen. The degree of overlap is variable, [2] if overlap does not occur, a distinct defect is seen where the oral ectoderm get entrapped leading to the formation of supplemental salivary gland. As a consequence, supplemental salivary gland may be described in the fascia of mylohyoid muscle. [3] Supplemental salivary tissue was identified within or adjacent to mylohyoid defects within the anterior two third of the muscle. All these findings justify our explanation into the development of supplemental salivary gland.

Supplemental salivary gland is a normal variant of the gland located interleaved between the mylohyoid muscles anterior to the main gland inferior to the Wharton's duct and located separately from the main gland, have their own blood supply and secondary duct emptying into the Wharton's duct. It is very rare and is usually asymptomatic. Supplemental salivary gland ranges in size from a few millimeters to a few centimeters. In our case report, supplemental salivary gland measuring about 3cm in diameter is present along with the main submandibular gland.

The larger deposit of gland which was noted on clinical examination can be misinterpreted as pathologically abnormal. Recognizing the usual imaging features of supplemental salivary gland allows us to differentiate this benign variant from a pathologic process and prevent an unnecessary surgical exploration of the region. Any disorder that affects the main gland may also affect the Supplemental salivary gland. [4]

Success of sialography is largely dependent on the imaging modality to which it is coupled. CBCT is the latest imaging modality which is used widely in maxillofacial radiology due to high resolution, low radiation dose, fast scanning time (9-40 seconds) and geometrically accurate images. [5]

CBCT sialography is a novel investigation technique and there are only few case reports in the literature. A study conducted by Jadu et al regarding the effective doses from CBCT examinations centered on parotid and submandibular glands has concluded that they were similar to those calculated for plain radiography for sialography [6] when 15 cm FOV was chosen in combination with exposure conditions of 80 kVp and 10mA. [2]

Xerostomia and alteration in salivary composition seen in patients taking antidepressants is due to stimulation of sympathetic system. Several mechanisms are put forward by various authors. Some important mechanisms are as follows:

According to Wynn et al in 2001 Antidepressants have anticholinergic action, which blocks the actions of parasympathetic system by inhibiting the effects of acetylcholine on the salivary gland receptors resulting in xerostomia.

According to Schubert & Izutsu (1987), the drugs may affect the salivary flow and its composition by interferences in the acinary and duct functions, and by means of alterations in the blood flow of the salivary glands.

According to Douglas (2002) diminishment of the salivary flow is due to the reduction in the blood flow of the gland, produced by adrenergic sympathetic vasoconstriction. Therefore, when there is sympathetic hyperactivity, xerostomia occurs. [7]

Discontinuing the drugs aggravate the condition so it is advised to alter the drugs like second and third generation tricyclic antidepressants like Maprotiline (ludiomil), Trazodone (desyrel), Nefazodone (serzone) which has less effect on functioning of salivary gland. Along with this Supplemental salivary substitutes/salivary stimulants are given.

4. Conclusion

The role of diagnostic imaging is no longer limited to provide an interpretation which will contribute to the importance in diagnosis & identification of the problem. Diagnostic imaging now plays a pivotal role in the overall management of patients. CBCT sialography is superior to conventional sialography in demonstrating the ductal system of the gland, identifying sialoliths and differentiating normal glands from those with secondary inflammatory changes. It also offer low radiation dose when compared to CT sialography. This case demonstrates a rare approach to anatomical aberrance and also highlights the therapeutic efficacy of CBCT sialogram.

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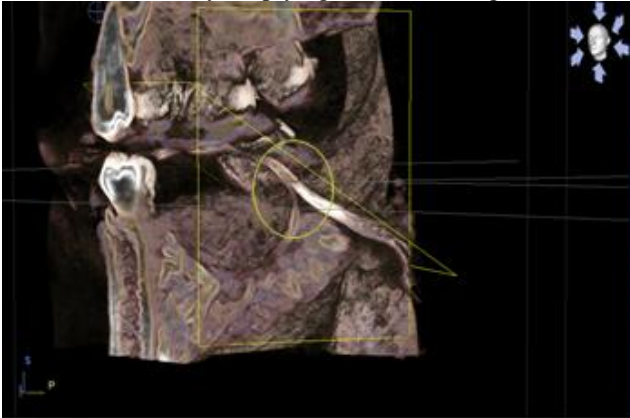
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Investigations- Sialogram



CBCT Scan of Early Emptying Phase Showing Bifurcation



Supplemental Salivary Gland

