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SIALOLITH: Radiographic Dilemma versus Clinical Outcome

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Abstract

Background: Sialoliths are calcareous deposits most often in ducts of major glands as well as in gland parenchyma. Salivary gland calculi are the most common disease of the salivary glands which may vary in size. Most of the salivary gland calculi are small in size, that reach several centimeters, and these are reported as megaliths or giant calculi in the literature. Sub Mandibular gland and its duct are more frequently involved with sialolithiasis. This paper reviews the major clinical and radiographic features of sialolith and illustrates these with an unusual case of sialolith within the submandibular gland duct. This paper reports a case of multiple submandibular salivary gland duct sialolith. A variation in the clinical situation as against the findings attributed through the radiographic interpretation largely based on conventional radiographs.

Method: the case was subjective to the clinical findings present and on the basis of them, radiographic investigations were incorporated but on surgical procedure a different view was found that lead to a conclusion of may be experience a variation in radiographic interpretation and the surgical outcome.

Results: on clinical surgical exploration as much as five sialolith were found that was radiographically interpreted as one large sialolith.

Conclusion: It would be wise to say that as found in this case, not all the clinical situations would correlate with the radiographic findings. So it would always be better to have additional investigations to ascertain the final clinical outcome to achieve better results and reduce the chances of any complications.

Keywords: sialolith , submandibular salivary gland, wharton's duct

Introduction

Sialolith belongs to the group of idiopathic calcification occurring in the salivary gland parenchyma or its associated ductal system. In majority of cases, they are asymptomatic, with the most common presenting feature of a slight increase in submandibular region during salivary stimulation, which causes a mild sensation of discomfort. The exact etiology and pathogenesis of salivary calculi is largely unknown. They are thought to occur as a result of deposition of calcium salts around an initial organic nidus consisting of altered salivary mucins, bacteria and desquamated epithelial cells[1]. Sialolith is the formation of calcific concretions in the major or minor salivary glands[2] and according to the literature, formation of sialolith can occur in two phases: a central core and a layered periphery. The central core is formed by the precipitation of salts, which are bound by certain organic substances. The second phase consists of the layered deposition of organic and inorganic material[3]. Calculi generally consist of a mixture of different calcium phosphates (mainly hydroxyl-apatite and calcium carbonate-apatite) together with an organic matrix[4]. So, several

techniques are used for diagnosis of sialolithiasis, ranging from simple techniques such as palpitation and inspection, including analysis of secreted saliva to complementary examinations such as Radiography, sialography, computed tomography, and ultrasonography. However depending on the location of sialolithocclusal radiograph can be used for its visualization. About 40% of Parotid and 20% of submandibular stones are not radio-opaque and sialography or other imaging techniques (computed tomography scan, ultrasound) may be required to locate them[4]. The present article reviews the clinical features of sialolith and reports a case of multiple calculi in the sub Mandibular duct with a radiographic dilemma.

Case Description And Results:

A 35 year old male patient came to the Department of Oral And Maxillofacial Surgery in our college with a chief complaint of pain and swelling in the posterior back region of the face on left side past 7 months that increases after meals and gradually decreases with time. Patient also complained of feeling of mass with tongue in the mouth below the tongue.

On clinical examination, there was a presence of a diffuse swelling in the submandibular region in the left side with a gradual increase once the salivation was promoted. The overlying skin was normal in texture in conjunction to the opposite side. Intraorally, the floor of mouth on the left side was slightly raised in the premolar and first molar region (fig.1). Bimanual palpation of the floor of mouth revealed a palpable hard nodule like mass in the floor of mouth, measuring 3.5cm x 2.5cm. Clinically an inflamed wharton's duct orifice was also noted and on milking the gland, a serosanguinous discharge was seen through the ductal orifice. The ortho pantomo gram (OPG) presented hardly any radio opacity in the left body region of mandible in probable region close to roots of premolars and molars(fig.2). The occlusal radiograph showed presence of single radio-opacity in premolar and molar region medial to lingual cortex, that appeared to be oval in shape, measuring approx 3.0cm x 1.5cm in size(fig.3)

Once the anaesthesia was achieved through lingual nerve block, a 3'0' black silk suture was placed distal to the swelling and a longitudinal incision was placed over the most prominent part of swelling. Once the duct was reached, a sharp incision was placed just over the swelling and the calculi were exposed (fig.4). Five calculi were identified and removed with one being largest measuring approx. 2.0 cm x 1.0 cm and the rest four were smaller approx.0.5 cm x 1.0 cm in size against as expected radiographically to be a single large calculi (fig.5). They all were irregular to oval in shape, smooth in texture and yellowish in colour. After the removal of stones, the duct was cannulated and expanded to maintain the patency of the duct for transmission of salivary flow. A circular suture back technique prevented subsequent fibrosis and ductal stricture (fig.6) but resulted in a proximal reposition of ductal orifice. Post-surgical antibiotic regimen was given to the patient and tissue healed normally and a post removal occlusal radiograph was done to confirm complete removal (Fig.7). At 6 month follow up, the patient was asymptomatic with normal secretory function and salivary flow.

Discussion

Sialolithiasis is the most common disease of salivary glands[5]. Sialolith are typically more common in middle aged males but some studies suggest a male to female ratio of 1:1 and with ages ranging from 12 to 93 years. Sialolith can often be detected on bimanual palpation, especially when they are located above the mylohyoid muscle or buccal mucosa and lip[6]. Submandibular stones are 82% inorganic and 18% organic in nature[1]. The sign and symptoms could be collectively listed in Table 1 in case of sub mandibular sialedenitis[7].

The other methodology of assessment could be radiographic assessment. The initial radiographic examination of sialolith is usually undertaken with plain films whose features are represented in table 2[7].

Imaging modalities, both conventional and advanced are very useful in diagnosing sialoliths. Inspite of majority of inorganic nature about 20% of submandibular sialolith are unseen on plain film examination due to a low mineral content, as found by Blatt a reason that could have lead to radiographic dilemma in our case[8].Sialoliths are well visualized on panoramic and periapical radiograph but can be obscured with superimposition over the roots of premolar and molar and muscle attachment ridges on cortices of mandible[7]. Lustmann found that sialolith were detected in 94.7% of cases using intraoral radiograph alone[5]. Williams stated that standard extraoral radiographs are less diagnostic than

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intraoral radiographs or occlusal views, a finding which was simulating in our case as well[9]. Sialoliths located within the duct distal to the hilum are better visualized with an occlusal radiograph displaying the floor of mouth[10]. Occlusal radiographs are useful in showing radiopaque stones. It is very uncommon for patients to have combination of radioapque and radiolucent stones, a finding that came out to be opposite in our case as there was a single large sialolith evident on radiograph but on surgical removal came out to be multiple in nature with variation in the size[11].

Other imaging techniques that may be used to diagnose sialoliths include sialography, ultrasound, computed tomography and magnetic resonance sialography[7]. Sialography is rarely indicated and should be restricted to those cases with a suspected ductal stricture or other obstruction but without a calcification visible on routine imaging[7]. Ultrasound will locate a sialolith but, with the subsequent requirement for conventional imaging, it is of limited clinical usefulness and in most cases introduces an unnecessary step in the diagnostic sequence[7].

Until proven otherwise it is prudent to consider and exclude the presence of multiple sialoliths in any patient presenting with a sialolith, a statement which coincides with over findings of a single sialolith on radiographic examination but on surgical outcome presented as a case of multiple sialoliths[7]. Computed tomography is useful in any situation where there are multiple stones or when the stone is situated in a site not readily examined intraorally, such as the lingual fossa and proximally intraglandular stones[7]. In most of the cases of sialoloiths, treatment is advised either for management of symptoms or, in quiescent lesions, to prevent periductal inflammation and fibrosis and the development of an obstructive situation. Sialoliths in the gland duct can often be removed without damage to the gland but intraglandular sialoliths generally require removal of gland. Other treatments used successfully in the management of sialoliths include interventional sialendoscopy with wire-basket extraction for small sialoliths(<4mm) and fiberoptic laser lithotripsy with basket retrieval for larger sialoliths(>4mm)[12]. Its also important to distinguish sialoliths from other calcific structures which are considered as differential diagnosis are mentioned in the table 3[13].

This directs the need of additional investigation procedures. In any retrieval procedure within the ductal system, care must be exercised firstly to ensure the stone does not track proximally and be lost to the extraction process which would not be possible if a proper diagnosis would be reached regarding the number and size of the sialolith[7]. A complication that could have resulted in this case due to presence of multiple sialolith, which were wrongly interpreted as a single sialolith in radiographic finding.

Conclusion: A sialolith of variable size could lead to both diagnostic and therapeutic challenge accounting towards inevitable complications by the surgeon. A thorough work up is necessary which includes a proper clinical examination with selection of the appropriate imaging techniques with addition of specialized diagnostic aids to confirm clinical diagnosis and defining more precise location of the sialolith in addition to their numbers and size. This paper has reviewed the major features of sialoliths, with probable radiographic findings and the differential diagnosis of a case of sialolith within the submandibular duct. Seeing the variation in radiographic finding and clinical-surgical outcome; we through our case draw an inference of requirement of additional subjective investigations rather than only making dependence on radiographs for diagnosis of sialoliths.

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Table 1. Signs and symptoms

Swelling
Anatomical asymmetry
Size fluctuation, usually rapid onset and partial resolution over one to several hours
Residual glandular swelling
Decreased stimulated salivary flow compared to the contralateral gland
Pain (intensifies during mealtimes or when salivary flow is stimulated)

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Stones commonly visible in submandibular duct
Swelling and erythema of submandibular papilla for distal stones
Suppuration (uncommon)
Localized cellulitis (uncommon)

Table 2. Radiographic Features

Radiopaque (homogeneous or with a laminated structure)
Some may be radiolucent
Cylindric or irregularly-shaped
Anatomical position important
Imaging must include full duct length and gland
Stone orientated antero-posteriorly within duct
Fixed stones tend to be more rounded

Table 3. Differential diagnosis

Mandibular torus
Osteoma
Calcified lymph nodes
Phleboliths and other vascular calcifications
Tuberculosis of lymph nodes or of the salivary gland itself
Calcified atherosclerotic plaques in major blood vessels
Myositis ossificans
Metastasis from distinct calcifying neoplasms

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