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SURGICAL MANAGEMENT OF SIALOLITH – A CASE REPORT

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INTRODUCTION

Sialolithiasis is a pathological condition caused by the obstruction of a salivary gland or its excretory duct by the development of salivary stones or calculus **[1]**. It is the most common salivary gland disease accounting for more than 50% of the cases **[2, 3]**. It has an incidence of about 0.012% in the adult population **[2]**. It may occur at any age but there is a peak incidence in fourth, fifth and sixth decades **[4]**. It is uncommon in pediatric population accounting for only 3% of all sialolithiasis cases **[1]**. Males are affected more as compared to females with male: female ratio ranging from 5.5:4.5 to 7:3 **[4]**.

Majority of salivary calculi (80%-95%) occur in the submandibular gland, whereas only 5% to 20% occur in the parotid gland. The sublingual gland and minor salivary glands are rarely affected (1%-2%) **[5]**. When minor salivary glands are involved, the most common sites are buccal mucosa or upper lip, and it presents as a firm nodule that may mimic tumor **[6]**. Simultaneous involvement of more than one salivary gland is rare **[6]**. In general, sialoliths are common

in submandibular duct compared to glandular tissue or parenchyma **[7]**. However, giant sialoliths are more common within the parenchyma of the salivary glands. Sialoliths located in the duct are usually elongated, while those situated in the gland or hilus tend to be round or oval **[4]**. Though bilateral cases have been reported (3%), salivary calculi are usually unilateral and occur equally on right and left sides **[8]**. Single sialolith is found in majority of cases (70-80%), two in about 20% of cases and three or more in 5% of patients **[4]**.

They are usually yellowish in color and consist of mainly calcium phosphate with small amounts of carbonates in the form of hydroxyapatite, as well as smaller amounts of magnesium, potassium, and ammonia. Submandibular stones are composed of 82% inorganic and 18% organic material, whereas parotid stones are composed of 49% inorganic and 51% organic material **[2]**. Sialolithiasis typically presents as a painful swelling of the affected gland during mealtimes, because the stone usually does not block the flow of saliva completely **[9, 10]**. However, most salivary stones are asymptomatic **[10]**.

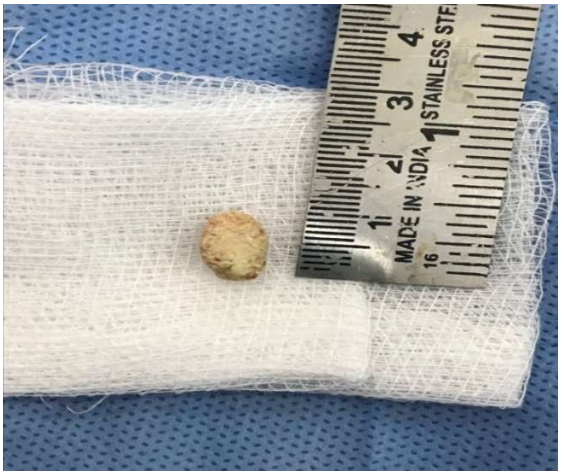
Case report

A 53 year old male patient reported to the Department of Oral and Maxillofacial Surgery with the complain of pain and swelling below the tongue. There was also associated pus discharge and halitosis since 1 week. Intraoral examination revealed soft, oedamatous sublingual mucosa and purulent discharge at the floor of mouth. CBCT was taken in relation to lower arch which revealed the presence of a radiopaque structure medial to the body of mandible in between 44 and 45 region measuring about 8.92 x 4.35 mm which was suggestive of sialolith of right submandibular salivary gland. As it was a large sialolith, we elected to remove it surgically under general anaesthesia. 2% lignocaine with 1:2,00,000 concentration of adrenaline was infiltrated in the right side of floor of mouth. A vertical incision was placed after bidigital palpation of sialolith. Blind dissection was done and the sialolith was identified and removed. The duct lining was sutured to the mucosa. No postoperative complications were noted. The patient was recalled and reviewed every 3 months post surgery. And there was no evidence of recurrence.

Pre-operative – intraoral

Pre-operative – CBCT

Intra-operative – sialolith exposed



sialolith

Wound closure

DISCUSSION

The exact etiology and pathogenesis of salivary calculi is unknown. However, salivary stagnation, increased alkalinity of saliva, infection, inflammation or physical trauma to salivary duct or gland may predispose to calculus formation **[6, 11]**. Commonly they are thought to occur as a result of deposition of the tricalcic phosphate salts around a nidus that consists of altered salivary mucin, desquamated epithelial cells and bacteria **[1]**. It is suggested that bacterial toxins produce a local environment with pH less than 5.5 leading to tissue damage; and when 7.2 pH is re-established during the healing process, crystallization of salivary ions (especially calcium phosphates) occurs leading to calculus formation **[1]**. According to another theory an unknown metabolic phenomenon increases the salivary bicarbonate content, altering calcium phosphate solubility and leading to precipitation of calcium and phosphate ions **[6]**. A retrograde theory states that substances or bacteria within the oral cavity migrate into the salivary ducts and become the nidus for further calcification

None of the giant sialolith was seen in children which is consistent with the literature on sialolith

The ability of a calculus to become giant depends mainly on the reaction of the affected duct. If the duct adjacent to the sialolith is able to dilate allowing nearly normal salivary flow, it might remain asymptomatic for a long period; thus eventually creating a giant calculus **[12]**.

Sialolith causes pain and swelling of the involved salivary gland by obstructing the food related surge of salivary secretion **[6]**. The severity of symptoms depends on the degree of obstruction. In few cases patients were asymptomatic **[6, 9, 10, 13]**.

The submandibular gland is more susceptible to the development of the salivary calculi because its duct is longer and tortuous, salivary flow is against gravity, salivary pH is more alkaline and its saliva has greater content of mucin, proteins, calcium, as well as phosphates **[3, 11]**. Generally, the most common radiographic techniques to diagnose submandibular sialoliths are panoramic and occlusal views **[14]**. Giant sialoliths are mostly radiopaque and are easily depicted on panoramic radiographs, probably because their lithogenesis is long enough for calcification to be completed **[5]**. Investigations like sialography, ultrasonography, and computed tomography may be required to locate small sialoliths (as 20% to 30% are radiolucent) **[1, 2, 10]**.

However, sialoliths smaller than 3 mm may not be detected during ultrasonographic examination, as they will not produce acoustic shadows **[15]**. Magnetic resonance sialography is a newer diagnostic modality that allows for visualization of the ducts without any radiation or dye injection, but it is limited by its cost and feasibility in claustrophobic patients **[16]**. Sialoendoscopy is a new, minimally invasive technique developed for direct visualization of intra-ductal stones **[1, 9]**. In this report, as the lesion was observed clearly on occlusal and panoramic radiographs, no further investigations were performed for diagnosis.

Giant calculi may cause various complications. They may perforate the floor of the mouth by ulcerating the duct or may result in a fistula by causing a suppurative infection **[9]**. Perforation of the floor of the mouth is more likely to occur when calculus is present in anterior part of duct **[13]**. Also, long term obstruction in the absence of infection can lead to atrophy of the gland with resultant lack of secretory function and ultimately fibrosis **[6]**. However, after elimination of the obstruction Association of sialolith with systemic diseases is questionable. Lustmann in a study on 245 patients with sialolithiasis found that 10.7% patients had associated nephrolithiasis **[4]**. Gout is the only systemic diseases known to predispose to salivary stone formation, although in gout the stones are predominantly made up of uric acid **[6]**. The differential diagnosis of sialolith includes calcified lymph node, embedded tooth, foreign body, phlebolith, and myositis ossificans **[14]**.

The treatment objective for giant sialoliths, as for the standard-sized stones, is restoration of normal salivary secretion **[11, 12]**. Treatment approach for sialolith depends on its size and location **[6, 11, 16]**. Removal of stones through an intraoral approach is recommended whenever stones can be palpated intraorally **[2, 5, 10]**. If the stone is small and sufficiently forward it can be milked and manipulated through the duct orifice **[6, 11]**. However, if the calculus is of a medium or large size, like the giant salivary gland calculi, a salivary colic may occur and the sialolith cannot be expelled spontaneously **[1]**. Almost half of the submandibular calculi lie in the distal third of the duct and are amenable to simple surgical release through an incision in the floor of the mouth **[6]**.

Newer minimally invasive treatment modalities such as shock-wave lithotripsy, sialoendoscopy, interventional radiology are effective alternatives to conventional surgical

excision for smaller sialolithsupto 4 mm **[22]**. Intermediate size stones between 5-7 mm may need further fragmentation either using a Holmium laser or lithotripsy prior to endoscopic extraction. Fluoroscopically guided stone retrieval with Dormia baskets and sialolithectomy with carbon dioxide laser are other special methods for removal of the calculus **[7]**. Retrieval of stones by baskets is usually done for stones less than 5mm **[8]**. The CO2 laser is set up in continuous mode at 4-6W with a focusing spot. It has a low incidence of complications and can be readily managed on an out-patient basis **[20]**. However, for giant sialoliths, transoralsial-olithotomy with sialodochoplasty or sialadenectomy remains the mainstay of management **[2, 6, 23]**. Akimoto reported an interesting and only case of a giant sialolith in which the calculus was not extracted surgically, but patient himself removed the calculus. The patient could easily pull it out because it was long, extremely narrow and its tip had perforated floor of the mouth **[13]**. In some cases, excision of the entire gland is required. Submandibular gland removal is indicated if 1) the gland has been damaged by recurrent infection and fibrosis, 2) there is a stone of substantial mass within the gland itself that is not surgically accessible intraorally, 3) there are small stones present in the vertical portion of Wharton's duct from the comma area to the hilum, 4) the size of an intraglandular stone reaches 12 mm or more as the success of lithotripsy may be less than 20% in such cases **[2, 6, 24]**. A diet rich in proteins and liquids including acid food and drinks is advisable in order to prevent recurrence **[1]**.

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