

Submandibular Sialolithiasis Associated with Sialadenitis –A Case Report

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Abstract:- Sialadenitis, an inflammation of major salivary glands is commonly associated with the obstruction of the salivary duct due to sialolith. The submandibular gland is particularly susceptible to sialolithiasis. This case report discusses a 33 year old female patient who reported with a swelling below the tongue/floor of the mouth associated with pain for a week. A comprehensive investigation has indicated the presence of multiple sialoliths. The treatment involved surgical removal of the sialoliths, accompanied by antibiotic therapy. Therefore, this case report emphasizes the presence of multiple sialoliths in a female patient.

Keywords:- Sialolith, Salivary Duct Stones, Obstructive Sialadenitis.

I. INTRODUCTION

Sialadenitis involves inflammation of one or more of the salivary glands, most commonly affecting parotid or submandibular gland. The condition can be caused by bacterial or viral infections, salivary duct obstruction, typically from stones (sialolithiasis) or autoimmune diseases like Sjögren's syndrome (1). It is responsible for approximately 30% to 50% of all cases of acute sialadenitis. Sialolithiasis is considered to be the most common salivary gland disorder and accounts for about 1.2% of unilateral major salivary gland swellings (1).

Submandibular gland has the highest predilection for sialolithiasis with 80% occurrence rate (2,3). The increased incidence of sialolithiasis in the submandibular gland is due to its more viscous saliva, ascendant, longer duct, sharp angled duct system and high mineral content in the saliva (3,6). The majority of sialoliths are formed from phosphate and oxalate salts (5,7). However, the organic matrix of submandibular stones is notably rich in protein and has a high lipid content (8,9). Sialolithiasis typically occurs between the age of 30 and 60 and is rare in children (1,8). Males are affected twice as often as females (1,4). Here we report a case of dual sialoliths of submandibular gland with notable clinical and radiological features.

II. CASE REPORT

A 33-year-old female patient reported to Department of Oral Medicine and Radiology with a complaint of pain in the mouth below the right half of tongue since 7 days. Pain was sudden in onset, intermittent, dull aching, non-radiating which intensified during meals and subsided on its own. The pain was associated with swelling since last 3 days which was initially small and gradually increased in size. Patient gave history of pus discharge with no history of fever. The patient reported a similar history two years ago, which resolved spontaneously without intervention. Patient had no relevant history except for a restoration performed 5 years back. Extra oral examination revealed no facial asymmetry (Fig. 1).



Fig 1: No Gross Asymmetry Noted on Extra Oral Examination

A single submandibular lymph node of size 1x1cm and single submental lymph node of size less than 1cm was palpable, tender, febrile, soft in consistency and not fixed to underlying structures. Local examination revealed, solitary, linear swelling of size 1.5x1cm noted extending from 41 to mesial aspect of 46 on the floor of the mouth with well-defined margin (Fig.2). Overlying mucosa appeared

erythematous, while the surrounding tissue appeared normal. No visible ulceration and pulsation was noted.



Fig 2: Solitary, Linear Swelling of Size 1.5x5cm Extending from 41 to 46

The swelling was tender on palpation, with a varying consistency ranging from soft to hard, non-fluctuant, non-compressible, with no pus discharge. Provisionally, it was concluded to be obstructive sialadenitis associated with sialolithiasis. To investigate further an occlusal radiograph and ultrasonography were done which revealed presence of dual calculi, one measuring 12mm noted near the distal opening of submandibular gland and another measuring 10mm located in the distal part of the duct (Fig.3 and Fig.4).



Fig 3: Occlusal Radiograph Revealing Presence of Radio-Opaque Structures of Size 12mm and 10mm



Fig 4: Ultrasonography Reports Revealing Presence of Dual Calculi

The treatment protocol followed was surgical excision of both the calculi followed by antibiotic therapy and anti-inflammatory medication. The patient was recalled for suture removal after 7 days and was monitored after 1 month. Additional findings revealed chronic irreversible pulpitis accompanied by significant calculus buildup for which oral prophylaxis and root canal treatment were performed to address these issues.

III. DISCUSSION

Obstructive sialadenitis refers to inflammation of salivary gland due to any form of obstruction in the gland's duct. This obstruction can be caused due to various factors like mucous plugs, trauma, scarring or salivary stones. In this case it was due to salivary stones. Sialolithiasis refers to the formation of calcified stones within the salivary glands, primarily affecting the submandibular gland. It's most prevalent in adults aged 30 to 60 and typically causes distinctive pain during meals, as the stones obstruct saliva flow (4,12). Sialolithiasis is more prevalent in adults due to the time required for the condition to develop, as well as the large size of the papillae and the cross-sections of the salivary glands, which facilitates the invasion of foreign substances (11). Additionally, with age, there is an increase in the concentrations of calcium and phosphorus in saliva, which further promotes the formation of sialoliths in adults (11). Males are affected twice as often as females (1). Research indicates that, on average, males tend to produce more saliva than females. It was found that salivary flow rates and protein secretion levels in males were 42% and 73% higher, respectively, highlighting a notable difference in salivary function between the sexes (13). Interestingly, in our case, the findings were contrary, as a female exhibited these traits, likely due to elevated serum calcium levels or anatomical variations in the submandibular duct. Submandibular gland has the highest predilection for sialolithiasis with 80% occurrence rate (4). The submandibular gland is commonly involved in sialolithiasis for several reasons:

- **Salivary pH:** The alkaline pH (6.8-7.1) of submandibular saliva favours the precipitation of calcium salts (4).
- **Calcium Content:** This gland has a higher concentration of calcium and phosphate salts in the form of apatite (4).
- **Viscosity:** The saliva produced is more viscous due to a higher mucous content, which can promote stagnation (4).
- **Anatomic Factors:** The submandibular duct drains saliva against gravity, contributing to stagnation. Its long and tortuous pathway, combined with potential kinking from the lingual nerve and mylohyoid muscle, further exacerbates the risk of obstruction (4).

Salivary stones form through the precipitation of salts, bonded by organic substances like carbohydrates and amino acids, and are surrounded by a layered periphery of both organic and inorganic materials (5). Typically, the average size of these calculi falls between 3 mm and 17 mm. In the present case, the sizes of the sialoliths were 12mm and 10mm (6,8).

Diagnosis of sialolithiasis involves bimanual palpation along the path of the duct to check for inflammation or induration abnormalities (6). Occlusal radiographs are effective for identifying radiopaque stones, particularly in the submandibular gland, where 80% to 94.7% of calculi are radiopaque, while ultrasonography provides a non-invasive, confirmatory imaging approach for diagnosing sialolithiasis (7). Additional diagnostic methods include sialolithiasis include sialography, MR sialography, CT scans, and sialendoscopy (7).

The foremost aim in addressing sialolithiasis is to safeguard gland function while minimizing complications and discomfort for the patient. A non-invasive approach, which includes milking and gland massage, sialagogues, and irrigation, proves most effective, particularly for smaller stones located within the duct. In cases where an infection is suspected, the appropriate use of antibiotics is essential to promote recovery (9).

Surgically, as performed in this case, the excision of a sialolith is performed with precision, utilizing a careful incision along the longitudinal axis of the submandibular duct's mucosa. It is crucial to restrict the incision to just before the first mandibular molar to safeguard the lingual nerve, thereby minimizing the risk of injury and ensuring a safe procedure. Following the excision of a sialolith, administering antibiotics can be an integral part of a comprehensive treatment plan, helping to prevent infection and support the healing process (2).

Recent advances in treatment include Holmium laser-assisted lithotripsy which has proved to be a refined and effective approach for treating sialolithiasis in the submandibular gland. Transductal sialolithotomy (TDS) techniques have also enhanced the management of salivary gland stones (10). Notably, the integration of sialendoscopy-assisted TDS for submandibular stones offers a minimally

invasive solution that reduces trauma and promotes quicker recovery. These innovative methods signify a promising shift towards more effective and patient-friendly treatments for sialolithiasis (10).

Recurrence may occur in such cases, as it is often driven by elevated serum calcium levels that may persist even after the sialolith has been removed, however the recurrence rate is low affecting only 1-10% of the patients (14). If recurrence is linked to abnormally elevated calcium levels, it can be effectively managed with appropriate medications to maintain control. Recurrence may also occur due to residual fragments of the sialolith serving as a focal point for bacterial infection (14). Sialodochoplasty of the submandibular duct, combined with gentle massage to eliminate any undetected or residual calculi, may help reduce the likelihood of recurrence (15).

IV. CONCLUSION

Sialolithiasis is a common salivary gland disorder, particularly affecting the submandibular gland. It can present with symptoms that necessitate thorough diagnosis and appropriate treatment, along with comprehensive strategies to minimize the risk of recurrence.

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