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RESEARCH ARTICLE

SURGICAL MANAGEMENT OF SUBMANDIBULAR GLAND SIALOLITH THROUGH SUBMANDIBULAR INCISION: A CASE REPORT

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ABSTRACT

Salivary gland calculi account for the most common disease of the salivary glands, and may range from tiny particles to several centimeters in length. Sialolithiasis (also termed salivary calculi, or salivary stones), is a condition where a calcified mass forms within a salivary gland[1]. The term is derived from the Greek words sialon (saliva) and lithos (stone), and the Latin -iasis meaning "process" or "morbid condition". Sialoliths are calcified organic matter that forms within the secretory system of the major salivary glands. The incidence of sailolith is 80% in sub mandibular gland, 4-10% in the parotid gland and 1-7% in the sublingual gland. Submandibular gland is the second largest salivary gland in human body[2]. Each submandibular gland weighs approximately 10-15.Submandibular gland excision is recommended in cases of substantial intra-glandular caliculli, which are inaccessible via a trans-oral approach and also, when multiple small calcified masses are present in the vertical and comma portions of Wharton's duct. The present case report describes a safe and easy surgical technique in a patient, who had a painful swelling in the right submandibular region, giving a clinical evidence of submandibular gland stone. MRI examinations were done where the gland and sialolith dimensions were approximately 4 x 3.5cm and 0.8 x 0.6mmrespectively. As the sailolith was present in the center of gland,causing inflammatory changes so that the gland had to be removed in toto.

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INTRODUCTION

Sialolithiasis is the most common disease of salivary glands, leading to salivary gland dysfunction. Sialolithiasis (also termed as salivary calculi, or salivary stones) is a condition where a calcified mass is formed within a salivary gland (Leung, 1999). The term is derived from the Greek words sialon (saliva) and lithos (stone), and the Latin -iasis meaning "process" or "morbid condition". The incidence of the sailolith is 80%, 4-10% 1-7% in submandibular, parotid and the sublingual glands respectively. Submandibular gland is the second largest salivary gland in human body (Seifort, 1992), weighs about 10-15 gms and is anatomically divided into superficial and deep parts by the mylohyoid muscle. Facial artery and the three important nerves hypoglossal, lingual and marginal mandibular branch of facial nerve lie in the medial part of submandibular gland (Lustman, 1990). Submandibular gland produces 71% of daily saliva which is composed of both serous and mucoid components. Usually, Submandibular gland is not recognized, however it may be palpated bimanually if it enlarges due to any diseases (McKenna, 1987).

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80% of salivary stones are seen in submandibular gland and they are most common in the hilus and probably because of its more viscous nature, long course of the duct, and high mineral content in the saliva (Stanley, 1996). Even though the etiology of this condition remains unknown, inflammation is said to be the most common cause. Surgical excision of the submandibular gland is indicated in patients with neoplasms, chronic sialadenitis, sialolithiasis, and to manage chronic sialorrhea (drooling) when it is not responsive to conservative treatment. While the classic submandibular gland surgery has involved a trans-cervical approach, several other approaches have recently been described that can be classified as 'open'or 'endoscopic' approaches (Tepan, 1985). The purpose of this article is to describe a safe and easy surgical technique to remove the submandibular gland with a sialolith within it, through submandibular incision.

CASE REPORT

A 24yr young lady reported to our department, complaining of severe pain and mild swelling on her right side of face since one month. Pain was intermittent, pricking type, sharp in nature and radiating to the tongue.

The pain aggravated during meals and relived by rest. There were associated symptoms. On detailed examination, the patient showed mild swelling in right submandibular region with overlying normal skin. There were no signs of sinus, fistula and ulceration in the affected region. The swelling was warm and tender on palpation with firm consistency. Intraoraliy, mild induration on right side floor of the mouth. Right submandibular gland was tender on bimanual palpation (Fig 1 clinical view).

Fig: 1. Clinical view

Radiological findings in OPG showed a small sailolith a,measuring 0.8 x 0.6 mm , located in the center of the gland. (Fig 2a OPG & 2b MRI scan). MRI examination showed 4 x 3.5cm sized submandibular gland.

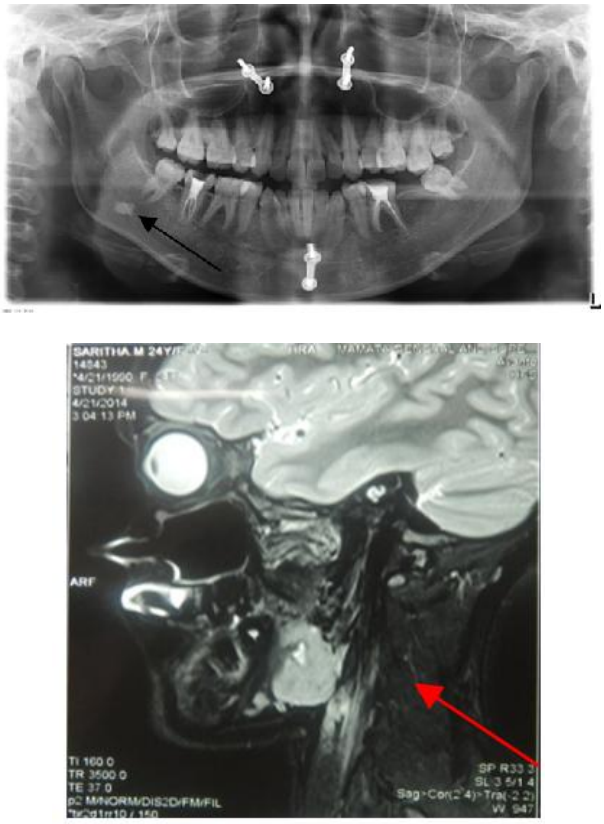

Fig. 2. OPG & MRI

On the basis of history, clinical, radiographic examination, a diagnosis of right submandibular calculi was made. Blood and serum biochemistry findings were within normal limits and her health history was unremarkable. Under general anesthesia, folloing all aseptic precautions,submandibular incisio was marked, running 2 cm below the inferior border of the mandible, firm incision made with a no. 15 blade in a single stroke, blunt dissection was carried out (Fig 3 submandibular incision) in layers. Submandibular gland and facial artery were identified (Fig 4 submadinular gland & facial artery identified), facial artery was carefully isolated from the gland and ligated. Removal of stone was very difficult as the gland was fully inflammed, stone was located in the center of the gland and it as smaller in size. Removal of the sailolith along with submandibular gland was performed (Fig 5 sailolith along with submandibular gland). Closure was done in layers with 3-0 vicryl and silk sutures. The postoperative period was uneventful and patient was put on to NASIDS, antibiotics therapy besides a warm saline rinse for couple of days. There were no remarkable post operative complications as the surgery was instituted by taking care of adjacent vital structures.

Fig 3. Submandibular incision marking

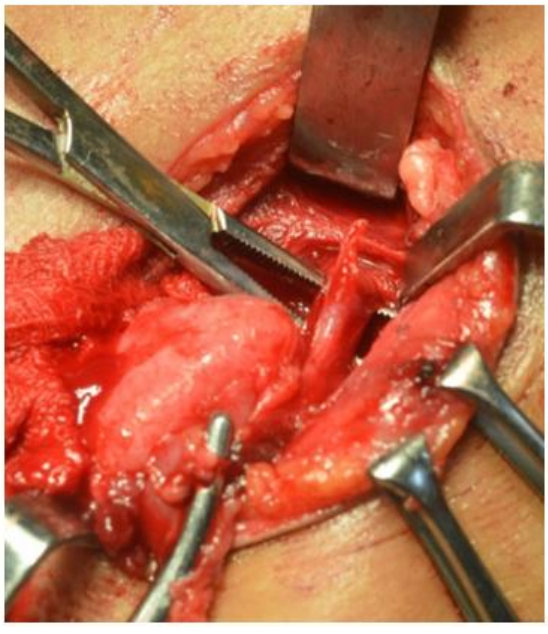

Fig 4. Submandibular gland & facial artery identified

Fig. 5. Sailolith along with submandibular gland

DISCUSSION

The incidence of sialolithiasis is estimated to be 12 in 1000 of the adult population[1].Salivary calculi are usually unilateral and attains a size obstructing the salivary flow either partially or completely. Salivary calculi are usually small and measure from 1 mm to less than 1 cm and rarely grow beyond 1.5 cm. Mean size is reported as 6 to 9mm[3]. Etiology remains unknown but 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[4]. Aliments, substances or bacteria within the oral cavity might migrate into the salivary ducts and become the nidus for further calcification. Factors that tend to favour submandibular gland stones are, i) Longer and larger caliber duct sands, lower rates of flow in the submandibular gland compared to the other ducts. ii)The fact that saliva flows against gravity in the submandibular gland.iii) The presence of more alkaline saliva in the submandibulargland. iv) The high mucin and calcium content to the saliva in the submandibular gland flow (Stanley, 1996). It typically causes pain and swelling of the involved gland, besides stasis of saliva, leading to bacterial ascent into the parenchyma of the gland. Long term obstruction in the absence of infection can lead to atrophy of the gland with resultant lack of secretory function and ultimately fibrosis (Tepan, 1985). Careful history and examination clench the problem,pain and swelling of the concerned gland at mealtimes and in response to other salivary stimuli are especially important (Harrill, 1959).

Bimanual palpation of the floor of the mouth, in a posterior to anterior direction, reveals a palpable stone,uniformly firm and hard gland suggests a hypofunctional or non- functional gland (Ellies *et al.*, 2004). Submandibular gland calculi have been reported to be radiopaque in 80% to 94.7% of cases. In the anterior floor of the mouth, an occlusal radiograph may reveal the calculus. Ultrasonography is widely reported as being very helpful in detecting salivary stones. As many as 90% of all stones larger than 2mm can be detected as echodense spots on Ultrasonography. However, detection of small calculi may be difficult with ultrasonography. Computed tomography (CT) is also highly diagnostic (Hiraide, 1980). When located in the submandibular gland, panoramic radiograph is helpful. In small and radiolucent calculi radiographic findings may be negative and sialography can be the examination of choice, although displacement of the calculus toward the gland cannot always be avoided (Williams, 1990). Patients presenting with sialolithiasis may benefit from a trial of conservative management, especially if the stone is small. The patient must be well hydrated and the clinician must apply moist warm bags and gland massage, while sialogogues are used to promote saliva production and flush the stone out of the duct. With gland swelling and sialolithiasis, infection should be assumed and a penicillinase resistant anti - staphylococcal antibiotic prescribed (Siddique, 2002).

Most stones will respond to such a regimen, combined with simple sialolithotomy when required. The stone more posterior in the duct needs opening to retrieve it. This involves a transoral approach where an incision is made directly onto the stone. In this way more posterior stones, 1–2 cm from the punctum, can be removed by cutting directly onto the stone in the longitudinal axis of the duct. Care is taken as the lingual nerve lies deep, but in close association with the submandibular duct posteriorly. Subsequently, the stone can be grasped and removed. No closure is done leaving the duct open for drainage. If the gland has been damaged by recurrent infection and fibrosis, or calculi have formed within the gland, it may require complete removal. The incorporation of extracorporeal short-wave lithotripsy to endoscopic removal has also been shown to be an effective modality and an alternative to conventional excision. Submandibular gland excision is recommended in cases of substantial intra-glandular caliculi, which are inaccessible via a trans-oral approach. Also, when multiple small stones are present in the vertical and comma portions of Wharton's duct, sialadenectomy is recommended (Rice, 1984). In our case report we used submandibular incision for the retrival of sailolith because the stone was located in the center of the gland, and the gland was severely inflamed, which was inaccessible via a transoral approach. Removal of the stone along with sumandibular gland excision was performed. There was no reported damage to the nerve in the reported case. Although modern methods of stone investigation and intervention have been reported for the treatment of giant calculi, transoralsialolithotomy with sialodochoplasty or sialodenectomy remain the mainstay of treatment.

Conclusion

If the gland has been damaged by recurrent infection and fibrosis, or calculi have formed within the gland, it may require complete removal. Submandibular gland excision is recommended in cases of substantial intra-glandular calculli, which are inaccessible via a trans-oral approach. Submandibular incision provides direct access, better visibility, less complications as in present case report.

- Total submandibular gland excision is indicated when sialolith is within the gland.
- Transoral approach is less/not preferred.
- Submandibular incision facilitates better operating field and outcome

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