Giant Calculus of the Submandibular Salivary Gland - A CASE REPORT

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Abstract: Sialolithiasis is the most common disease of the salivary glands. This report describes the case of a patient who had an unusually large submandibular gland sialolith (calculus) that was completely encased in the glandular substance. The author describes giant sialolith of submandibular gland in the lights of the literature.

Introduction: Sialolithiasis is the most common disease of the salivary glands. Males are more frequently affected than females and children are rarely involved. Sialolith can form in any of the salivary glands of the head and neck, but the submandibular gland is the most common site (80% to 92%). It has been reported in the parotid gland (6% to 20%) and the sublingual and minor salivary glands (1% to 2%). Bilateral or multiple-gland sialolithiasis is occurring in fewer than 3% of cases. In patients with multiple stones, calculi may be located in different positions along the salivary duct and gland. Submandibular stones close to the hilum of the gland tend to become large before they become symptomatic. Sialolithiasis occurs equally on the right and left sides.

Commonly, Sialoliths measure from 1 mm to less than 1 cm. Giant salivary gland stones (GSGS) are those stones measuring over 1.5 cm and have been rarely reported in the medical literature. GSGS measuring over 3 cm are extremely rare, with only scant reported cases. The aim of this article is to present a case of a giant sialolith in the lights of the literature on giant sialoliths (1.5 cm or larger).

Case Report: A 46-year-old man was admitted to the ENT Department. He complained of a huge, firm mass in the left submandibular area. He had a history of having episodes of left submandibular swelling occurring with meals. The past medical history was unremarkable.

On otolaryngologic examination, palpation revealed a swollen area corresponding to the anatomic location of submandibular salivary gland. The swollen area palpated extraorally and through the mouth, it was firm
and non-tender. The floor of mouth was swollen. Ultrasonography revealed a giant stone in the submandibular area. Findings on blood and serum biochemistry were within normal limits.

The gland and the calculus were excised via an incision in the skin crease 2 cm below the lower border of the mandible under general anesthesia. The gland with the calculus was dissected free, the wound was closed in layers, with insertion of a vacuum drain. There were no post-operative complications. The symptoms resolved after operation.

The salivary gland measured 5 cm in its largest dimension, and the enclosed calculus measured 2.6 by 2.3 cm (See picture to the right). The yellowish calculus was round and had a rough, irregular surface. Note the enlarged hilum of the salivary gland which housed the stone.  

\[\text{Enlarged Picture At End of Manuscript.}\]

**Discussion:** Although large sialoliths have been reported both in salivary glands and in salivary ducts, stones larger than 3 cm are rare.\(^5\)\(^6\)\(^7\) The giant sialolith in this patient was completely encased in the hilum of the submandibular gland. The authors were able to find only three reported cases in literature in which the weight and volume of the stone was bigger than the one in this case report. A review of the literature by Ledesma-Montes et. al found only 16 reported cases of stones having a size or 3.5 cm or greater.\(^4\)

Several factors contribute to the development of salivary stones in the submandibular gland. The saliva from the submandibular has a high content of mucin and flows uphill in a wider and longer duct as compared to the parotid gland. Stenson’s duct (parotid gland) is narrower and the serous saliva from the parotid gland flows down hill.

In addition, the the saliva secreted by the submandibular gland is more alkaline\(^4\) and has a higher content of calcium and phosphate which promotes stone formation.\(^8\)

Sialoliths are ovoid or round, smooth or rough with a yellowish color. They consist of calcium phosphate with small accounts of hydroxyapatite, magnesium, potassium and ammonia.\(^9\) In our case the stone was consisted of calcium phosphate.

Giant sialoliths are a rare finding; their sizes vary from approximately 1.5 cm to 7 cm, and their weight varies in the literature.\(^2\)\(^3\)\(^4\) Our sialolith was 2.6 cm in size and 27 grams in weight.

The clinical and radiological methods for diagnosis of sialolithiasis are various. The conventional diagnostic methods for detecting obstructions in the salivary ductal system are routine (occlusal and panoramic) radiographs, sialography, ultrasound and computed tomography. Submandibular gland calculi have been reported to be radiopaque in 80% to 94.7% of cases.\(^6\)\(^8\)\(^9\) Often, an anteroposterior view of the mouth will allow for visualization of the stones. Ultrasonography is widely reported as being very helpful in detecting salivary stones. As many as 90% of all stones larger than 2 mm can be detected as echodense spots on Ultrasonography.\(^10\) Computed tomography is also highly diagnostic.\(^11\)

Submandibular stones are typically removed surgically via either an intraoral or an external approach.\(^12\)\(^13\) The most appropriate mode of treatment depends primarily on the stone’s location. An intraoral approach is often utilized when the calculi is located anterior to the lingual nerve and artery.
However some authors have advocated using it to retrieve stones form the proximal duct and hilum of the submaxillary gland. As with all types of surgery, intraoral surgical intervention can lead to complications. One complication that is not unusual is lingual nerve anesthesia. The lingual nerve loops around the mid to distal portion (next to the papilla) of Warthin’s Duct before it enters the tongue. It is in this area that the nerve can be easily injured. Occasionally, ranulas can form due to the disruption of the sublingual salivary duct. Excision of the submandibular gland by an external approach carries a 0 to 8% risk of permanent or temporary marginal mandibulary nerve palsy. The likely reason for this is that the nerve is stretched or cut as it courses next to the superior portion of the gland.

The future holds great promise due to the developments of non-surgical, non-invasive techniques such as shock wave lithotripsy, basket retrieval, and endoscopic laser lithotripsy. In a review of over 4,691 patients, Iro, et al. reported that retrieval of stones by baskets or microforceps is usually done for stones less than 5 mm and extracorporeal lithotripsy was mainly used for fixed parotid stones that were less than 7 mm in diameter.

**Conclusion:** Because of the early diagnosis and treatment regimens, stones of submandibular region very rarely became giant in size. Once the diagnosis of an intraglandular salivary stone is established attempts at removal by minimally invasive techniques should be considered. However, the efficacy of these techniques in the removal of giant calculi is not known and success rate and long term results would be expected to be much less favorable. In these patients, the removal of the gland via an extra oral approach is recommended. In the case report, we present a case of a giant salivary gland stone stone and a review of the literature.

**References:**


