Surgical management of an unusually large sialolith of the Wharton’s duct: A case report

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Abstract The estimated frequency of occurrence of sialoliths is 1.2%. They are frequently formed in the submandibular gland. They are commonly less than 10 mm in size and rarely larger than 15 mm. A 40-year-old female was referred to our department for the assessment of swelling, pain and pus discharge from the left side of the mouth. A hard mass was palpable along the left Wharton’s duct. Radiographic and clinical examination confirmed the diagnosis of sialolithiasis of the left submandibular duct. The calculus was removed trans-orally under local anaesthesia. The sialolith measured 18 × 6 mm. Six months after the intervention, the salivary flow was normal.

1. Introduction

Sialolithiasis is a disease characterised by the development of salivary stones, known as calculi or sialoliths, in the salivary ducts or in the salivary gland itself. More than 80% of salivary sialoliths occur in the submandibular gland or in its duct, 6–15% in the parotid gland and about 2% in the sublingual and minor salivary gland [1,2]. Its estimated frequency is 1.2% in the adult population, with a slight male predominance [3].

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It is believed that salivary calculi develop as a result of deposition of mineral salts around a nidus of bacteria, mucus, or desquamated cells. Sialoliths are composed of varying ratios of organic and inorganic substances. The chemical composition consists mainly of microcrystalline apatite or whitlockite: apatite is the most prevalent component present throughout the stone, while whitlockite is mainly found in the core [4,5]. Submandibular stones are composed of 82% inorganic and 18% organic material, whereas parotid stones are composed of 49% inorganic and 51% organic material [6].

Commonly, sialoliths are less than 1 cm in size. They are rarely larger than 15 mm. The aim of this article is to report a case of a salivary duct stone of unusual dimension and discuss its surgical management.

2. Report of a case

A 40-year-old female was referred to the Department of Oral & Maxillofacial Surgery, Ahmedabad Dental College & Hospital for the assessment of swelling, pain and pus discharge from the left side floor of the mouth. The patient’s medical his-
tory was unremarkable. Presently, her pain was continuous, of pricking type and sharp in nature, radiating to the tongue with restricted tongue movement. Extraoral examination revealed a diffuse induration in the left submandibular region with normal overlying skin. The swelling was warm and tender on palpation with a firm consistency. Intraorally, bimanual palpation revealed inflammation and induration along the left Wharton’s duct with the absence of salivary flow from the orifice (Fig. 1). Pus discharge was detected from the duct orifice. The left submandibular gland was tender. The patient did not report any increase in pain while eating. A long radiopaque mineralised body located within the left side Wharton’s duct was seen with the occlusal radiograph (Fig. 2). On the basis of physical and radiographic findings, a diagnosis of sialolithiasis of the left Wharton’s duct was made. Antibiotics and analgesics were prescribed preoperatively following which the surgical removal of the sialolith with an intraoral approach was planned.

After administration of local anaesthesia, sialolithotomy was performed via intraoral approach (Fig. 3). Upward and medial pressure was applied to the submandibular gland, and the incision was placed directly over the sialolith to expose it. The sialolith was carefully dissected and a cylindrical, hard, rough and yellow mass was obtained. It measured $18 \times 6 \text{ mm}$ and weighed 0.59 g (Fig. 4). Six months after the surgical procedure, the patient showed no signs or symptoms of xerostomia, and the salivary flow was normal.

### 3. Discussion

Sialoliths commonly measure between 5 and 10 mm in size. Salivary calculi are mainly made up of calcium phosphate with small amounts of carbonates in the form of hydroxyapatite. Magnesium, potassium, and ammonia are components of sialoliths too [7]. Sialolithiasis typically causes pain and swelling of the involved salivary gland by obstructing the post-prandial surge of salivary secretion. Usually, an intraductal sialolithiasis is more severe than an intraglandular one as the stasis of the salivary flow is more accentuated [8].

Salivary stagnation, a nidus, and the precipitation of salivary salts are necessary for the formation of the calculus. Local, chemical, and mechanical factors are involved in sialolith formation. In fact, infection, inflammation of the gland, physical trauma to the duct or its orifice, introduction of foreign bodies, or the presence of desquamated epithelial cells seem to be involved in the development of salivary stones [9].
Ledesma-Montes et al. [10] said, salivary proteins might play an important role in sialolith formation too.

Based on 120 submandibular gland sialendoscopy studies, Marchal et al., [11] observed the presence of a sphincter system in the first 3 cm of the Wharton’s duct in 90% of their studied cases, and suggested that variation of such sphincter-like mechanism within the salivary ducts could be responsible for easier retrograde migration of oral materials.

In this case the sialolith was located in the submandibular gland which has shown to be the most susceptible to calculus formation due to the alkalinity of its saliva, a greater concentration of calcium and phosphate, and a higher mucus content. Moreover, its excretory duct is longer, wider and it has a bow-shaped course in the cranial direction, causing a particular tendency to secretory congestion and concretion formation due to the antigravity flow [9].

Radiopacity is not a feature in 40% of parotid and 20% of submandibular stones; therefore sialography or other imaging techniques (computed tomography scan, ultrasound) may be required to locate them [12]. In contrast, giant sialoliths are mostly radiopaque and are easily depicted on panoramic radiographs, probably because their lithogenesis is long enough for calcification to be completed [9].

The treatment objective for both giant and standard-sized sialoliths is the restoration of normal salivary secretion. We agree with Rai and Burman [7] that a giant sialolith should be removed in a minimally invasive manner, via transoral sialolithotomy, to avoid morbidity associated with sialadenectomy. Long-term obstruction by giant sialoliths may lead to salivary gland sialadenitis resulting in a fibrotic and atrophic gland [13]. However, 6 months after sialolithotomy, our patient showed no signs or symptoms of xerostomia, and salivary flow of left submandibular gland was normal. As Soares et al. [14] said, intraductal stones may be removed by a transoral approach, whereas for intraglandular stones, an extraoral submandibular gland excision is indicated. Diagnosis and management of sialoliths of a remarkable size are challenging for the clinician. Conservative methods of treatment such as extracorporeal and endoscopic intracorporeal shockwave lithotripsy techniques should be considered as an alternative to surgical excision, in particular for little calculi [15].

References