Detection of a metallic foreign body in the Wharton duct
A case report
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Abstract
Rationale: Foreign bodies are rarely found in the submandibular gland and the Wharton duct, due to their physiological and anatomical features.

Patient concerns: A 23-year-old man was referred to Foshan Stomatology Hospital in July 2016, with pain and intermittent swelling in the right submandibular area.

Diagnoses: Physical examination revealed enlarged, indurated, and painful swelling in the right submandibular area, with a normal oral cavity. No abscess or fistula was detected. Radiography and computed tomography (CT) indicated a 1.7 cm radiopaque mass in the Wharton duct, close to the submandibular gland.

Interventions: Submandibular sialadenectomy was performed under general anesthesia. Upon exploration of the fully dissected submandibular gland, a 2.0 cm long barb-like metallic body was found in the Wharton duct.

Outcomes: The patient had an uneventful recovery during a 6-months follow-up.

Lessons: Foreign bodies in the Wharton’s duct can be detected by imaging techniques, such as radiography and CT, and successfully treated by submandibular sialadenectomy.

Abbreviation: CT = computed tomography.

Keywords: metallic foreign body, sialadenectomy, submandibular sialadenitis, Wharton duct

1. Introduction
Sialolithiasis, the most commonly encountered disease of the salivary gland, affects about 1.2% of the adult population. Meanwhile, very large sialoliths have been reported in the submandibular gland and the Wharton duct. However, foreign bodies in the submandibular gland and the Wharton duct are rarely encountered. This could be explained by physiological and anatomical features. On one hand, the intraoral end of the Wharton duct has limited support from the papilla of the sublingual caruncle, with possible flapping and twisting in all directions; in addition, the caliber of the Wharton duct is extremely small in the floor of the mouth. This makes difficult for a foreign body to pass into the Wharton duct. On the other hand, because of the mobility and near horizontal extension of the Wharton duct, there is almost continuous egress of salivary flow from the duct to the oral cavity, and foreign bodies in the Wharton duct are unstable and would be rejected spontaneously. Despite these anatomical and functional characteristics of the submandibular salivary gland and the Wharton duct, a patient with retrograde passage of a metallic foreign body into the Wharton duct presented to our clinic. The etiology, diagnosis, and treatment of this case are presented in this report.

2. Case report
In July 2016, a 23-year-old man Tibetan farmer was referred to the Department of Oral and Maxillofacial Surgery, Foshan Stomatological Hospital, with complaints of pain and intermittent swelling in the right submandibular area. The first onset occurred 10 months prior to the visit. The symptoms were more pronounced when getting up in the morning or after a meal, and eased after a few hours. The pain was limited to the base of the oral cavity. The patient used non-prescription anti-inflammatory drugs, which alleviated the symptoms. He had not sought medical help before presenting to our clinic, and had no history of drinking or smoking. This clinical research was approved by the Institutional Ethics Committee of our hospital. Informed written consent was obtained from the patient for publication of this case report and accompanying images.

On physical examination, enlarged, indurated, and painful swelling was detected in his right submandibular area, without abscess or fistula. The oral cavity was otherwise normal. Then, plain radiographs were performed, revealing a barb-like...
radiopaque mass in the right submandibular region (Fig. 1). To determine the accurate position of this mass, computed tomography (CT) scan of the head and sialography were subsequently performed. As a result, a 1.7 cm radiopaque mass was found in the Wharton duct, close to the submandibular gland (Fig. 2).

Based on the above, the patient was diagnosed with chronic inflammation of the right submandibular gland, with a foreign body in the duct. After obtaining informed consent from the patient, submandibular sialadenectomy was performed under general anesthesia. Through the traditional approach of skin incision, the submandibular gland was mindfully dissected. During the operation, the gland was found to be fibrotic, adhering to surrounding tissues. Upon exploration of the fully dissected submandibular gland, a 2.0 cm long barb-like metallic body was found in the Wharton duct, close to the submandibular gland (Fig. 3).

After the surgery, the patient revealed that while cleaning his teeth, he broke a small metallic rod, whose parts were left in the oral cavity. Finally, the patient had an uneventful recovery with no complication observed during a 6 months follow-up.

3. Discussion

Sialolithiasis represents one of the most common reasons for inflammation of the major salivary gland, and is generally manifested by intermittent swelling and pain in the salivary gland region. During radiographic examination, the most commonly radiopaque mass in submandibular areas is calculus, which is usually of round or ovoid appearance. Moreover, the possible radiopaque tissues in this area, for example, calcified lymph nodes, vascular lesions, or neoplasms often appear to be multiple and scattered, and also round, ovoid, or linear in shape.

The presentation of a barb-like radiopaque mass observed in the current case is rather rare. As clinical presentation, the prolonged swelling course, which increased during meals, is a symptom of persisting congestion of the salivary duct. Furthermore, such congestion may lead to inflammation of the gland. Therefore, a possible etiology for this case was that a metallic foreign body retrogradely entered into the Wharton duct and lodged in its deep side. Indeed, this hypothesis was supported by the past history of the patient postoperatively.

Due to the tortuous anatomy of the Wharton duct and the barb-like feature of the metallic foreign body retrieved, it was impossible for the foreign body to retract spontaneously. Although sialoendoscopy is currently considered an efficient and simple method for the treatment of salivary duct obstruction, its success is limited to foreign bodies occurring in the distal duct or the hilum of the submandibular gland. Apparently, sialoendoscopy is not suitable for cases with foreign bodies located in the more proximal part and secondary branches of the Wharton duct, which may be neither parallel nor near parallel to the main duct. Therefore, the approach of removing the metallic foreign body via the endoscopic technique was ruled out. Finally,
surgical removal of the foreign body was selected as the treatment modality.

For surgery, intraoral removal was an option. This approach has the possible risk of pushing the foreign body towards the deeper duct system, which may damage the lingual nerve. In the current case, the foreign body could not be accurately localized and approached by the intraoral approach. Actually, the traditional submandibular approach via cervical skin incision may be preferable for its simplicity and safety, with the prevention of complications, for example, lingual and hypoglossal nerve injury. We, therefore, applied submandibular sialadenectomy for treatment, and the patient recovered well with no remarkable complication observed during a 6-month follow-up.

4. Conclusion

In this case of 23-year-old man with metallic foreign body in the Wharton duct, imaging techniques, such as radiography and CT, were used to reach an accurate diagnosis, and successful treatment was obtained by submandibular sialadenectomy, with an uneventful recovery.

Author contributions

Conceptualization: Dahong Huang.
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