

New transoral approach to remove a hilar stone of the submandibular gland

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June 5, 2020

Abstract

Background: Surgical treatment for submandibular gland stones varies depending upon the site and size of the submandibular gland. With the transoral method, nerve damage and intraoperative bleeding in the direct incision over the hilar stones are possible. We used the lateral oral floor approach and report our procedure and the associated complications. Methods: Surgery was performed under general anesthesia. A 2–3 cm longitudinal mucosal incision was approximately parallel and outside of the Wharton’s duct. The surrounding tissues were peeled away and the incision was made just above the stone and the stone was extracted. Results: 2 males and 5 females enrolled in this study, all stones were removed without leaving residual stone fragments. One patient had slight hypoesthesia on one side of the tongue, which resolved in 1 month. Conclusions: Hilar stone excision from the submandibular gland was performed using the lateral oral floor approach. There were few complications and the technique seemed to be effective for relatively large hilar stones.

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1 INTRODUCTION

Surgical treatment for submandibular gland stones varies depending upon the site and size of the submandibular gland, and upon the choice of surgical intervention (total submandibular adenectomy, transoral surgery, or endoscopic resection). Although submandibulectomy is recommended for hilar stones to ensure their removal, the surgical area is relatively large. Endoscopic surgery is also an option, but it will be difficult if the stone is large and if there are adhesions. Because many surgical protocols using the transoral method have been reported, nerve damage and intraoperative bleeding in the direct incision over the hilar stones is possible.

However, we used the lateral oral floor approach, which involves an incision outside the normal mucosal incision. Here, we report our procedure and the associated complications.

2 MATERIALS AND METHODS

Seven patients were informed of the possibility of lingual nerve injury and residual stones, and written consent was obtained. The surgeries were performed at the NTT Medical Center, Kameda Medical Center, and Saitama Medical Center by our team. Surgical time, stone size, and complications were evaluated.

Surgery was performed via nasal intubation under general anesthesia. Using a mouth opener, the affected oral floor was opened wide in a bright field. To assist with the procedure, an endoscope can be used if required.

The palpable stone was marked and a 2–3 cm longitudinal mucosal incision that was approximately parallel to the Wharton's duct and 1–2 cm outside of the stone was made(Fig1).

The mucous membrane flap was abraded medially on the mylohyoid fascia. The lingual nerve was located, and the sublingual gland was lifted and attached to the flap. While checking the position of the stone by palpation, the tissue was peeled away from the lingual nerve and it was pulled with vessel tape. Concurrently, the submandibular gland branch of lingual nerve was preserved(Fig2).

Walton's duct in the hilar area was palpated, and the surrounding tissues were peeled away. The incision was made just above the stone and the stone was extracted (Fig3). The mucous membrane incision was roughly sutured with approximately two stiches using absorbable sutures.

Schematic drawings are presented in Figure4, which shows the cut-out model of the oral floor mucosa. The lingual nerve and sublingual gland are pulled medially, and the hilar area of Wharton's duct is in the field of view.

3 RESULTS

There were 2 males and 5 females enrolled in this study, and their mean age was 44.3 years range from 29 to 59. All stones were removed without leaving residual stone fragments. The average surgical time was 44 minutes, ranging from 21 to 63 minutes. The minimum stone size was 4 mm and the maximum size was 10 mm.

For complications, one patient had slight hypoesthesia on one side of tongue, which resolved in 1 month.

4 DISCUSSION

For a long time, the transoral surgical approach was the surgical mainstay for treating submandibular gland stones¹. In 2003, Marchal et al.² introduced endoscopic management of salivary stones. Sialendoscopy is a technique that allows endoscopic stone removal, which allows preservation of the salivary glands. Marchal et al. recommended fragmentation before endoscopic extraction of large stones, which are greater than 4 mm in diameter for submandibular patients. However, he observed that despite prior fragmentation, successful removal of larger stones was possible in only 80% of patients. Still there are situations where the stone cannot be removed, and in these patients, the gland needs to be removed.

A submandibulectomy has many problems, such as scar formation, disturbance of skin sensation, injury to the gustatory nerve, and functional disturbance of the marginal branch of the facial nerve. A unilateral submandibulectomy leads to a reduction in saliva flow, which may cause poor oral hygiene. If possible, a submandibulectomy should be avoided.

There are many reports of using the transoral approach. The main oral approach for a hilar stone is from the papilla or retropapillar region³.However, there are some residual cases, and some sensory disturbances, have been reported. To overcome these complications, and to obtain a better success rate, we present a new oral approach, which is called the lateral oral floor approach. The key to this technique is blunt dissection of Wharton's duct, and the mucosa is not incised just above the stones. In this technique, the surrounding blood vessel is not dissected, and bleeding is minimal, so a good surgical view is achieved. Our patients are very small, but there were no permanent complications and a 100% success rate was achieved.

The indication for this technique in our patients was excision of stones that were minimal 4mm in diameter. In our experience, 4 mm is the smallest size that can be palpated. There is no limitation for larger stones. Our technique is good to use when adhesions are present because it provides a direct view of the adhesive point without any expensive equipment.

In addition, the same technique was used in endoscopic submandibular ganglion neurectomy for drooling⁴. The approach used was almost the same as our approach, and thus, our technique can be used for removing hilar stones and to help correct drooling.

5 CONCLUSION

Hilar stone excision from the submandibular gland was performed using the lateral oral floor approach in seven patients. The stones from all patients were excisable.

Complications included transient hypotonia of the tongue in one patient, but it resolved in 1 month. There were few complications and the technique seemed to be effective for relatively large hilar stones.

Conflict of interest

We have no conflicts of interest.

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FIGURE LEGENDS

Figure 1. The palpated stone position and incision line are shown.

Figure 2 The submandibular gland branch of the lingual nerve is shown.

Figure 3. The lingual nerve are pulled away, the stone was exposed.

Figure 4. Schematic drawings of the oral floor. The lingual nerve and sublingual gland are pulled medially, and the hilum of the duct is in view.

Key Points

Hilar stone of the submandibular gland was performed using the lateral oral floor approach in seven patients.

The key technique is blunt dissection.

The stones from all patients were excisable.

There were few complications and the technique seemed to be effective for relatively large hilar stones.



FIGURE 1

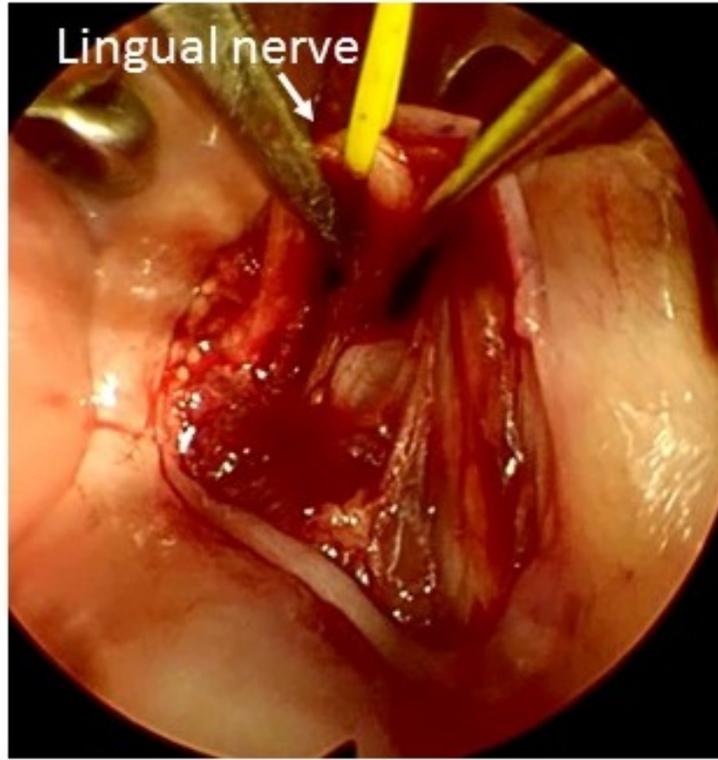


FIGURE 2

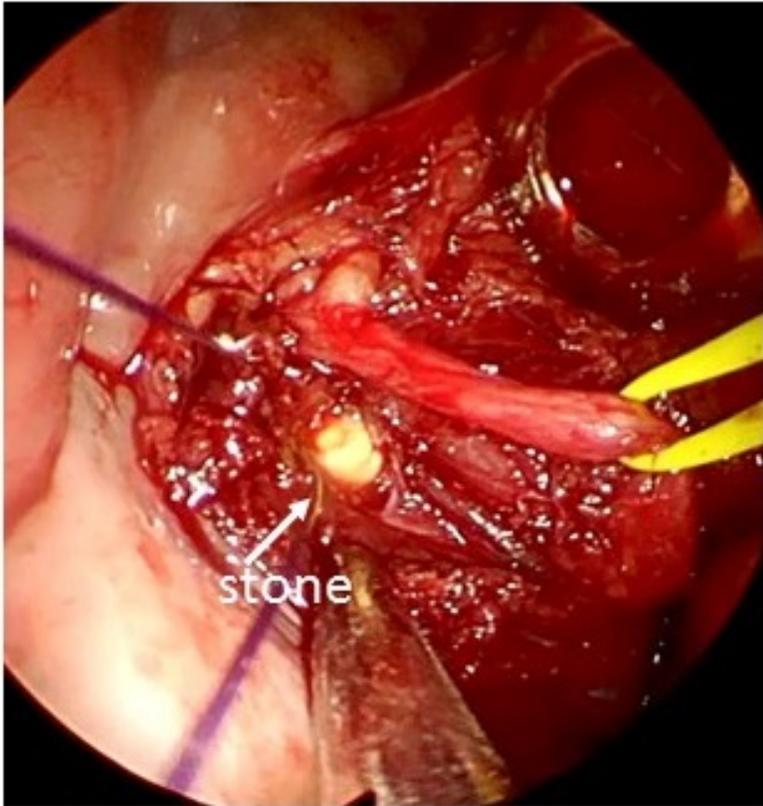


FIGURE 3

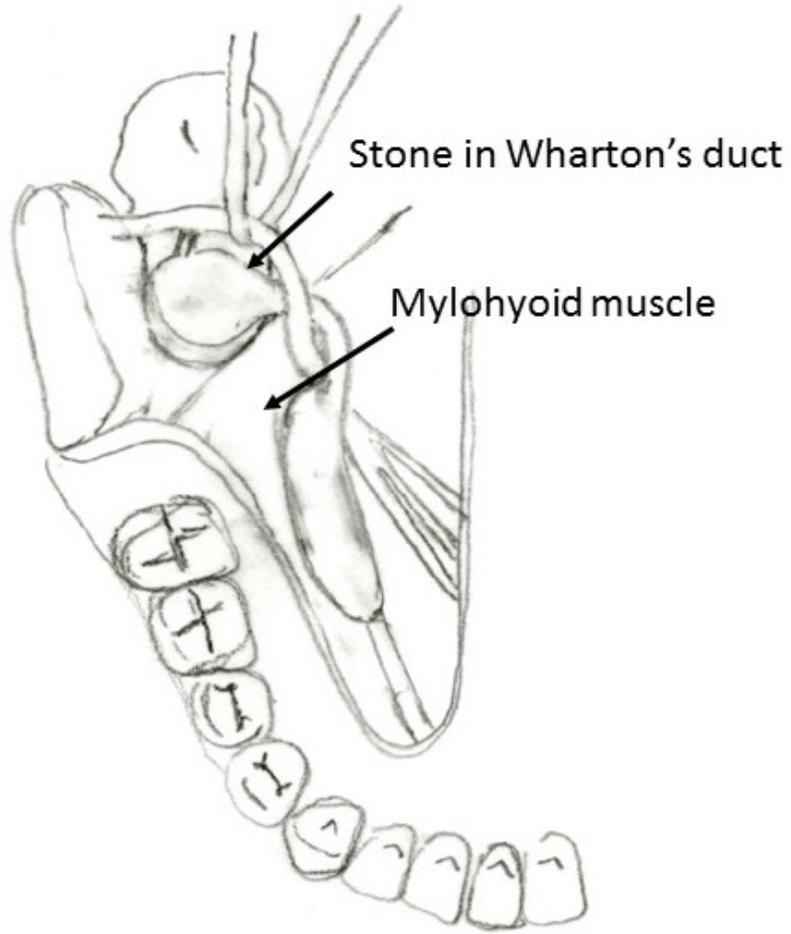


FIGURE 4