Plunging Ranula - Surgery by Marsupialization


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Abstract

Introduction: A ranula starts as a retention cyst in the floor of mouth. When it progresses to a very large size, lifting the floor of the mouth and base of tongue, it is known as a ranula. When it penetrates through mylohyoid muscle it is referred to as a plunging ranula.

Material and Method: This report presents seven patients who had ranulas that were treated surgically by marsupialization. The upper lip of the marsupialized cyst was sutured with chromic catgut. The lower lip of the marsupialized cyst was not sutured as accidental ligation of the submandibular gland may lead to pseudo cyst formation. The marsupialized cavity was packed with ribbon gauze soaked with Betadine. The pack is removed at bedtime to prevent its accidental aspiration. The pack is replaced the next day. This procedure is done every day until the marsupialized cavity is healed from its apex.

Results: The first two cases healed satisfactorily. A recurrence was found in a third case, with pseudo cyst formation, where the lower lip of the marsupialized cavity was sutured and packing of the marsupialized cavity was not done daily. The cyst required another marsupialization surgery. In the last four cases, the lower lip was not sutured and packing of the marsupialized cavity was done daily (removed at bedtime to prevent accidental aspiration). The healing in these cases was excellent without any recurrence.

Conclusion: To prevent the accidental ligation of the submandibular duct and pseudo cyst formation, the lower lip of the marsupialized cavity should not be sutured. Packing of the marsupialized cavity with ribbon gauze packing should be done daily to promote the healing of the cavity from its apex.

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Introduction

A retention cyst can form in the floor of mouth arising from the submandibular or sublingual duct or from mucous glands in the floor of mouth. Cysts may occur in any part of the mouth. When they occur in the floor of the mouth, they may enlarge to considerable size and may cause discomfort or disability hence a separate name is given as ranula. Ranula is a Latin word which means rana or frog-like, blue, transparent swelling in the floor of the mouth resembling the underbelly of a frog. A ranula is nothing more than a retention cyst. These cysts can progress to a very large size lifting the oral mucosa and base of tongue and are known as ranula. A ranula below the mylohyoid muscle is referred to as a plunging or cervical ranula. A plunging ranula is formed in the following ways:

1. The sublingual gland may penetrate the mylohyoid muscle or an ectopic salivary gland forms on the cervical side of the muscle. These cysts presents on the posterior side of the mylohyoid.

2. A cyst may penetrate through the mylohyoid muscle. A simple ranula passes through a path of least resistance. When a ranula passes though a dehiscent mylohyoid muscle, usually at the anterior two-thirds of the muscle, it becomes a plunging ranula.

3. The sublingual duct may join the submandibular gland and form a ranula in continuity with the submandibular gland.

The cyst wall may become so thin that it ruptures and extravasates into the tissues causing difficulty in its removal. In some cases, when extravasation extends widely through the tissue plane, it is known as a “Burrowing ranula.”

Pathophysiology: The parotid and submandibular salivary glands secrete in response to stimuli such as eating while the sublingual glands secrete continuously in the interdigestive period. Obstruction of the parotid duct leads to suppression of secretion from the serous alveoli and a tendency for recurrent infection. The ligation of the parotid duct ultimately leads to atrophy of the gland. The obstruction of the submandibular salivary gland leads to swelling of the gland whenever secretion of saliva is stimulated by eating. As this gland is encapsulated by a firm fascial capsule, the swelling produces increase in pressure and pain. The obstruction of the sublingual salivary gland leads to a thin-walled cyst which is painless as there is no firm capsule surrounding it. The overlying mucosa easily stretches and the cyst presents as a painless swelling covered by a thin mucosa.
Methods

This is a case study of seven patients with a plunging ranula. All the cases were treated with marsupialization. All of the surgeries were performed by the first author. All of the patients' ages were between the 2nd and 3rd decade. All patients had a history of painless swelling in the floor of mouth under the surface of the tongue for three to six months duration. One case had undergone simple, wide bore aspiration by another surgeon elsewhere and one had undergone incision and drainage by another surgeon also elsewhere. Both the cases recurred within one month.

Diagnosis: The diagnosis was done by clinical examination of the cyst which was tense, fluctuant and nontender (Figure 1 - Right-hand picture). A wide bore needle aspiration was done on the operation table to confirm the clinical diagnosis. An ultrasonography was done to determine the extension of the cyst into the neck. No other investigations were performed.

Operative Steps: All the cases underwent marsupialization surgery under general anesthesia. During surgery the patient was kept in a supine position with a small pillow under their head and the head turned to one side. The mouth was opened with a Doyen mouth gag retractor. A temporary suture at the tip of the tongue was placed to retract the tongue. With the help of a tongue depressor, the ranula was visualized. Just before starting the marsupialization procedure, a wide bore needle aspiration was done to reconfirm that the swelling was a cyst.

With a No. 12 blade, an incision was made. The mucoid secretion was completely evacuated by the use of a wide suction cannula. Two curved artery forceps were introduced on either side of the collapsed wall of the cyst (Figure 2, 3) and the mucosa in between the two artery forceps was excised initially with a blade (Figure 4) and later on with cutting cautery (Figure 5). After deroofing was completed, all the bleeding points were cauterized and the upper lip of the marsupialized cyst was sutured with chromic catgut (Figures 6a, 6b, 6c). The lower lip of the marsupialized cyst (Figure 7) was not sutured, as sutures may accidentally ligate the submandibular duct which may lead to pseudo cyst formation or enlargement of the submandibular gland. The marsupialized cyst was packed with Betadine-soaked ribbon gauze up to its apex (Figure 8). One end of this ribbon gauze was taped outside (Figure 9) to prevent its accidental aspiration. After recovery from anesthesia, the patient is asked to keep pressing the ribbon gauze with a finger to prevent its extrusion. At night, the gauze was removed to prevent accidental aspiration during sleep. The next day a fresh Betadine-soaked gauze was reinserted into the cavity. This procedure was repeated every day till complete healing occurred.

Surgical Technique: View YouTube Video: https://youtu.be/rtR0Nci7_yk
Figure 2: Curved artery forceps on lower side of collapsed wall of cyst

Figure 3: Curved artery forceps on upper side of collapsed wall of cyst

Figure 4: Mucosa in between the two artery forceps is excised with a blade

Figure 5: The mucosa in between the two artery forceps is excised with cautery

Figure 6a: The upper lip of marsupialized cyst is sutured with chromic catgut

Figure 6b: The upper lip of marsupialized cyst is sutured with chromic catgut

Figure 6c: The upper lip of marsupialized cyst is sutured with chromic catgut

Figure 7: The Marsupialized Ranula

Figure 8: Marsupialized cyst packed with Betadine soaked ribbon gauze up to its apex

Figure 9: One end of the ribbon gauze is taped on the outside
Results

On the operating table in the initial three cases, the packing of the marsupialized cavity was done mainly as a pressure pack and the lower lip of the marsupialized cavity was sutured by continuous ligature to control bleeding from the cut edges. One case developed a secondary cyst formation with swelling of the submandibular gland within ten to twelve days and a repeat marsupialization had to be performed (Table 1). Afterwards, a protocol was made not to suture the lower lip of the marsupialization cavity to prevent this complication. In the next four cases, the lower lip was not sutured and the bleeding points were controlled with cautery and pressure. The marsupialized cavity was packed with gauze. The oral cavity rapidly healed and became lined with mucosa in 7-10 days (Figures 10, 11, 12). There were no post operative recurrences.

Table 1: Results of Ranula Marsupialization

<table>
<thead>
<tr>
<th>Case no.</th>
<th>Suturing of upper lip of marsupialized cavity</th>
<th>Suturing of lower lip marsupialized cavity</th>
<th>Ribbon gauze packing removed</th>
<th>complication</th>
</tr>
</thead>
<tbody>
<tr>
<td>One, two</td>
<td>yes</td>
<td>yes</td>
<td>4-5 hrs after surgery</td>
<td>Nil</td>
</tr>
<tr>
<td>three</td>
<td>yes</td>
<td>yes</td>
<td>4-5 hrs after surgery</td>
<td>Pseudo cyst formation and swelling of submandibular gland</td>
</tr>
<tr>
<td>Four, five, six, seven</td>
<td>yes</td>
<td>No</td>
<td>After 7-8 days depending on healing of marsupialized cavity</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Discussion

Surgery is the primary method of treatment for ranulas. Various techniques have been described in literature for the treatment of plunging ranula. The excision of a ranula either through the oral or cervical...
route has been advocated, but the author finds the excision of a ranula intraorally or through the cervical route too extensive of a procedure with increased patient morbidity as compared to marsupialization.

Rho, et.al, used OK-432, a sclerosing agent in their case study of 21 patients and found it to be very effective. Mintz, et al., used a CO2 laser to vaporize the ranula. Yoshimura Y. in his comparison of 27 patients treated with surgical excision, marsupialization, and surgical excision combined with removal of the sublingual gland. He found no recurrences in those cases in which excision of the ranula was combined with removal of the sublingual gland. Ichimura, et al., in his series of 7 patients observed that without intraoral swelling, the cervical approach is the treatment of choice.

Conclusion

Marsupialization was found to be is a safe and very effective treatment and when performed properly their is little chance for recurrence. During the procedure, the lower lip of the marsupialized cavity should not be sutured to prevent the accidental ligation of the submandibular duct and pseudo cyst formation. Betadine-soaked ribbon gauze packing should be done every day to promote the healing from the cavity's apex. This packing should be removed at bedtime to prevent its accidental aspiration and should be reapplied the next day. The patient is asked to press the ribbon gauze with fingers during the daytime to prevent extrusion of the gauze packing.

References

Figure 6a
Figure 6b
Figure 6c
Figure 7
Figure 8
Figure 9