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Case Report

Optimizing surgical outcomes in recurrent plunging ranula: a case report

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ABSTRACT

A plunging ranula is the extravasation of saliva from the sublingual gland due to trauma or ductal obstruction. The saliva tracks through fascial planes into the submandibular space. While typically originating from the sublingual gland, it rarely involves the submandibular gland. Two types are recognized: simple oral ranula and plunging ranula. Various treatment approaches exist, particularly for preventing recurrence in the plunging type. This case report presents the clinical and radiological findings along with our surgical management of a recurrent plunging ranula using a combined intraoral and extraoral approach with dual salivary gland excision utilising intraoperative ultrasonography to ensure complete excision and prevent recurrence. We present the case of a 16-year-old female with recurrent plunging ranula following incomplete excision of a sublingual ranula in the past. Initially asymptomatic after the first surgery, the patient later developed swelling in the mouth floor and neck. The recurrence was managed using a combined intraoral and extraoral approach for complete excision of the sublingual and submandibular glands, along with the cervical extension of the ranula, guided by intraoperative ultrasonography. Postoperatively, the patient showed no signs of recurrence during follow-up, with complete resolution of symptoms. The combined approach ensured thorough removal of mucus-secreting glands and cystic components, preventing recurrence. The optimal treatment for a plunging ranula involves excision of the lesion and the involved gland. Intraoperative ultrasonography aids in ensuring complete excision of all cystic components, reducing recurrence risk.

Keywords: Plunging ranula, Recurrent ranula, Combined approach, Dual salivary gland excision, Intraoperative ultrasonography

INTRODUCTION

A plunging ranula is a rare variant of a mucous retention cyst, typically originating from the sublingual gland and, in rarer cases, from the submandibular gland. Unlike oral ranulas, which present as swelling in the floor of the mouth, plunging ranulas extend beyond the oral cavity, penetrating the mylohyoid muscle and causing cystic swelling in the neck. The term "ranula" is derived from the Latin word for frog (rana) due to its resemblance to a frog's distended underbelly.[1]

Plunging ranulas are uncommon, with an incidence of approximately 0.2 cases per 1,000 people, and the cervical variant is particularly rare. The condition is most often diagnosed in children and young adults, peaking in the third decade of life. Despite its rarity, early and accurate diagnosis is important because plunging ranulas can clinically mimic other neck masses, including cystic hygromas, branchial cleft cysts, or lymphadenopathy.

The pathogenesis of plunging ranulas is attributed to either obstruction or rupture of the sublingual gland ducts, leading to mucin extravasation into the surrounding soft tissues. Treatment typically involves complete excision of the affected sublingual gland to prevent recurrence.[1,2] Surgical approaches vary and can be classified as intraoral, extraoral, or combined techniques, with intraoral excision often favoured for primary cases.[3]

In this report, we present the case of a 16-year-old female with a recurrent plunging ranula, successfully treated using a combined intraoral and extraoral surgical approach. This case emphasizes the importance of thorough surgical management to prevent recurrence. Detailed clinical and radiographic findings further highlight the effectiveness of this combined approach for managing such a rare condition.

CASE REPORT

A 16-year-old female, presented with complaints of swelling on the right side of her neck and the floor of her mouth for the past 4 months. She initially developed a right sublingual swelling 8 months ago, which gradually increased in size and was diagnosed as a ranula. She underwent excision on 21 March 2024, and the histopathology report (HPR) confirmed the diagnosis. Postoperatively, she was asymptomatic for 2 months before developing recurrent swelling in the same region. The swelling over the floor of the mouth would increase in size and occasionally rupture, discharging a mucus-like fluid, only to recur after a short period. Additionally, for the past month, the patient reported the development of a new swelling on the right side of her neck. The swelling was insidious in onset, painless, and gradually progressed in size. She had no associated fever, pain, or difficulty in mastication or articulation.

The patient had no significant comorbidities. Family history and personal history were not remarkable. On examination, the patient was in good general health with stable vitals. A diffuse, non-tender, soft swelling measuring 4×3 cm was noted in the right submandibular region (Figure 1a).

Healed bilateral scars from previous cervical lymph node excision were observed. Intraorally, a 2×2 cm swelling was present over the right sublingual region, with a sinus opening of 0.5×0.5 cm on the right side of floor of mouth and a swelling of size 3×3 cm on the left side (Figure 1b). There was no active discharge. The oral mucosa appeared normal and the patient maintained good oral hygiene.

Figure 1: Pre-operative pictures (a) extraoral oral view showing swelling in right submandibular region, and (b) intraoral view showing swelling in the left and right side of floor of mouth.

Contrast-enhanced magnetic resonance imaging (CE-MRI) of neck with floor of mouth confirmed the diagnosis of a plunging ranula on the right side, with extravasation of mucus extending from the sublingual gland into the cervical tissues and simple ranula on the left side (Figure 2).

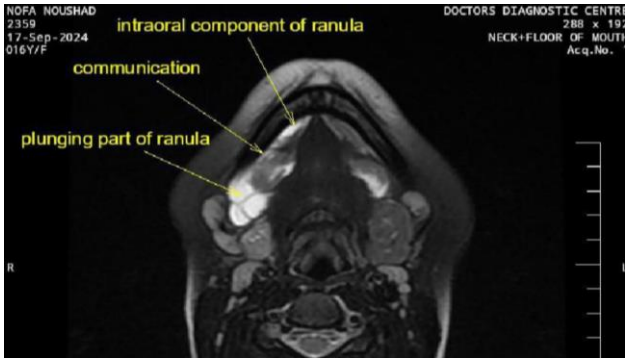

Figure 2: MRI of head and neck showing plunging ranula on right side with tail sign and simple ranula on left side.

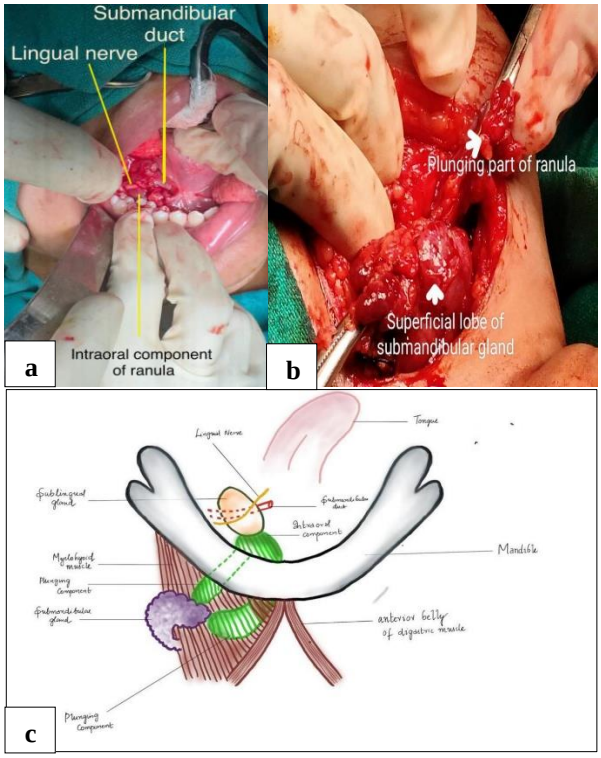

Figure 3: Perioperative pictures on the right side (a) intraoral view showing the ranula, (b) extraoral view showing the plunging component of the ranula, and (c) schematic representation of the perioperative findings, illustrating the complex anatomical relationship of the plunging ranula.

The lesion on the right side was excised via a combined intraoral and extraoral cervical approach under general anesthesia, using intraoperative ultrasonography (Figure 3a and b). A complete excision of the sublingual and

submandibular glands, along with the intraoral and cervical components of the ranula, was performed on the right side, with marsupialization on the left side (Figure 3c). The excised tissue was sent for histopathological evaluation.

DISCUSSION

Plunging ranulas are a distinct clinical entity that demand precise management due to their high recurrence risk, particularly when the sublingual gland is not fully excised. This case highlights the complexities of managing recurrent plunging ranula, emphasizing the need for a thorough understanding of the condition's pathophysiology, diagnostic challenges, and optimal treatment strategies.[3]

The pathophysiology of plunging ranula involves mucin extravasation from the sublingual gland into the cervical tissues following ductal obstruction or rupture.[3,4] Differentiating a plunging ranula from other cystic neck lesions, such as lymphangiomas or branchial cleft cysts, is critical, as these conditions have overlapping clinical features but require distinct management approaches. Advanced imaging techniques, particularly MRI, are essential in confirming the diagnosis and evaluating the extent of the lesion.[5]

While diagnosis of plunging ranula is largely clinical, imaging modalities, including ultrasound and MRI play a pivotal role in assessing the lesion's size and its relationship with surrounding structures. Accurate imaging helps ensure a comprehensive treatment plan and mitigates the risk of recurrence, especially in complex or deep-seated cases. Recurrence rates for plunging ranulas can be as high as 60% when the sublingual gland is incompletely excised.[5,6] In cases where the ranula extends into deeper neck tissues, a more extensive surgical approach may be required. Failure to fully remove the sublingual gland often results in persistent leakage of mucus, contributing to recurrence. The preferred initial surgical approach for uncomplicated cases of ranula is intraoral excision, which allows for direct access to the sublingual gland while minimizing external scarring.[7]

This less invasive method is typically effective for primary cases, as it provides a straightforward technique to remove the cyst while preserving surrounding tissues. Intraoral excision has been reported to result in shorter recovery times and lower postoperative complications compared to more extensive approaches.[8]

However, in cases of recurrent or deeply extending plunging ranulas, a combined intraoral and extraoral approach is often recommended. This dual approach not only facilitates better visualization of the cystic structure but also allows for more thorough excision of any residual tissue that may contribute to recurrence. Recent studies have demonstrated that utilizing both approaches in tandem significantly reduces the recurrence risk in complex or recurrent cases The decision to employ a combined intraoral and extraoral surgical strategy in this case was driven by the anatomical complexity of the lesion. Few reports of recurrent plunging ranulas exist in the literature, making this case an important contribution. Documenting the successful management of recurrent cases is essential for refining surgical techniques and improving outcomes for future patients.[9-11]

CONCLUSION

This case of recurrent plunging ranula underscores the complexities involved in managing this rare condition, particularly when initial treatment fails to prevent recurrence. The intricate anatomy of the sublingual gland and its connections with cervical structures necessitate a thorough surgical approach to achieve successful outcomes. The importance of complete excision of the sublingual gland cannot be overstated, as it significantly reduces the likelihood of recurrence. This case demonstrates that meticulous removal of both the intraoral and extraoral components of the ranula is the most effective strategy. Additionally, the submandibular gland was excised due to the ranula's close proximity to it, raising questions about its origin; thus, the decision was made to remove both glands. The integration of intraoperative ultrasound (USG) played a pivotal role in this process, facilitating real-time visualization of the ranula's anatomy and ensuring the complete removal of all involved tissue. The use of a combined intraoral and extraoral surgical technique, as illustrated here, proves particularly valuable in cases where ranulas have extended through the mylohyoid muscle. While non-surgical treatments and marsupialization remain viable options for selected cases, their limited success in preventing recurrence—especially in the context of plunging ranulas—favours the comprehensive surgical approach employed in this instance.

This report contributes to the limited literature on recurrent plunging ranulas, adding to the growing body of evidence supporting this surgical strategy. It also highlights the importance of ongoing research into optimizing surgical outcomes for patients facing this rare yet challenging condition.

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