

Case study

A Conservative Approach for Treating Ranula: Excision and Partial Sublingual Glandectomy

Ziad Mohamed^{1*}, Safa Elhadery², Ebtesam Aldieb¹, Raga Abuatwirat¹, Ahmed Sassi¹¹Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, University of Tripoli, Tripoli, Libya²Department of Prosthetic Dentistry, Faculty of Dentistry, University of Tripoli, Tripoli, LibyaCorresponding Email. Znasr718@gmail.com

Abstract

A ranula is a mucous extravasation cyst originating from the sublingual gland due to ductal disruption or trauma. It commonly presents as a cystic swelling on the floor of the mouth. In some cases, a portion of the sublingual gland herniates through the mylohyoid muscle, allowing mucin to track into the submandibular and submental spaces, resulting in cervical swelling, a condition termed plunging ranula. Various treatment modalities, including aspiration, sclerotherapy, marsupialization, incision and drainage, excision of the ranula alone, or complete removal of the sublingual gland, have been described, with mixed success rates. Most evidence supports the removal of the sublingual gland as a definitive treatment for both oral and plunging ranulas. This clinical narrative study (Case-Based Research) examines a single patient treated for a ranula, highlighting a conservative approach through partial sublingual glandectomy and evaluating its outcomes in the context of existing literature.

Keywords. Sublingual Gland, Ranula, Cystic Fluid, Submental and Mandibular Voids.

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Introduction

A cyst known as a ranula can develop on the base of the mouth, beneath the tongue. It has a salivary gland blockage or injury and is filled with saliva (spit). A functioning salivary gland releases saliva into the mouth. Salivary glands that are obstructed or injured may leak saliva into the tissues around them. Hence, saliva keeps accumulating until an abscess or "bubble" forms. The term "ranula" was first used more than one thousand years ago during the Byzantine era, and it is derived from the Latin word "rana," meaning "frog," because the swollen appearance of the sublingual mucous membranes mimics the transparent underbelly of a frog. Ranulas come in two varieties: basic and plunging [1].

Ranulas are regarded as a kind of pseudocyst since they are bordered by granulation tissue rather than epithelium. The mylohyoid muscle dehisces under these circumstances. The submandibular and submental spaces may be affected if a piece of the sublingual gland herniates through this gap and its extravasated mucus spreads there. The term for this occurrence is a plunging ranula [2,3].

Multiple surgical methods have been used, including marsupialization, incision and irrigation, excision of the ranula alone, removal of the sublingual gland along with the ranula, and sclerotherapy. Recurrence rates vary based on the procedure performed [4].

Since extravasation cysts originate from the sublingual salivary gland, surgical excision of the sublingual gland alongside the ranula remains the gold standard for effective management. This case-based study presents a detailed description of a ranula, highlighting its clinical presentation, diagnostic approach, and surgical management.

Clinical Narrative study

A 25-year-old female presented with a 6-month history of a singular, nontender, progressively enlarging, soft submental mass extending to the right submandibular region. There was no history of trauma, systemic illness, or previous oral or neck surgery.

Physical examination revealed a painless, diffuse, oval swelling of soft tissue consistency, located between the right mandible and the submental area (Figure 1). The overlying skin was normal in appearance.

To characterize the mass further, ultrasonography and a biopsy were performed. Ultrasonography revealed a cystic lesion extending through the fibres of the mylohyoid muscle into the submental space, consistent with a plunging ranula. Colour Doppler imaging showed no vascularity associated with the lesion, and there was no lymphadenopathy in the vicinity.

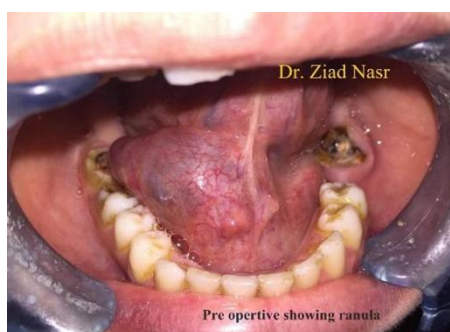


Figure 1. Preoperative intraoral view

Three weeks later, a computed tomography (CT) scan confirmed the sonographic findings. The lesion was identified as a cystic mass in the submental space (level 1A), extending to the right of the midline. Communication between the submental and sublingual components was observed through a defect in the floor of the mouth. The sublingual component was located medial to the mandible and posterior to the right sublingual gland. No abnormalities were noted in adjacent soft tissues or bone structures. The patient underwent surgical excision of the right sublingual gland along with the ranula (Figure 2a & b). The procedure was completed without complications.

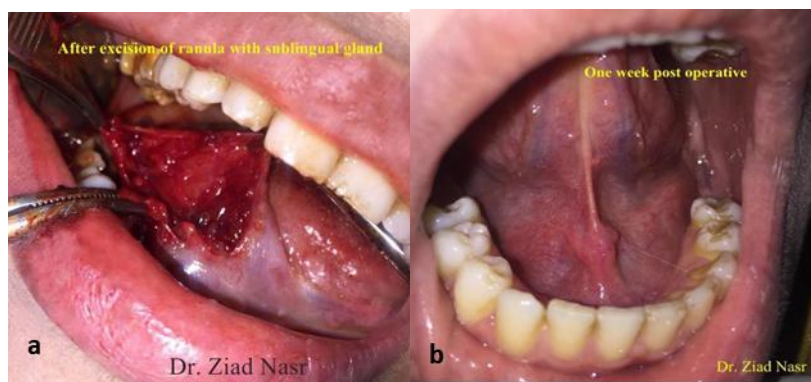


Figure 2. A. Surgical excision of the ranula and sublingual gland. B. Postoperative intra-oral view

Gross examination revealed soft tissue fragments measuring 3×2 cm, with a firm consistency and a pink-to-red colouration (Figure 3). Histopathological examination confirmed a mucocoele within a normal sublingual gland, with no associated abnormalities. Histopathological, plunging ranulas are non-epithelial pseudocysts. The fibroconnective tissue that makes up the walls is similar to granulation tissue and was created in reaction to the inflammatory effects of salivary secretion (Figure 4).

The cytology of fluid aspirates shows yellowish mucus mixed with histiocytes. When compared to serum, biochemical examination showed a higher protein and amylase content, confirming that the source is the sublingual gland [5].

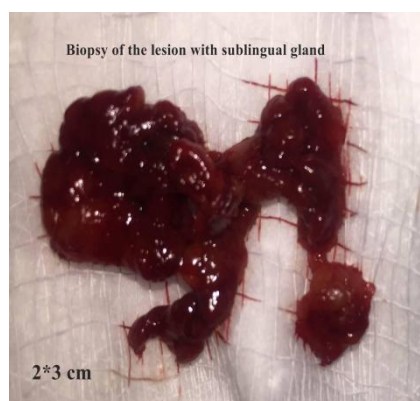


Figure 3. Biopsy picture

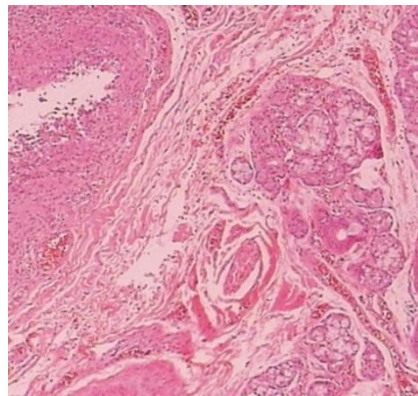


Figure 4. Histopathologic features of a ranula

Discussion

The sublingual glands, the smallest salivary glands located beneath the tongue, drain through 12–20 small ducts (ducts of Rivinus) into the floor of the mouth. Trauma, obstruction, or inflammation can damage these ducts, leading to mucus leakage into surrounding tissues. This triggers a fibroblastic response that encapsulates the mucus, forming an extravasation pseudocyst, the most common type of ranula. Less commonly, congenital duct obstruction leads to retention cysts, accounting for less than 10% of ranulas [6]. Ranulas typically present as slow-growing, painless, sublingual swellings. A plunging ranula occurs when a sublingual cyst ruptures and fluid dissects through the mylohyoid muscle into the submandibular or submental regions. These cysts can extend further into the parapharyngeal, retropharyngeal, or supraclavicular spaces [7].

Predisposing factors for plunging ranulas include ectopic sublingual glands, congenital mylohyoid defects (e.g., boutonnière of Gaughran), and postsurgical changes. Plunging ranulas are associated with sublingual ranulas in most cases, but can also present independently in 21% of cases. The diagnosis relies on imaging and fluid analysis. High-resolution ultrasonography often reveals a thin-walled, avascular cystic structure. CT and MRI can confirm deeper involvement, with a characteristic "tail sign" extending to the sublingual space. Fluid aspirates typically contain mucus with elevated amylase levels, confirming a sublingual origin [1].

Surgical excision of the sublingual gland and ranula is the gold-standard treatment, with nearly 0% recurrence [10]. Alternative treatments like marsupialization and incision-drainage have higher recurrence rates (61–89%). Minimally invasive sclerotherapy using OK-432 has shown promise but may require multiple injections [3]. Differential diagnoses for sublingual and submandibular swellings include dermoid cysts, thyroglossal duct cysts, cystic hygromas, and abscesses. Imaging and fine-needle aspiration cytology are essential for accurate diagnosis, distinguishing ranulas from these conditions [4]. In this case, the patient's right-sided plunging ranula was effectively managed with surgical excision, with imaging findings and histopathology confirming the diagnosis. The case underscores the importance of imaging and multidisciplinary care in diagnosing and treating ranulas.

Conclusion

This case-based study highlights the clinical presentation, imaging findings, and successful surgical management of a plunging ranula. The condition, though rare, should be considered in the differential diagnosis of soft, painless, submandibular or submental swellings, particularly in young adults. Imaging modalities such as ultrasound, CT, and MRI are invaluable in confirming the diagnosis and assessing the extent of the lesion. Surgical excision of the sublingual gland and associated cyst remains the gold standard for treatment, offering excellent outcomes with minimal recurrence risk. Early diagnosis and appropriate management are crucial for preventing complications and ensuring optimal patient recovery.

Declaration. The authors declare no conflicts of interest, of any kind, with this case report.

Ethical Approval. Written informed consent has been obtained from the patient for the publication.

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