

# Retrospective analysis of ranula patients managed with surgical treatment

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## Abstract

**Objective:** We aimed to examine patient characteristics, recurrence rate and efficacy of treatment methods in patients who underwent surgery with the diagnosis of ranula in our department retrospectively. The subject is discussed in the light of current literature.

**Methods:** Twenty-seven patients with ranula managed surgically between 2008 and 2018 were included in this study. The indications, age and sex distribution, surgical pathology reports, surgical methods, complications encountered and recurrence rates were examined retrospectively.

**Results:** The mean age was 27.48±18.66 years. There were 8 (29.6%) male and 19 (70.4%) female cases. The mean size of the ranula was 3.07±0.35 cm. When the symptoms were evaluated, 23 (85.2%) of the patients had a swell-

ing in the floor of the mouth, 3 (11.1%) had a neck swelling and 1 (3.7%) had swelling on the lower surface of the tongue. The treatment method was marsupialization in 11 (40.7%) patients and ranula cyst excision in 16 (59.3%) patients. Four (14.8%) of these patients had a recurrence. The first surgical procedure was marsupialization in 3 (75%) and cyst excision in 1 (25%) of the cases with recurrence. Of the patients with recurrence, 3 subsequently underwent cyst excision and 1 of the patients underwent marsupialization. No complication or additional recurrence was observed in the follow-up of these patients.

**Conclusions:** Concerning our ten years of experience with the management of ranula, we can conclude that ranula can be treated by both marsupialization and cyst excision with a low risk of recurrence.

**Keywords:** Ranula, treatment, surgery.

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## Introduction

Ranula is the most common fluctuant soft tissue lesion of the oral cavity, generally located in the lateral part of the mouth floor as a result of obstruction or rupture of salivary gland ductus due to many reasons including trauma.<sup>[1]</sup> Histopathologically, it is characterized as a cyst with mucinous fluid content, with loose and vascularized connective tissue. Although it is usually encountered as an asymptomatic lesion, large lesions may cause difficulty during speech and swallowing.<sup>[2]</sup>

The mechanisms involved in the formation of ranula cyst are extravasation and retention. Ranula is usually classified as a simple (oral) ranula limited to the oral cavity, located superior to the mylohyoid muscle or as a plunging (cervical) ranula that extends to the neck by passing through this muscle.<sup>[3,4]</sup> Although ranula commonly originates from the sublingual gland due to the gland's spontaneous secretory activity, it can originate from any minor or major salivary gland. Ranulas of the minor salivary glands usually regress, whereas surgery is performed on those that do not regress spontaneously.

In the present study, patients with ranula diagnosed and treated over a period of ten years were evaluated retrospectively and the clinical characteristics of the patients are discussed in the light of current literature.

## Materials and Methods

The hospital records of patients with ranula who underwent surgical treatment between 2008 and 2018 in the Department of ENT and Head Neck Surgery, Haseki Training and Research Hospital were evaluated retrospectively. The patients' clinical characteristics such as age and gender, indications for surgery, treatment methods, and recurrence rates were recorded from patient records. Patient characteristics such as age and gender were noted. Presenting symptoms, physical examination characteristics, surgical management methods, and surgical pathology results were examined retrospectively. Recurrence rates, patient characteristics with recurrence and the treatment modalities used were compared with the cases that did not have recurrence. The study protocol was approved by the institutional review board (2018/219). The study was conducted following the ethical principles laid down in the Helsinki Declaration.

## Results

The study included 27 patients with ranula, composed of

eight male (29.6%) and 19 female (70.4%) cases. The mean age of our patients was  $27.48 \pm 18.66$  years. The presenting symptoms were swelling in the floor of the mouth (Figure 1) in 23 patients (85.2%), swelling in both the floor of the mouth and the neck in three (11.1%) patients and swelling in the ventral surface of the tongue in one (3.7%) patient. The mean size of the lesion was  $3.07 \pm 0.35$  (min-max: 1-6) cm. Eighteen patients (66.7%) were diagnosed by clinical findings and palpation. Only three (11.1%) patients with plunging ranula and six (22.2%) patients with a sublingual mass had a suspicion of vascular mass, therefore, they were further evaluated with computed tomography (CT) and magnetic resonance imaging (MRI) for definitive diagnosis. Treatment method was marsupialization in 11 (40.7%) patients and ranula cyst excision in 16 (59.3%). Histopathological examination of the patients was consistent with the ranula.



**Figure 1.** Ranula located in the floor of the mouth.

Recurrence was observed in 4 (14.8%) patients and the mean time of recurrence after the first procedure was  $26.25 \pm 12.27$  days. The first procedure was marsupialization in three and cyst excision in one patient with recurrence. In these patients, the secondary surgical procedure was cyst excision in three patients and marsupialization in one patient. No complication or additional recurrence was observed in the follow-up of these patients.

## Discussion

Ranula derives from the word “Rana” which means frog in Latin. Use of the word also is because a ranula is a cavity filled with mucus that looks like the frog underbelly.<sup>[1]</sup> It is more common among women in the second and third decades.<sup>[5,6]</sup> Consistent with the literature, 19 (70.37%) of the patients included in our study were female, the mean age of our patients was 27.48±18.66 years and the most common symptom was swelling on the floor of the mouth.

Ranula generally presents as a painless asymptomatic mass with a bluish color, transparent appearance and loose in consistency. The bluish color is caused by congestion and cyanosis of the tissue overlying the cyst.<sup>[7-9]</sup> Ranula may be seen in any location containing minor and major salivary glands in the oral cavity but usually originates from sublingual salivary glands. They are reported to be most common in the floor of the mouth and lateral parts of the lower lip, followed by the tongue, buccal mucosa, palate and rarely in the retromolar triangle.<sup>[9]</sup> Consistent with the literature, in our study the most common finding in our patients was swelling in the floor of the mouth.

The diagnosis of ranula is usually based on physical examination and clinical findings. Palpation is the most important part of the physical examination. Radiological imaging is not necessary in case of simple ranula but if there is a suspicion of sialolithiasis, which may cause ductal obstruction, plain X-ray or panoramic X-rays can be used. CT and MRI are important for the evaluation of the extent of the ranula or differential diagnosis.<sup>[10]</sup> Branchial cleft cysts, dermoid cysts, lipomas, lymphangiomas, laterally located thyroglossal duct cysts, oral hemangioma, pyogenic granuloma, abscess and lymphadenopathy should be considered in the differential diagnosis.<sup>[2]</sup> In our study group, 18 (66.7%) patients were diagnosed clinically with palpation, consistent with the literature. Only three (11.1%) patients with plunging ranula and six (22.22%) patients with a sublingual mass had a suspicion of vascular mass and were therefore further evaluated with CT and MRI for definitive diagnosis.

Mylohyoid muscle serves as a diaphragm between the floor of the mouth and the neck but it is not a firm barrier. In 35-45% of cases of cadavers studied, dehiscence in two third parts of the mylohyoid muscle was observed.<sup>[11]</sup> Thus, the ranula may extend to the neck by passing through the dehiscence of the mylohyoid muscle, called a plunging ranula. The Blandin-Nuhn

glands are seromucous mixed minor salivary glands located at the ventral surface of the tongue and ranula originating from these glands are called a Blandin-Nuhn cyst.<sup>[12]</sup> In our study, three patients (11.1%) had a plunging ranula and one patient (3.7%) had a Blandin-Nuhn cyst.

The management of ranula includes aspiration, marsupialization, ranula cyst excision (together with the sublingual gland or not), micromarsupialization and other methods including topical corticosteroid, sclerosing substance (OK-432), botulinum toxin A, CO2 laser and cryosurgery.<sup>[13-20]</sup>

Zhao et al<sup>[9]</sup> reported a retrospective analysis of surgical management and recurrence rate of 580 ranula cases between 1962 and 2002. The authors found that the recurrence rate was 66.7%, 57.69% and 1.2% after marsupialization, simple cyst excision and cyst excision with sublingual gland removal, respectively. Although the lowest rate of recurrence was seen in ranula excision together with the sublingual gland, the authors did not suggest removing the sublingual gland as primary treatment due to the risk of damage to the sublingual nerve. In the present study, the treatment method was marsupialization in 11 (40.7%) patients and ranula cyst excision in 16 (59.3%) and recurrence was observed in four patients (14.8%). The first surgical procedure was marsupialization in 3 (75%) and cyst excision in 1 (25%) of the cases with recurrence. We had a far lower recurrence rate even though the sublingual gland was not excised in any of the cyst excision cases, which may be due to the lower number of cases in our series.

## Conclusion

With respect to our ten years' of experience with the management of ranula, we can conclude that ranula can be treated by both marsupialization and cyst excision with a low risk of recurrence. If there is a risk of sublingual nerve damage during intraoral excision or the creation of a hollow space after cyst excision is probable, marsupialization can be preferred instead of cyst excision.

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**Ethics Committee Approval:** The study protocol was approved by the institutional review board (2018/219). The study was conducted following the ethical principles laid down in the Helsinki Declaration.

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**Author Contributions:** Designing the study – F.A., Y.A.; Collecting the data – F.A., Y.A.; Analysing the data – F.A.,

Y.A.; Writing the manuscript – F.A., Y.A.; Confirming the accuracy of the data and the analyses – F.A., Y.A.

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