LETTER

High self-healing rate of oral ranula: A prospective study

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Dear Editor,

A ranula is a pseudocystic lesion that arises from the extravasation of mucous from the sublingual gland. According to the extent of the lesions, a ranula can be classified into two types: oral (simple) ranula, confined to the floor of mouth; and cervical (plunging) ranula, presenting as a swelling in the neck.

Oral ranulas are much more common than cervical ranulas. Most oral ranulas are painless, sometimes with a mild sensation of a foreign body in the mouth. Because oral ranulas are superficial and painless, their appearance and disappearance can be easily and reliably evaluated in oral cavity, based on the patient' s subjective observation. Clinical confirmation of the diagnosis is normally established if "egg-white", transparent viscous fluid is present through aspiration or rupture of the mass. Imaging examination, such as B-ultrasonography or magnetic resonance imaging (MRI), is used for plunging ranula but is not necessary for oral ranula.[1]

Surgical resection of the associated sublingual gland has been widely reported as the most effective and reliable treatment for oral ranula.[2-4] The procedure is usually performed under general anesthesia. In addition to sacrificing the functional sublingual gland, surgical glandectomy carries the potential for complications such as lingual nerve injury, damage to Wharton's duct, or even life-threatening acute postoperative bleeding. Conservative treatment mainly includes reconstruction of drainage through micromarsupialization or marsupialization, or destroying the leakage.[3] These less invasive treatment modalities are not widely viewed as routine management because of higher recurrence rates.[2]

Interestingly, cases of self-healing ranulas have been sporadically reported in the literature.[5,6] We hypothesize that self-healing may not be uncommon, and that monitoring for self-healing should be encouraged as routine practice before any clinical intervention such as conservative treatment or surgical resection of the sublingual gland is undertaken. This intentional delay of medical intervention has little potential consequence because most oral ranulas are painless with little influence on quality of life if no secondary infection is present. In this letter, we report the results of a large cohort of patients with oral ranulas managed with the modality of monitoring for self-healing.

Patients

This prospective study was conducted at the department of oral and maxillofacial surgery, School and Hospital of Stomatology, Peking University (Beijing China), between March 2018 and February 2022. Informed consent was obtained from all patients, and approval for the study was obtained from the institutional review board of the hospital (PKUSSIRB-202163040).

The diagnosis of oral ranula was established when a blueish translucent swelling was observed on the floor of the mouth and "egg-white", transparent viscous fluid was present through aspiration or rupture of the cyst. CT or MRI scans were performed if a plunging type of ranula was suspected.

After being informed about the nature of ranulas, the patients were advised about routine management options, including conservative intervention and surgical resection of the sublingual gland. Patients were encouraged to monitor the ranula for self-healing. They were required to immediately advise the researchers of any change in the ranula such as ulceration, pain, or size fluctuation. Plunging ranulas and congenital ranulas were not included in this research. Patients with symptoms, such as pain, severe sensation of a foreign body, or cancerous signs such as ulceration or infiltration, were excluded or dropped from the study.

Patient characteristics such as age and sex were recorded. Initial clinical information about the ranula, such as location (left or right side), site (anterior or posterior, separated by the landmark of the line between the lower cuspid and the first premolar), size (greatest dimension), and history were assessed and recorded. Intraoral photographs of all ranulas were taken.

Follow up and assessment of outcomes

All the patients were followed up for at least 12 months in the outpatient clinic or through remote medical consultations via the internet or telephone. The date of disappearance or appearance of the ranula was recorded and the photographs of the affected mouth floor were also taken. As the post-healing surveillance, follow-up was extended up to the present time after disappearance of the ranula, and any reappearance of the ranula was evaluated.

Oral ranulas are cystic lesions, and growth and shrinkage are common clinical manifestations. In this study, self-healing was defined as the disappearance of the ranula for at least 3 months. Recurrence was defined as the reappearance of the ranula in the same place after self-healing of the former ranula.

Complications of longstanding ranulas, such as infection, were carefully observed and patients were encouraged to undergo routine interventions.

Statistical analysis

All statistical analyses were performed with SPSS software version 20.0 (SPSS Inc., Chicago, IL, USA). Continuous variables were expressed as mean, standard deviation values, and range. Categorical variables were defined as the absolute number of cases and percentage values. The chi-square test and Fisher' s exact test were used to evaluate the association between clinical and demographic characteristics. Kaplan-Meier survival curve and log-rank test were used to estimate ranula duration and its possible risk factor including age, gender, size, site, side and history of ranula. A P-value of <0.05 and a 95% confidence interval were adopted as denoting significance.

Descriptive analyses

From March 2018 to February 2022, 121 consecutive patients referred with oral ranula were encouraged to monitor for self-healing. Seven patients were terminated from the study and treated with micromarsupialization or surgery after waiting for 1–6 months because they were not confident that the ranula would self-heal. The remaining 114 patients agreed to monitor the ranula for self-healing and were included as the final cohort of this prospective study.

There was distinct female predilection (M/F = 1:2.16). Mean age was 24.61 ± 12.9 years and most patients (90.4%) were younger than 40 years old. There were 46 anterior ranulas (40.4%), and 68 posterior ranulas (59.6%). Only 37(32.5%) ranulas were smaller than 1 cm in their greatest dimension (Figure 1A).

Main analyses

Patients were followed up for 12–55 months. The median following up time was 25 months (InterQuartile Range, IQR 19-35). Only three patients have been lost to follow-up. Without any treatment, 105 patients reported spontaneous disappearance of the oral ranula for at least 3 months, which was defined as self-healing. The rate of self-healing was 92.1%. The median duration of 105 self-healing oral ranulas was 6 months (IQR 3– 12) (Figure 1B).

A. Characteristics of ranulas (no. of patients = 114) and self-healing rate

Characteristics	No. of ranulas (%)	Self-healing		
		Yes (%)	No (%)	*P*
Patient's Age, y, mean±SD (range)	24.61±12.9 (3~63)	105 (92.1)	9 (7.9)	
<10	23 (20.2)	20 (87.0)	3 (13.0)	0.257
10~19	17 (14.9)	14 (82.4)	3 (17.6)	
20~29	27 (23.7)	26 (92.6)	2 (7.4)	
30~39	36 (31.6)	36 (97.2)	1 (2.8)	
≥40	11 (9.6)	9 (100.0)	0 (0.0)	
Gender				
Male	36 (30.5)	32 (88.9)	4 (11.1)	0.46
Female	78 (69.5)	73 (93.6)	5 (6.4)	
History of ranula, month, mean±SD, (range)	1.71±2.09 (1~18)			
1	84 (73.7)	77 (91.7)	7 (8.3)	1.000
>1	30 (26.3)	28 (93.3)	2 (6.7)	
Site				
Left	63 (55.3)	57 (90.5)	6 (9.5)	0.729
Right	51 (44.7)	48 (94.1)	3 (5.9)	
Side				
Anterior	46 (40.4)	43 (93.5)	3 (6.5)	0.739
Posterior	68 (59.6)	62 (91.2)	6 (8.8)	
Greatest dimension, cm, mean±SD (range)	1.43±0.79 (0.4~3.7)			
<1	37 (32.5)	37 (100.0)	0 (0.0)	0.004
1~1.9	32 (28.1)	31(96.9)	1 (3.1)	
2~2.9	34 (29.8)	29 (85.3)	5 (14.7)	
≥3	11 (9.6)	8 (72.7)	3 (27.3)	

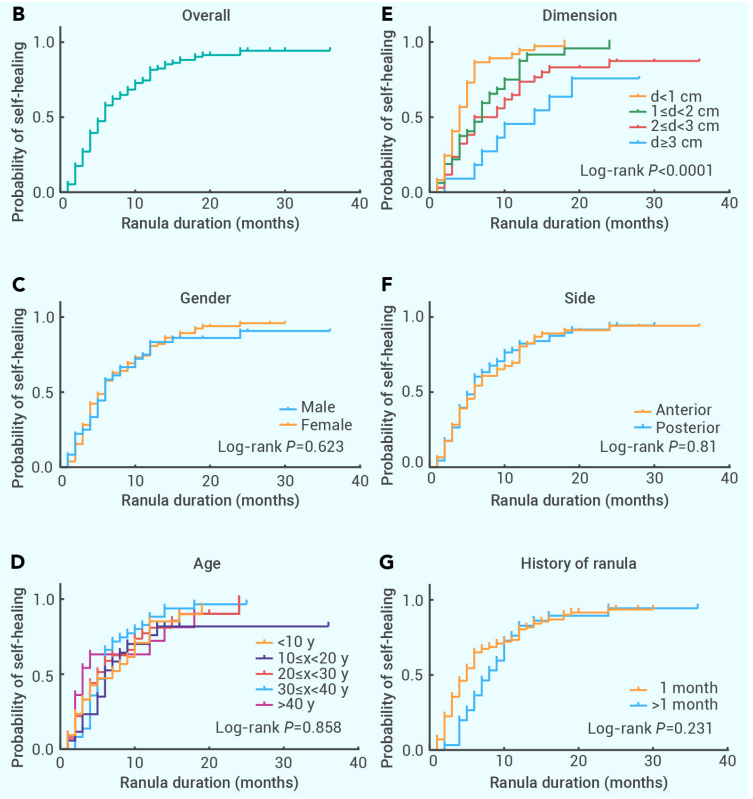

Figure 1. Characteristics and self-healing rate of oral ranulas (A). The high overall self-healing rate (B) and its influence factor (C~G). There were no significant differences between patient gender (C) and age groups (D), nor different ranula sites (F) and history (G). But smaller ranulas were more likely to self-heal and resolve sooner (E).

All patients were followed up until February 2023, with the mean follow-up period of more than 2 years. Only one recurrence (0.9%) was observed. She was 9 years old when the first ranula appeared, and the ranula self-healed after 13 months. The ranula re-appeared after 20 months. The recurrent ranula was reported self-healing again one month later.

There were no significant differences between patient gender and age groups, nor different ranula sites and history of oral ranula (Figure 1C,D,F,G). Smaller ranulas were more likely to self-heal and resolve sooner (Figure 1E). All oral ranulas smaller than 1.0 cm resolved, lasting for 4.86 months (mean). Of those measuring 1–1.9 cm, 96.9% resolved, lasting for 7.63 months (mean). Of those measuring 2–2.9 cm, 85.3% resolved, lasting for 11.41 months (mean). Of those measuring 3-3.9 cm, only 72.7% resolved, lasting for 14.90 months (mean).

Four patients (3.5%) were diagnosed with multi-primary ranula. One male patient had bilateral oral ranulas simultaneously. Two patients experienced bilateral ranulas at different times. One patient had two ranulas in anterior and posterior sites of the ipsilateral floor of the mouth with an interval of 10 months. All the second primary ranulas were also reported self-healing.

None of these oral ranulas developed into plunging ranulas. Only one case (0.9%), a 6-year-old girl with a large cystic ranula on the right floor of the mouth, experienced painful swelling, indicative of infection. She recovered 1 month after antibiotic treatment.

In this study, 114 patients with oral ranulas were monitored to allow for self-healing. Most patients experienced self-healing of the lesions (105/114, 92.1%). Only 9 ranulas were not reported resolving. After self-healing, only one recurrence was observed. The large sample size in this study and the long-term follow-up demonstrated the high self-healing potential of oral ranulas.

The high self-healing potential of oral ranulas could explain the high curative rate achieved by various treatment modalities. Compete surgical removal of the sublingual gland was viewed as the most effective treatment,[3,4] but partial resection of the sublingual gland was also reportedly effective.[7] Even with no sacrifice of glandular tissue, a high cure rate can also be achieved by simply disturbing the cyst wall, using techniques such as marsupialization (removal of the cyst wall), micromarsupialization (suturing the cyst wall). Interestingly, both local medication and oral medication can achieve an ideal outcome. Their cure rate was probably a result of self-healing.

For initial treatment of most oral ranulas, even the most minimally invasive medical interventions amount to overtreatment, and surgical resection of the sublingual gland is contraindicated. Monitoring for self-healing should be the first priority before any medical intervention. Minimal interventions, such as micromarsupialization or intracystic injection, which were formerly viewed as the first strategy before glandectomy, may reasonably be relegated to a secondary treatment option. In this study, one recurrent and four multi-primary ranulas were reported and also resolved spontaneously, supporting the proposal of monitoring for self-healing. The risk of monitoring for self-healing seems very low. Some mucoepidermoid carcinomas can resemble ranulas and may be misdiagnosed as an intraoral ranula.[8] The risk of possibility of misdiagnosis is particularly significant for older patients. Potential infection secondary to a large ranula is also a risk.

This research was conducted in a single institution. Clinical researches with larger sample and longer observation time, as well as basic researches on the etiology of ranulas and the mechanism of self-healing would be preferable.

In conclusion, oral ranulas have a high potential for self-healing. Patients with an asymptomatic ranula may be initially encouraged to monitor the ranula for self-healing.

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DECLARATION OF INTERESTS

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ETHICAL STATEMENT AND PATIENT CONSENT

Informed consent was obtained from all patients, and approval for the study was obtained from the institutional review board of the hospital (PKUSSIRB-202163040).