Micro-marsupilization for Treatment of Mucocele and Ranula

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Abstract

Background: Mucoceles and ranulas are common benign lesions of salivary gland origin. Different techniques had been described for their treatment; however, most of them are invasive. The aim of the present study was to evaluate the effect of micro-marsupialization in the treatment of mucoceles and ranulas.

Methods: The study was conducted on 18 patients with lower lip mucocele and 8 patients with ranula of the floor of the mouth. After topical anesthesia, the lesion was punctured by 3/000 black silk suture and followed for evaluation of healing.

Results: Complete resolution was noted in 83.33% (15/18) of cases of mucoceles and three recurrent lesions were surgically excised. In 80% (12/15) of the cases, the healing accomplished within one week, 13.33% (2/15) of the cases showed complete healing within two weeks and only one case (6.67%) healed within three weeks which was associated with infection. On the other hand, complete resolution of ranula lesions was noted in six cases and only two cases showed recurrences and then a complete surgical excision of the lesions with associated sublingual salivary glands was performed. In 66.67% (4/6) of cases the healing was achieved within one week, 16.67% (1/6) of cases showed complete healing within two weeks and 16.67% (1/6) of cases showed complete healing within three weeks which was associated with bleeding. Conclusion: Micro-marsupialization is simple and good noninvasive treatment option for mucoceles and ranulas and is well-tolerated by the patients with minimal recurrence rate of the lesions.

Keywords: Ranula, Micro-marsupialization, Mucocele, Salivary gland, Lip, Mouth.


Introduction

Mucoceles are common oral soft tissue psuedocysts of minor salivary glands origin, clinically are characterized by asymptomatic well defined painless, smooth, soft, translucent dome-shaped sessile nodular lesions. They vary from few millimeters to approximately 1cm in diameter. Oral mucoceles rarely cause significant problems like discomfort and/or interference with speech, mastication or swallowing, and these complications depend on the size and location of the mucoceles (1,2).

The color of mucoceles ranges from deep blue to the normal color of oral mucosa. The variation in color depends on the size of the lesion and its proximity to the mucosal surface. Superficial lesions cause tissue stretch, which makes the tissue thinner and cyanotic and causes vascular congestion, resulting in bluish lesions. But the deeper mucoceles are well-circumscribed masses covered by normal oral mucosa (2).

Ranula is specifically localized on the floor of the mouth, and its name was derived from the Latin “rana” for frog, due to similarity of the clinical aspect of the lesion to a frog belly. The literature also reports a similarity between voice of the patient, altered by difficulty in phonation, and the croaking of a frog (3).
Two mechanisms for development of this lesion have been suggested: mucous extravasation and mucous retention phenomena⁴. Mucous extravasation phenomenon results from mechanical trauma to the excretory duct of the salivary glands leading to severance or rupture of the duct with consequent accumulation of mucin in the connective tissue stroma. They are considered as psuedocysts, as they are not lined by epithelium. The majority of mucoceles occur in the lower lip⁵. Chronic trauma from sharp tooth cusp, proclined anterior teeth and biting habit are most commonly encountered etiological factors⁶.

The mucous-retention cysts are less common than extravasation phenomenon and considered as true cysts. Usually older individuals are mostly affected and are commonly seen on floor of the mouth, hard palate and upper lip⁷. In mucous retention phenomena, mucus is retained in the duct and/or acini as a result of duct obstruction by sialolith or strictures⁸. The ductal narrowing can occur due to frequent use of antiplaque mouth washes or tartar-control toothpastes⁹.

Several treatment modalities, both surgical and non-surgical, have been proposed in the literature and the prognosis is favorable. Surgical excision of the lesion with or without removal of the associated gland was the most practiced treatment⁴⁰. Because of several complications after surgery, many noninvasive methods have been introduced to treat mucocele or ranula including cryosurgery⁴¹, laser ablation⁴², sclerotherapy⁴³, botulinum toxin injection⁴⁴, topical corticosteroids⁴⁵ or intralesional steroids injection⁴⁶, nickel gluconate-mercurius heel-potentised swine organ preparations⁴⁷, macro- and micro-marsupialization⁴⁸,⁴⁹,⁵⁰.

Therefore, the aim of the present study was to assess the feasibility of micro-marsupialization as an alternative non-invasive method in the treatment of mucocele and ranula.

Materials and Methods

The study was conducted on patients with ranula or mucocele presented to the Department of Oral and Maxillofacial Surgery, College of Dentistry/ Hawler Medical University and Rizgary Teaching Hospital in Erbil/ Kurdistan region of Iraq. The study extended from October 2014 to September 2016.

A total of 26 cases (18 mucocoeles and 8 ranulas) were treated with micro-marsupialization. All subjects were informed about the nature of the procedure and informed consents were obtained for their participation. The duration of treated mucocoeles was 2.69±1.08 months with a range of 1-4 months while the duration of treated ranulas was 2.93±1.62 months with a range of 1-6 months.

Micro-marsupialization was conducted on the lower lip mucocoeles only that showed smooth surface with a sessile base and with a fluid consistency. Lesions with fibrous consistency, those on the palate, floor of the mouth, buccal mucosa and/or those previously treated, were excluded. Ranulas were diagnosed with supplemental CT when necessary. Recurrent lesions, previously treated by surgery, were also excluded.

The technique of micro-marsupialization was conducted after disinfecting the lesion with chlorhexidine solution 0.2% and anaesthetized by two minutes application of 20% benzocaine gel. A 3/0 black silk suture was inserted through the overlying mucosa along the greatest diameter and the suture was loosely tied with surgical knot. For lesions larger than 1cm, a second suture was inserted through the overlying mucosa perpendicular to the first one. After suture insertion, the lesion was squeezed with digital pressure to empty the accumulated saliva along the puncture wound around the suture (Figure 1). Patients were instructed to apply chlorhexidine gel 0.5% twice daily to prevent secondary infection and the suture was removed after one week. In addition, patients were followed up for a minimum of six months.
Results
In the present study, the mean±SD age of the 18 patients with mucocele was 13.5±4.46 years and ranged from 8 to 22 years. There were 11 females and 7 males with F:M ratio of 1.6:1. The mean±SD age of the eight cases of patients with ranula was 17.25±6.38 years and a range of 11 to 32 years. There were six females and two males with F: M ratio of 3:1 (Table 1).

![Image of mucocele and ranula]

**Figure 1:** (A1) Mucocele on lower lip. (A2) Mucocele after micro-marsupialization. (B1) Ranula of floor of the mouth. (B2) Ranula after micro-marsupialization.

**Table 1:** Characteristics of patients with the mucocele (A) and ranula (B) with the size and duration of lesions

<table>
<thead>
<tr>
<th>Mucocele</th>
<th></th>
<th>Ranula</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Case No.</td>
<td>Age(years)</td>
<td>Sex</td>
<td>Size(cm)</td>
</tr>
<tr>
<td>1</td>
<td>32</td>
<td>M</td>
<td>2x2</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>F</td>
<td>1x2</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>F</td>
<td>2x2</td>
</tr>
<tr>
<td>4</td>
<td>19</td>
<td>F</td>
<td>3x2</td>
</tr>
<tr>
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<td>12</td>
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</tr>
<tr>
<td>6</td>
<td>21</td>
<td>F</td>
<td>2x1.5</td>
</tr>
<tr>
<td>7</td>
<td>11</td>
<td>F</td>
<td>3x1</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
<td>F</td>
<td>2x2</td>
</tr>
</tbody>
</table>

After surgery, complete resolution of the mucocele lesions was noted in 15 cases (83.33%) and only three cases (16.67) showed recurrences and were then surgically excised. The recurrent cases were associated with longer durations (3.5-5months) and larger size which ranged from 12x10 to 15x10mm.
In 80% (12/15) of the cases, healing was accomplished within one week, 13.33% (2/15) of the cases showed complete healing within two weeks and only one case (6.67%) healed within three weeks which was associated with infection.

Complete resolution of the ranula lesions was noted in six cases and only two cases showed recurrences and then a complete surgical excision of lesions with associated sublingual salivary glands was performed. In 66.67% (4/6) of the cases healing was achieved within one week, 16.67% (1/6) of the cases showed complete healing within two weeks and 16.67% (1/6) of the cases showed complete healing within three weeks which was associated with bleeding (Table 2).

Table 2: Characteristics of the treated cases of mucocele (A) and ranula (B) which did not undergo recurrence after micro-marsupialization

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Healing Time (weeks)</th>
<th>Complication</th>
<th>Follow-up (months)</th>
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<td>B</td>
<td></td>
<td></td>
</tr>
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<td>1</td>
<td>None</td>
<td>8</td>
</tr>
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Discussion

Mucocele is a common cystic lesion of salivary gland origin, the lower lip is the most frequent site for mucocele. In addition, the majority of mucoceles (95%) are extravasation phenomenon and the remaining 5% are mucus retention true cysts. Also, it was reported that the incidence of mucocele is 2.5/1000 person and the majority of cases occur in the second decade of life and rarely occur before one year of age. In our study female predilection was found. The same finding was observed by 20 who reported a female: male ratio of 3:21. Moreover, 24 reported a predominance of females, corresponding to approximately 70% of 41 cases. However, other studies found no gender predilection. This gender variation between the different studies may be attributed to a small sample size of the majority of published studies.
Many treatment modalities of mucoceles and ranula have been attempted. However, all these procedures are invasive and not well-tolerated by patients. In addition, surgical intervention has several disadvantages including pain, swelling, lip disfigurement and damage to adjacent structures.

Micro-marsupialization involves draining the accumulated saliva by creating a new epithelialized tracts along the sutures inserted through the lesion. It is noninvasive and requires only topical anesthesia. It is particularly useful for children and adolescents who can't tolerate surgical procedures. In the present study the procedure was well-tolerated by patients with no major complications. Only one case of infection was observed in mucocele group and minor bleeding in a case of ranula treated by micro-marsupialization.

In this study, complete resolution of mucoceles was observed in 83.33% of patients (15/18). The three recurrent mucoceles appeared pale, fibrotic and were associated with longer duration and larger size. It was found that micro-marsupialization is more likely to be successful if the lesion is treated within 90 days of evolution. In addition, found that micro-marsupialization would be more successful in recently developed mucoceles because of their thinner overlying mucosa.

Furthermore, treated 11 patients with ranula and mucocele with micro-marsupialization augmented with low level laser therapy with complete resolution of lesions and without evidence of recurrence. On the other hand, compared micro-marsupialization to surgical excision in the treatment of mucoceles and found no significant difference in the recurrence rate between the two treatment methods. Also, treated 20 patients with ranula by micro-marsupialization and found that 75% success rate after the first procedure. The five recurrent lesions were treated by revision micro-marsupialization leading to resolution of three lesions and recurrence of the other two ones that were treated by surgical excision.

In our study, the two recurrent cases of ranula were surgically excised after they had failed to respond to micro-marsupialization. In both cases, the surgical procedure was not affected by previous micro-marsupialization. The majority of mucoceles showed full resolution within one week and two cases resolved after two weeks. Our findings come in accordance with those of.

One suture was used in the present study while recommended placement of multiple sutures through the lesion to facilitate and hasten healing. However, multiple sutures would increase the discomfort of patient and may lead to inflammation due to collection of food debris that may end with obliteration of the established ducts.

The disadvantage of micro-marsupialization is that the procedure does not enable a biopsy to be performed and the diagnosis depends only on clinical features. As previously pointed, only lower lip mucoceles were included in this study and those on the palate and cheek were surgically excised.

**Conclusion**

The modified micro-marsupialization technique is a non-invasive technique, does not require extensive surgical skills and can be done easily in general outpatient daycare setup. The success of the technique depends on selection of cases and regular follow-up visits.

**Ethical Clearance**

The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest**

The authors declare that they have no conflict of interest

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References


