NOTE *Surgery*

First Case of Salivary Mucocele Originating from the Minor Salivary Gland of the Soft Palate in a Dog

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ABSTRACT. We found a case of salivary mucocele that originated in the minor salivary gland (palatine gland) of the soft palate in a dog. At first admission, the soft palate swelled remarkably. Computed tomography (CT) revealed cystic radiolucency inside a large quantity of liquid in the soft palate, and most of the airway was occupied. Marsupialization was performed, but since a recurrence was observed one month later, the salivary mucocele was removed. There has been no report of salivary mucocele arising from the minor salivary gland of the soft palate in dogs. To our knowledge, this case is the first. Complete removal, including minor salivary glands surrounding the lesion, is necessary for treatment of salivary mucocele in dogs.
KEY WORDS: canine, minor salivary gland, palatine gland, salivary mucocele, soft palate.

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The mucocele is a common lesion of the oral mucosa resulting from rupture of a saliva gland duct and spillage of mucin into the surrounding soft tissues [11]. Although salivary mucoceles of the minor salivary glands are common in human dentistry, reports of them in the palatine glands, which are minor salivary glands, is very rare [2, 3, 7, 9, 11]. To date, all reports in dogs have concerned salivary mucoceles that arose from the major salivary glands, not salivary mucoceles from the minor salivary glands [4–6]. CT was performed on a dog with a remarkably swollen soft palate and recognized dyspnea. The removal operation led to the diagnosis that the salivary mucocele originated in a minor salivary gland (palatine gland).

This case was a 7-year-old female Welsh Corgi weighing 9.4 kg. Three years previously, the dog presented with an abnormal breathing sound at 4 years of age. At that time, remarkable swelling of the soft palate was confirmed by oral examination under sedation, and approximately 10 m*l* of blackish brown, highly viscous liquid was collected by puncture and drainage. Complete blood cell count and serum biochemistry profiles were within normal limits. The dog improved temporarily after puncture and drainage of the soft palate. However, recurrence occurred every 2–6 months. When the condition changed for the worse, the dog lapsed into dyspnea as a result of airway occlusion. In addition, 15 m*l* or more of fluid occasionally accumulated. In the puncture fluid examination, the bacterial culture was negative, and some reactive neutrophils were noted in the retained fluid, but there were no atypical cells. Therefore, it was judged that the swelling of the soft palate was not infectiousness or neoplastic. Fundamental treatment was judged difficult by puncture drainage, and the dog was referred to the Animal Medical Center, Gifu University, for screening and treatment.

At first admission, breathing with a snoring sound and slight accelerated respiration were noted. When the mouth was opened and observed, the soft palate was observed to

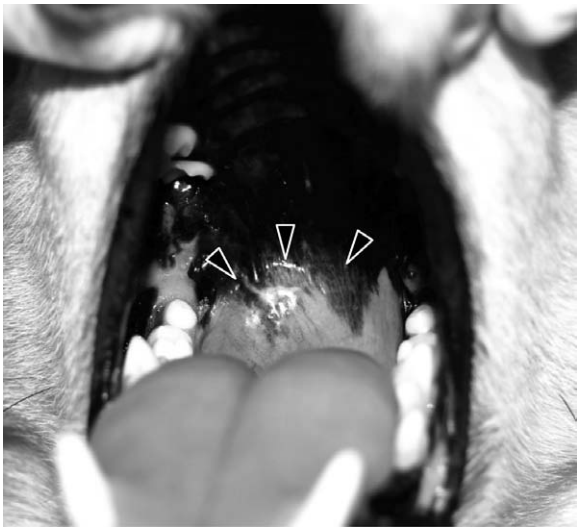

Fig. 1. Photo of the oral cavity at 1st admission. Remarkable swelling of the soft palate is observed (▲).

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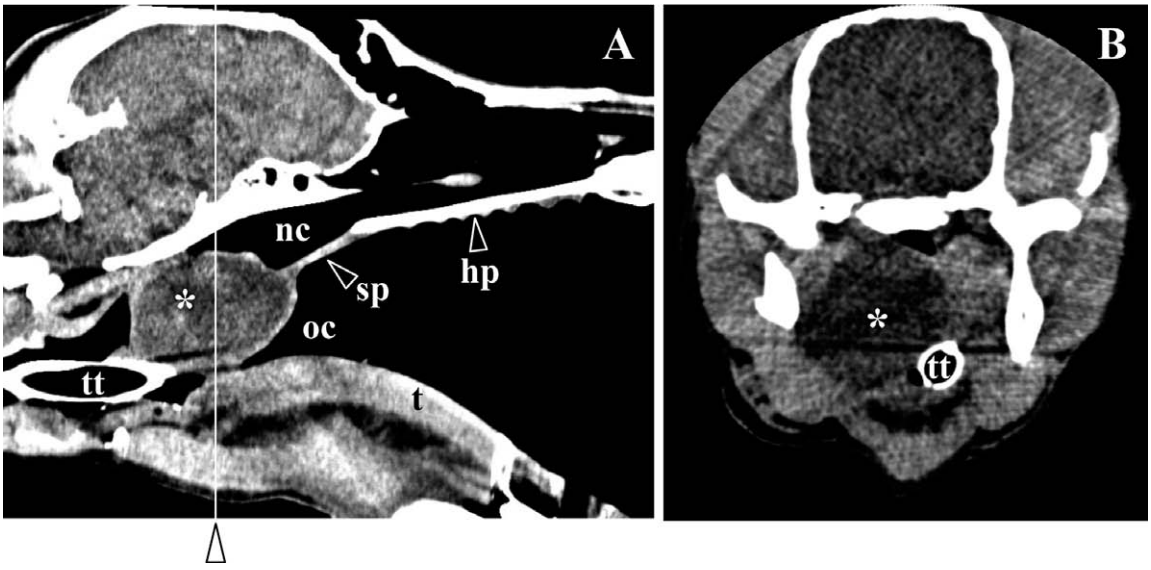

Fig. 2. CT photograph at 1st admission (A and B: sagittal multiplanar reconstruction CT image and an axial section at A-△, respectively). Spherical cystic radiolucency (*) inside the soft palate (sp) behind the hard palate (hp) is recognized. This radiolucency (*) contacts the tongue (t), and the nasal cavity (nc) and oral cavity (oc) are blocked off. There is little space for tracheal tube (tt) entry.

have swollen remarkably (Fig. 1). Then, CT was performed under general anesthesia. Endotracheal intubation was performed by forcing the soft palate up with a finger under visual observation. CT revealed a spheroidal cystic radiolucency of about 4 cm in diameter included within a large quantity of liquid of the soft palate in a sagittal multiplanar reconstruction CT image (Fig. 2A) and the axial section (Fig. 2B), and the majority of the airway was occupied. When the mucous on the oral cavity side of the swelling of the soft palate was punctured with a biopsy trepan 3.5 mm in diameter, about 10 m*l* of transparent viscous liquid was collected. Afterwards, marsupialization was performed by excision and fusiform-type fenestration around the hole in the soft palate. The gathered liquid was used for bacterial culture. Part of the tissue was histopathologically examined. The fusiform hole was not subjected to further aggressive incision and suture to avoid functional injury to the soft palate. The dog was then administered cefalexin (20 mg/kg twice daily per os) for 14 days afterwards. We performed a 1-month follow-up.

However, 1 month after 1st admission, the snoring and slightly accelerated respiration were observed again. When the mouth was opened and examined under general anesthesia, it was found that the soft palate had swollen remarkably again to the same size as at 1st admission and that the fusiform hole in the soft palate had closed completely. It was determined that curing the dog would be difficult via marsupialization. We then tried complete removal of the salivary mucocele. After the soft palate was transected to the lumen of the lesion with a scalpel, a viscous dark brown liquid mixed with blood was sampled (about 10 m*l*). After absorbing this liquid, the lumen of the lesion was confirmed. A limbic incision was then made with a scalpel, and we separated the lesion wall and the mucous on the oral cavity side of the soft palate with a scalprum. The lesion wall on the oral cavity side was exfoliated. In order not to bore the hole through the nasal cavity, the lesion wall of the nasal cavity side was also carefully exfoliated, and the salivary mucocele was removed completely (Fig. 3). After removal of the salivary mucocele, the incision was closed using an absorbable surgical suture (4–0 Maxon). The mattress suture technique was performed with the suture penetrating the soft palate on the oral cavity and nasal cavity sides. The dog was then administered cefalexin (20 mg/kg twice daily per os) for 14 days postoperatively. Afterwards, clinical manifestations, such as abnormal breathing sounds and dysphagia, were not observed. There were also no clinical findings of recurrence in an examination 1 month after excision. One year after the removal operation, no recurrences have been observed, and the dog is in good condition.

The results of histopathological examination of the collected liquid and removed tissue are as follows: no atypical cells were identified. The diagnostic impressions obtained with the marsupialization and lesion removal were the same. Examination of a smear preparation of the liquid revealed that it was mauve mucus, and it was thought to be saliva. In addition, bacteria were not detected in a bacterial culture of the collected liquid. The histopathological examination of the removed tissue revealed a part without a cystic wall and a part that had an obvious partial cystic wall, although there were no characteristic tissues to identify either side of the nasal cavity or oral cavity. In the part without a cystic wall, mature granulation tissue was detected. Inflammatory cells mainly composed of macrophages, lymphocytes and plasma

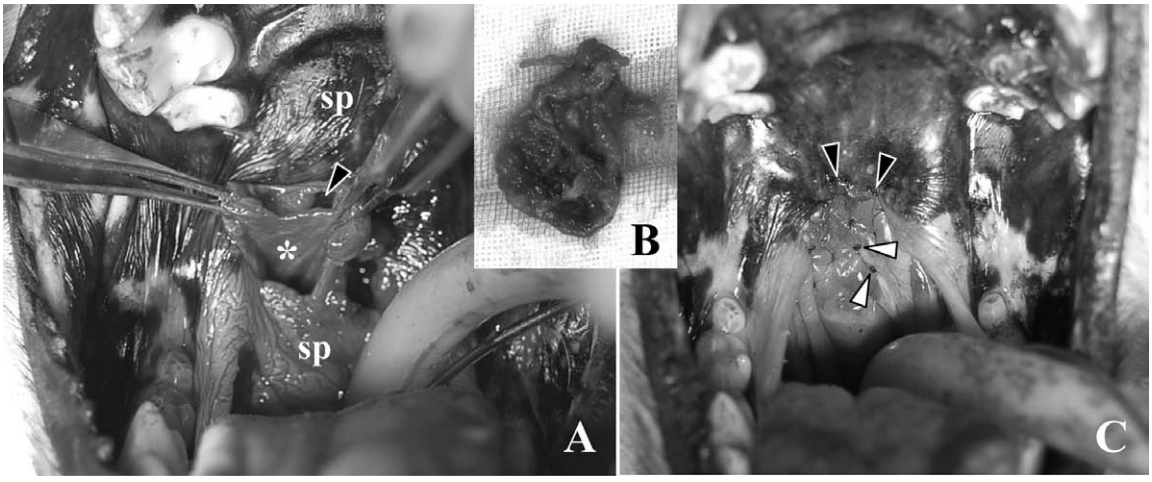

Fig. 3. Photo of the surgical operation. A: The mucous on the oral cavity side in the soft palate (sp) and the lesion wall (*) are separated. The lesion lumen is recognized (▲). B: Removed lesion. C: Suture of the incision line of the soft palate (▲) and the mattress suture that penetrated the soft palate on the oral cavity and nasal cavity sides (△).

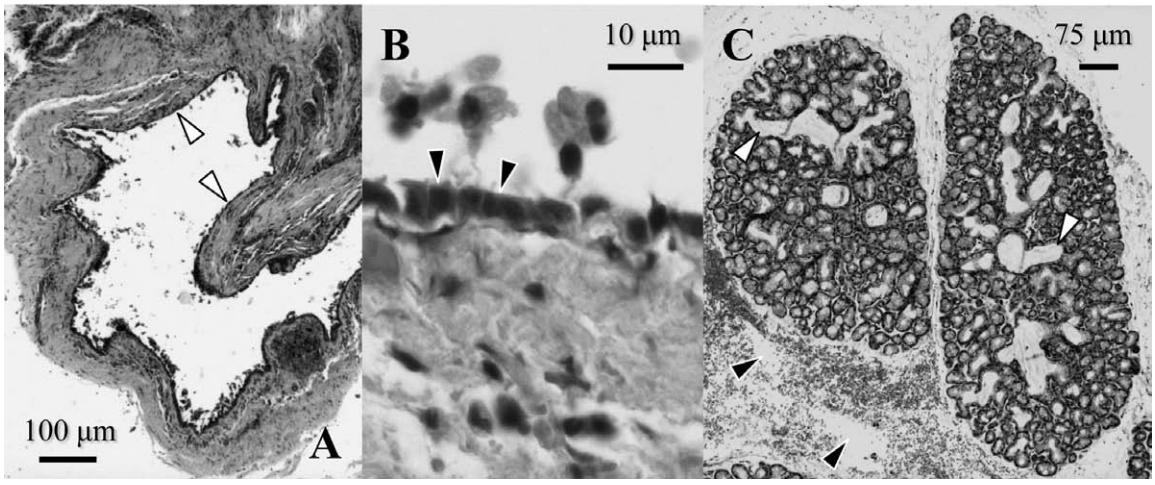

Fig. 4. Photo of the histopathological examination of the removed lesion. A: Photo of part with a cystic wall. A cystic wall (△) is observed. B: Enlarged photo of Fig. 4A. The lesion consists of simple cuboidal epithelium cells (▲) and fibrous connective tissue. C: In the minor salivary glands, in the tissues around removed lesion, hyperplasia of salivary gland tissue, distension of interlobular conduit (△) and edema in a part of the stroma (▲) can be seen.

cells infiltrated throughout the granulation tissue, while simple cuboidal epithelium cells, pseudostratified ciliated epithelium cells and fibrous connective tissue were recognized in the part that had a cystic wall. A few lymphocytes and plasma cells invaded the connective tissue under the epithelium (Fig. 4A, B). In addition, there were minor salivary glands in the tissues around the removed lesion. Hyperplasia of the salivary gland tissue, distension of the interlobular conduit and edema in a part of the stroma were recognized (Fig. 4C). These were considered to be caused by the retention of saliva. From the above results, this case was diagnosed as a salivary mucocele originating in the minor salivary gland (palate gland) of the soft palate in the dog.

The minor salivary gland of dogs has palatine glands, lingual glands, labial glands and molar glands [1]. The present case was considered to be a salivary mucocele that developed in the palate gland from the point of origin. All current reports on salivary mucoceles in the dog have been about those that arose from the major salivary glands, not salivary mucoceles from the minor salivary gland [4–6]. This case is the first such report to our knowledge. Furthermore, among salivary mucoceles arising in the oral mucosa in humans, only 1.3% of lesions occurred in the palatine mucosa [3, 11]. Thus, this disease is also very rare in the minor salivary gland in humans. The diameter of the salivary mucocele in the soft palate in humans has been reported to be 0.1–4.0 cm (average of 0.8 cm), and the size of the lesion in this case is equal to the largest reported in humans [3]. Of course, there

has been no report of treatment of salivary mucoceles that arose from the minor salivary gland in dogs. Treatment of salivary mucoceles occurring from the minor salivary gland in humans has been by complete removal, including the minor salivary glands surrounding the lesion [8, 10]. In the present case, the dog was repeatedly treated by drainage via puncture at each recurrence. Therefore, at the time of 1st admission, we performed marsupialization secondary to oral examination. This was done to perform a biopsy and minimize the surgical stress on the soft palate. Lesion extraction of the soft palate might cause postoperative soft palate defect and palatal paralysis. However, the result of marsupialization was recurrence of the same condition as before the operation. The salivary mucocele was therefore removed completely, and the animal recovered. Based on this result, treatment of salivary mucoceles arising from the minor salivary gland by drainage via puncture or marsupialization is less likely to result in the condition being cured. Complete removal, including minor salivary glands surrounding the lesion, is necessary for treatment of salivary mucocele in dogs just as in humans [8, 10]. When removing a lesion approximately 4 cm in diameter in the soft palate as in this case, the structure and function of the soft palate may be damaged. However, there was a great possibility in the present case that the dog would develop dyspnea given the position of the lesion. Informed consent was considered necessary when the operation was undertaken. In the present case, it was thought that diagnosis by conventional radiography would be difficult. For diagnosis of a salivary mucocele in the soft palate, confirmation of cystic radiolucency by CT and detection of highly viscous liquid by puncture are necessary. Since many small secretory portions of the minor salivary gland are scattered about in the soft palate, periodic postoperative checks must be performed.

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