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## Sialocele in the cat. A report of 2 cases

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## Σιελοκήλη στη γάτα. Αναφορά σε 2 περιστατικά

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**ABSTRACT.** In the present article the history, physical examination findings, laboratory test results, treatment, follow up and outcome of 2 cats with sialoceles were reported. Both cats were presented with a painless fluctuant cervical swelling. In one cat a ranula was also present. Aspiration of the swellings detected highly viscous fluid and cytology of the aspirates was consistent with the appearance of saliva. A diagnosis of sialocele was made. Both cats were managed by resection of the mandibular and sublingual gland complex through a lateral approach. In case 2 marsupialization of the ranula was also performed. The histopathological examination of the excised tissues in one cat was compatible with chronic inflammation of the mandibular and sublingual gland. The outcome was favorable in both cases and no relapses were detected after a mean follow up time of 13 months.

**Keywords:** cervical sialocele; cat; ranula.

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**ΠΕΡΙΛΗΨΗ.** Στην παρούσα μελέτη παρουσιάζεται το ιστορικό, τα κλινικά και εργαστηριακά ευρήματα, η θεραπεία, η μετεγχειρητική παρακολούθηση και η εξέλιξη 2 γατών με σιελοκήλη. Και οι 2 γάτες παρουσίασαν ανώδυνη υπογνάθια διογκωση, ενώ σε μια από αυτές διαπιστώθηκε και βατράχιο. Έγινε αναρρόφηση των διογκώσεων και βρέθηκε πυκνόρρευστο υγρό που κυτταρολογικά ήταν συμβατό με σίελο. Και οι 2 γάτες υποβλήθηκαν σε εκτομή του υπογνάθιου και υπογλώσσιου σιελογόνου αδένου και σε μια από αυτές έγινε και μαρσιποποίηση του βατραχίου. Η ιστοπαθολογική εξέταση των σιαλογόνων αδένων από τη μια γάτα ήταν συμβατή με αλλοιώσεις χρόνιας φλεγμονής του υπογλώσσιου αδένου. Και οι 2 γάτες είχαν καλή κλινική εξέλιξη και ήταν κλινικά υγιείς μετά από μέση παρακολούθηση 13 μηνών.

**Λέξεις ευρετηρίασης:** υπογνάθια σιελοκήλη, γάτα, βατράχιο

## INTRODUCTION

Sialoceles are subcutaneous, sublingual or pharyngeal accumulations of saliva that is extravasated through a tear in a salivary duct (Ritter and Stanley, 2012). This salivary collection induces an inflammatory reaction resulting in a localized accumulation of saliva (Ritter and Stanley, 2012). Sialoceles have been rarely reported in cats and only 16 cases have been reported in the literature (Wallace et al., 1972, Harrison and Garrett, 1975, Harvey, 1977, Feinman, 1990, Speakman et al., 1997, Hawe, 1998, Rahal et al., 2003, Kiefer and Davis, 2007, Rahal et al., 2007, Vallefucio et al., 2011). Sialoceles have been reported 3 times more often in dogs than in cats (Spangler and Culbertson, 1991). All the major salivary glands have been involved in the formation of a sialocele in cats (Wallace et al., 1972, Harrison and Garrett, 1975, Harvey, 1977, Feinman, 1990, Speakman et al., 1997, Hawe, 1998, Rahal et al., 2003, Kiefer and Davis, 2007, Rahal et al., 2007, Vallefucio et al., 2011). Clinical signs depend on the location and the extent of the sialocele (Wallace et al., 1972, Harrison and Garrett, 1975, Harvey, 1977, Feinman, 1990, Speakman et al., 1997, Hawe, 1998, Rahal et al., 2003, Kiefer and Davis, 2007, Rahal et al., 2007, Vallefucio et al., 2011). Definitive treatment of sialoceles consists of surgical excision of the affected salivary glands and/or marsupialization and drainage of the sialocele (Wallace et al., 1972, Feinman, 1990, Speakman et al., 1997, Hawe, 1998, Rahal et al., 2003, Kiefer and Davis, 2007, Rahal et al., 2007, Vallefucio et al., 2011). In the present article we report history, physical examination findings, laboratory test results, treatment, follow up and outcome of 2 cats with sialoceles.

## CASE DESCRIPTION

### Case 1

An 8-months-old, intact male, British shorthair cat, month-old 3.1 kg was referred with a history of a cervical swelling on the right side of 2 months duration. The cat was kept indoors/outdoors but 2 month duration no history of trauma was recorded. The swelling was initially managed with aspiration, from the referring veterinarian, but the swelling recurred soon after. Physical examination revealed a fluctuant non-painful, submandibular swelling in the right side of the head (Fig 1). Aspiration of the swelling revealed a viscous and golden colored fluid (Figs 2,3). Cytology of the fluid was compatible with a sialocele. No other abnormalities were noted. Cefoxitin was administered intravenously for prophylaxis at anesthetic induction. Under general isoflurane anaesthesia the cat was placed in left lateral recumbency and through a right lateral approach the platysma muscle was incised and the mandibular and sublingual salivary glands were removed (figs 4, 5, 6). Evacuation of the sialocele was achieved from the same incision. Closure of the wound was routinely performed in two layers using 3/0 polyglyconate (Monocryl, Ethicon Inc, J&J) in a simple continuous pattern for subcutaneous closure and a simple interrupted pattern for skin closure with 3/0 polyamide suture material (Ethilon, Ethicon Inc, J&J). The cat received pethidine subcutaneously for the immediate postoperative period and oral meloxicam for 3 days after surgery. Gross examination of the excised gland complex revealed that the polystomatic portion of the sublingual gland was absent. Histopathological examination of the excised mandibular and sublingual glands (Fig 6) revealed

the presence of edema, hyperemia and hemorrhage of the glands. Pseudo cyst remnant-like formations were found in between salivary lobules. The above formations were characterized by the presence of dense fibrous tissue, with increased number of collagen bundles, fibroblasts and inflammatory cell infiltrates consisting mainly of macrophages and lymphocytes (Figs 7,8). The microscopic appearance was compatible with a pseudocyst accompanied by chronic inflammation.

The cat recovered uneventfully and discharged from the hospital the day after surgery. Follow-up that was performed by re-examination and telephone communication with the owner revealed that the cat was healthy 14 months after surgery.

## Case 2

An 8-month-old, intact female, domestic shorthair cat, weighing 4 kg was presented with a history of a cervical swelling on the left side, dysphagia and ptyalism of 2 weeks duration. The cat was allowed outdoors but there week was no history of trauma. Clinical examination identified a soft, non-painful submandibular swelling on the left cervical area and a fluctuant ipsilateral sublingual swelling, extending from the mandibular symphysis to the molar tooth. Aspiration of both swellings revealed the presence of a blood tinged, tenacious fluid. On cytological examination of the fluid mucus was found consistent with saliva and a diagnosis of sialocele was made. No further abnormalities were found. The cat received antibiotic prophylaxis as in case 1 at anesthetic induction. Surgical treatment was undertaken, under general isoflurane anaesthesia and the left mandibular and sublingual salivary glands were removed and the ranula was marsupialized. Cervical wound closure was performed in a similar way as in case 1. Marsupialization was achieved using 3/0 polyglyconate suture material in a simple interrupted fashion. No histopathological examination was performed. The cat had an uneventful recovery and received pethidine subcutaneously for the immediate postoperative period and oral meloxicam for 4 days after surgery. Re-examination 12 months after the surgery found the cat to be in a good clinical condition.



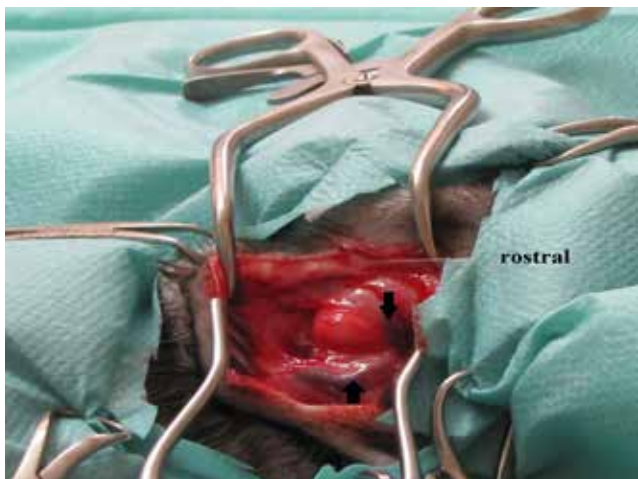
**Figure 1.** Cervical sialocele in an 8-month-old British shorthair cat.



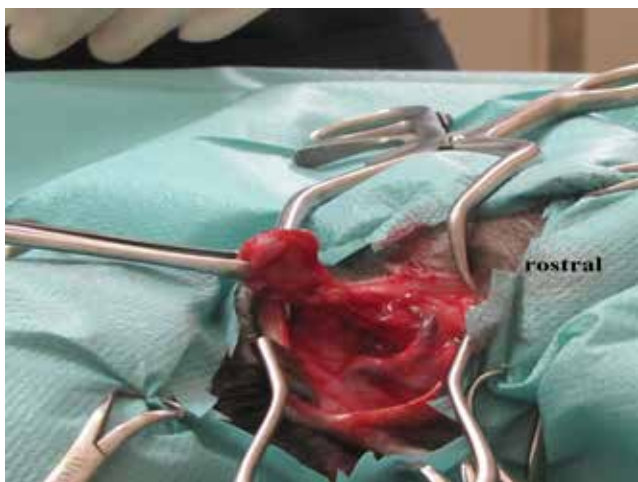
**Figure 2.** Fine needle aspiration of the sialocele of the cat of fig 1 revealed a golden colored mucoid fluid.



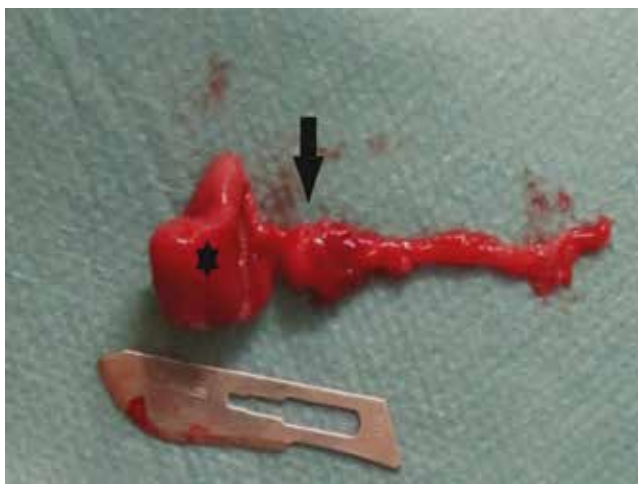
**Figure 3.** Extrusion of the tenacious fluid from the syringe of the sialocele (cat of fig 1).



**Figure 4.** Intraoperative view of the mandibular salivary gland (cat of fig 1). Note that the linguofacial (thicker arrow) and maxillary (small arrow) veins unite over the gland.



**Figure 5.** The mandibular and sublingual gland of the cat of fig 1 were dissected free down to the lingual nerve.



**Figure 6.** The mandibular (asterisk) and monostomatic sublingual (arrow) gland complex following excision (cat of fig 1). It appears that the polystomatic portion of the sublingual gland is absent.

## DISCUSSION

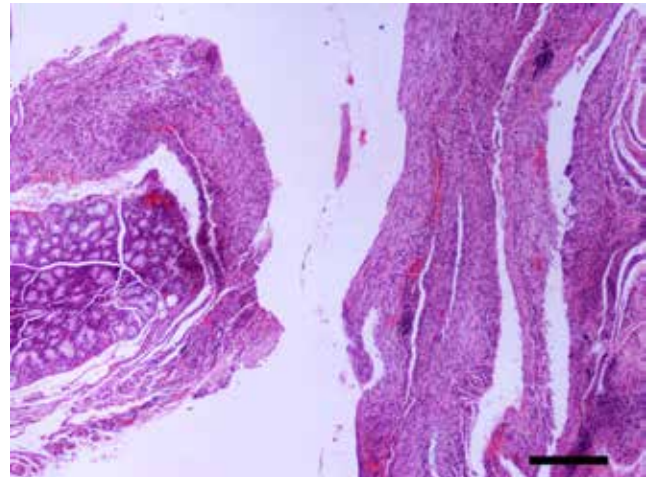
Five major salivary glands are described in cats; the parotid, mandibular, sublingual, zygomatic and molar (Grandage, 1993). The sublingual gland is composed of a monostomatic portion that drains by a single duct and a polystomatic portion that drains by many smaller ducts (Grandage, 1993). The feline sublingual salivary gland is smaller than that of dogs and sometimes the polystomatic portion does not exist in cats as it was shown in one of our cases (Grandage, 1993). The mandibular and sublingual salivary glands open by separate ducts on a small papilla lateral to the frenulum (Kiefer and Davis, 2007). Extravasation of saliva from the rostral polystomatic portion of the sublingual gland leads to a ranula formation, whereas extravasation from the caudal monostomatic portion results in a cervical sialoceles (Glen, 1972). Most of the reported sialoceles in cats have been associated with damage to the sublingual gland (Feinman, 1990, Kiefer and Davis, 2007). In contrast to dogs, where cervical sialoceles are over presented, ranulas are preponderate in cats (Bellenger represented and Simpson, 1992, Kiefer and Davis, 2007). In the study reported here a combination of a cervical sialoceles and a ranula (case 2) is described for the second time in the literature (Feinman, 1990). Possible causes of sialoceles include blunt trauma, bite wounds, surgical or dental procedures in the region, foreign bodies, neoplasia and developmental predisposition (Brown, 1989, Feinman, 1990, Smith, 2010) although in most cases the inciting cause remains unknown. In the cases presented here there was no history of trauma although it cannot be ruled out since both cats had outdoor access. Difficulties in experimentally creating sialoceles indicate that trauma to the glands or obstruction of the ducts not always induces creation of sialoceles (Harrison and Garrett, 1972, Harrison and Garrett, 1975). In the reported cases of sialoceles in cats there is no breed or sex predisposition (Harrison and Garrett, 1975, Feinman, 1990, Speakman et al., 1997, Kiefer and Davis, 2007, Rahal et al., 2007).

Differential diagnosis of cervical swellings in

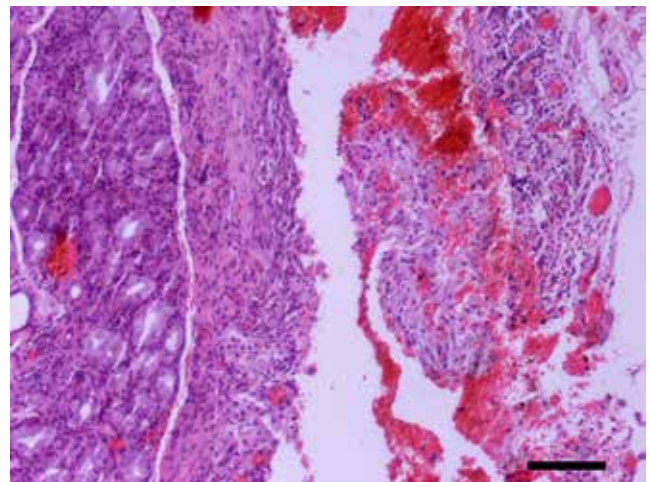
cats include abscess, neoplasia, foreign body granuloma, branchial cyst, thyroglossal duct cyst, thyroid and parathyroid cyst, pharyngeal remnants and sialoceles (Joffe, 1990, Giles et al., 2007, Kiefer and Davis, 2007, Nelson et al., 2012 ). In our study a tenacious golden colored or blood tinged fluid was aspirated from the swellings suggesting a sialocele (Kiefer and Davis, 2007). Cytology usually reveals small numbers of neutrophilic leucocytes, lymphocytes, macrophages, and red blood and plasma cells (Ritter and Stanley, 2012). In the present study diagnosis of sialoceles was made based on the history, clinical and cytological examination. Sialocele localization was easily made based on the history and clinical examination findings. Sialography may help in localization but experience in cats is poor.

Treatment of sialoceles includes surgical excision of the affected salivary glands and/or marsupialization and drainage of the sialocele (Wallace et al., 1972, Feinman, 1990, Rahal et al., 2003, Kiefer and Davis, 2007). The mandibular and sublingual salivary complex removal in case 1 combined with marsupialization of the ranula in case 2 proved effective in the present study. Kiefer and Davis (2007) reported that marsupialization alone for the management of ranulas in 2 cats was uncomplicated; however, a larger number of cases are needed to confirm the effectiveness of this treatment option. Histopathological examination of the excised tissue may confirm the presence of salivary glands and may indicate which of the two glands is mainly affected by chronic inflammatory reaction or not (Spreull and Head, 1967, Kiefer and Davis, 2007). In the study presented here it seems that the sublingual gland was responsible for the cervical sialocele and ranula formation in the 2 cats (Kiefer and Davis, 2007).

Recurrence is reported to be the most common complication of surgery for sialoceles in dogs (Tsioli et al., 2013). However, no postoperative complications associated with the surgical management of sialoceles in cats have been published. We believe that by removing the entire mandibular and sublingual salivary gland complex in cats the possibility of



**Figure 7.** Salivary gland of the cat of fig.1: The gland is associated with a pseudocystic formation that consists of a thick fibrous capsule without epithelial lining. (HE, Bar = 250µm)



**Figure 8.** Salivary gland of the cat of fig.1: part of cystic wall bordered by highly vascularized granulation tissue with hyperemia and hemorrhage. Aggregation of lymphocytes and plasma-cytes are prominent within the cyst's wall. (HE, Bar = 100µm)

recurrence is minimal.

In conclusion 2 cats with sialoceles were described. The one cat had a cervical sialocele and the other had a cervical sialocele and a ranula. Excision of the mandibular and sublingual salivary gland complex along with marsupialization of the ranula provided a successful outcome.

### Conflict of interest

The authors of the present study declare no conflicting interests. ■

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