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Feline sialocoele: clinical presentation, treatment and outcome in 19 cases

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Abstract

Objectives The aim of this retrospective observational study was to describe the clinical presentation, treatment and outcome of cats with sialocoele.

Methods Clinical records from seven referral hospitals were retrospectively searched to identify cats with sialocoele between 2007 and 2021.

Results Nineteen cats were identified. The most common clinical signs were ptyalism, dysphagia and anorexia. Localisation of the sialocoele was cervical (n = 6), sublingual (n = 6), cervical/sublingual (n = 3), facial (n = 2), cervical/pharyngeal (n = 1) and zygomatic (n = 1). The affected salivary glands were mandibular–sublingual (n = 15), mandibular–sublingual/parotid (n = 1), zygomatic/parotid (n = 1) and parotid (n = 2). The aetiology of the sialocoele was traumatic in two cases, neoplastic in one cat and unknown in 16 cats. Sialoadenectomy was performed in 11 cats. Other treatments included ranula marsupialisation (n = 3), needle drainage (n = 2), single stab incision (n = 2) and parotid duct ligation (n = 1). The median follow-up time was 399 days (range 15–1460). Postoperative seroma was the only complication observed in one cat. No recurrence was reported.

Conclusions and relevance Feline salivary sialocoele are relatively rare and have a good prognosis. They can be managed successfully with sialoadenectomy; however, a more conservative approach can be used with appropriate case selection.

Keywords: Sialocoele; sialoadenectomy; salivary glands; salivary mucocoele

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Introduction

Salivary mucocoele or sialocoele is the most common disease affecting the salivary glands in dogs, whereas it is rarely reported in cats.[1,2] It is defined as submucosal or subcutaneous collection of saliva in the oral, periocular and cervical regions.[3–6]

The pathophysiology of sialocoele has not been clearly established, but it has been linked to the obstruction or rupture of the salivary gland–duct complex following trauma, foreign bodies, sialoliths or neoplasia, or it can be iatrogenic following oral/maxillofacial surgeries; however, in the majority of the cases, the underlying aetiology remains unknown.[1,3,7,8]

Clinical signs are based on the location of the sialocoele with a soft and fluctuant swelling detected on physical examination.[1,3] Fine-needle aspiration (FNA) and cytological examination are recommended to confirm the diagnosis.[1,3]

Surgical excision of the affected gland–duct complex, with or without marsupialisation and drainage of the sialocoele, is considered the treatment of choice.[1,3,7,9]

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In the veterinary literature, management of sialocoele in cats is limited to single case reports or small case series.[3–6,9–13]

The aim of this study was to describe the clinical presentation, treatments, complications and outcomes in a population of cats diagnosed with sialocoele.

Materials and methods

Study design and eligibility criteria

The medical records of seven referral veterinary hospitals were searched to identify cats diagnosed with sialocoele from 2007 to 2021. Only cases with complete and comprehensive clinical records and a diagnosis of sialocoele were included in the study.

Data retrieved from the clinical records included signalment, clinical history, duration of clinical signs, examination findings, preoperative diagnostic findings, diagnostic imaging, cytology, side of sialocoele (left or right) and location (cervical, sublingual, pharyngeal, facial or zygomatic), surgical treatment, any concomitant procedure, histopathological findings and hospitalisation time. The cause of the sialocoele was determined on the basis of clinical, diagnostic and histopathological findings. The occurrence of any intraoperative and postoperative complication and recurrence was recorded (Table 1).

Complications were classified as minor (defined as complications that did not require additional medical or surgical treatment to resolve), and major, when they required additional medical or surgical treatment to resolve. Follow-up and outcome were obtained by evaluating the medical records or by owner interview.

Results

Population data, clinical presentation and diagnostic investigations

Twenty-three cats were diagnosed with a sialocoele; 19 cats met the inclusion criteria and four were excluded owing to incomplete clinical records (signalment, clinical history, sialocoele side and type of treatment). The population included 13 (68.4%) neutered males and six (31.6%) neutered females. At the time of diagnosis, mean age was 71.2 months (range 12–180), and median body weight was 4.1 kg (range 3.2–5.4). Two breeds were represented: domestic shorthair (n = 17 [89.5%]) and domestic longhair (n = 2 [10.5%]).

Findings at physical examination included ptyalism (n = 5 [26.3%]), dysphagia (n = 4 [21.1%]), cervical swelling (n = 4 [21.1%]), cervical/sublingual swelling (n = 4 [21.1%]), sublingual swelling (n = 2 [10.5%]), facial swelling (n = 2 [10.5%]), mandibular symphyseal separation (n = 1 [5.3%]), anorexia (n = 1 [5.3%]), cervical/pharyngeal swelling (n = 1 [5.3%]) and zygomatic swelling (n = 1 [5.3%]). The mean duration of clinical signs was 42 days (range 9–240). Localisation of the sialocoele was cervical (n = 6 [31.6%]), sublingual (n = 6 [31.6%]), cervical/sublingual (n = 3 [15.8%]), zygomatic (n = 1 [5.3%]), parotid (n = 2 [10.5%]) and cervical/pharyngeal (n = 1 [5.3%]).

Table 1 Case details of cats with sialocoele, including complications and recurrence

Case	Breed	Age (years)	Sex	Sialocoele location	Procedure	Approach	Complications/ recurrence	Follow-up (days)
1	DLH	6	Male	Sublingual	Drainage	Intraoral	No	1095
2	DSH	7	Male	Sublingual	Drainage	Intraoral	No	1095
3	DSH	5	Male	Sublingual	Marsupialisation	Intraoral	No	730
4	DSH	4	Male	Cervical + pharyngeal	Marsupialisation	Ventral	No	1460
5	DSH	3	Male	Sublingual	Marsupialisation	Intraoral	No	37
6	DSH	2	Male	Sublingual	Stab incision	Intraoral	No	240
7	DSH	11	Male	Facial	Stab incision	Lateral	No	21
8	DSH	6	Male	Facial	Parotid duct ligation	Lateral	No	2
9	DLH	15	Female	Cervical	Sialoadenectomy	Lateral	No	30
10	DSH	15	Female	Cervical	Sialoadenectomy	Lateral	Seroma	42
11	DSH	9	Male	Zygomatic/facial	Sialoadenectomy + parotid duct ligation	Lateral	No	36
12	DSH	4	Female	Cervical	Sialoadenectomy	Lateral	No	21
13	DSH	4	Female	Sublingual	Sialoadenectomy	Lateral	No	42
14	DSH	1	Male	Sublingual + cervical	Sialoadenectomy	Ventral	No	630
15	DSH	7	Male	Cervical	Double sialoadenectomy	Ventral	No	600
16	DSH	3	Male	Cervical	Sialoadenectomy	Ventral	No	7
17	DSH	2	Male	Sublingual + cervical	Sialoadenectomy	Lateral	No	480
18	DSH	3	Female	Sublingual + cervical	Sialoadenectomy	Ventral	No	35
19	DSH	5	Female	Cervical	Sialoadenectomy	Lateral	No	180

DLH = domestic longhair; DSH = domestic shorthair

The sialocoele was located on the left side in 11 cats (57.9%), on the right side in seven (36.8%) and bilateral in one (5.3%).

The cause of the sialocoele was not identified in 16 cats (84.2%), whereas it was deemed to be traumatic in two cases (10.5%) and neoplastic in one (5.3%).

FNA of the sialocoele was performed in all cats and cytological examination revealed mucoid fluid consistent with saliva in 12 cases. Mild neutrophilic inflammation (n = 2 [10.5%]) and neoplastic cells compatible with adenocarcinoma (n = 1 [5.3%]) were also reported in one case. Cytology was non-diagnostic in one case (5.3%) and it was not reported in three cases (15.8%). Diagnostic imaging, including ultrasound (n = 7) and CT (n = 3), confirmed a fluid-filled cavity in proximity of the salivary gland involved. In nine cases no preoperative imaging was performed.

Prior to referral, a single needle drainage was performed in three cats: two with cervical and one with sublingual sialocoele. All re-presented for a recurrence within 2 weeks and treatment included parotid sialoadenectomy (n = 1) and sublingual marsupialisation (n = 2).

Treatment

Sialoadenectomy of the affected salivary gland was performed in 11 cases (57.9%) (mandibular–sublingual [n = 8], mandibular–sublingual/parotid [n = 1], parotid [n = 1] and zygomatic [n = 1]). Mandibular–sublingual salivary gland–duct complex excision was performed in eight cats using either a lateral approach (n = 5) or a ventral paramedian approach (n = 3). In one cat a ventral paramedian approach was used to combine mandibular–sublingual and parotid sialoadenectomy.

Five cats that had undergone mandibular–sublingual salivary gland–duct complex excision had tunnelisation dorsal to the digastricus muscle: four using a ventral approach and one using a lateral approach. In all these cases, the salivary duct was ligated using monofilament absorbable suture material and transected as closely as possible to the lingual branch of the trigeminal nerve.

One cat had a parotid sialoadenectomy, while one cat had zygomatic sialoadenectomy in combination of the ligation of the parotid duct. A lateral approach was performed in both.

The inflammatory pseudocapsule was partially (n = 1) or completely (n = 4) excised in five cases; it was not excised in 12 (63.1%) cats and it was not reported in two (10.5%).

One cat had concurrent excision of the ipsilateral medial retropharyngeal lymph node with the excision of the mandibular–sublingual salivary gland due to a salivary gland adenocarcinoma. A Penrose drain was placed in the surgical wound in two cases that underwent mandibular–sublingual salivary gland–duct complex excision. The drain remained in place for 24 and 72 h, respectively. Median hospitalisation time was 2.5 days (range 1–7).

Thirteen cats (68.4%) received antibiotic treatment prior to the procedures and six did not (31.6%). Antibacterial and analgesic therapy was prescribed postoperatively at the discretion of the surgeon.

Aerobic and anaerobic bacterial culture and antimicrobial testing were performed in five cases and were negative in all. Histopathological evaluation of the excised glands was performed in all 11 cats that underwent sialoadenectomy and the results revealed sialoadenitis in eight cats, adenocarcinoma in one cat and no pathological changes were reported in two cats.

Sialoadenectomy was not performed in eight cats (42%; sublingual sialocoele [n = 5], cervical/pharyngeal sialocoele [n = 1], facial sialocoele [n = 2]). Marsupialisation of a sublingual (n = 2) and cervical/pharyngeal (n = 1) sialocoele was performed in three cats using monofilament absorbable suture material in a simple interrupted pattern. Needle drainage was performed in two cats with sublingual sialocoele, while a single stab incision on the most ventral aspect of the sialocoele was performed in one cat with sublingual and in one cat with facial sialocoele. Parotid duct ligation was performed in one cat with a facial sialocoele.

Complications and outcomes

No intraoperative complications were reported in any case and all cats were discharged uneventfully. Follow-up was available for 17 cases and ranged from 15 to 1460 days (median 399). Two cats were lost to follow-up after hospital discharge at 2 and 7 days, respectively. During the follow-up period only one cat developed a minor complication consisting of a self-limiting seroma 3 days after the mandibular–sublingual sialoadenectomy using a lateral approach.

No major postoperative complications occurred during this study period and no sialocoele recurrence was reported.

Discussion

Feline sialocoeles are uncommon, with only a limited number of cases described in veterinary literature.[1,3–6,9–11,14] One study reported that dogs had two times the occurrence of sialocoele than cats.[15] To our knowledge this is the largest case series of cats presented and treated for sialocoele. Sialocoele can affect cats at any age with no sex or breed predisposition;[1,11,14] this is supported by this study, where the population ranged from 12 to 180 months. Despite sialocoele having been previously reported in the British Shorthair breed,[6,10] only domestic shorthair and domestic longhair cats were represented in this study.

Similarly to dogs, the most common salivary gland affected in cats is the sublingual–mandibular gland–duct

complex, which could result in sublingual, cervical or pharyngeal sialocoele.[3]

Although the most common presentation in dogs is a swelling in the cervical region, in cats intraoral or sublingual swelling appears to be more common.[1,3,5,6,10–12] This is in contrast to our results, where the clinical presentation occurred in an equal percentage as cervical or sublingual swelling.

Cats with sialocoele affecting the sublingual–mandibular gland–duct complex can present with dysphagia, ptyalism and/or a potentially life-threatening upper respiratory tract obstruction, in addition to any discernible swelling.[1,3,5,11,12] In our study, 47% of the cats were presented with a fluctuant non-painful swelling but were otherwise asymptomatic, whereas 53% were symptomatic presenting with either ptyalism, dysphagia and/or anorexia. All symptomatic cats had sublingual swelling, while one cat with ptyalism had a cervical swelling.

In our study, the second case of zygomatic sialocoele had a similar presentation as that described by Speakman et al.[13] Zygomatic sialoadenectomy was performed using the same surgical approach and no complications or recurrences were reported.[13]

In order to confirm the diagnosis, identify the affected glands and to further define any underlying aetiology, a combination of diagnostic imaging and cytological examination is recommended. Sialography was not used in any of our cases as it was not considered necessary and is technically challenging, especially in cats.[5,9,13]

Despite the most frequently reported cause of sialocoele in cats being trauma to the gland or duct, sialoliths, foreign bodies, bite wounds or neoplasia,[3,7,9] our study demonstrated that in the majority of the cases the aetiology remains unknown.[1,3,5,6,9,12–14,16]

Adenocarcinoma of the mandibular salivary gland was diagnosed in one cat. Salivary neoplasia is the most common pathology reported in salivary glands in cats, with the parotid gland being the most commonly affected, and they commonly present as a firm, but painless, mass.[15,17–20] The majority of salivary gland tumours are malignant, with local lymph node metastasis reported in 8–17% of cats at presentation.[7] For these cases, advanced imaging is recommended to determine the extent of lesions, for clinical staging and surgical planning.[7] The adenocarcinoma reported in this study was considered to be the underlying cause of the sialocoele affecting the mandibular salivary gland.

The treatment options of sialocoele include simple draining of the sialocoele, surgical excision of the affected salivary gland, marsupialisation of the sialocoele or a combination of these techniques.[10,12] In general, draining of the sialocoele or marsupialisation alone is not recommended owing to a high risk of infection and/or frequent recurrence.[1,3,6,7,10,11,14,15]

In 2007, Kiefer and Garret reported that sialocoele marsupialisation for the management of a ranula in two cats led to complete resolution of clinical signs with no recurrences reported.[11]

In our study, eight cases did not undergo sialoadenectomy and had either sialocoele marsupialisation, needle drainage, single stab incision into the sialocoele cavity or ligation of the affected salivary duct. In three cases the sialocoele relapsed following single needle drainage, while in the other five cats complete resolution of clinical signs was reported. Surgical excision of the affected gland or marsupialisation of the sialocoele (n = 2) was performed in the three cases that recurred after needle drainage. Surgery led to a complete resolution of the clinical signs, with no evidence of recurrence. Further investigation and comparison between conservative and surgical treatment of sialocoele in cats is warranted.

Complete excision of the involved gland–duct complex is considered the treatment of choice, and is associated with a low risk of complications and recurrences.[1,3,4,6,7,10–12,14,19] Two different surgical approaches (lateral or ventral) have been used for mandibular and sublingual sialoadenectomy in both dogs and cats.[4,5,21,22] Recently, Cinti et al reported that a ventral paramedian approach for mandibular–sublingual complex excision led to less recurrence but more wound-related complications than the lateral approach in dogs.[2] In our study, no differences between the two approaches in cats were noted.

In dogs and cats presented with a sialocoele involving the parotid gland, the best treatment remains unclear. Parotid sialoadenectomy is a technically challenging surgical procedure given the anatomical location,[9] and ligation of the proximal salivary duct has been reported to be an effective surgical treatment, resulting in glandular atrophy.[1,23–25] However, this treatment is controversial as the obstruction of the salivary duct is considered to be one of the possible causes for sialocoele formation.[25,26]

Recurrence, resulting from incomplete removal of the gland–duct complex, inappropriate surgery or incorrect side, is the most common complication described after excision of a sialocoele, followed by seroma or infection.[6,15,17–20] In our population of surgically treated (sialoadenectomy) cats no recurrences occurred, and the only complication reported was a self-limiting seroma in one case that occurred 3 days after the excision of a mandibular–sublingual gland–duct complex excision through a lateral approach. It is possible that late-onset complications and recurrences might have been missed; however, the median follow-up of 399 days was considered adequate. Similar results were reported in a case series of two cats with a follow-up of 12 and 14 months, respectively,[6] and in another case series of seven cats with a follow-up ranging between 2 months to 13 years.[11]

The main limitation of this study is the multi-institutional retrospective nature, which can increase the variability in management and treatment of cases. Anaesthesia, peri- and postoperative treatment protocols, and surgical protocols were not standardised, and surgery

was performed by different surgeons with different levels of expertise. It is possible that late-onset complications and recurrences might have been missed. A larger number of cases would be needed to evaluate the risk of recurrences and complications, as well as the outcomes between the different treatment options for sialocoeles in cats.

Conclusions

Cats with sialocoele presented most commonly with a fluctuant non-painful cervical and/or sublingual swelling. The mandibular–sublingual salivary gland–duct complex was the most frequently involved. Surgical excision of the affected salivary gland resulted in complete resolution of clinical signs without major complications or recurrences. More conservative treatments could result in good outcome in selected patients.

Conflict of interest The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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Ethical approval This work involved the use of non-experimental animals only (including owned or unowned animals and data from prospective or retrospective studies). Established internationally recognised high standards ('best practice') of individual veterinary clinical patient care were followed. Ethical approval from a committee was therefore not specifically required for publication in *JFMS*.

Informed consent Informed consent (either verbal or written) was obtained from the owner or legal custodian of all animals described in this work (either experimental or non-experimental animals) for the procedures undertaken (either prospective or retrospective studies). For any animals or humans individually identifiable within this publication, informed consent (either verbal or written) for their use in the publication was obtained from the people involved.

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References

1 Ritter MJ and Stanley BJ. **Salivary glands.** In: Tobias KM and Johnston SA (eds). Veterinary surgery: small animal. 2nd ed. St Louis, MO: Elsevier/Saunders, 2018, pp 1653–1663.
2 Cinti F, Rossanese M, Buracco P, et al. **Complications between ventral and lateral approach for mandibular and sublingual sialoadenectomy in dogs with sialocele.** *Vet Surg* 2021; 50: 579–587.
3 Bassanino J, Parlierne S, Blondel M, et al. **Sublingual sialocele in a cat.** *JFMS Open Rep* 2019; 5. DOI: 10.1177/2055116919833249.
4 Papazoglou LG, Tzimtzimis E, Rampidi S, et al. **Ventral approach for surgical management of feline sublingual sialocele.** *J Vet Dent* 2015; 32: 201–203.
5 Smith MM. **Lateral approach for surgical management of feline sublingual sialocele.** *J Vet Dent* 2015; 32: 198–200.
6 Tsioli V, Brellou G, Siziopkou C, et al. **Sialocele in the cat. A report of 2 cases.** *J Hellenic Vet Med Soc* 2015; 66: 141–146.
7 De la Puerta B and Emmerson T. **Salivary gland disease in dogs and cats.** *In Pract* 2020; 42: 428–437.
8 Ritter AM. **Closed and open tooth extraction.** In: Reiter AM and Gracis M (eds). BSAVA manual of canine and feline dentistry and oral surgery. 4th ed. Gloucester: BSAVA, 2018, pp 304–337.
9 Vallefuoco R, Jardel N, El Mrini M, et al. **Parotid salivary duct sialocele associated with glandular duct stenosis in a cat.** *J Feline Med Surg* 2011; 13: 781–783.
10 Kilduff-Taylor A, Gombert A, Hahn H, et al. **Sialocoele associated with the molar salivary gland in a British Shorthair cat.** *JFMS Open Rep* 2021; 7. DOI: 10.1177/2055116921990307.
11 Kiefer K and Garret J. **Salivary mucoceles in cats: a retrospective study of seven cases.** *Vet Med* 2007; 102: 582–585.
12 Feinman JM. **Pharyngeal mucocele and respiratory distress in a cat.** *J Am Vet Med Assoc* 1990, 197: 1179–1180.
13 Speakman AJ, Baines J, Williams JM, et al. **Zygomatic salivary cyst with mucocele formation in a cat.** *J Small Anim Pract* 1997; 38: 468–470.
14 MacPhail CM. **Disorders of the salivary gland.** In: Monnet E (ed). Small animal soft tissue surgery. Oxford: Wiley-Blackwell, 2013, pp 299–303.
15 Spangler WL and Culbertson MR. **Salivary gland disease in dogs and cats: 245 cases (1985–1988).** *J Am Vet Med Assoc* 1991; 198: 465–469.
16 Ryan T, Welsh E, Gorum MC, et al. **Sublingual salivary gland sialolithiasis in a dog.** *J Small Anim Pract* 2008; 49: 254–256.
17 Hammer A, Getzy D, Ogilvie G, et al. **Salivary gland neoplasia in the dog and cat: survival times and prognostic factors.** *J Am Anim Hosp Assoc* 2001; 37: 478–482.
18 Ayres SA and Liptak JM. **Head and neck tumors.** In: Kudnig ST and Séguin B (eds). Veterinary surgical oncology. Chichester: Wiley-Blackwell, 2012, pp 87–118.
19 Langley-Hobbs SJ. **Head.** In: Langley-Hobbs SJ, Demetriou JL and Ladlow JF (eds). Feline soft tissue and general surgery. St Louis, MO: Saunders Elsevier, 2014, pp 571–586.
20 Cray M, Selmic LE and Ruple A. **Salivary neoplasia in dogs and cats: 1996–2017.** *Vet Med Sci* 2020; 6: 259–265.
21 Ritter MJ, Von Pfeil DJ, Stanley BJ, et al. **Mandibular and sublingual sialoceles in the dog: a retrospective evaluation of 41 cases, using the ventral approach for treatment.** *N Z Vet J* 2006; 54: 333–337.
22 Marsh A and Adin C. **Tunneling under the digastricus muscle increases salivary duct exposure and completeness of excision in mandibular and sublingual sialoadenectomy in dogs.** *Vet Surg* 2013; 42: 238–242.
23 Hawe RS. **Parotid salivary sialocele in a cat.** *Feline Pract* 1998; 26: 6–8.
24 Knecht CD. **Salivary glands.** In: Bojarab MJ (ed). Current technique in small animal surgery. 3rd ed. Philadelphia, PA: Lea and Febiger, 1998, pp 183–186.
25 Harrison JD and Garrett JR. **Mucocele formation in cats by glandular duct ligation.** *Arch Oral Biol* 1972; 17: 1403–1414.
26 Harrison JD and Garrett JR. **An ultrastructural and histochemical study of a naturally occurring salivary mucocele in a cat.** *J Comp Pathol* 1975; 85: 411–416.