UNIVERSITI PUTRA MALAYSIA

RETROSPECTIVE STUDY OF SALIVARY GLAND DISEASES IN DOGS AND CATS PRESENTED TO THE UNIVERSITY VETERINARY HOSPITAL UNIVERSITI PUTRA MALAYSIA

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AARIN TAN LI SHUEN

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It is hereby certified that I have read this project paper entitled “Retrospective Study of Salivary Gland Diseases in Dogs and Cats Presented to the University Veterinary Hospital, Universiti Putra Malaysia”, by Aarin Tan Li Shuen and in my opinion, it is satisfactory in terms of scope, quality, and presentation as partial fulfillment of the requirement for the course VPD 4999 – Final Year Project.

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRAK

Abstrak daripada kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar, Universiti Putra Malaysia untuk memenuhi sebahagian daripada keperluan kursus VPD 4999 – Projek Tahun Akhir.

KAJIAN RETROSPEKTIF PENYAKIT KELENJAR AIR LIUR PADA ANJING DAN KUCING YANG DIRAWAT DI UNIVERSITY VETERINARY HOSPITAL, UNIVERSITI PUTRA MALAYSIA

Oleh

Aarin Tan Li Shuen

2024

Penyelia: Dr Rozanaliza Radzi

Penyakit kelenjar air liur jarang dilaporkan pada anjing dan kucing. Penyelidikan mengenai penyakit kelenjar air liur pada anjing dan kucing yang telah dijalankan di University Veterinary Hospital (UVH), Universiti Putra Malaysia (UPM) adalah sangat terhad. Kajian retrospektif ini bertujuan untuk menganalisis ciri-ciri klinikal, rawatan dan kesan akhir penyakit kelenjar air liur pada anjing dan kucing yang dirawat di University Veterinary Hospital, Universiti Putra Malaysia. Buku log kes dan rekod perubatan University Veterinary Hospital, Universiti Putra Malaysia, telah disemak secara retrospektif untuk mengenal pasti anjing dan kucing yang menghidapi penyakit kelenjar air liur antara Januari 2013 dan Ogos 2023. Terdapat 12 pesakit yang menghidapi penyakit kelenjar air liur, terdiri daripada tujuh ekor kucing dan lima ekor anjing, telah dikenal pasti dalam kajian retrospektif ini. Diagnosis termasuk sialocele servikal (7/12 kes), sialocele sublingual atau ranula

(5/12 kes), prolaps kelenjar air liur (1/12 kes), dan tumor kelenjar air liur (1/12 kes). Purata umur anjing yang menghidapi penyakit kelenjar air liur ialah 7.4 tahun manakala untuk kucing ialah 4.6 tahun. Tanda-tanda klinikal yang paling biasa untuk anjing ialah bengkak pada mandibel, bengkak pada leher, dan dengkuran yang kuat semasa tidur. Tanda-tanda klinikal yang paling biasa untuk kucing ialah bengkak pada bawah lidah, bengkak pada mandibel, halitosis dan penghasilan air liur berlebihan. Rawatan terdiri daripada rawatan konservatif dan pembedahan untuk merawat penyakit kelenjar air liur. Rawatan konservatif hanya melibatkan ubat preskripsi dan pemantauan rapi terhadap tanda-tanda klinikal tanpa rawatan invasif seperti pembedahan. Empat anjing dan dua kucing telah dirawat dengan rawatan konservatif sebelum dirawat dengan pembedahan; tempoh purata rawatan konservatif untuk empat anjing ialah 102.8 hari dan untuk dua kucing ialah 19 hari. Kekambuhan selepas pembedahan dikenal pasti dalam dua daripada lima kes anjing dan satu daripada tujuh kes kucing. Kedua-dua kes kekambuhan untuk anjing telah dirawat dengan pembedahan pemotongan unilateral kelenjar air liur yang terjejas; manakala kes kekambuhan untuk kucing telah dirawat dengan marsupialisasi. Kesimpulannya, penyakit kelenjar air liur pada anjing dan kucing agak jarang berlaku. Tiada pesakit telah pulih sepenuhnya melalui rawatan konservatif mencadangkan prognosis yang lebih baik boleh dicapai dengan rawatan pembedahan yang sesuai berbanding dengan rawatan konservatif.

Kata kunci: anjing, kucing, penyakit kelenjar air liur

ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine, Universiti Putra Malaysia in partial fulfillment of the course VPD 4999 – Final Year Project.

RETROSPECTIVE STUDY OF SALIVARY GLAND DISEASES IN DOGS AND CATS PRESENTED TO THE UNIVERSITY VETERINARY HOSPITAL, UNIVERSITI PUTRA MALAYSIA

By

Aarin Tan Li Shuen

2024

Supervisor: Dr. Rozanaliza Radzi

Salivary gland diseases are uncommonly reported in dogs and cats. There is also limited research conducted at the University Veterinary Hospital (UVH) and Universiti Putra Malaysia (UPM) on salivary gland diseases in dogs and cats. This retrospective study aimed to analyse the clinical presentation, treatment and outcome of salivary gland diseases in dogs and cats presented to the University Veterinary Hospital, Universiti Putra Malaysia. Case logbooks and medical records of the University Veterinary Hospital, Universiti Putra Malaysia, were retrospectively searched to identify dogs and cats diagnosed with salivary gland diseases between January 2013 and August 2023. A total of 12 patients with salivary gland diseases, consisting of seven cats and five dogs, were identified in this retrospective study. The diagnoses included cervical sialocele (7/12 cases), sublingual sialocele or ranula (5/12 cases), salivary gland prolapse (1/12 cases),

and salivary gland neoplasia (1/12 cases). The mean age of affected dogs and cats was 7.4 y and 4.6 y, respectively.

The most common clinical signs for dogs were mandibular or submandibular swelling, neck swelling, and loud snoring while sleeping. Cats' most common clinical signs were sublingual swelling, mandibular or submandibular swelling, halitosis and hypersalivation. Treatment comprises conservative treatment and surgical approaches to manage salivary gland diseases. Conservative treatment involves only prescription medications and close monitoring of the clinical signs without invasive treatment such as surgery. Four dogs and two cats were treated conservatively before proceeding with the surgical approach; the mean duration of conservative treatment was 102.8 days and 19 days, respectively. Recurrence after surgery was identified in two of five dog cases and one of seven cat cases. Both recurrence cases in dogs were initially treated with unilateral excision of affected salivary glands, while the recurrence in cats was initially treated with marsupialization. In conclusion, salivary gland diseases in dogs and cats are relatively rare. No patient has achieved complete recovery through conservative treatment, suggesting a better prognosis can be achieved with an appropriate surgical approach compared to conservative treatment.

Keywords: dog, cat, salivary glands diseases

1.0 INTRODUCTION

Salivary gland diseases are not frequently reported in dogs and cats. According to Spangler and Culbertson (1991), out of 87,392 cases reviewed, only 245 cases, or a prevalence of 0.3% was found. This is further supported by Cray, Selmic, and Ruple's (2019) report of an overall incidence of 0.17% in dogs and cats with salivary gland disease. There is also limited research conducted at University Veterinary Hospital, Universiti Putra Malaysia on salivary gland diseases in dogs and cats. Salivary gland diseases may include salivary neoplasia, salivary mucocele, sialoadenitis, and sialadenosis (Thompson, 2017).

Salivary gland diseases can be tricky and challenging to diagnose in dogs and cats. The most common clinical sign of salivary mucocele is soft, fluctuant, and painless swelling presented during physical examination (Bobis-Villagrá et al., 2022). However, other conditions, such as cystic or neoplastic lymph nodes, tonsil cysts, and branchial cysts, can cause swellings in the same region as mucoceles. In some cases, mucoceles may be challenging to differentiate from cysts or neoplasia. A histopathological examination is crucial to diagnose salivary neoplasia and to distinguish congenital cysts from mucoceles (Fossum, 2019).

This retrospective study aims to analyse the clinical presentation, treatment and outcome of salivary gland diseases in dogs and cats presented to the University Veterinary Hospital, Universiti Putra Malaysia, from January 2013 to August 2023. There is a scarcity of research specifically addressing salivary gland diseases in dogs and cats that have been brought to the attention of the University Veterinary Hospital, Universiti Putra Malaysia. This retrospective study will utilize existing patient records from the University Veterinary Hospital, Universiti Putra Malaysia,

covering ten years. This retrospective study can enhance knowledge and understanding of salivary gland diseases in dogs and cats by analysing patients' clinical presentation, treatment and outcome.

2.0 LITERATURE REVIEW

2.1 Anatomy and Physiology

Dogs and cats have both major and minor salivary glands. The major salivary gland of dogs are parotid gland, mandibular gland, zygomatic gland and sublingual gland. The major salivary gland of cats are parotid gland, mandibular gland, zygomatic gland, sublingual gland and molar gland (Puerta & Emmerson, 2020).

The primary role of salivary glands is to produce saliva that helps to lubricate feed during ingestion. Other roles of saliva in dogs and cats include thermoregulation, oral cleansing, reduction of bacterial growth and protection of the oral epithelium. The major difference of saliva function compared to human is saliva does not play a significant role in carbohydrate digestion in dogs and cats. (Puerta & Emmerson, 2020).

According to Puerta and Emmerson (2020), there are different anatomical positions and characteristics of each major salivary glands. For parotid gland, it is a triangular gland and located superficial and ventral to the vertical ear canal. Zygomatic gland is located medial to zygomatic arch, ventral and rostro-lateral to eyeball. Mandibular gland is a round gland located caudo-medial to the angle of mandible. Sublingual gland is a triangular gland and it is closely associated with mandibular gland. Molar gland is linguo-caudal to the mandibular first molar tooth (Murphy et al., 2019).

According to a retrospective study of salivary gland diseases in 179 dogs conducted by Lieske and Rissi (2020), the most commonly affected major salivary gland is the mandibular gland, with 52 cases being identified in 179 dogs. Other

less commonly affected major salivary glands were sublingual gland, followed by parotid gland and zygomatic gland.

2.2 Sialocele

Salivary sialocele or also known as salivary mucocele is defined as collections of saliva within submucosal or subcutaneous tissue of oral, periocular and cervical regions (Bobis-Villagrá et al., 2021). Biopsy sample of salivary glands with sialocele will demonstrate cavitated areas filled with mucoid-like secretions (Lieske & Rissi, 2020). According to study by Lieske and Rissi (2020), the most common locations affected by sialocele are major salivary glands of cervical and sublingual region. The most common clinical sign of sialocele presented in dogs and cats is soft, fluctuant and non-painful mass detected on the common locations of major salivary glands. Besides, cats presented with sublingual swelling or ranula showed clinical signs such as hypersalivation, dysphagia and anorexia (Bobis-Villagrá et al., 2021).

Besides diagnosis based on clinical presentation, fine needle aspiration (FNA) and cytology examination of the aspirated content can be performed to confirm sialocele. FNA of a sialocele contains mucoid fluid consistent with saliva (Bobis-Villagrá et al., 2021). Moreover, diagnostic imaging can be used to diagnose sialocele. Ultrasound and computed tomography scan revealed a fluid-filled cavity in proximity of the affected salivary gland (Bobis-Villagrá et al., 2021).

Sialocele can occur due to many reasons, mainly caused by damage of a salivary gland and duct complex due to trauma, foreign bodies, sialoliths and neoplasia

(Puerta & Emmerson, 2020). Other possible factors of sialocele development include blunt trauma (due to inappropriate usage of choke chains), presence of foreign objects, and sialoliths formation (Fossum, 2018). However, the specific underlying cause of sialocele still remains unknown and study suggests that there is a possibility of developmental predisposition factor in affected animals (Puerta & Emmerson, 2020).

The available treatments for sialocele include draining the sialocele, surgically removing the affected salivary gland, performing marsupialization of the sialocele, or a combination of these methods (Bobis-Villagrá et al., 2021). However, according to Bobis-Villagrá et al. (2021), the best treatment of choice for sialocele is surgical excision of the affected salivary gland, with or without marsupialization. Solely performing marsupialization is not advisable due to increased risk of recurrence (Bobis-Villagrá et al., 2021).

2.3 Sialolithiasis

Sialolithiasis or salivary calculus formation is very rare in dogs and cats and commonly associated with the parotid gland (Puerta & Emmerson, 2020). Clinical sign of dogs and cats with sialolithiasis is presence of painful and fluctuant swelling of salivary glands due to obstructions of duct caused by sialoliths (Puerta & Emmerson, 2020). There are different compositions of sialoliths, include calcium phosphate, calcium carbonate, oxalate, magnesium carbonate, ammonium and proteinaceous material (Monnet, 2023). Diagnosis of sialolithiasis can be made using skull radiographs, computed tomography scan, ultrasonography and sialography (Puerta & Emmerson, 2020). Treatment of sialolithiasis varies

depending on the location of the obstruction (Puerta & Emmerson, 2020). Surgical removal of the calculus followed by cannulation and lavage of the obstructed duct is one of the treatment options. Surgical excision of the affected salivary gland can be opted if there are presence of fibrosis, inflammation or concurrent sialocele (Monnet, 2023).

2.4 Salivary Gland Neoplasia

Salivary gland neoplasia in dogs and cats are very rare disease. According to research by Cray et al. (2019), the incidence of salivary gland neoplasia of dogs and cats is 15.3 per 100,000 dogs and 26.3 per 100,000 cats, respectively. Salivary gland neoplasia is most commonly seen in older animals (Puerta & Emmerson, 2020). Salivary gland neoplasia diagnosed in dogs were mostly malignant and of epithelial origin, with no breed and sex predisposition (Lieske & Rissi, 2020). According to Hammer et al. (2001), the median survival time of 24 dogs diagnosed with salivary gland malignant neoplasia was 550 days. One of the most common salivary gland neoplasia is adenocarcinomas, followed by less common one such as mucoepidermoid carcinomas and acinic cell carcinomas (Lieske & Rissi, 2020). Treatment of salivary adenocarcinomas in dogs includes surgical excision, which results in longer survival time in dogs (Lieske & Rissi, 2020).

According to Hammer et al. (2001), there is a higher incidence of salivary gland neoplasia in male Siamese cat. The median survival time of 30 cats diagnosed with salivary gland malignant neoplasia was 516 days (Hammer et al., 2001). There is no site predilection of salivary gland neoplasia, therefore any salivary glands can be affected (Puerta & Emmerson, 2020). For adenocarcinoma in cats, the most

common affected salivary gland is the parotid gland, with clinical sign of a solid and painless mass (Bobis-Villagrá et al., 2021). Research by Bobis-Villagrá et al. (2021) indicates that majority of salivary gland neoplasia are malignant, and 8-17% of cats are diagnosed with local lymph node metastasis. Advanced imaging is recommended as diagnostic method of salivary gland neoplasia in cats to assess the extent of the lesions (Bobis-Villagrá et al., 2021).

2.5 Sialoadenitis

Sialoadenitis is also known as salivary gland inflammation, and has been reported in the mandibular gland, zygomatic gland and parotid gland of dogs (Monnet, 2023). A retrospective study of salivary gland diseases by Lieske and Rissi (2020), up to 50% of 179 canine salivary gland biopsy samples were confirmed with nonspecific sialoadenitis, consisting neutrophilic inflammatory infiltrates. Sialoadenitis can be caused by various reasons, such as trauma (penetrating bite wounds), tumour infiltration and systemic viral infection. Treatment of sialoadenitis involves treatment of the underlying cause, which may help to resolve the inflammation of salivary gland (Monnet, 2023).

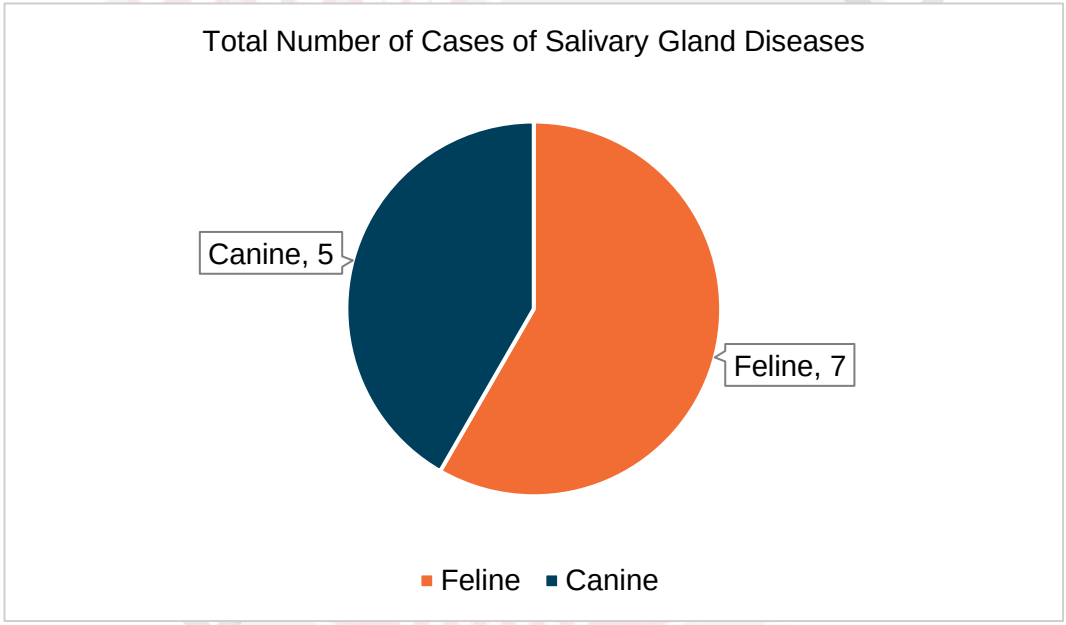
3.0 METHODOLOGY

Case logbooks and medical records of the University Veterinary Hospital, Universiti Putra Malaysia were searched to identify dogs and cats diagnosed with salivary gland diseases. Eligible cases were retrieved from January 2013 to August 2023 that had keywords of any of the following: salivary gland mucocele, salivary sialocele, ranula, salivary gland neoplasia, salivary gland prolapse, sialolithiasis, salivary gland necrosis, sialoadenectomy and marsupialization. Patient Medical Record (PMR) forms, Specimen Submission and test Request Forms, Daily Progress Notes, Anaesthesia Record, Surgical Protocol, Treatment Plan Forms from selected cases were assessed for patient signalment, history, clinical signs, differential diagnosis, diagnostic findings, diagnostic imaging, cytology, anatomic location of salivary glands involved, treatment, complication (intraoperative and postoperative), hospitalization time, outcome and prognosis. Retrieved data was recorded, analysed and tabulated using Microsoft Excel. Frequencies and percentages were used to describe any categorical data. Data analysis was performed using descriptive analysis. Results were interpreted and discussed.

4.0 RESULTS

From January 2013 to August 2023 period, a total of 12 eligible cases of salivary gland diseases were retrieved, comprising five canine cases and seven feline cases.

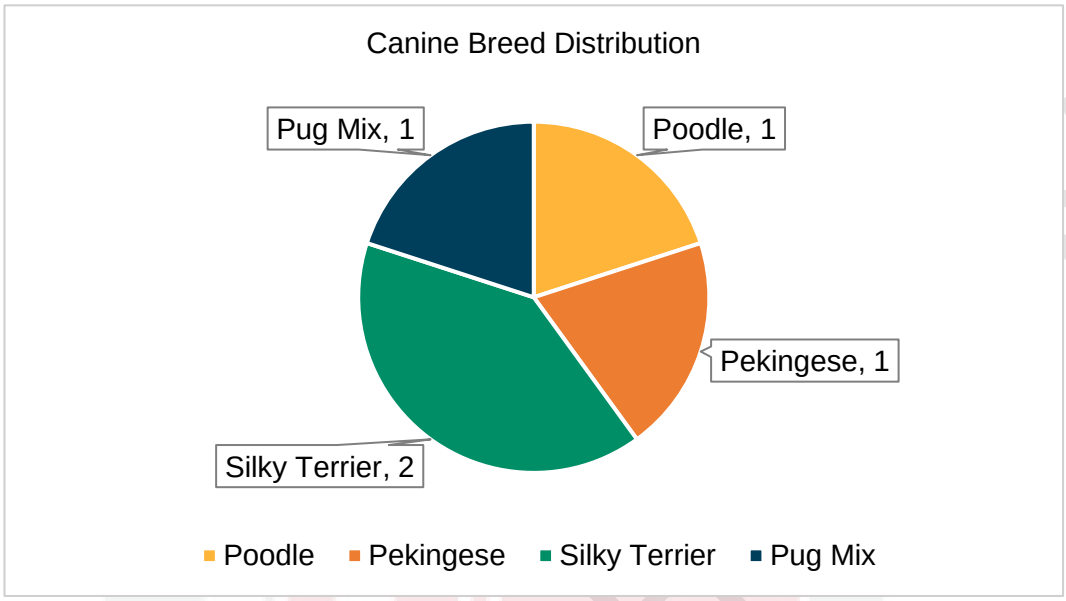
Figure 1: Total number of cases of salivary gland diseases in canine and feline, respectively.



4.1 Patient Signalment

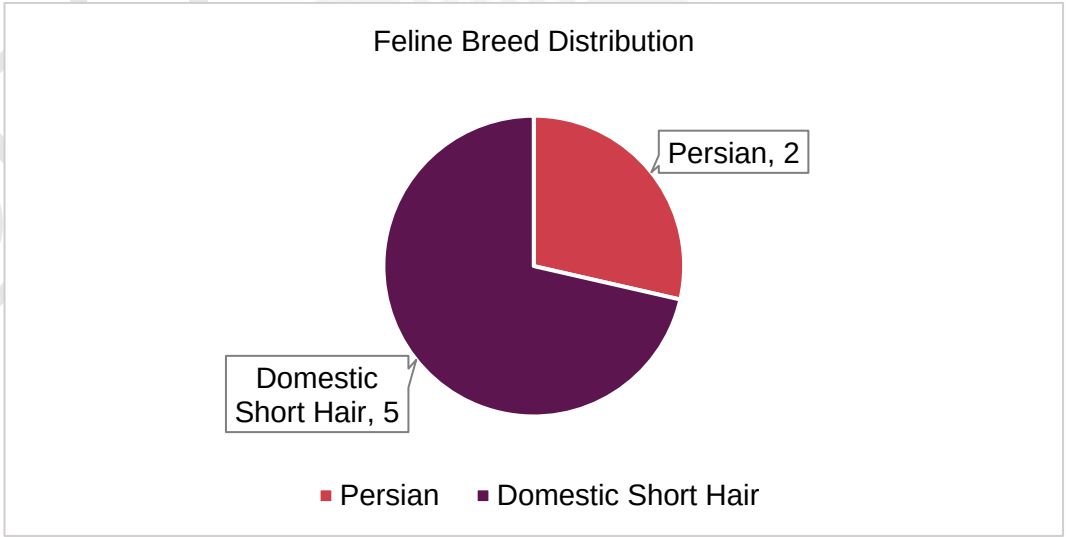
For five canine cases of salivary gland diseases, there were four male dogs and one female dog. The canine breed distribution was Poodle (1/5 dogs), Pekingese (1/5 dogs), Pug mix (1/5 dogs) and Silky Terrier (2/5 dogs). The range of age of canine cases was between 4 years old to 12 years old with a mean of 7.4 years old. The neuter status of five canine cases consists of three intact dogs and two neutered dogs.

Figure 2: Breed distribution of canine with salivary gland diseases.



There were three male and four female cats for seven feline cases of salivary gland diseases. The feline breed distribution was Persian (2/7 cats), and Domestic Short Hair (5/7 cats). The range of age of feline cases was between 1 year old to 10 years old, with a mean of 4.6 years old. The neuter status of seven feline cases consists of six intact cats and one neutered cat.

Figure 3: Breed distribution of feline with salivary gland diseases.



4.2 Definitive Diagnosis and Presenting Clinical Signs

The definitive diagnosis of salivary gland diseases in canine comprised four cervical sialocele cases (4/5 cases) and one salivary gland prolapse (1/5 cases). No sublingual sialocele (ranula) and salivary gland neoplasia were diagnosed in canine cases. The most common presenting clinical signs of dogs with salivary gland diseases are mandibular and submandibular swelling (3/5 dogs), neck swelling (2/5 dogs) and loud snoring during sleep (2/5 dogs). Less common presenting clinical signs included oral swelling, dysphagia and exophthalmos.

Table 1: Presenting clinical signs of dogs with salivary gland diseases.

Presenting Clinical Signs of Dogs	Number
Mandibular & Submandibular Swelling / Mass	3
Neck Swelling / Mass	2
Loud snoring during sleep	2
Oral Swelling / Mass	1
Dysphagia	1
Exophthalmos	1

* Total number exceeds five as most cases displayed a combination of two or more different clinical signs.

The definitive diagnosis of salivary gland diseases in feline comprised of five cases of sublingual sialocele or ranula (5/7 cases), one case of cervical sialocele (1/7 cases) and salivary gland neoplasia (1/7 cases). No salivary gland prolapse was diagnosed in feline cases. The most common presenting clinical signs of cats with salivary gland diseases are sublingual swelling (5/7 cats), mandibular and submandibular swelling (3/7 cats), halitosis (2/7 cats) and hypersalivation (2/7 cats). Less common presenting clinical signs included loud snoring during sleep, anisocoria, neck swelling and inappetence.

Table 2: Presenting clinical signs of cats with salivary gland diseases.

Presenting Clinical Signs of Cats	Number
Sublingual Swelling (Ranula)	5
Mandibular & Submandibular Swelling / Mass	3
Halitosis	2
Hypersalivation	2
Loud snoring during sleep	1
Anisocoria	1
Neck Swelling / Mass	1
Inappetence	1

* Total number exceeds seven as most cases displayed a combination of two or more different clinical signs.

For canine cases, the side of affected salivary gland were bilaterally affected (3/5 cases), left salivary gland affected (1/5 cases) and right salivary gland affected (1/5 cases). For feline cases, the side of affected salivary gland were left salivary gland affected (4/7 cases), right salivary gland affected (1/7 cases) and unidentified affected salivary gland (2/7 cases).

4.3 Conservative and Surgical Treatment

Treatment choices of salivary gland diseases were conservative treatment and surgical approach. Four out of five canine cases were treated with conservative treatment before proceeding to surgery. The duration on conservative treatment for four canine cases ranged from 16 to 282 days, with a mean duration of 102.8 days. On the other hand, two out of seven feline cases were treated with conservative treatment before proceeding to surgery. The duration on conservative treatment for two feline cases ranged from 16 to 22 days, with a mean duration of 19 days.

Conservative treatment included prescription medications such as anti-inflammatory (papase and serratiopeptidase) and antibiotic (enrofloxacin, metronidazole, amoxicillin and clavulanic acid). This retrospective study found no patient has achieved complete recovery through conservative treatment. Therefore, surgical treatment was performed in all 12 canine and feline cases with salivary gland disease.

Table 3: Conservative treatment and duration before surgery in four out of five canine cases.

No	Duration (days)	Treatment
1.	90	• Antibiotic Enrofloxacin (Baytril 50mg ½ tab PO SID x 7 days) • Anti-inflammatory Papase (1 tab PO BID x 7 days)
2.	16	• Anti-inflammatory Papase ½ tab BID • Antibiotic Amoxycillin Clavulanate 15mg/kg BID
3.	282	• Anti-inflammatory (Papase 1 tab PO BID x 55 days) • Anti-inflammatory Serratiopeptidase (Danzen 1 tab PO BID x 30 days) • Corticosteroid Prednisolone (1.25 tab PO BID x 2 days, 0.75 tab PO BID x 3 days, 0.75 tab PO SID x 2 days) • Antibiotic amoxycillin and clavulanic acid (Clavamox 62.5mg 1.5ml PO BID x 7 days)
4.	23	• Antibiotic Marbofloxacin (Marbocyl 20mg 1.25 tab PO SID x 10 days) • Antibiotic (Metronidazole 200mg 20mg/kg 0.75 tab PO BID x 7 days) • Anti-inflammatory (Papase 1 tab PO BID x 10 days)

Table 4: Conservative treatment and duration before surgery in two out of seven feline cases.

No	Duration (days)	Treatment
1.	22	• Anti-inflammatory Serratiopeptidase (Danzen 1 tab PO BID x 21 days) • Antibiotic Marbofloxacin (Marbocyl 5mg 1.5 tab PO SID x 7 days)
2.	16	• Anti-inflammatory Meloxicam (Rheumocam 0.1mg/kg 0.28ml PO SID x 8 days) • Antibiotic amoxycillin and clavulanic acid (Clavamox 62.5mg 12.5mg/kg 0.85ml PO BID x 7 days) • Antibiotic (Metronidazole 200mg 10mg/kg 0.25 tab PO BID x 7 days)

Surgical approach for five dogs with salivary gland diseases was sialoadenectomy. Four out of five canine cases were treated with excision of the mandibular and sublingual salivary gland, while one out of five canine cases were treated with zygomatic salivary gland excision. For feline cases, surgical approach was marsupialization and sialoadenectomy. Five out of seven feline cases were treated with marsupialization, two out of seven were treated with mandibular salivary gland excision, and one was treated with sublingual salivary gland excision.

The days of hospitalization post-surgery for five canine cases ranged from 2 days to 12 days, with a mean duration of 7.3 days. Besides, the days of hospitalization post-surgery for seven feline cases ranged from 3 to 11 days, with a mean duration of 5.5 days.

Table 5: Surgical approach for dogs with salivary gland diseases.

Surgical Approach	Number
Mandibular Salivary Gland Excision	4
Sublingual Salivary Gland Excision	4
Zygomatic Salivary Gland Excision	1
Marsupialization	0

*Total number exceeds five as most cases removed more than one affected salivary glands.

Table 6: Surgical approach for cats with salivary gland diseases.

Surgical Approach	Number
Marsupialization	5
Mandibular Salivary Gland Excision	2
Sublingual Salivary Gland Excision	1
Zygomatic Salivary Gland Excision	0

*Total number exceeds seven as some cases removed more than one affected salivary glands.

4.4 Recurrence Interval and Condition

Recurrence cases post-surgery had been identified in two out of five canine cases and one out of seven feline cases. Two canine cases were initially treated with unilateral excision of affected mandibular and sublingual salivary gland, and after 15 days and 191 days of first surgery respectively, both cases recurrence with cervical sialocele on the opposite side of salivary gland. For the feline case with recurrence condition, the cat was initially treated with marsupialization and after 41 days, the cat had left cervical sialocele as a recurrence condition.

Table 7: Recurrence interval and condition for dogs with salivary gland diseases.

No.	Salivary Gland Diseases	1st Surgery Approach	Recurrence Interval (days)	Recurrence Condition
1.	Right Cervical Sialocele	Right Mandibular Salivary Gland Excision	15	Left Cervical Sialocele
2.	Left Cervical Sialocele	Left Mandibular and Sublingual Salivary Gland Excision	191	Right Cervical Sialocele

Table 8: Recurrence interval and condition for cat with salivary gland diseases.

No	Salivary Gland Diseases	1st Surgery Approach	Recurrence Interval (days)	Recurrence Condition
1.	Sublingual Sialocele (Ranula)	Marsupialization	41	Left Cervical Sialocele

5.0 DISCUSSION

From January 2013 to August 2023, up to 10 10-year periods, a total of 12 eligible cases of salivary gland diseases in dogs and cats were retrieved from medical records of the University Veterinary Hospital, Universiti Putra Malaysia. This limited number of retrieved cases was due to infrequent salivary gland diseases in dogs and cats. This can be supported by Spangler and Culbertson (1991), out of 87,392 diagnostic pathology records reviewed from July 1985 to November 1988, only 245 cases of salivary gland diseases were identified, or equivalent to a prevalence of 0.3%. Another study by Cray et al. (2019) reported that the incidence of salivary gland neoplasia is 15.3 per 100,000 dogs and 26.3 per 100,000 cats. Therefore, salivary gland diseases in dogs and cats were rarely reported due to very low prevalence and incidence.

The range of age of canine cases was between 4 years old and 12 years old with a mean of 7.4 years old, while the range of age of feline cases was between 1 year old to 10 years old with a mean of 4.6 years old. The range and mean of age for canine and feline presented in this study showed a wide range of age from young to senior animals. In addition, a study by Lieske and Rissi (2020) on salivary gland diseases in 179 dogs, the range of age was between 6 months old to 20 years old, with a mean age of 8.5 years old. Another study by Bobis-Villagrá et al. (2022) stated that sialocele can affect cats at any age. Based on the evidence presented, dogs and cats have no age predisposition for salivary gland diseases.

There were four male dogs and one female dog for five canine cases of salivary gland diseases. The canine breed distribution was Poodle (1/5 dogs), Pekingese (1/5 dogs), Pug mix (1/5 dogs) and Silky Terrier (2/5 dogs). On the other hand,

there were three male cats and four female cats for seven feline cases of salivary gland diseases. The feline breed distribution was Persian (2/7 cats), and Domestic Short Hair (5/7 cats). These findings can be supported by studies from Lieske and Rissi (2020) and Bobis-Villagrá et al. (2022), stated that no breed and sex predisposition was apparent for salivary gland disease in dogs and cats. Hence, there is no breed and sex predisposition for salivary gland diseases in dogs and cats.

The definitive diagnosis of salivary gland diseases in canine comprised of four cases of cervical sialocele (4/5 cases) and one case of salivary gland prolapse (1/5 cases). The definitive diagnosis of salivary gland diseases in feline comprised of five cases of sublingual sialocele or ranula (5/7 cases), one case of cervical sialocele (1/7 cases) and salivary gland neoplasia (1/7 cases). Most of the dogs were diagnosed with cervical sialocele, on the contrary, most of the cats were diagnosed with ranula. This finding differs from the result of Lieske and Rissi (2020), where the most common diagnosis in 179 dogs with salivary gland diseases was nonspecific sialoadenitis, which is nearly 50% of the presented cases. Another study by Spangler and Culbertson (1991) found out that the most common diagnosis was malignant neoplasms (74/245), sialadenitis (64/245) and sialocele (21/245) out of 245 cases of salivary gland diseases identified in dogs and cats. A study by Bobis-Villagrá et al. (2021) reported that the common diagnosis for feline sialocele were ranula (6/19 cases) and cervical sialocele (6/19 cases). Besides, there was no dog diagnosed with ranula in this 10-year retrospective study. However, two cases of canine ranula were reported by Karbe and Nielsen (1966) in a seven-month-old German Shepherd dog and a 12 years old Miniature Pinscher dog.

The most common presenting clinical signs of dogs with salivary gland diseases are mandibular and submandibular swelling (3/5 dogs), neck swelling (2/5 dogs) and loud snoring during sleep (2/5 dogs). The most common presenting clinical signs of cats with salivary gland diseases are sublingual swelling (5/7 cats), mandibular and submandibular swelling (3/7 cats), halitosis (2/7 cats) and hypersalivation (2/7 cats). This can be supported by Bobis-Villagrá et al. (2021) stated that the most common clinical signs presented in dogs is swelling in the cervical region, while in cats, the most common clinical sign is intraoral or sublingual swelling. This is further supported by Lieske and Rissi (2020) stated that sialocele will mainly affect cervical and sublingual locations in dogs and cats.

For canine cases, the most common side of affected salivary gland were bilaterally affected (3/5 cases). In contrast, for feline cases, the most common side of affected salivary gland were left salivary gland affected (4/7 cases). The reasons of common side of affected salivary gland in dogs and cats were not specifically mentioned and not well studied currently. Similarly, Bobis-Villagrá et al. (2021) also reported that the salivary glands commonly affected in cats are on the left side (11/19 cases). However, the main reason why the salivary gland on the left side of cats is more commonly affected remains unknown.

Treatment choices of salivary gland diseases were conservative treatment and surgical approach. This retrospective study found out that no patient has achieved complete recovery through conservative treatment. Therefore, surgical treatment was carried out in all 12 canine and feline cases with salivary gland disease. This finding is supported by Bobis-Villagrá et al. (2021) stated that removal of the affected salivary gland through surgery is considered one of the best treatment

choices in cats with sialocele, moreover, surgical excision can achieve complete resolution of the clinical signs, with no evidence of recurrence. Bobis-Villagrá et al. (2021) also mentioned that drainage of sialocele is not recommended due to increased infection risk. Furthermore, Puerta and Emmerson (2020) stated that surgical treatment helps achieve better results than conservative treatment in dogs and cats with salivary gland diseases. Surgical excision alone with or without radiation therapy helped to improve survival time of salivary adenocarcinomas cases.

Recurrence cases post-surgery had been identified in two out of five canine cases and one out of seven feline cases. Both recurrence cases in dogs were initially treated with unilateral excision of affected salivary glands; while the recurrence in cats was initially treated with marsupialization. Ritter et al. (2006) stated that recurrence of the sialocele resulting from misdiagnosis (wrong side), inappropriate surgery (marsupialization, removal of lymph nodes), or incomplete removal of the glands.

6.0 CONCLUSION

In conclusion, most common presenting clinical sign in dogs with salivary gland diseases was mandibular/submandibular swelling, while in cats was sublingual swelling. Based on the evidence presented, no patient has achieved complete recovery through conservative treatment. Surgical approach included sialoadenectomy and marsupialization helps to achieve better prognosis in comparison to conservative treatment.

7.0 RECOMMENDATIONS

This retrospective study has small sample size due to relatively rare salivary gland diseases and only single-institutional study was carried out, only descriptive analysis was carried out in this study. As recommendation to increase sample size, a multi-institutional study may be carried out to include more cases of salivary gland diseases in dogs and cats. With a sufficient sample size collected in the future, statistical analysis can be carried out to obtain significant results and analysis.

Another limitation of this retrospective study is medical records were incomplete and failed to be retrieved. Information and records on surgical protocol, location of swelling, sizes and measurement of swelling was not completely recorded in some cases. Hence, all relevant clinical findings and procedures should be recorded by clinicians for future reference.

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