A preliminary study of prevalence, clinical indicators and risk factors of ear mite infestation in dog and cat in the south of Thailand

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Keywords: ear mite, dog, cat, prevalence, risk factors, clinical indicators

Introduction

Ear mite are the important external parasite in mammals. Their scientific name is Otodectes spp. They can infest several mammal species such as dog, cat, rabbit, fox and ferret [1]. Ear mite infestations has been reported in many countries. Infested animals could show different clinical signs i.e., overproduction of cerumen, irritation in ear cavity because of mite’s saliva, intense itch and secondary infections [2]. According to previous studies, risk factors associated with ear mite infestation were sex, age and lifestyle [3]. Aims of this study are 1) to determine a prevalence of ear mite in dogs and cats in Hat Yai district, Songkhla province, 2) to identify the clinical indicators of ear mite infestation in dogs and cats and to determine risk factors associated with Otodectes spp infestation.

Materials and methods

In this study, 29 dogs and 84 cats were included. Age of animal subjects of this study ranged from 4 months to 15 years. Animals in this study live in 2 areas of Hat Yai district, Songkhla province. History taking, physical examination and observable external appearance of ears were conducted. The signs of otitis externa (erythema, edema/swelling, erosion/ulcer and exudate) were scored (0-3) for both ears. The earwax in both ears were swabbed by sterile cotton bud. The swabs were smeared on glass slides covered by a drop of liquid paraffin. Detection of ear mite were conducted by microscope examination. The presence and number of ear mites under microscopic field were recorded. The Pearson’s Chi-Square test were used for analyzing the risk factors associated with prevalence of Otodectes spp. in dogs and cats.

Results and Discussion

Prevalence of ear mite infestation in dogs and cats lived in Hat Yai district was 33.62% (38/113), including 12.39% (14/113) in dog and 21.23% (24/113) in cat. Previous study in Iran and Iraq border area reported that prevalence of ear mite infestation in cats higher than those of dogs [4]. In this study, numbers and percent of ear infested were found in bilateral more than unilateral site ears. In addition, the infestation of ear mite did not associated with species of animals, age, sex and ear shape. These results agree with the study on risk factors of mange-mite infestation in Mexico [5]. In this study, the prevalence of ear mite infestation were not significantly associated with otitis externa, lesion of skin disease and otitis externa score (OE). On the other hands, erythema otitis externa score in OE significantly related with ear mite infestation (P-value = 0.006). This result agree with the study of Italy in 2014 which report the ear mite infestation with sign of erythema as a primary symptom [6]. The present study revealed that erythema could be the primary indicator for ear mite infestation in dog and cat.
Acknowledgements

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Reference

Nephrotomy for renal calculi in a dog

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Keywords: renal calculi, nephrolith, nephotomy, dog

Introduction

Among the canine urolithiasis, less than 3% of them which were submitted for analysis have been remove from the upper urinary tract (1). There were many factors that might contribute to the prevalence of the disease such as breed predispositions, metabolic imbalances, sex, age, neuter state and underlying diseases. Surgical removal of renal calculi or nephotomy should be considered when they trend to infect or cause obstruction which might leads to irreversible renal damage (2). To provide an optimal result, maintaining normal urine production could be achieved by preoperative and postoperative management including investigation of contralateral renal function and consideration of anesthetic risk (3). This case report is present a renal pelvic calculi in a dog which is treated by nephotomy in association with diagnosis and post-operative management.

Case description

Case history

A 12-year-old neutered male Shih Tzu name “Tiger”, body weight 8 kg was referred to Prasu-Arthorn Animal Hospital after an annual health check with incidental radiographic findings of cystic calculi and renal calculi. He was healthy and asymptomatic. Normal hematological and biochemical profile. Urine specific gravity was 1.027 with urine pH 8.0.

Diagnostic imaging

Abdominal radiography presented a 8x10 mm² radio-opaque calculi in the left renal pelvis and multiple radio-opaque cystic calculi. Abdominal ultrasonographic examination confirmed the present of nephrolith that was hyperechoic substance with acoustic shadow at renal left renal pelvis with no evidence of renal pelvis dilated and hydronephrosis. While, found mineralization in right kidney and multiple cystic calculi. Serial radiographs of intravenous pyelogram displayed no obstruction along the tract of both kidneys.

Surgical procedure

The dog was performed a bisection nephotomy. Anesthetic drugs were selected to minimize the renal effects of general anesthesia.

Figure 1 Ventrodorsal abdominal plain film radiographs illustrated a 8x10 mm² radio-opaque calculi in the left renal pelvis (arrow head).

Figure 2 A single, irregular shape calculi size 1 cm in diameter in the left renal pelvis was removed.

Post-operative management

The renal pelvic urolith submitted for mineral analysis was identified as 100% calcium oxalate monohydrate stone. The bacterial culture from the renal pelvis reported no bacterial growth after 7 days. Analgesic medications were administrated on eight consecutive days which were fentanyl 3-5 mcg/kg/hour CRI 24 hours for first 4 days then changed to tramadol 4 mg/kg IV q8h. Hematocrits
and urine output were monitored. The dietary treatment (Royal Canin Veterinary Diet urinary SO) was recommended to prevent recurrence of uroliths after surgical removal. Monitoring of the recurrence nephrolith via serial radiography and ultrasonography as well as monitoring of renal function and urine cultures were suggested every 6 months.

**Discussion**

The traditional surgical procedure was selected in this case due to a large nephrolith located in renal pelvis concerned to damage renal parenchyma and further obstruction which are classified to a problematic nephrolith (2, 4). Moreover, there is unavailable dissolution protocol for calcium oxalate uroliths (5). Minimally invasive techniques such as shockwave lithotripsy is not available in Thailand yet. Bisection nephrotomy is the technique of choice for nephroscopy in dogs which require less surgical manipulation and time compares to intersegmental nephrotomy (6). There were no significant histologic differences (intrarenal hemorrhage, cortical infarction and cortical inflammation) remained between the kidneys operated with the 2 techniques by 4 weeks (6) and also does not decrease renal function (6, 7). Serum ionized and total calcium concentrations should be investigate in all calcium oxalate stone patients to rule out and correcting hypercalcemia (8). High-moisture diet, increase water consumption to increase urine volume, dietary with low protein, calcium and oxalate should be suggested to prevent recurrence (4). In case of recurrence, additional treatment should be considered included potassium citrate and thiazide diuretics (4).

In conclusion, this study suggests that nephrotomy can be performed if patient is under the indication of removal. With good technical skill of surgery and pharmacological management, it will had a little to no negative effect on renal function. Follow-up care will be completed with die-tary and medical therapy as well as eliminated the probably primary causes to prevent the recurrence of urolith.

**References**

Ocular signs of canine monocytic ehrlichiosis: a retrospective study in dogs from Chiang Mai, Thailand

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Keywords: dog, monocytic ehrlichiosis, ocular abnormalities, uveitis

Introduction

Canine monocytic ehrlichiosis (CME) is a tick-borne of dog disease caused by the rickettsia *Ehrlichia canis* which is an obligate intracellular bacterium with tropism for hematopoietic cells (1). CME is manifested by a wide variety of clinical signs that can be categorized into acute, subclinical and chronic phases, although in endemically infected countries it is difficult to classify clinical cases into such distinct stages (2,4). In the majority of the reports, the ocular manifestations were casually mentioned and the number of cases that underwent a systematic ophthalmic examination and had a satisfactory follow-up was low (3). The aims of the this study were to determine the prevalence and spectrum of ocular manifestations and response to treatment in dogs with CME that were admitted to the Small Animal Teaching Hospital, Faculty of Veterinary Medicine, Chiang Mai University, Chiang Mai, Thailand, for 4 years between January 2013 to December 2016.

Materials and methods

The medical records of 120 cases, admitted to the Small Animal Teaching Hospital, Faculty of Veterinary Medicine, Chiang Mai University, Chiang Mai, Thailand, for 4 years (January 2013 to December 2016), which diagnosis CME were reviewed. The medical records of these dogs were reviewed for the documentation of ocular lesions, the presence of systemic disease along with ocular manifestations, laboratory findings, and the response of ocular lesions to systemic treatment specific for *E. canis* and topical treatment. The serologic dog studies for *E. canis* were conducted with enzyme-linked immunosorbent assay (ELISA). Dogs were considered to have systemic clinical signs for generalized, anterior uveitis posterior uveitis and perivascular opacities. The affected dogs were treated with doxycycline (Veemycin 100 mg*, Osoth Inter Laboratories Co., Ltd., Chonburi, Thailand), imidocarb dipropionate (5 mg/kg IM; Imizol®, Intervet, Bankok, Thailand) and topical 0.1% prednisolone solution (Inf-Oph®, Seng Thai company, Bankok, Thailand).

Results and discussion

The population of 120 dogs in this study, 57 were males (48%) and 63 females (52%) and an age range of 0.5-15 years (7.4±4.4). The pure-breeds of dogs were 100 cases and representing 24 different breeds. The common breed were mixed (n=20) and shih tzu (n = 16). The diagnosis of dogs with CME were most commonly presented for a variety of systemic signs including weight loss, depression, weakness, lethargy, fever, dermatologic disorders, anorexia, renal failure, recurrent lameness, epistaxis, vomiting, diarrhea and blindness.

Figure 1. Photograph of dog eyes with monocytic ehrlichiosis (*E. canis*). Notice the secondary glaucoma (A), deep corneal ulcer (B), the retinal detachment (C) and the keratitis (corneal opacity) (D).
Table 1. Types of ocular manifestations in 120 dogs with canine monocytic ehrlichiosis (*Ehrlichia canis*)

<table>
<thead>
<tr>
<th>Ophthalmic finding</th>
<th>Anterior uveitis</th>
<th>Posterior uveitis</th>
<th>Panuveitis</th>
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<tbody>
<tr>
<td></td>
<td>n=103 %</td>
<td>n=17 %</td>
<td>n=12 %</td>
</tr>
<tr>
<td>Ocular discharge</td>
<td>95 93.1</td>
<td>9 75.0</td>
<td></td>
</tr>
<tr>
<td>Tear deficiency</td>
<td>24 23.5</td>
<td>3 25.0</td>
<td></td>
</tr>
<tr>
<td>Blepharitis</td>
<td>50 49.0</td>
<td>5 41.7</td>
<td></td>
</tr>
<tr>
<td>Conjunctivitis</td>
<td>91 89.2</td>
<td>10 83.3</td>
<td></td>
</tr>
<tr>
<td>Deep corneal ulcer</td>
<td>21 20.6</td>
<td>1 8.3</td>
<td></td>
</tr>
<tr>
<td>Keratoconjunctivitis</td>
<td>42 41.2</td>
<td>9 75.0</td>
<td></td>
</tr>
<tr>
<td>Cataract formation</td>
<td>37 36.3</td>
<td>4 33.3</td>
<td></td>
</tr>
<tr>
<td>Posterior lens luxation</td>
<td>8 7.8</td>
<td>3 25.0</td>
<td></td>
</tr>
<tr>
<td>Loss of vision</td>
<td>47 46.1</td>
<td>10 83.3</td>
<td></td>
</tr>
<tr>
<td>Secondary glaucoma</td>
<td>26 25.5</td>
<td>7 58.3</td>
<td></td>
</tr>
<tr>
<td>Panophthalmitis</td>
<td>24 23.5</td>
<td>6 50.0</td>
<td></td>
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<tr>
<td>Blepharospasm</td>
<td>80 78.4</td>
<td>11 91.7</td>
<td></td>
</tr>
<tr>
<td>Photophobia</td>
<td>87 85.3</td>
<td>11 91.7</td>
<td></td>
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<tr>
<td>Lacrimation</td>
<td>88 86.3</td>
<td>11 91.7</td>
<td></td>
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<tr>
<td>Conjunctival congestion</td>
<td>75 73.5</td>
<td>10 83.3</td>
<td></td>
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<tr>
<td>Corneal edema</td>
<td>75 73.5</td>
<td>10 83.3</td>
<td></td>
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<tr>
<td>Deep corneal Vascularization</td>
<td>42 41.2</td>
<td>11 91.7</td>
<td></td>
</tr>
<tr>
<td>Keratitic precipitation</td>
<td>18 17.6</td>
<td>3 25.0</td>
<td></td>
</tr>
<tr>
<td>Miosis</td>
<td>67 65.7</td>
<td>5 41.7</td>
<td></td>
</tr>
<tr>
<td>Hypotony</td>
<td>68 66.7</td>
<td>4 33.3</td>
<td></td>
</tr>
<tr>
<td>Aqueous flash</td>
<td>54 52.9</td>
<td>9 75.0</td>
<td></td>
</tr>
<tr>
<td>Iris hyperpigmentation</td>
<td>18 17.6</td>
<td>3 25.0</td>
<td></td>
</tr>
<tr>
<td>Posterior synechia</td>
<td>3 2.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mydriasis</td>
<td>9 52.9</td>
<td>5 41.7</td>
<td></td>
</tr>
<tr>
<td>Vitreous opacity</td>
<td>11 64.7</td>
<td>8 66.7</td>
<td></td>
</tr>
<tr>
<td>Retinal detachment</td>
<td>11 64.7</td>
<td>7 58.3</td>
<td></td>
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<tr>
<td>Retinal degeneration</td>
<td>3 17.6</td>
<td>1 8.3</td>
<td></td>
</tr>
<tr>
<td>Chorioretinitis</td>
<td>8 47.1</td>
<td>5 41.7</td>
<td></td>
</tr>
<tr>
<td>Optic disk atrophy</td>
<td>6 35.3</td>
<td>6 50.0</td>
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</tbody>
</table>

The most of admitted dog were noticed bilateral ocular lesions. Ocular manifestations of anterior, posterior or panuveitis are showed in Table 1. Uveitis cases were anterior in 103/120 (86%) posterior uveitis in 17/120 (14%) and panuveitis 12/120 (10%). The prevalence of bilateral uveitis was significantly higher than unilateral uveitis (*P* < 0.01), and anterior uveitis was significantly more common than posterior uveitis (*P* < 0.01) or panuveitis (*P* < 0.01). The frequency of uveitis cases with higher than 50% from anterior uveitis in descending order were uveal discharge (93%) > conjunctivitis (89%) > lacrimation (86%) > photophobia (85%) > blepharospasm (78%) > conjunctival congestion (73%) = corneal edema (73%, Fig.1D) > hypotony (67%) > miosis (66%) > aqueous flash (53%) while posterior uveitis were vitreous opacity (65%) = retinal detachment (65%, Fig.1C) > mydriasis (53%) and panuveitis were blepharospasm, photophobia, lacrimation, and deep corneal (92%) > conjunctivitis, loss of vision, conjunctival congestion and corneal edema (83%) > ocular discharge, keratoconjunctivitis and aqueous flash (75%) > vitreous opacity (67%) > retinal detachment and secondary glaucoma (58%, Fig.1A) > optic disk atrophy and panophthalmitis (50%).

Table 2. Ocular response to systemic and specific plus topical treatment, in 120 dogs with natural canine monocytic ehrlichiosis

<table>
<thead>
<tr>
<th>Ocular abnormalities</th>
<th>Complete</th>
<th>Partial</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior uveitis</td>
<td>46 44.7</td>
<td>39 37.9</td>
<td>18 17.5</td>
</tr>
<tr>
<td>Posterior uveitis</td>
<td>1 5.9</td>
<td>9 52.9</td>
<td>7 41.2</td>
</tr>
<tr>
<td>Panuveitis</td>
<td>1 8.3</td>
<td>6 50.0</td>
<td>5 41.7</td>
</tr>
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</table>

The response to treatment was graded as complete, partial or poor (As shown in Table 2). Anterior uveitis of 46 in 103 dogs (44.7%) responded completely, 39/103 dogs (37.9%) partially, and 18/103 dogs (17.5%) poorly to the systemic and topical treatment. Posterior uveitis and panuveitis were highest responded in partial grade for 52.9% and 50.0%, respectively. The ocular discharge (93%) was highest of good treatment in anterior uveitis. The highest poor grade for treatment response of anterior uveitis was loss of vision (8%). Based on the results of this data, uveitis performs to be the most common ocular manifestation. The major of the dogs treated with topical medications and specific systemic antibiotics, a complete or partial resolution of ocular lesions may be expected. Moreover, it is expected that the results from this study will be helpful for treatment CME of dog diseases in Thailand.
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References

Unilateral hydronephrosis secondary to congenital anomaly in dog

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Keywords: hydronephrosis, ureteropelvic junction obstruction, dog

Introduction

Hydronephrosis is defined as distention or enlargement of the renal pelvis with urine as a result of obstruction of the outflow of urine distal to the renal pelvis. Hydronephrosis is defined as distention or enlargement of the renal pelvis with urine as a result of obstruction of the outflow of urine distal to the renal pelvis. Hydronephrosis can commonly occur following ureteral obstruction usually acquired and associated with urolithiasis, ectopic ureter, iatrogenic ligation, urinary tract tumors, etc (1). However, congenital hydronephrosis was rarely reported in dogs. In the present case, the diagnosis of a unilateral hydronephrosis secondary to congenital anomaly was made by use of abdominal imaging, intravenous pyelography, gross examination, and histopathological findings after ruling out other common underlying causes and the dog had exhibited no previous illness suggestive of ureteral obstruction.

Case background

A 3-year-old female intact crossbred dog, weighting 8 kg was presented to Prasu-Arthorn Animal Hospital at the Faculty of Veterinary Science, Mahidol University. The owner had come for a follow up on her dog symptoms, since the dog has been accidentally diagnosed with an asymptomatic left hydronephrosis 2 years earlier. On physical examination, the dog was good in body condition with normal vital signs, however abdominal distension was detected on palpation. The hematologic lab outcomes indicated nonazotemic. A mild decreased in serum alkaline phosphatase was present at 18 U/L (Reference interval (RI) 23-212 U/L). The complete blood count was within reference range, decreased in serum albumin at 1.8 g/dL (RI 2.7-3.8 g/dL). Urinalysis showed proteinuria and few cocci bacteria. Urine culture was not found any microbial growth. A plain film abdominal radiograph showed decreased serosal details with increased soft tissue opacity at cranio-caudal to caudodorsal abdomen with a visible mass and the loop of small intestine was displaced caudally. Importantly, radiopaque uroliths were not identified. An intravenous pyelogram (IVP) using an iohexol contrast agent with serial left lateral (Fig. 1A) and ventrodorsal (Fig. 1B) view.

Figure 1 Representative intravenous pyelography (IVP) made 20 minutes after contrast administration of left lateral (A) and ventrodorsal (B) view of the abdomen. A thin rim of contrast indicated margin of left hydronephrotic kidney. A normal filling of contrast media was detected from the right kidney through the ipsilateral ureter and graduate filled the bladder while abnormal filling of contrast media was obstructed on the left ureter. These findings suggested the obstruction in the left ureter.

Abdominal radiographs was performed to further characterize the structure of the urinary tract and provide semiquantitative analysis of urinary tract function revealed normal findings in the contrast agent from the right kidney to its ureter and urinary bladder, though not a visible contrast flow through the left ureter indicated obstructive lesion at level of ureteropelvic junction. Abdominal ultrasonography revealed a left kidney enlargement (13.2 x 8.3 cm), loss of corticomedullary differentiation suggested severe hydronephrosis, and a 5.18 cm in length of right kidney showed a hyperechoic at renal cortex and decrease of corticomedullary junction and mild to moderate irregular contour. These findings support the diagnosis of a right chronic kidney disease. According to these findings, a left unilateral nephrectomy was performed. On gross examination, the left kidney appeared significantly enlarged (13.5 cm in length) with a markedly reduced thickness
compared to the right normal kidney (Fig. 2A). Also, the left kidney contained a dark brown fluid-filled and ureteropelvic junction was obstructed (Fig. 2B). Cytology evaluation of the drained fluid from the left kidney showed the moderate number of cellular debris and negative in bacterial lab culture.

**Figure 2** Gross examination revealed severely enlarged (13.5 centimeter in length) of the excised left kidney (A). A loss of corticomedullary architecture of normal anatomy and obstruction of ureteropelvic junction was observed (B). Obstructive lesion at ureteropelvic junction was found (black circle).

**Discussion**

A diagnosis of unilateral congenital severe hydronephrosis associated with obstructive of ureteropelvic junction was made in this case. This was an incidentally finding that the dog was asymptomatic, was not azotemic and had normal urine concentrating ability. The hydronephrosis was suspected to have occurred secondary to a congenital condition resulting in a gradual progression of in intra-renal pressure and developed severe acquired hydronephrosis which the dog had showed no previous illness suggestive of ureteral obstruction. Congenital hydronephrosis have been rarely reported in dog and it is mostly seen in German Shepherd dog suggesting that the breed of this dog may be prone to congenital abnormality in both ureters and kidneys (2). As in our case, some authors report that unilateral renal enlargement can be asymptomatic, and progressive abdominal distension can be detected at physical examination (3). The physiologic response to ureteral obstruction is depends on various factors include the species, age of the animal, degree of obstruction, length of time the obstruction exists, and whether or not the obstruction is unilateral or bilateral (4). Ureteral obstruction of several weeks duration may also leads to complete loss of renal function and the affected kidney may present as a fibrous sac (3). Abdominal radiography can identify renomegaly and large enough radiopaque urinary calculi which may be the underlying cause of the ureteral obstruction but structure of ureter is almost impossible to see unless severe hydroureter was developed (1). Abdominal ultrasonography has more sensitive to visualize the entire urinary tract even though small increases in the size of the renal pelvis and ureter and it is useful for detection echogenicity material that may be the causes of obstruction (1). In this case, a severe left renomegaly was detected but a preoperative etiological diagnosis was not found by radiographic and ultrasonographic imaging. An intravenous pyelogram was performed aid in visualization of the level of obstruction revealed an obstructive lesion at left ureter compare to the right side. In one report, CT urography was used to aid the diagnosis of the cause of both hydroureter and hydronephrosis (Mesquita L et al., 2015). A unilateral nephrectomy was performed to remove a severe left hydronephrosis and confirm macroscopic etiology appearance. Gross examination confirmed a left severe hydronephrosis associated with loss of corticomedullar structure. Furthermore, an obstructive abnormality was identified at the level of ureteropelvic junction. In conclusion, although hydronephrosis due to congenital abnormality is quite rare in dogs, this condition should be considered in a patient with hydronephrosis of undetermined cause. A dog can presented with asymptomatic sign and normal minimal database but carefully palpation can detected renomegaly in more progressive hydronephrosis. Additional diagnostics imaging should be examine for further define an underlying cause and for properly therapeutic planning.

**References**

Efficacy of sildenafil in the treatment of pulmonary hypertension in dogs

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Keywords: pulmonary hypertension, sildenafil, echocardiography

Introduction

Pulmonary hypertension (PH) is a condition characterized by abnormal increase in the pulmonary arterial circulation (1, 2). PH is classified as primary (idiopathic) or secondary to various underlying disorders including left-sided heart disease, pulmonary disease, heartworm disease (2). Dogs with symptomatic PH commonly present with cough, dyspnea, lethargy, syncope, exercise intolerance and ascites associated with the worst quality of life (3). PH is practically diagnosed in the clinic by Doppler echocardiography. Pulmonary arterial pressure (PAP) can be obtained by applying peak tricuspid regurgitant flow velocity (PTRFV) to the modified Bernoulli equation (pressure gradient = 4 x velocity² (m/s)). In veterinary medicine, the treatment of dogs with PH is still uncertain. The drugs commonly used in both human and veterinary medicine for patients with PH is now sildenafil. Sildenafil is a highly specific phosphodiesterase type V (PDE-5) inhibitor that causes pulmonary artery vasodilation by increasing pulmonary vascular concentrations of cyclic guanosine monophosphate (cGMP), resulting in vasodilation by the vasodilatory effect of endogenous nitric oxide (NO) (4, 5). No study has been obviously provided evidences for the efficacy of sildenafil to decrease PAP. Therefore, the objective of this study was to determine the efficacy of sildenafil in dogs with PH by evaluating the change in PAP and quality of life after receiving sildenafil.

Material and methods

This present study was approved by Faculty of Veterinary Science- Animal Care and Use Committee (FVS-ACUC). Client-owned dogs with PTRFV > 2.8 m/s were diagnosed of PH and recruited in the study with no limitation of sex, breed or age. The enrolled dogs were underwent a complete physical examination. Blood collection was collected for hematological test and serum chemistry evaluation. Complete echocardiography was performed in all dogs including 2D, M-mode, and Doppler echocardiography. The owners were also asked for comprehensive history taking and questions to evaluate the quality of life (QOL) of their dogs, modified from Haggstrom et al. (2008) (6). Clinical score was summed from all variables. All dogs enrolled were prescribed sildenafil at a dose of 1 mg/kg PO every 8 hours and scheduled for re-examination in 30 after the first examination and repeated procedures were carried out. A dog with evidence of any systemic disorder such as hepatic disease, renal disease and systemic disorders were excluded from the study only at the beginning of the study.

Results and Discussion

Twenty-three dogs, 12 (52.2%) males and 11 (47.8%) females were enrolled in the study. Breeds included; Poodle (n=7; 30.4%), Shih Tzu (n=7; 30.4%), Pomeranian (n=3; 13%), Dachshund (n=1; 4.3%), Yorkshire Terriers (n=1; 4.3%), English Cocker Spaniel (n=1; 4.3%) and Mixed breed (n=3; 13%). Re-examination obtained from 23 dogs had a median of 33 (28, 37) days. The median PTRFV was 3.41 m/s at baseline and 3.13 m/s after sildenafil therapy. The PTRFV after initiating sildenafil was significantly lower than baseline (P=0.002) (Table 1). The median PAP was also significantly decreased (P=0.003) when compared to the baseline. The median PAP was 46.51 mmHg at baseline and 39.19 mmHg after sildenafil therapy (Table 1). Clinical scores assessed by owners were recorded in all dogs. Median clinical score was significantly decreased from 10 at baseline to 9 at the time after sildenafil therapy. The PTRFV after initiating sildenafil was significantly lower than baseline (P=0.002) (Table 1). The median PAP was also significantly decreased (P=0.003) when compared to the baseline. The median PAP was 46.51 mmHg at baseline and 39.19 mmHg after sildenafil therapy (Table 1). Clinical scores assessed by owners were recorded in all dogs. Median clinical score was significantly decreased from 10 at baseline to 9 at the time after sildenafil therapy (P=0.015) as shown in Table 2. There was no significance in heart rate and respiratory rate between baseline and after the therapy (P=0.760 and P=0.229 respectively) (Table 2). In conclusion, this study demonstrated that sildenafil can decreased PTRFV, lower PAP and decreased clinical score resulting in improved QOL in dog with PH.
Table 1 Comparison of echocardiographic parameters at baseline and after sildenafil treatment

<table>
<thead>
<tr>
<th>Parameters</th>
<th>n</th>
<th>25th percentile</th>
<th>Median</th>
<th>75th percentile</th>
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<tr>
<td>PTRFV (m/s)</td>
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<tr>
<td>Pre-treatment</td>
<td>23</td>
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<td>3.41</td>
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<tr>
<td>Post-treatment</td>
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<td>2.98</td>
<td>3.13</td>
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<td>PAP (mmHg)</td>
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<tr>
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<td>46.51</td>
<td>60.53</td>
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<tr>
<td>Post-treatment</td>
<td>23</td>
<td>35.52</td>
<td>39.19</td>
<td>46.51</td>
<td></td>
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Table 2 Comparison of clinical score at baseline (pre-treatment) and after sildenafil treatment

<table>
<thead>
<tr>
<th>Parameters</th>
<th>n</th>
<th>25th percentile</th>
<th>Median</th>
<th>75th percentile</th>
<th>P-value</th>
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<tr>
<td>Clinical Score</td>
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<tr>
<td>Pre-treatment</td>
<td>23</td>
<td>8</td>
<td>10</td>
<td>11</td>
<td>0.015</td>
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<tr>
<td>Post-treatment</td>
<td>23</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>- Exercise intolerance</td>
<td>23</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0.033</td>
</tr>
<tr>
<td>Post-treatment</td>
<td>23</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>- Respiratory effort</td>
<td>23</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.035</td>
</tr>
<tr>
<td>Post-treatment</td>
<td>23</td>
<td>1</td>
<td>1</td>
<td>2</td>
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</table>

Acknowledgment

This study was funded by Faculty of Veterinary Science, Mahidol University. We also gratefully acknowledge Prasu Arthorn Animal Hospital, Faculty of Veterinary Science, Mahidol University for all dogs and the support of laboratory unit.

References

Influence of obesity on feasibility to detect intra-thoracic lymph nodes on computed tomographic images of normal cats

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Keywords: computed tomography, obesity, cat, intra-thoracic lymph nodes

Introduction

In cats, there are several symptoms or diseases caused lymphadenopathy at the deep anatomical areas both at intra-thoracic and intra-abdominal cavities e.g. infectious diseases from Feline Immunodeficiency Virus (FIV)⁰ or Feline Leukemia Virus (FeLV)² and Feline Infectious peritonitis (FIP)⁹. To differentiate the lymphadenopathy from normal lymph nodes, there are several factors need to be concerned such as size and feasibility to detect the lymph node. It has been reported that the appearance of intra-cavity, normal lymph nodes was interfered by surrounded fat accumulation⁶. Therefore, the aim of this study was to investigate the effect of obesity on feasibility to detect the intra-thoracic lymph nodes of normal cats on computed tomographic (CT) images. In addition the appearance including other parameters were investigated.

Materials and Methods

This study was approved by the Institutional Animal Care and Use Committee of Chulalongkorn University (CU-IACUC). Client-owned, clinically healthy cats (n = 8), which subsequently divided into 2 groups of normal body condition and the obese cat (n = 4 in each group) were enrolled in this study. All cats were confirmed to be normal by means of physical examination, hematology and serum biochemistry, basic diagnostic imaging by chest radiography and abdominal ultrasonography, and serological test for FIV and FeLV. After fasting for anesthetic procedure, cats were sedated acepromazine maleate (Combistress®, Antwerp, Belgium, 0.03 mg/kg) and tramadol hydrochloride (Tramache®, Baroda, India, 2 mg/kgBW, IM). Subsequently, cats were general anesthesia induced by propofol (Lipuro®1%, Melsungen, Germany, 2 - 4 mg/kg BW IV). Then, cats were intubated and maintained the general anesthesia with 2 -5 % isofurane (Isofurane®, Bethlehem, U.S.A.) CT scan using a 64-slice, helical CT unit (Optima, CT660®, GE, Bangkok, Thailand) both of pre- and post-contrast series were done by sternal recumbency with following parameter 120 kVp, 100 mA, and 0.625 mm of slide thickness. As soon as the pre-contrast serie was achieved, non-ionic, iodine contrast medium using iohexol (Omnipaque 300®, Cork, Ireland) is manually intravenous administrated at the dose of 600 mgI/kgBW and the post-contrast enhanced CT images are subsequently performed. CT images are processed by the image viewer using OsiriX® software. Images are analyzed by soft tissue window using 1111 Hounsfield (HU) of the window width (WW) and 94 HU of the Window Level (WL) to enhance the fat attenuation window. Appearance of all thoracic lymph nodes (sternal, cranial mediastinal, tracheobronchial and intercostal lymph nodes) including the size, shape, contour, architextural pattern both of the pre- and post-contrast enhancement images were recorded and compared between the normal and obese cats, which distinctly categorized through the ratio of lateral subcutaneous fat at the mid-thoracic area to the 7th thoracic vertebral height (Fig.1).

![Fig.1](image_url)

Fig.1 The ratio of the average lateral subcutaneous fat thickness (red lines) at the mid-thoracic area on the axial computed tomographic (CT) image to the 7th thoracic vertebral height (blue line) was applied to differentiate the obese cat from the normal body condition feline patient.
Results and Discussion

Comparing to the normal body condition cats which include 3 spayed female cats and a castrated cat with mean age at 8.5±1.7 years old and mean body weight at 3.6±0.6 kg, the obese cats were 2 spayed female and 2 castrated male cats with the mean age at 7.5±2.8 years old and mean body weight at 5.0±0.4 kg. The intra-thoracic lymph node was not be detected at the intercostal area in all cats. The overall size of the other lymph nodes was larger in the obese cat than those of the normal body condition, especially at sternal area. In addition, the obese cat revealed clearer detection of the thoracic lymph nodes (Table 1, Fig. 2).

To distinguish the subtle abnormal condition of the lymph node especially at the intra-cavity, especially in the thorax of dogs and cats is often difficult due to the less sensitivity of the radiograph and incapability of the ultrasonogram. CT that provides the transverse, gray scale-adjustable images of the patients could exhibit the small anatomical structure. Therefore, in this study, we would like to investigate the normal appearance of intra-thoracic lymph nodes through CT image that the result would be benefit as a reference value for practitioner prior the clinical diagnosis. We found that not only the amount of surround fat accumulation will increase the feasibility to detect lymph node (4), the size of the lymph node in the obese cat was also larger than those of the normal body condition cat. This might be caused by the fat accumulation at the hilar region of the lymph node. In addition to the capability to detect the lymph node and lymph node size, this study could not detect the intercostal lymph nodes in all cats. It could cause by the very small sizes of those lymph nodes in the normal condition cat. Therefore, the comparative study both of the gross anatomy and CT appearance study will be precisely clarify the intercostal lymph node.

Table 1 The location, size and feasibility to detect the intra-thoracic lymph nodes at each area between the normal body condition and obese cats.

<table>
<thead>
<tr>
<th>Location of lymph node</th>
<th>Normal W (mm.)</th>
<th>Normal L (mm.)</th>
<th>Feasibility to detect</th>
<th>Obesity W (mm.)</th>
<th>Obesity L (mm.)</th>
<th>Feasibility to detect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sternal</td>
<td>2.36±0.03</td>
<td>3.74±1.25</td>
<td>++</td>
<td>3.40±0.47</td>
<td>5.76±1.76</td>
<td>+++</td>
</tr>
<tr>
<td>Cranial Mediastinum</td>
<td>2.36±0.39</td>
<td>3.25±1.05</td>
<td>+</td>
<td>3.37±0.49</td>
<td>5.15±1.08</td>
<td>+++</td>
</tr>
<tr>
<td>Tracheobronchial</td>
<td>2.83±0.15</td>
<td>2.88±0.15</td>
<td>+</td>
<td>2.52±0.51</td>
<td>3.32±0.74</td>
<td>++</td>
</tr>
<tr>
<td>Intercostel</td>
<td>N/A</td>
<td>N/A</td>
<td>-</td>
<td>N/A</td>
<td>N/A</td>
<td>-</td>
</tr>
</tbody>
</table>

Fig. 2. Axial, contrast-enhanced computed tomographic (CT) images of intrathoracic lymph nodes which were sternal lymph node (a and d), cranial mediastinal lymph nodes (b and e), and tracheobronchial lymph nodes (e and f) between the normal body condition (a-c) and obese cat (d-f).

References
Comparative clinical diagnosis of malocclusion in rabbit by using radiography and CT scan

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Keywords: malocclusion in rabbit, radiograph, diagnosis, CT scan, X-ray

Introduction

Malocclusion in rabbit is a common dental disorder which causes improper wearing of teeth. This condition leads to other problems and poor quality of life (1). The main factor of malocclusion is caused by improper feeding (2). Oral examination combined with radiography are standard diagnostic technique for dental disorders in rabbit including malocclusion which can be divided into 6 grades (3). Limitation of flat two dimensional image of radiograph can caused misdiagnosis by superimposition. Computed tomography (CT scan) is a modern imaging modality which can reformat image in various planes or even as volumetric (3D) representations of structures (4). Therefore, aim of this study is to compare clinical diagnosis of malocclusion in rabbit by using CT scan and radiography.

Materials and Methods

22 rabbits were used in this study by random age, sex and breed. All rabbits were oral examined and performed radiographically to assess the abnormality of teeth and grading into 6 grades. CT scan of skull was performed under general anesthesia using xylazine 3 mg/kg IM with ketamine 20 mg/kg IM. The dental structures and dental abnormalities were compared between radiographs and CT images.

Results and Discussion

Radiographs of rabbit with malocclusion grade 1, 2 and 3 resemble morphology with CT images. In additions, CT images showed more details of dental structures and supportive structures of each tooth. Although both diagnostic imaging techniques revealed normal dental structure in these grades, the occlusal surfaces of cheek teeth in CT image clearly presented a non-zigzag pattern in grade 3 rabbit.

Malocclusion grade 4 is the level which dental structures become abnormal. On lateral radiograph (Figure 1. A), a zigzag pattern of the occlusal surfaces, curvature of teeth, increased interdental space were not clearly seen. The opacity of pulp cavity appeared to be normal and enamel ridge remained along the teeth. In this case, CT images showed more lesions which unable to detect on radiograph (Figure 1. B, C and D). For example, Root penetration through mandible from root elongation, decreased in size of some teeth, increased opacity of pulp cavity and abnormal position of cheek teeth were noticed. These abnormal conditions can be detected on CT images.

Over than grade 5, increased opacity of pulp cavity and suspicious degeneration of pulp cavity from partial loss of enamel ridge were detected on radiograph. CT images showed lesion seem like small cyst from root penetration through mandible in the same area that suspicious degeneration of pulp cavity. Therefore, shifting the grade of malocclusion by using CT scan could be possible because of its effiancy detected better lesion than radiography.
In conclusion, this study revealed that radiographic image is enough for diagnosis and prognosis of the malocclusion in rabbit. However, unclearly lesions which was not seen by radiographs can be detected by CT image scan. Thus, CT scan would be appropriate for surgical plan because it can identify border of lesion accurately.

Acknowledgements

This research was a part of special problem course and afforded by Faculty of Veterinary Medicine, Khon Kaen University, Thailand.

References

Introduction

Antioxidants are substances that could prevent oxidative reactions of nucleic acids, proteins, lipids or carbohydrates by scavenging and reducing free radicals, (1,2), preventing cell damage and neoplastic transformation in dogs (3,4). Vitamin E is a fat-soluble antioxidant. Alpha-tocopherol is the most potent vitamin E in the bloodstream and the tissues. Vitamin E has the ability to inhibit the growth of cancer by promoting the immune system, inhibiting the factors that contribute to the formation of angiogenesis and inhibiting the spread of cancer cells (5). For studies in humans, vitamin E can prevent many types of cancer (6-8). A lot of studies investigated antioxidant status in human cancer patients. As there are few studies on alpha-tocopherol in cancerous dogs compared that in to people with cancer, the objective of this study was to evaluate serum alpha-tocopherol in cancerous dogs compared to clinically healthy dogs.

Materials and Methods

Blood samples were obtained from 101 clinically healthy dogs and 80 dogs suffering from cancer at Veterinary Teaching Hospital. The owner consent was obtained for all participated dogs and this study protocol was approved by The Research Ethics Committee, faculty of Veterinary Medicine, Khon Kaen University. Serum alpha-tocopherol was measured by using high performance liquid chromatography according to a method of Thurnham (9). A dual wavelength UV-visible detector (model 2847, Waters) was set at wavelength 292 nanometers for the detection of alpha-tocopherol. Quantification was based on peak-height measurement by using a Clarity program. Next, recording quantitative data and statistical analysis by independent-sample T test were performed. A $P$ value < 0.05 was considered statistically significant.

Results and Discussion

Table 1 Comparison of the serum alpha-tocopherol levels between clinically healthy group and cancerous group. *$p$<0.05 with compared to healthy group.

<table>
<thead>
<tr>
<th>Group</th>
<th>N (cases)</th>
<th>Alpha-tocopherol (µmol/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy dogs</td>
<td>101</td>
<td>15.08±12.45</td>
</tr>
<tr>
<td>Cancerous dogs</td>
<td>80</td>
<td>12.4±7.57</td>
</tr>
</tbody>
</table>

*p=0.167

For this study, no significant differences in serum alpha-tocopherol levels evaluated were found between healthy and cancerous groups and also the downward trend in serum alpha-tocopherol levels were seen in the cancerous dogs. One study found that people with low vitamin E levels were associated with cancer (7). Vitamin E may be some advantages in inhibition of carcinogenesis, enhancement of immunity, inhibiting factor of promotion angiogenesis, and also inhibiting cancer metastasis (5). The results were consistent with a previous study that showed alpha-tocopherol levels were decreased compared with control dogs and the decrease in vitamin E secondary to lymphoma development suggests an imbalance reactive oxygen species production and antioxidant protection (10) which is similar to the results of one study in dogs with mammary cancer that showed decreased alpha-tocopherol concentration in the neoplastic tissues compared to the normal tissue of an adjacent mammary gland (11). The decrease alpha-tocopherol status may indicate a greater utilization of the vitamin. The best antioxidant micronutrient for reducing cancer risks is unknown (12). So further study should be done.

Acknowledgements

We thank the faculty of medicine, Khon Kaen University for research laboratory.
References


Intestinal fungal infection in a dog: case report

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Keywords: dog, fungal infection, enteritis

Introduction

Intestinal fungal infection cause by large variety of sparsely septate hypha fungi. Mostly, oncomycetes and zygomycetes such as; Pythium, Laginidium Aspergillus, Mucor and Rhizopus are commonly found. Pythium insidiosum is an oomycete pathogenic in mammals, particularly in horses, dogs and humans. The infection occurs mainly in temperate areas. In Thailand, pythiosis is considered to be endemic (6). Therapy includes radical surgery, anti-fungal drugs, immunotherapy or a combination of these therapies. Avoiding stagnant water could be the prevention, although the presence of P. insidiosum on grass and soil in enzootic areas will makes this practice useless (6).

Materials and methods

Case history: A two years old female mixed breed dog referred to the small animal teaching hospital, Faculty of Veterinary Science, Chulalongkorn University with anorexia for a month, watery diarrhea for two weeks and chronic vomiting once a day. From the history, the dog had incomplete vaccination and the behavior of routine contact the stagnant water. On physical examination, the body condition score is two out of five and mild abdominal cramp. Blood collection for CBC, serum blood chemistry and CCV/CPV antigen test kit were initially performed. For further investigation, radiography was selected after primary gastrointestinal lesions were suspected. Radiographic images with barium study showed mid-abdominal soft tissue mass and delayed gastric emptying time. The ultrasonographic results (Fig. 1) showed duodenitis and the granulomatous reaction of the mesentery and surgical exploration for the incisional biopsy mesenteric mass was performed afterward (Fig. 2). The tissue samples were submitted for fungal-bacterial culture and histopathological evaluation. After the surgery, metronidazole (20 mg/kg, bid) and sulfamethoxazole/trimethoprim (22 mg/kg, bid) were administrated for 12 days during waiting for the laboratory result. Then, itraconazole (10 mg/kg, sid) and turbinafine (35 mg/kg, sid) were administrated continuously with the ultrasound rechecking the lesion every 1 month.

Fig. 1 Ultrasonography. a) A large heterogenous hypoechoic mass at the center of mesenteric fat size 4.3 x 2.7 cm. b) Thickening wall of the terminate descending duodenum (5.8 mm), loss of layering pattern, reserved peristalsis.

Fig. 2 Gross pathology. a) Thicken and irregular wall of the descending duodenum. b) Multifocal abscess-liked masses throughout the mesentery fat near pancreas.

Results and Discussion

The neutrophilia and monocytosis were the only significant findings of clinical pathology parameters. Both of the CCV/CPV antigen test kit results were negative. The biopsy results showed the granuloma in fibrous tissue of the submucosa to the serosa layer of the duodenum incorporated with many inflammatory cells. Also, the short contorted fungal hypha present at the center of granuloma (Fig. 3a, b) Moreover, the mesentery fat at the jejunum showed inflammation with active fibroblasts and inflammatory cells. The histopathological diagnosis was fungal granuloma and chronic steatitis. To visualize the fungal hyphae...
in the tissue, sample was stained with periodic acid-Schiff reaction (PAS) and Gomori methenamine silver (GMS). The presence of the sparsely septate hyphae with thick wall, occasionally branched at angle of 90 degree resembled *P. insidiosum*.

**Fig. 3** a) Histopathology. Multiple pyogranuloma present in fibrous tissue of submucosa to serosa layers of duodenum. b) Many inflammatory cells; pus cells, lymphocytes, plasma cells, macrophages and multinucleated giant cells with short contorted fungal hypha (arrow). H&E stain.

The cytology and histology may help in the diagnosis of pythiosis, but do not allow differentiation between pythiosis and infections caused by the zygomycetes. However, further identification of the culture as *P. insidiosum* by serology or using molecular tools, including sequencing is recommended in any case (6).

There was no growth of any fungus or bacteria of the cultures of this case. This may due to the sample transportation which normally cooling at 4°C inhibited growth of *P. insidiosum* (6). *P. insidiosum* is well adapted to the body temperature of its mammalian hosts. It had an optimum and maximum temperature for growth of 34-36°C and 40-45°C, respectively (3).

In dogs, the gastrointestinal form of pythiosis occurs more often than the subcutaneous form. The clinical symptoms include vomiting, weight loss, intermittent diarrhea and palpable masses in the abdomen (4). Extension of the infection to the pancreas, mesenteric lymph nodes and bile ducts can occur (2). The infections caused by *P. insidiosum* poorly respond to therapy. In addition, wide surgical excision, antimicrobial agents and immunotherapy have been used with some success in the treatment of pythiosis. Since *P. insidiosum* lack of ergosterol in their cytoplasmic membrane so agents interfering with ergosterol biosynthesis expected to have little effect on *P. insidiosum*. However, combinations of terbinafine and itraconazole reports the clinical successful (1). In this case, the condition of the dog after the treatment was mild improved but unfortunately the dog passed away after the treatment for 1 month.

**Acknowledgement**

We would like thank Dr. Chidchanok Ngamdumrongkiet for the pictures of Fig. 2.

**References**

Modified Blake drain technique in traumatic brain injury craniectomy dog - a case report

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Keywords: traumatic brain injury, craniectomy, drain

Introduction

Dog bite is one of the most common traumatic brain injury (TBI) causing significant morbidity and mortality in small breed group. Animal bite wounds are distinctive as they are puncture type deep wounds which are infected by bite force, with inoculums of pathologic bacteria from the saliva of the attacking dog. Immediate and appropriate treatment is critical to potentiate an acceptable recovery. Accurate and frequent assessment of both systemic and neurological injuries can allow for a successful outcome. Emergency management of an animal with TBI necessitates stabilization of the cardiovascular and respiratory systems with maintenance of blood pressure oxygenation and control infectious. TBI causes primary and secondary brain damages. Primary brain damages occur immediately as the consequence of mechanical impact to the neural tissues at the time of trauma and they ignite complex inflammatory processes which end up to secondary brain damages. Secondary injury occurs hours to day after trauma. Result in oedema, ischemia, increased intracranial pressure (ICP) and decreased cerebral perfusion. The aim of treatment for TBI is the prevention of secondary brain injury. After TBI, the volume of the intracranial contents within the skull may increase due to haemorrhage, oedema or cerebrospinal fluid (CSF) accumulation. The brain has the capacity to tolerate small increases in volume by adjusting the size of one of the three components: brain parenchyma, CSF and blood. This ability to compensate is more effective if the increase in volume occurs slowly.

The Monro-Kellie doctrine for describes the relationship between these components and their ability to compensate for increases in volume within the cranial cavity. With continued elevation of ICP, brain herniation can result. Increase ICP is a life-threatening condition. A patient showing symptoms of increased ICP must get emergency medical help right away.

Surgical intervention is reserved for patients that do not improve or deteriorate aggressive medical therapy. Surgical may be indicated to remove haematomas, relieve ICP, address skull fractures and debridement. Advanced imaging is necessary for surgical planning and is also used in medically refractory patients.

Materials and methods

This 3 months-old intact female crossbreed dog who had succumbed to head bite injuries is presented, contaminated wound with pus on the head (figure 1).

CT scanning is the preferred for imaging bone and identifying areas of acute hemorrhage or oedema (figure 2, 3).

Figure 1: Left head swelling with perforate wound

Figure 2: CT scan identifying areas of acute haemorrhage or oedema

Figure 3: CT scan identifying areas of acute haemorrhage or oedema
Distinctive bite marks diagnostic of canine dentition were present, most prominently on the head. Skull is found fractured to the pieces on its posterior 2/3 aspect of skull, most on the parieto-temporal region with open comminuted depressed fracture (Figure 4) following penetrating injury extending backward and left laterally to involve left parieto-occipital bone (Figure 5). Surgical technique are remove skull fractures (Figure 6) debridement and place Blake drain at left subcutaneous layer (Figure 7). Meninges found lacerated under the fractured skull on left parieto-temporal region. Left lobe of brain is found lacerated on the parieto-temporal region underneath the skull fracture. Three days later, the dog can ambulatory, conscious and eating without esophagostomy tube. Post operative care for 7 days Blake drain removed and 10 days stitches off.

**Results and discussion**

Bite wounds are always considered as complex injuries contaminated with unique polymicrobial inoculum. Typically, skull fractures do not require surgical intervention. However, significantly contaminated, comminuted fractures may require surgical debridement, especially if open. After 1 week the dog improved clinical signs was displayed, the dog became consciousness, and non vocalization. Her circling was absent. The skull bones in young dog is thin and incompletely mineralized making them susceptible to puncture-type fracture with intracranial injury. Penetrating head wounds could present with hematoma, pus, profuse external bleeding, conjunctival haemorrhage, eyelid swelling. Surgical intervention is pursued, aggressive debridement should include removal of all devitalized tissues and bone and should be guided by imaging. In another case we used penrose drain placement. Finally the dog died with encephalitis and wound dehiscence.

Modified Blake drain technique in traumatic brain injury was applied in craniectomy dog with contaminated wound, benefit to control infection in close system for favorable outcome.

**Acknowledgments**

Supported by Critical Care Unit and Neurological center of Kasetsart University Veterinary Teaching Hospital

**References**

Atopic dermatitis in french bulldog: a case report

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Keywords: atopic dermatitis, french bulldog, elimination diet, serum test, intradermal skin test

Introduction

Atopic dermatitis is a reaction pattern that can be caused by food allergens or environmental allergens because it evokes an IgE immune response. As genetic predisposition is expressed in the breed and line, breed predispositions are very significant but varying from one country of origin to another. The disease is commonly found in breeds in America, Europe and Japan including the Sharpei, Fox Terrier, Jack Russell Terrier, Labrador Retriever, West Highland White Terrier, Boxer, Dalmatian and French Bulldog. French Bulldog has significantly showed the disease more than other breeds for both inhalant and food allergy. In most cases, the observations have pruritis and pyotraumatic dermatitis. The goal of this study is to compare the diagnosis of atopic dermatitis by Intradermal Skin Testing, Laboratory Serum Tests (ELISA) and Elimination Diet in French Bulldog.

Materials and Methods

A one-year old, 17 kg, female non-neutered French Bulldog had itchy skin, biting or licking its feet and scratching at its ears for many months. She was initially recommended to take Antihismine for a few months but her condition never improved. The skin examination was later taken and it was found that her skin had multifocal alopecia, mild crusting lesions, epidermal collarettes at ventral area, lichenification at both pinnae and erythema with some crust all interdigital web. Cytology examination revealed moderate bacteria and yeast infection. As a result, the dog was admitted at the hospital for a month in order to pursue elimination diet with hydrolyzed protein commercial food and serum allergy test. She also had taken Cepahlexin 25 mg/kg bid for 14 days, Itraconazole 5 mg/kg bid for 14 days, topical treatment with Chlorhexidine bid and showering with medical shampoo (Malaseb®, BayerDVM) once a week. At the end, she was prepared for intradermal skin test by stop taking antihistamine, antibiotic and antifungal for two weeks.

![Figure 1](image1.png)

**Figure 1** After treatment with antibacterial and antifungal drugs, including start elimination diet, the dog skin was obviously improvement in week 3.

After three weeks of elimination diet, there was significant recovery at her skin. (Figure 1) In week 5, Intradermal skin test was used and it was found that the dog was allergic to *Acarus siro* at level 4, *Blomia Tropicalis* at level 3, *Ctenocephalides* spp at level 2, *Derm Pteronyssinus* at level 2, *Derm Farinae* at level 1, *Brachiaria Mutica* at level 1 and *Paspalum Notatum* at level 1. She had no allergy to *Felis Catos Epitelium* and *Cynodon Dactylon* (Figure 2 and Table 1).

![Figure 2](image2.png)

**Figure 2** Intradermal skin test
Table 1 Intradermal skin test report. Results are on scale of 0 (low) to 4 (high).

<table>
<thead>
<tr>
<th>Latin name</th>
<th>Common name</th>
<th>Testing strength</th>
<th>Grading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Negative control</td>
<td>Diluent</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>2 Positive control</td>
<td>Histamine</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>3 Derm. farinae</td>
<td>House dust mites</td>
<td>250</td>
<td>1</td>
</tr>
<tr>
<td>4 Blomia tropicalls</td>
<td>Storage mites or Mold mites</td>
<td>250</td>
<td>3</td>
</tr>
<tr>
<td>5 Derm. pteronyssinus</td>
<td>House dust mites</td>
<td>250</td>
<td>2</td>
</tr>
<tr>
<td>6 Brachiaria mutica</td>
<td>Para grass</td>
<td>1,000</td>
<td>1</td>
</tr>
<tr>
<td>7 Paspalum notatum</td>
<td>Bahia grass</td>
<td>1,000</td>
<td>1</td>
</tr>
<tr>
<td>8 Felis catus epithelium</td>
<td>Cat dander</td>
<td>1,000</td>
<td>0</td>
</tr>
<tr>
<td>9 Ctenocephalides spp.</td>
<td>Flea</td>
<td>1:1,000 W/V</td>
<td>2</td>
</tr>
<tr>
<td>10 Cynodon dacylon</td>
<td>Bermuda grass</td>
<td>1,000</td>
<td>0</td>
</tr>
<tr>
<td>11 Acarus siro</td>
<td>Storage mites or Mold mites</td>
<td>250</td>
<td>4</td>
</tr>
</tbody>
</table>

According to serum allergy test, it was found that she was allergic to Meadow grass (outdoor allergens) at level 2 and *Derm pteronyssinus* (indoor allergens) at level 2 as well. (Figure 3)

Results and Discussion

After elimination diet, her skin obviously recovered in Week 3. The intradermal skin test and serum allergy test similarly found that she had allergy to *Derm pteronyssinus*. However, there are some inconsistencies in test results. While *Acarus siro* in serum test showed grade 0, intradermal skin test showed grade 4. While *Ctenocephalides* spp. in serum test showed grade 0, intradermal skin test showed grade 2. In conclusion, it is suggestive that this dog should maintain hydrolyzed protein commercial food and prevent any activity on grass field. In addition, the owner should not stock her food no longer than a month in order to prevent storage mites and should keep her environment clean in order to prevent tick and flea.

References

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Bacterial species diversity and antimicrobial resistance distribution in feline clinical samples at a veterinary teaching hospital

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Keywords: methicillin-resistant staphylococci, extended spectrum beta-lactamase, vancomycin resistance, feline, clinical sample

Introduction

Bacterial infection is a common problem in the most of clinical cases for all small animal practitioners. The number of cats in Bangkok city, Thailand is still uncontrollable and many of them become semi-feral or stray cats. There is still not a political plan supported within near future. This also has brought an increase trend of clinical case in veterinary hospitals. Moreover, difficulty of oral antibiotic administration in cats and inconsistency of some owners may drive a selective pressure opportunity resulting consequence of antimicrobial resistant (AMR) distribution in the hospital and public health concern.

In practice, the bacterial diagnosis for Thai veterinarians is still limited since the routine microbiological method cannot provide for identification in all bacterial species. In addition, use of an approved antimicrobial panel for susceptibility determination is not widely used in all diagnostic laboratories. Current knowledge on diversity of bacterial species is majorly relied on clinical isolates. The situation and distribution of AMR from feline isolates would be beneficial higher in treatment and prevention strategies for each veterinary unit within hospital (1). This study aimed to investigate bacterial species from feline clinical isolates and their antimicrobial resistance. We focused on the priority pathogen list based on the World Health Organization (WHO) recommendation (6); methicillin resistant staphylococci (MRS), vancomycin resistant enterococci (VRE), carbapenem resistant enterobactericeae, Acinetobacter baumanii and Pseudomonas aeruginosa (CRE CRA and CRP respectively) and extended spectrum beta-lactamase (ESBL) producing gram negative bacteria.

Materials and Methods

Clinical samples from 137 cat patients were submitted to Veterinary Diagnostic Laboratories and Department of Veterinary Microbiology, Chulalongkorn University, Bangkok from April to December 2016 for culture and antimicrobial susceptibility determination. Histories of patients was systemically recorded included type of diseases, organs, and locations indicated clinical units comprising the sections of surgery, general medicine (OPD), emergency (ER), critical care unit (CCU) and obstetric gynecology and reproductive (OGR) and special clinics; oncology, dermatology, cardiology, urology and feline medicine. All were primarily isolated on basic growth media; blood agar and MacConkey agar. A pure colony represented a main colonization was phenotypically identified its species and antimicrobial susceptibility profiles, by VITEK® automated instrument using ID:GP, ID:GN, AST:GN65 and AST:GP76 cards (biMérieux, France) (5). MRSP were recovered on tryptic soy agar (Difco, France) with 5% sheep blood at 37°C for 24 h. Pure colonies were confirmed the methicillin resistance and ESBL by mecA gene detection and double disk diffusion assay (2,6). Possible associations between occurrence of MRS, ESBL, CRE, CRP and VRE bacteria in each collected units were performed by descriptive analysis.

Results and Discussion

A total of 137 bacteria were isolated from all feline clinical samples dividng 70 Gram negative and 67 Gram positive bacteria. Most of samples were derived from surgical unit, medical unit and OGR, respectively. The lists and number of bacterial identification are presenting in Table 1. Overall, 17 Gram negative and 28 Gram positive of bacterial species were successfully identified by the automated machine. For Gram negative
bacteria, *Escherichia coli* were commonly found in all sections which could be acted as contamination and pathogen depended on host immune status (7). *P. aeruginosa* were mainly detected from the samples from surgical unit, OPD and feline medicine, respectively. Amikacin had the most efficacies against *P. aeruginosa*, meanwhile, about half of them were susceptible to gentamicin, enrofloxacin and imipenem. Most of *Klebsiella pneumoniae* ssp. *pneumonia* was recovered from the samples from OGR. ESBL-producing *Enterobacteriaceae* were detected in *E. coli* (4 of 17) at OPD, OGR, special clinics of cardiology, urology and feline medicine and in *Klebsiella pneumoniae* (n=2) sampled at OGR. This finding is an awareness of high risk AMR pathogen in all positive sections. Moreover, the five *E. coli* and 3 *K. pneumonia* were confirmed as CRE presenting at almost hospital sections. Interestingly, *A. baumannii* complex presenting multidrug resistance were found at OPD, OGR, surgical unit, feline medicine and oncological clinic which confirmed the wide distribution of this harmful AMR bacteria as well as that of human hospital (8).

For Gram positive bacteria, *Staphylococcus* spp. was the most of common genus (39 of 67). *S. pseudintermedius, S. chromogenes* and *S. schleiferi* were the predominant member on cat skin (Table 1) as well as in dogs. *S. aureus* was also isolated from feline dermatitis, wound associated skin cancer and surgical site infection, but there was no detection of MRSA in this study. However, the dramatic prevalence of MRS by oxacillin resistance was found at 71% of skin samples and 5 of 7 *S. pseudintermedius* were MRSP with mecA positive indicating failure of all beta-lactam antibiotic against the bacteria (3). This highlighted a very high occurrence of methicillin resistant trait in the clinical isolates which implied in the possible of AMR bacteria transmission from clinical manipulation or sample collection to veterinarians. Beside, MRS distributing in animal hospital environment could intervene in the interpretation and therapeutic decision (4). On the other hand, *Enterococcus faecalis* was the most frequent species that distributed in the samples from all hospital units and vancomycin resistant enterococci (VRE) was found at ORG. The other bacteria were identified in 16 species including the species member belonging to genus *Streptococcus* (n=6). Surprisingly, 40-42% of Gram positive bacteria were resist to erythromycin, fluoroquinolone and clindamycin. VRE, CRE, ESBL are set into the list of critical level that pose a particular threat in hospitals, nursing homes, and among patients (6). The high occurrence and distribution of the critical AMR pathogen must be prioritized in consideration of veterinary hospital policy.

**Conclusion**

At least 46 species of bacteria were identified from 137 feline clinical samples at a veterinary teaching hospital, Bangkok, Thailand. Over 70% of isolates were presented multidrug resistant bacteria. Finding of MRSP, VRE, CRE and ESBL in the hospital dramatically revealed a number of critical pathogen wide distribution within hospital. Our result supports a need to determine antimicrobial susceptibility in diagnostic process which is very benefit to treatment and prevention strategies.

**Acknowledgements**

This work was supported by Diagnosis and Monitoring of Animal Pathogen-Special Task Force for Activating Research (DMAP-STAR), Chulalongkorn University. The authors also thank Mr. Pongthai Boonkham for technical supports.

**References**

Table 1. List of bacteria from feline clinical sample.

<table>
<thead>
<tr>
<th>Order</th>
<th>Bacteria</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Achromobacter xylosoxidans</em></td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td><em>Acinetobacter baumannii complex</em> (1 CRA)*</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td><em>Aeromonas hydrophila/caviae</em></td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td><em>Aeromonas sobria</em></td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td><em>Burkholderia cepacia</em></td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td><em>Citrobacter freundii</em></td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td><em>Enterobacter cloacae complex</em></td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td><em>Escherichia coli</em> (4 ESBL, 5CRE)*</td>
<td>17</td>
</tr>
<tr>
<td>9</td>
<td><em>Klebsiella pneumoniae</em> ssp pneumonia* (2 ESBL, 2 CRE)*</td>
<td>8</td>
</tr>
<tr>
<td>10</td>
<td><em>Methylobacterium</em> spp</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td><em>Pasteurella canis</em></td>
<td>6</td>
</tr>
<tr>
<td>12</td>
<td><em>Pasteurella multocida</em></td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td><em>Pantoea</em> spp</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td><em>Proteus mirabilis</em></td>
<td>6</td>
</tr>
<tr>
<td>15</td>
<td><em>Pseudomonas aeruginosa</em> (3 CRP)*</td>
<td>11</td>
</tr>
<tr>
<td>16</td>
<td><em>Rhizobium radiobacter</em></td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td><em>Salmonella group</em></td>
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</tr>
<tr>
<td>18</td>
<td><em>Serratia marcescens</em></td>
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<table>
<thead>
<tr>
<th>Gram positive</th>
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<tbody>
<tr>
<td>19</td>
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<tr>
<td>20</td>
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<td>40</td>
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<tr>
<td>41</td>
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<tr>
<td>42</td>
</tr>
</tbody>
</table>

43 *Streptococcus constellatus ssp constellatus* 2
44 *Streptococcus dysgalactiae ssp equisimilis* 1
45 *Streptococcus equinus* 1
46 *Streptococcus pluranimalium* 1

Total 137

*indicates the priority list of AMR bacteria in critical level by WHO.
A case report: diagnosis and treatment of ureterolithiasis in cat

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Keywords: ureterolithiasis, calcium oxalate, ureterotomy, feline, cat

Introduction

The most common urolith type in the feline upper urinary tract is calcium oxalate (1) (2). The ureterolithiasis tends to develop in middle age to older cat. The clinical signs are often related to uremia. Cats may present with hematuria without concurrent lower urinary tract signs such as stranguria or pollakiuria (1). Feline ureteral obstruction may show polyuric, oliguric or produce normal urine volumes depending on the degree of obstruction. The abdominal pain in cats are variable (1). Diagnostic imaging should be performed, including survey abdominal radiography, abdominal ultrasound and additional imaging modality, such as contrast radiography (2). Selecting the method of treatment is based on the type, size and the complication of the ureterolith with kidney function (2). The aim of this case report is to describe the diagnostic approach and management outcome of ureterolithiasis in cat.

Materials and Methods

An 8 year-old, persian breed, 2.7 kilograms bodyweight, female cat was presented with a chief complain of a 1 year history of intermittent red urine. She was previously treated with antibiotic (amoxicillin/clavulanic acid), therapeutic diet (urinary S/O) and fluid therapy (subcutaneous fluid) for 1-week prior. She was referred to the author with red urine problem. She has been fed dry urinary S/O and cat snacks at home. She has been kept indoors, and was dewormed and vaccinated regularly. Every vital sign were normal. In this case, a blood sample was collected to evaluate complete blood count, blood parasite, blood chemistry profile and FIV/FeLV to rule out other systemic disease. The initial test results were normal. An investigation of red urine was then performed by a collection of voided urine for urinalysis (Combur, sediment, USG) and an abdominal ultrasound. The urinalysis after antibiotic and fluid therapy revealed it was inappropriately diluted (SG=1.012). The urine pH was 7, RBC was too numerous to count and WBC counted 15-20 cells/HPF. The abdominal ultrasound result revealed numerous ureteric calculi and marked dilation of right renal pelvis and right ureter (Fig. 1). Based on the results, ureterolithiasis was suspected to be the cause of hematuria and urinary tract inflammation. Further diagnosis plan was to perform intravenous pyelogram to localize the site of ureteral obstruction before surgery. The contrast media accumulated in the right ureter. Urine flow obstruction at right ureter (Fig. 2), caused by ureteral calculi was diagnosed. There was evidence of right ureteral obstruction so surgical removal of ureteral calculi was considered.

Surgical treatment was performed by ureterotomy (Fig. 3). Abdominal fluid and urine samples were sent for bacterial culture and drug sensitivity test and the calculi were sent for analysis. An antibiotic (imipenem dose 5 mg/kg IV q 8 hr) was used prophylactically in case peritonitis was presented by contamination of urine in abdomen. Painkiller (tramadol dose 4 mg/kg SC q 12 hr) was used to alleviate pain from post-operative care. The diet given while the patient was admitted was urinary S/O.

Figure 1. The abdominal ultrasound result revealed ureteral calculi and marked dilation of right renal pelvis and right ureter.

Figure 2. The intravenous pyelogram, The contrast media were accumulated in right ureter. Ureteral calculi caused the urine flow obstruction in right ureter.
**Results and discussion**

1 week after the ureterotomy, her urine was clear yellow. The abdominal ultrasound revealed that the dilation of right renal pelvis and right ureter still persisted, but the kidney profile results from blood samples were normal.

The stone analysis result was calcium oxalate. The medical dissolution of calcium oxalate urolith has not yet been developed and there was also evidence of right ureteral obstruction, so surgical removal of ureteral calculi was appropriate. Calcium oxalate urolith formation occurs when the urine is oversaturated with calcium and oxalic acid. Formation of these minerals is not fully understood yet. Nutrition and adequate water intake should be consider to prevent recurrence. The baceterial culture and drug sensitivity from abdominal fluid revealed *E.coli* with sensitivity to imipenem, which was administered as previously described. But there was no growth of organism from urine culture.

1 month later, the abdominal ultrasound revealed no evidence of dilation of renal pelvis and ureter (Fig. 4). There was no recurrence of red urine. Thus, monitoring appointment was due in the next 3 months.

**Acknowledgements**

Staff of Thonglor Pet Hospital, Bangkok, Thailand

**References**

Computed tomography in retrobulbar squamous cell carcinoma in a dog: a case report

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Keywords: dog, computed tomography, retrobulbar mass, squamous cell carcinoma, neoplasm

---

**Introduction**

Retrobulbar tumors can occur from any orbital tissue, which rarely in dogs and cats.1 Squamous cell carcinoma (SCC) is a neoplastic condition of squamous epithelial cells. SCC is less frequent in dogs and usually superficial which generally affecting any structure of the eye globe and adnexa. Most of these tumors are benign and rarely metastasize to other organs.2

The case report presented here describes the clinical and imaging finding of retrobulbar squamous cell carcinoma in a dog.

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**Material and Methods**

A thirteen-year-old intact male 19.5 kilograms mixed breed dog was presented at small animal teaching hospital, Chulalongkorn University with a chief complaint of chronic wound at the right eye for 2 months. The dog had signs of right frontal swelling with mucopurulent exudates and both dry eye (Fig. 1). The imaging finding of the skull was performed and surgical excisional biopsy mass of the right eye with enucleation was decided for this dog. After the surgery, the Computed Tomography (CT) scan was also performed. Finally, the dog was scheduled for a followed up at the oncology unit with a plan for chemotherapy treatment.

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**Results and Discussion**

Ocular neoplasms can occur primary or metastatic into the ocular tissues. Despite there are often found histologic evidence of malignancy, most primary ocular neoplasms are benign in behavior. Nevertheless, their expansive growth induces significant modification within the eye that may necessitate enucleation.3

The radiographic finding of the skull showed a lobulated soft tissue opacity mass at right frontal–orbital region (3.5x6.6 cm) with no evidence of bone lysis or periosteal reaction. The ultrasonographic finding showed signs of an irregular shape and margin, homogenous hyperechoic, 4.5x5.6x3.4 cm retrobulbar mass of the right eye which compressed the globe to the lateral canthus. (Fig. 2.) Squamous cell carcinoma was histologically diagnosed from excisional biopsy and the cytology result of the submandibular lymph node was lymphadenitis. After the surgery, the dog had signs of epistaxis from both nares and seizure. The dog also had planned for chemotherapy treatment with Paclitaxel at oncology unit.

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**Figure 1** The dog had signs of right frontal swelling with mucopurulent exudate.

**Figure 2** A lobulated soft tissue opacity mass at right frontal–orbital region (3.5x6.6 cm).

SCC may occur in young animal, but the incidence increases with age usually 6-10 years old in dogs which not related to this case.4 However, the clinical sign and in the present case stimulated...
well with the previous report included unilateral exophthalmos, neuro-ophthalmic effects such as lack of menace response, pupillary light reflexes. The radiographs of skull should be done to revealed bone alteration and thoracic part to find out possible metastasis which there are no evidence of lung metastasis in this case. The ultrasonography should be done to confirm the presence of a retrobulbar mass and excluded abscess, cyst and mucocele. Orbital CT scan is important at least three areas for the management of patients with orbital neoplasms. First, the ability to reformat axial images in different planes for surgeon to preoperatively evaluate the relationship between the mass and other orbital structures. Second, to check bone involvement and to located area of tumor involvement. Third, to monitored fine needle biopsy. However this case was performed the CT scan after the surgery, which demonstrated right temporal, orbital and intranasal mass with extensive bone lysis (Fig. 3), intracranial invasion of the mass (Fig. 4) with compensated brain herniation (Fig. 5), regional lymphadenopathy which reactive or metastasis was suspected.

![Figure 3](image3) CT scan showed a right temporal, orbital and intranasal mass with extensive bone lysis.

![Figure 4](image4) CT scan showed an intracranial invasion of the mass.

The histopathological result from surgical biopsy consisted of a poorly-circumscribed, expansile proliferation of neoplastic squamous epithelial cells. The neoplastic cells were arranged in nests and cords by fine fibrous connective tissue. The neoplastic cells were basophilic ovoid to polygonal, contained a small to large amount of eosinophilic cytoplasm, and exhibited asynchronous squamous differentiation. The nuclei were round to oval, had finely stippled chromatin, and contained 1-2 prominent nucleoli. Mitotic figures were often seen. There was moderate anisokaryosis. Occasionally at the periphery of the mass, neoplastic cells exhibited central cornification (keratin pearls). Many segmented neutrophils were observed at the surface and can final diagnosis to be squamous cell carcinoma, well differentiated type. (Fig. 6)

![Figure 5](image5) CT scan showed a compensated brain herniation.

![Figure 6](image6) The histopathological result showed expansile proliferation of neoplastic squamous epithelial cells with keratin pearls.

As a result, imaging is necessary for diagnosis and monitoring effected area. Confirmatory diagnosis could be achieved by histopathological evaluation from surgical biopsy.
Acknowledgements

We wish to thank Dr. Aut Sawangwong and Dr. Onrampa Srimuang for the clinical signs figures. Dr. Titiphan Trakanpol for anesthesia this case while doing the CT scan. Dr. Ratanopol Assawawiroonhakarn and Dr. Sirichai Techarungchaikul for their check grammar and spelling of this manuscript. Dr. Katriya Chankow for the histopathological figure. Also, we wish to thank Ophthalmology unit for the information of this case.

References

Doxorubicin for the treatment of cutaneous transmissible venereal tumor in dog: a case report

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Keywords: dog, doxorubicin, cutaneous transmissible venereal tumor

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Introduction

Canine Transmissible Venereal Tumor (TVT) is a naturally occurring neoplastic disease usually involves the external genitalia mucosa of male and female dogs. TVT may also develop at extragenital sites, metastasis is reported to occur in <5% of the case. Metastasis of TVT to the skin, regional lymph node, tonsils, eye, brain, pituitary, nose, tongue, lips, mammary region and thoracic-abdominal organ has been reported. The most effective treatment is chemotherapy and single agent therapy with vincristine sulfate is the most effective, resulting in the good outcome in extragenital metastasis TVT patients. Other single agent and multi-agent protocol have been used in resistant cases.

Materials and methods

A twelve-year-old, female Miniature pincher dog was presented to the Kasetsart University Veterinary Teaching Hospital for a problem of numerous skin mass. On presentation, the dog had multiple mass at mammary region, vulva, inguinal region and median thigh of both high limb. The thoracic radiograph and abdominal ultrasonography not found abnormal sign. The skin biopsy was performed and the result is TVT, the dog received vincristine sulfate (0.7 mg/m²) intravenously every week. After four treatment of vincristine sulfate administration, cutaneous mass are same amount and slightly reduced sized. Therefore the chemotherapeutic treatment switched to doxorubicin, the dog received doxorubicin (25 mg/m²) intravenously, every 3 weeks for five total treatments.

Results and discussion

After doxorubicin administration, the dog responded well and presented complete tumor regression. After 20 months of follow-up, no recurrent cutaneous mass was found. Vincristine sulfate have been reported to produce excellent response in canine TVT treatment. In this case, the dog showed minimal response to vincristine treatment and the surgical removal could not be remove all cutaneous mass. It is necessary to use other chemotherapeutic agents for treatment. Previous studies showed several other chemotherapeutic agents for canine TVT including cyclophosphamide, methotrexate, vinblastine and combination protocol of these drugs. There are no reports of good chemotherapeutic response when prepared with vincristine sulfate. This report intended to inform doxorubicin has good response in treatment of canine TVT

Acknowledgements

We sincerely acknowledge the veterinarians, staffs, patients and owner-pets of Kasetsart University Veterinary Teaching Hospital

Reference

Introduction

Ceruminous adenoma (ceruminous cystomatosis, apocrine cystadenomatosis) is a rare neoplastic otic disease of the feline ear of unknown etiology. Ceruminous adenoma may develop as a sequela to otitis externa, a senile degenerative change or a congenital condition. The most common neoplasm of the ear canal is ceruminal gland in origin. These neoplasms are more common in the cat than in the dog. One report noted that tumors of the ceruminous glands accounted for 40.7% of the histopathology of external ear masses evaluated in cats and are most often benign. Malignant ceruminous gland tumors tend to be ulcerative and infiltrating rather than obstructive/occlusive. Ceruminous glands are located in the deeper dermis of the external ear canal. They are believed to be modified apocrine sweat glands that secrete waxy cerumen instead of watery sweat. In the normal dog and cat the ducts of the ceruminous glands are virtually non-visible. The classic appearance of ceruminous hyperplasia is multiple, often numerous, punctuate nodules or vesicles, in the external ear canal and inner pinna. They are dark blue, brown or black. If they ruptured, brownish exudate can be easily seen. They are usually confined to the external ear canal and rarely extend beyond the vertical canal.

Benign ceruminous gland neoplasia tends to present with signs of obstructive otitis externa, including pruritus, head shaking, malodor, otorrhea, and occasionally hemorrhage caused secondary bacterial infection and require a proper treatment.

Diagnosis is based on cytology, histological examination of biopsied tissue samples. Bacterial culture and sensitivity can reveals a variety of bacteria such as *Staphylococcus intermedius*, *Pseudomonas* spp., *Proteus* spp. and *Escherichia coli*. Treatment goal is to control a secondary infection and decrease pain for improving quality of life.

Materials and Methods

An 4 cats were presented to the hospital by chronic otitis externa with an obvious brownish exudate of unilateral and bilateral ears. Mostly shown a chronic inflammation that involved pinna. The signs were a dark blue or brown to black multiple mass (figure A). All cats has history of pruritic ears and head shaking. Previous treatment were on prolong both of antibiotics orally and topically. Diagnosis started with digital otoscope (Human UB camera) to examine inside ear canal to check possibility of tympanic membrane damage and to estimate severity of chronic signs. Taking a sample from exudate for cytology and bacterial culture and sensitivity. Cleaning ear by pouring Diethylene glycol monoethyl ether and Salicylic Acid solution in, massage vertical canal gently about 3-5 minutes each time, then wipe with cotton swab until solution turns to clear-colored. Re-examine inside canal again and repeat procedure as necessary.

A cytology reveals an overwhelm of cocci bacteria. Bacterial culture and sensitivity of 3 out of 4 cases shown an infection of *Staphylococcus intermedius*, another one shown no growth, susceptible to Gentamycin. Histological examination shown no evedence of tumor cells. The treatment is to give Gentamicin sulfate, USP; Betamethasone Valerate, USP; and Clotrimazole, USP Oinement (Otomax) twice a day for 2 weeks and 2 to 3 times per week of ear cleaning. Long termed treatment with ear...
cleaning alone is best to control and manage otitis externa cases with minimizing the usage of systemic medication once secondary bacterial infection already been cleared.

**Results**

Remission signs of exudate and smaller of a mass were gradually improved within 1-2 weeks with dramatically decrease in pruritus and head shaking. However, recurrence of otitis externa such as small blue to dark mass, erythema pinna and stenotic canal still can be seen due to inadequate ear cleaning. Thus, a proper management is a key to success in these cases.

**Conclusion**

Chronic otitis externa with secondary bacterial infection in cat can caused by many underlying diseases including ceruminous cystomatosis. Most of patients need variety of prolong treatment and management. To comfort these patients by topically solution can be useful in term of life-long management and minimizing antibiotics systemically. Anyway, underlying diseases still need to be solved all together with this topically one.

**References**

Detection of feline infectious peritonitis virus in body effusion using an immunofluorescence assay

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Keywords: feline infectious peritonitis, immunofluorescence, effusion, macrophage

Introduction

Feline Infectious Peritonitis (FIP) is a fatal infectious disease which is distributed worldwide in domestic cats. Affected cats may have clinical signs of an effusive form, characterized by an accumulation of non-septic exudates in the body cavity, including thoracic, peritoneal, or pericardial cavity (1). A non-effusive form which is typically characterized by pyogranulomatous lesions on several organs, such as kidney, brain eyes, etc. may be developed in some cats. (2). The confirmation test of FIP relies on typical findings on a histological examination combined with a positive result of immunohistochemistry on tissue lesions. However, the test is limited to postmortem examination. History, clinical signs, blood profile, analysis of effusions, Rivalta’s test, and antibody detection have been used for diagnosis in clinical practice, but they are not specific for FIP (3). In previous studies, an immunofluorescence assay (IFA) has been shown to be highly specific for FIP (3, 5), but this test is still unavailable in Thailand. The objective of this study was to demonstrate the clinical utility of an IFA for detection of FIP virus in body effusions of cats in Thailand.

Materials and methods

Effusions were obtained from 17 cats with a suspicion of FIP that were presented to the Small Animal Veterinary Teaching Hospital of Chulalongkorn University (n=14) or private veterinary hospitals (n=3). Cats were diagnosed FIP when the cause of effusion could not be determined based on clinical pathology, imaging findings, echocardiogram, and microbiological analysis, and the effusive sample was positive on IFA. Effusions were stored at 4°C until use. An effusive sample was centrifuged at 1,500 x g for 5 min. The cell-rich pellet was smeared on a glass slide, followed by air dried and then fixed with an acetone/methanol solution for 15 min. After washing, the smear was incubated with a polyclonal anti-feline corona virus (FCoV) antibody conjugated with FITC in a humid chamber at 37°C for 40 min. After washing, the slide was mounted with a medium containing DAPI. A cover slip was applied on slide, and the slide was sealed and stored at 4°C until analyzed. FIP virus was observed under an inverted fluorescence microscope (excitation 475–494 nm, emission 503–533 nm). A sample was defined positive when a granular cytoplasmic green fluorescence in macrophages was present (Fig 1).

Results and discussion

Of a total 17 cats, 10 were diagnosed as FIP, while 7 were diagnosed as restrictive cardiomyopathy (n=1), lymphoma (n=3), feline leukemia virus (n=2) and cholangiocarcinoma (n=1). FIP was commonly found in young, male cats which were in multi-cat households. The IFA results showed that a positive FCoV was detected as green fluorescence staining in the cytoplasm (Fig. 1A) and blue fluorescence staining in the nucleus (Fig. 1B) of the macrophage. There were 9 and 3 cats that had IFA positive results in the FIP and non-FIP groups, respectively. The sensitivity, specificity, NPV and PPV were shown in Table 1. Of the results, the diagnostic sensitivity (90%) of this study was very high when compared to previous studies (4-5), which resulted in a high NPV (80%). However, a false negative was also found. It was possible that the sample was degraded or there was very low number of macrophages in the sample. It was shown that the diagnostic specificity was low (57%) when compared to previous studies which had the specificity between 71.4%-100% (3, 5). The major possibility of false positives was a non-specific binding of the polyclonal anti-FCoV antibody. Because of a low PPV, a positive IFA result should be interpreted with caution, and diseases that can develop effusions in the body cavity must be ruled
out. In addition, limitations of this study are a relative small sample size, and FIP cats may be misclassified due to lack of necropsy findings. In conclusions, the immunofluorescence assay has 90% sensitivity and 57% specificity for diagnosis of FIP, and the test should be used to detect FIP in effusions from cats that are suspected of having FIP.

**Figure 1** A positive result of IFA (A) FCoV (green fluorescence) in an intracytoplasmic macrophage (B) A nuclear staining of macrophage with DAPI (blue fluorescence)

**Table 1** Prevalence of FIP, diagnostic sensitivity, diagnostic specificity, negative predictive value (NPV) and positive predictive value (PPV) of the IFA

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of FIP</td>
<td>59</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>90</td>
</tr>
<tr>
<td>Specificity</td>
<td>57</td>
</tr>
<tr>
<td>NPV</td>
<td>80</td>
</tr>
<tr>
<td>PPV</td>
<td>75</td>
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**References**

Intrahepatic arterioportal fistula in cat: case report

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Keywords: cat, intrahepatic arterioportal fistula

Introduction

Seethao is 6-month old, male none-castrated, 5 kilograms, a Thai cat. He came to the Small animal hospital of the faculty of Veterinary Science, Chulalongkorn University with abdominal distension. Other kittens in the same litter did not show signs of abdominal distension. On physical examination, abdominal fluctuation was palpated. The cat was sent for abdominocentesis and 649 ml of clear yellowish fluid was measured. The fluid was negative for Rivalta test. Moreover, the fluid was also sent for fluid analysis and bacterial culture. Blood collection revealed elevated WBC and ALT, which were 28,600 cell/microliter and 131 units, respectively. The cat was treated with Enrofloxacin. Ascites was detected from radiography. Intrahepatic portal distension/aneurysm was found from ultrasonography, which was consistent with intrahepatic shunt and extrahepatic acquired shunt. CT scan showed arterioportal fistula with intrahepatic portal aneurysm and multiple acquired portal collateral circulation.

Materials and methods

Seethao is 6-month old, male none-castrated, 5 kilograms, a Thai cat. He came to the Small animal hospital of the faculty of Veterinary Science, Chulalongkorn University with abdominal distension. Other kittens in the same litter did not show signs of abdominal distension. On physical examination, abdominal fluctuation was palpated. The cat was sent for abdominocentesis and 649 ml of clear yellowish fluid was measured. The fluid was negative for Rivalta test. Moreover, the fluid was also sent for fluid analysis and bacterial culture. Blood collection revealed elevated WBC and ALT, which were 28,600 cell/microliter and 131 units, respectively. The cat was treated with Enrofloxacin.

Results and discussion

Abdominal radiography

Figure1: On lateral and ventrodorsal view show increase opacity of abdomen with homogeneous opacity; ascites was suspected

Abdominal ultrasonography

Figure2: There is large tortuous vessel in right medial lobe of liver extend from distended portal vein

Figure3: There is connection between intrahepatic vein and abnormal vessel
**Result and discussion**

Intrahepatic arterioportal fistula (IHAPF) is a congenital or acquired condition in which a circulatory shunt forms between the hepatic or portal vein within the liver. IHAPF extremely rare in cats. Only four cases of IHAPF have previously been described in cat, whereas congenital IHAPF has been reported in 18 human cases. Both congenital and acquired cases have been reported in people, but almost all reported cases in dogs and cats have been congenital. Clinical sign of this case were loss of vigour, decreased appetite and ascites. The previous case report was treated by coil embolisation.

**Acknowledgement**

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**Reference**