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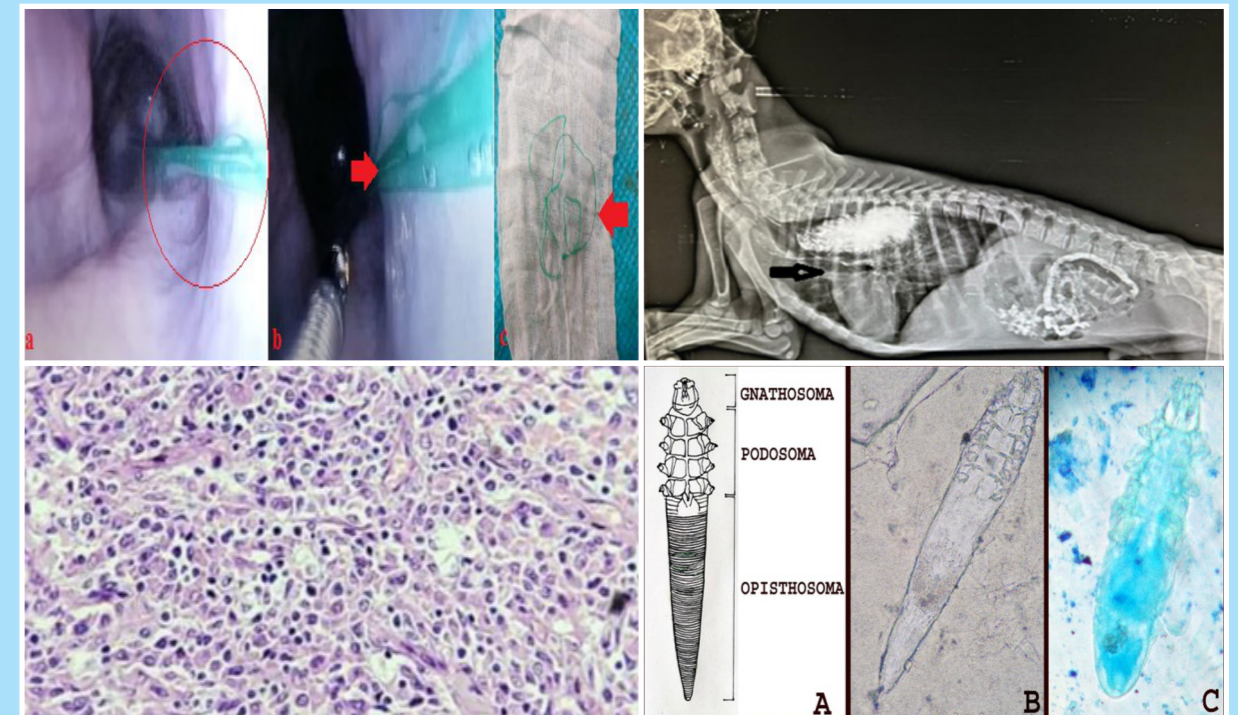
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Epidemiological studies of canine ehrlichiosis and babesiosis in Andhra Pradesh

B Mounika¹, Y Chaitanya², K Sudhakar Goud³ and L Jeyabal⁴

Department of Veterinary Medicine,

NTR college of Veterinary Science, Gannavaram- 521102

Sri Venkateswara Veterinary University, Tirupati, Andhra Pradesh

¹PG scholar, Department of veterinary Medicine, CVSc, Tirupati

Email: mounibana17@gmail.com

²Assistant Professor, Department of Veterinary Clinical Complex, NTR C.V.Sc, Gannavaram

³Assistant Professor, Department of Veterinary Medicine, C.V.Sc, Tirupati

⁴Associate Professor, Department of Veterinary Clinical Complex, NTR C.V.Sc, Gannavaram

Abstract

The present study was aimed to report the prevalence of canine ehrlichiosis and babesiosis in dogs. Overall prevalence of canine ehrlichiosis and babesiosis was 28.23 per cent (35/124) based on polymerase chain reaction (PCR). Among 35 dogs, 20 (57.14%) were affected with canine ehrlichiosis, 11 (31.43%) with canine babesiosis and 4 (11.43%) with concurrent ehrlichiosis and babesiosis. Canine ehrlichiosis (45%) and babesiosis (63.64%) was found to be higher in dogs below 2 years of age. Breed wise prevalence of canine ehrlichiosis and canine babesiosis was highest in Labrador retriever. The occurrence was higher in males (68.57%) compared to females (31.43%) in canine ehrlichiosis and babesiosis.

Keywords: Epidemiology, Incidence, Canine Ehrlichiosis, Babesiosis

Introduction

Tick borne diseases are emerging problem worldwide in pet animal practice. Ticks are notorious vectors of various pathogenic protozoa, rickettsiae, bacteria, and viruses that cause serious and life-threatening illnesses in animals (Aleksiev *et al.*, 2001). Hot and humid conditions favours the proliferation of tick population, tick borne diseases like ehrlichiosis and babesiosis are of significant concern in tropical countries like India., as they are transmitted mainly by the brown dog tick, *Rhipicephalus sanguineus* (Shaw *et al.*, 2001). *Rhipicephalus* is the most common tick present in urban India (Abd Rani *et al.*, 2011). *Rhipicephalus (Boophilus) microplus*, *R. sanguineus* and *Hyalomma anatolicum* species are reported in 24, 21 and 20 states of India, respectively (Ghosh and Nagar, 2014). Hence the incidence of tick-borne disease also varies according to abundance of parasitic burden. The variation in the occurrence might be attributed to sample size, geographical area, climatic conditions which directly influence the tick population, time of sample collection, sub clinical infection, immune status of the host and other managemental practices in different parts of India (Mahalingaiah *et al.*, 2017). Diagnosis of

the haemoparasitic diseases is challenging due to their different phases and multiple clinical manifestations. Traditional techniques like haematology, blood smear examination, serology and isolation were valuable tools for diagnosis of haemoparasites (Harrus and Waner, 2011). Molecular techniques like polymerase chain reaction was sensitive and specific diagnostic method in the diagnosis of canine ehrlichiosis and babesiosis. Hence, the present study was conducted to record the occurrence of canine ehrlichiosis and babesiosis in dogs by PCR.

Materials and Methods

During the study period that was carried out at Veterinary Clinical Complex, College of Veterinary Science, Tirupati and NTR College of Veterinary Science, Gannavaram, from february 2023 to november 2023. A total of 2,398 dogs were screened for canine ehrlichiosis and babesiosis. The age, gender and breed wise incidence was recorded during present study. Primary screening of dogs was done based on history, clinical signs, lymphadenopathy, tick infestation and blood smear examination. Blood was collected aseptically from cephalic and sephanous vein in EDTA vacutainers and stored at 4°C for DNA extraction. Thin peripheral blood smear was made from whole blood for microscopic examination. Rapid diagnosis was carried out by

using Rapid Ab test kit as per protocol recommended by the manufacturer (J&G BIOTECH LTD). Genomic DNA was extracted from 200µl of stored blood using HiPurA® Blood Genomic DNA Miniprep Purification kit as per manufacturer protocol. PCR was carried out with a reaction mixture of 20µl using (ECA-F): 5' AACACATGCAAGTCGAACGGA3' and (HE3-R): 5' TATAGGTACCGTCATTATCTTCCCTAT3' primers for *E. canis* (Wen *et al.*, 1997) targeting a 16S rRNA gene and (Ba103F): 5' CCAATCCTGACACAGGGAGGTAGTGACA 3' and (Ba721R): 5' CCCCAGAACCCAAAGACTTTGATTTCTCTCAAG 3' primers for *Babesia* sp. (Azhahianambi *et al.*, 2018) targeting a 18S rRNA gene.

Results

Out of 2,398 dogs, 124 were identified to have canine ehrlichiosis and babesiosis based on the history and clinical signs and blood smear examination. The identified cases were subjected to haemato-biochemical and urinalysis to assess the renal function and PCR analysis for further confirmation. In the present study, 35 dogs were confirmed with ehrlichiosis and babesiosis based on PCR, thus representing the overall incidence of 28.23 per cent. Out of 35 affected dogs, 20 (57.14%) had canine ehrlichiosis, 11 (31.43%) dogs affected with canine babesiosis and 4 (11.43%) dogs with concurrent ehrlichiosis and babesiosis (Table 1 and Figure 1).

The age wise incidence of canine ehrlichiosis and canine babesiosis was found to be higher in dogs less than 2 years of age (51.43%) followed by dogs aged in between 2-4 years (20%), 4-6 years (11.43%), 6-8 years (8.57%), 8-10 years (5.71%) and was less in dogs above 10 years of age (2.86%). The occurrence of canine ehrlichiosis was higher in dogs less than 2 years (45%) followed by 30 per cent in dogs aged between 2-4 years, 10 per cent in dogs aged between 4-6 years and 5 per cent each in dogs aged between 6-8 years, 8-10 years and 10-12 years. Higher occurrence of canine babesiosis was observed in dogs less than 2 years of age (63.64%) followed by 2-4 years, 4-6 years, 6-8 years and 8-10 years (9.09%) each. In concurrent infection, higher occurrence was noticed in dogs less than 2 years of age (50%) followed by 4-6 years and 8-10 years (25%) each (Table 2).

Out of 35 affected dogs with ehrlichiosis and babesiosis, 64.52 per cent (20/35) were male and 35.48 per cent (11/35) were female. Canine ehrlichiosis was recorded in 65 per cent (13/20) of the male dogs and 35 per cent (7/20) of female dogs, while canine babesiosis was more in males (63.34%) than in female dogs (36.36%) and in concurrent infection males (75%) were more affected than females (25%) (Table 3).

The breed wise incidence of canine ehrlichiosis and babesiosis was recorded high in Labrador retriever (48.57%) followed by Pomeranian (11.43%), Dobermann (8.57%), Golden retriever, Pug, German Shepherd, Mongrel (5.71%) each, followed by others. In our study, higher occurrence of canine ehrlichiosis was noticed in Labrador retriever (45%) followed by Pomeranian (15%), Mongrel (10%), Dobermann, Golden retriever, Pug, German Shepherd, Beagle and Belgian Shepherd (5%) each. Among the dogs with canine babesiosis, higher occurrence was observed in Labrador retriever (36.36%) followed by Dobermann (18.18%), Pomeranian, Golden retriever, Pug, German Shepherd and Shih Tzu (9.09%) each. All the concurrently infected dogs were Labrador retriever (Table 4).

Discussion

The incidence of canine ehrlichiosis and babesiosis was 28.23 per cent in the present study which might be due to hot and humid climate favouring the development, survival of tick population and increased urbanisation (Bayer, 2013). Among 35 dogs, 20 (57.14%) were affected with canine ehrlichiosis in the present study. Various studies had been carried out regarding the occurrence of *E. canis* and was reported to be 50 per cent (49/98) in Chennai (Lakshmanan *et al.*, 2007) and 20.6 per cent from four different regions of India (Abd Rani *et al.*, 2011). The variation in the occurrence might be attributed to sample size, geographical area, climatic conditions which directly influence the tick population and time of sample collection. Higher occurrence might be due to the fact that the study was carried out in dogs referred to the veterinary clinics presented with clinical manifestations consistent with canine ehrlichiosis (Milanjeet *et al.*, 2014).

Table I: Occurrence of canine ehrlichiosis and babesiosis

S.No	Total No. of dogs screened	No. of dogs affected	Percentage Affected	Canine Ehrlichiosis	Canine Babesiosis	Concurrent infection
1.	124	35	28.23%	20(57.14%)	11(31.43%)	4(11.43%)

*Figures in parenthesis indicates percentage

Table II: Age wise occurrence of canine ehrlichiosis and babesiosis

S.No	Age group	Number of dogs affected	Canine ehrlichiosis (n=20)	Canine babesiosis (n=11)	Concurrent infection (n=4)
1.	Up to 2 years	18(51.43%)	9(45%)	7(63.64%)	2(50%)
2.	2-4 years	7(20.00%)	6(30%)	1(09.09%)	-
3.	4-6 years	4(11.43%)	2(10%)	1(09.09%)	1(25%)
4.	6-8 years	3(08.57%)	1(5%)	1(09.09%)	1(25%)
5.	8-10 years	2(05.71%)	1(5%)	1(09.09%)	-
6.	10-12 years	1(02.86%)	1(5%)	-	-
	Total	35(100%)	20(100%)	11(100%)	4(100%)

*Figures in parenthesis indicates percentage

Table III: Gender wise occurrence of canine ehrlichiosis and babesiosis

S.No	Gender	Number affected	Canine ehrlichiosis (n=20)	Canine babesiosis (n=11)	Concurrent infection (n=4)
1.	Male	23(65.71%)	13(65%)	7(63.64%)	3(75%)
2.	Female	12(34.29%)	7(35%)	4(36.36%)	1(25%)
	Total	35(100%)	20(100%)	11(100%)	4(100%)

*Figures in parenthesis indicates percentage

Table IV: Breed wise occurrence of canine ehrlichiosis and babesiosis

S.No	Name of breed	Number affected	Canine ehrlichiosis (n=20)	Canine babesiosis (n=11)	Concurrent infection (n=4)
1.	Labrador retriever	17(48.57%)	9(45%)	4(36.36%)	4(100%)
2.	Pomeranian	4(11.43%)	3(15%)	1(09.09%)	-
3.	Dobermann	3(08.57%)	1(5%)	2(18.18%)	-
4.	Golden retriever	2(05.71%)	1(5%)	1(09.09%)	-
5.	Pug	2(05.71%)	1(5%)	1(09.09%)	-
6.	German Shepherd	2(05.71%)	1(5%)	1(09.09%)	-
7.	Mongrel	2(05.71%)	2(10%)	-	-
8.	Beagle	1(02.86%)	1(5%)	-	-
9.	Belgian shepherd	1(02.86%)	1(5%)	-	-
10.	Shih Tzu	1(02.86%)	-	1(09.09%)	-
	Total	35(100%)	20(100%)	11(100%)	4(100%)

*Figures in parenthesis indicates percentage

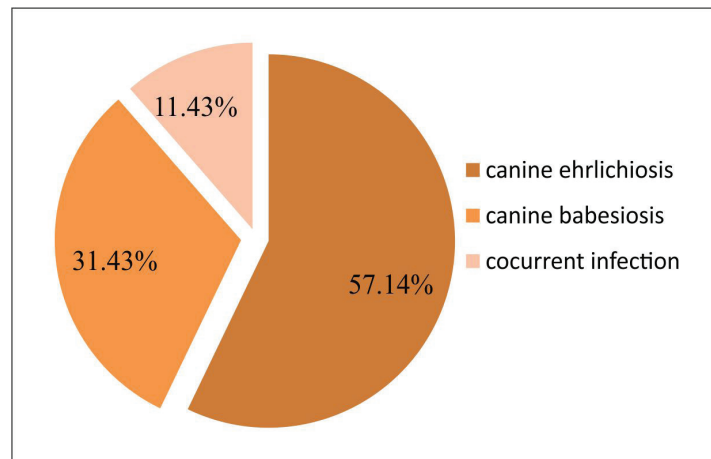


Figure 1: Pie diagram showing the occurrence of canine ehrlichiosis and canine babesiosis

The occurrence of babesiosis was 31.43 per cent (11/35) which was in congruence with the previous reports of Azhahianambi *et al.* (2018) and Muguero *et al.* (2023) who recorded the occurrence of *Babesia* sp as 31 per cent and 28.8 per cent respectively. On the contrary, Gonde *et al.* (2017) and Sindhu *et al.* (2020) reported lower occurrence of canine babesiosis as 9.79 per cent and 4.25 per cent respectively. 11.43 (4/35) per cent dogs were positive for concurrent ehrlichiosis and babesiosis which was similar to the findings of Fonseca *et al.* (2017) and Azhahianambi *et al.* (2018) who reported the occurrence of concurrent infection of ehrlichiosis and babesiosis as 5.6 per cent and 5.92 per cent respectively and this might be due to *Rhipicephalus sanguineus* can cause co-infection of ehrlichiosis and babesiosis in dogs (Nava *et al.*, 2015). These variations in the occurrence of might be due to differences in sampling, testing methodology, background of study animals (Muguero *et al.*, 2023) and sub clinical infection, immune status of the host and other managerial practices (Mahalingaiah *et al.*, 2017).

In the present study, the higher occurrence was observed in dogs less than 2 years of age in ehrlichiosis (45%), babesiosis (63.64%) and concurrent infection (50%) which corroborates with the findings of Milanjeet *et al.* (2014), Mahalingaiah *et al.* (2017), Rautenbach *et al.* (2018) and Preena *et al.* (2021). This might be ascribed to the low immunity of young animals compared to adults (Bhadesiya and Raval, 2015).

The gender wise occurrence of canine ehrlichiosis, canine babesiosis and concurrent infection was higher in male dogs (65% vs 63.64% vs 75%) while it was (35% vs 36.36% vs 25%) in female dogs. This

might be attributed to more liking of male dogs by pet owners which resulted in over presentation of male dogs, increased roaming behaviour, sex-linked genetic influences, temperament and hormonal status of the male dogs (Salem and Farag, 2014, Gonde *et al.*, 2017 and Rawangchue and Sungpradit, 2020). On the contrary, Opara *et al.* (2017) reported a higher occurrence in female dogs due to their sedentary nature during nursing periods and immunosuppressive effects of stressful reproductive activities. However, some authors reported that gender had no significant effect in the occurrence of canine ehrlichiosis and babesiosis (Milanjeet *et al.*, 2014 and Aktas *et al.*, 2015).

In the present study, breed wise occurrence was found to be higher in Labrador retriever in canine ehrlichiosis (47.05%), canine babesiosis (36.36%) and 100 per cent in concurrent infection which was in comparable with the study of Gonde *et al.* (2017) on contrary to the Milanjeet *et al.* (2014), Bhadesiya and Raval (2015) and Malik *et al.* (2018). The higher occurrence in Labrador retriever compared to other breeds might be due to poor managerial practices, health status and increased exposure to the tick vectors (Gonde *et al.*, 2017). In our study, all German Shepherd dogs died during the therapy suggesting that these breeds of dogs were more susceptible than the other breeds. The disease was more severe and had a poorer prognosis in our study and this could be due to low cellular immune response in this breed (Milanjeet *et al.*, 2014). The variation in the occurrence of ehrlichiosis among different breeds might be due to more distribution of particular breed in the geographical area and variations in managerial practices in and around Andhra Pradesh.

Conclusion

In the present study the overall occurrence of canine ehrlichiosis and babesiosis was 28.23 per cent and was higher in dogs below 2 years of age (51.43%). The gender wise incidence revealed that male (68.57%) dogs were more prone to canine ehrlichiosis and babesiosis. Similarly the incidence was higher in Labrador retriever (48.5%).

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Morphometry of *Demodex* species in dogs

Sirigireddy Sivajothi¹ and *Bhavanam Sudhakara Reddy

Department of Veterinary Medicine, College of Veterinary Science, Proddatur - 516360
Sri Venkateswara Veterinary University, Andhra Pradesh, India.

Abstract

The present study was carried out to record the mean length and width of gnathosoma, podosoma and opisthosoma of two different *Demodex* mites in dogs. The mean lengths gnathosoma, mean width of gnathosoma, podosoma and opisthosoma did not differ significantly ($P>0.05$); mean length of podosoma, opisthosoma and the total body differed significantly ($P<0.05$) between both types of mites of *Demodex canis* and *Demodex cornei*. The present study suggests that apart from examination of deep skin scrapings, tape impression smears may also be made a regular practice while dealing with demodicosis suspected dogs in order to detect the surface dweller like *Demodex cornei*.

Keywords: *Demodex cornei*, *Demodex canis*, Dog, Morphometry

Introduction

Demodicosis presents as a severe and intensely itchy inflammatory condition affecting the hair follicles and sometimes in sebaceous glands of a dog's skin. *Demodex* is a cigar-shaped, eight-legged parasite, is the culprit, visible under microscopic examination (Mueller *et al.*, 2020). Typically, it is normal resident on canine skin and it can proliferate rapidly, leading to generalized disease, particularly in immunocompromised dogs, regardless of breed, sex, or age (Reddy *et al.*, 2015). Among the *Demodex* species commonly found in dogs are *Demodex canis*, *Demodex cornei* and *Demodex injai* (Izdebska *et al.*, 2011). In 2010, identification of the different *Demodex* mites was done based on the morphological variation such as shape and length of opisthosoma (Reddy *et al.*, 2011; Sivajothi *et al.*, 2015). Molecular studies were carried out to distinguish between the *Demodex canis* and *Demodex cornei* (deRojas *et al.*, 2012; Yoon *et al.*, 2020). The aim of this communication is to present a comparison of the morphometry of these two different *Demodex* mites with gap of 12-year period in the same geographical location, highlighting the importance of collection of samples for dermatological examination.

Materials and Methods

Present study was carried out at Department of Veterinary Medicine, College of Veterinary Science, Proddatur on four dogs which were presented with generalized alopecia, hyperpigmentation, scales, mild to

moderate pruritus. Physical examination of dogs revealed widespread alopecia, hyperkeratosis, lymphadenopathy and lichenification on the feet, trunk, abdomen, tail and periorbital alopecia. For further dermatological examination, skin scrapings were obtained using a scalpel blade dipped in glycerin, continuing until a slight ooze of blood was observed from the dermal capillaries. Tape impression smears were collected for further identification of mites. Morphological characteristics of the two types were evaluated, including the lengths of gnathosoma, podosoma and opisthosoma (Fig. 1A). The precise size of the microorganisms was determined using calibrated ocular lenses and a stage micrometer (Erma objective micrometer, Japan) under a compound light microscope (Olympus microscope Model CH-20i). The data were analyzed and results were recorded as mean \pm standard error. Comparison between the two different mites was conducted using Student's t-test in the SPSS®. Dogs were administered with weekly subcutaneous injections of doramectin at a dosage of 0.6 mg/kg body weight along with the supportive medications. After 6 - 8 weeks of treatment, the skin lesions successfully resolved and dogs were free from mites.

Results and Discussion

Microscopic examination of deep skin scrapings revealed *Demodex canis* and tape impression examination revealed the *Demodex cornei* mites. *Demodex canis* displayed distinctive characteristics, including a cigar-shaped body divided into three parts: gnathosoma, podosoma with four pairs of stumpy legs, and opisthosoma with transverse striations on both dorsal and ventral surfaces. The gnathosoma bore

Corresponding author: bhavanamvet@gmail.com

¹Department of Veterinary Parasitology

mouthparts consisting of paired palps, chelicerae, and an unpaired hypostome. Epimeral plates, trapezoidal in shape, were observed on the ventral surface of the podosoma. The opisthosoma was elongated and slender, tapering towards the posterior end. *Demodex cornei* exhibited short, stumpy legs on the podosoma and a shorter opisthosoma with rounded terminal end (Fig. 1B, 1C). Identification of the mites based on the morphology as per the previous references (Sivajothi *et al.*, 2013).

The morphometric measurements of *Demodex* species were summarized in Table 1. For *Demodex canis* including both adult males and females, mean length of gnathosoma, podosoma, opisthosoma and total body length were $20.78 \pm 0.87 \mu\text{m}$ (range from 19.4 to 22.1), $63.18 \pm 0.67 \mu\text{m}$ (range from 62.1 to 64.7), $132.71 \pm 2.66 \mu\text{m}$ (range from 129.2 to 135.3) and $216.67 \pm 4.33 \mu\text{m}$ (range from 209.7 to 222.5) respectively. Measurement of *Demodex cornei*, including adult males and females, yielded mean length of gnathosoma, podosoma, opisthosoma and total body length as $19.01 \pm 0.15 \mu\text{m}$ (range from 18.7 to 20.2), $60.87 \pm 1.77 \mu\text{m}$ (range

from 58.1 to 62.2), $64.71 \pm 0.96 \mu\text{m}$ (range from 62.7 to 66.2) and $143.81 \pm 3.12 \mu\text{m}$ (range from 139.7 to 148.5) respectively. The mean length of gnathosoma, mean width of gnathosoma, podosoma and opisthosoma did not differ significantly; mean length of podosoma, opisthosoma and the total body differed significantly between both types of mites of *Demodex canis* and *Demodex cornei*. In the present study, morphological variation and the difference in the morphometry can be useful to separate the two different mites.

The present study suggests that apart from examination of deep skin scrapings, examination of tape impression smears may also be made a regular practice while dealing with demodicosis suspected dogs in order to detect the surface dweller like *Demodex cornei*. Further research studies are warranted to record the variations in the pathophysiology, development of clinical signs and therapeutic variations in formulation of treatment protocol for the two types of *Demodex* mites in dogs.

Table 1. Micrometry of *Demodex canis* and *Demodex cornei* mites

Parameters		Different mites			Reddy et al., (2011)	
		<i>Demodex canis</i> (n:30)	<i>Demodex cornei</i> (n:30)	P-value	<i>Demodex canis</i>	<i>Demodex cornei</i>
Gnathosoma	L (μm)	20.78 \pm 0.87	19.01 \pm 0.15	0.058 ^{NS}	19.02 \pm 0.15	18.86 \pm 0.13
	W (μm)	19.91 \pm 0.31	17.92 \pm 0.72	0.072 ^{NS}		
Podosoma	L (μm)	63.18 ^b \pm 0.67	60.87 ^a \pm 1.77	0.048*	63.13 \pm 0.75	57.52 \pm 1.14
	W (μm)	38.92 \pm 0.28	37.17 \pm 0.18	0.092 ^{NS}		
Opisthosoma	L (μm)	132.71 ^b \pm 2.66	64.71 ^a \pm 0.96	0.001**	130.19 \pm 2.35	50.82 \pm 1.78
	W (μm)	34.82 \pm 0.18	35.81 \pm 0.55	0.088 ^{NS}		
Total body length	L (μm)	216.67 ^b \pm 4.33	143.81 ^a \pm 3.12	0.001**	212.57 \pm 2.06	123 \pm 1.9

*P<0.05; **P<0.01; ^{NS}P>0.05; ^{ab}Columns bearing different superscripts differ significantly.

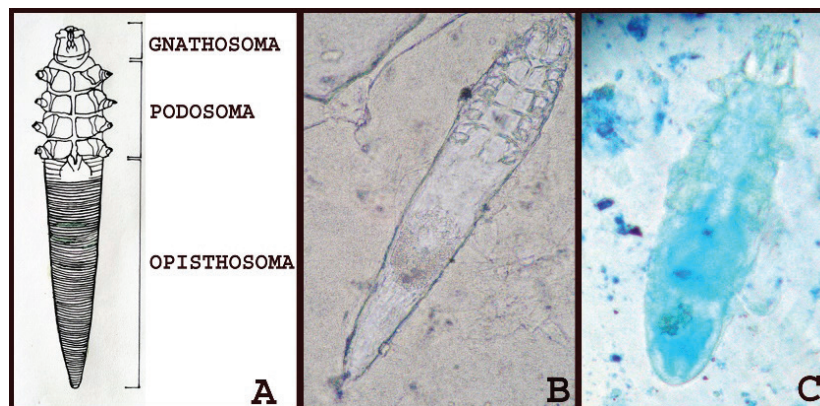


Fig.1. Morphometry of two different mites (*Demodex canis*; *Demodex cornei*)

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Endoscopic retrieval of oesophageal foreign body in a Shih-tzu dog

Satish Kumar.K., Abboori Sangeetha, Suman. P., Balakrishna. A and Indhu Teja.B

Department of Veterinary Medicine, College of Veterinary Science, Rajendranagar, PVNRTVU, Hyderabad, Telangana-500030

Abstract

A 9 month old, female Shih-tzu dog was presented with history of vomiting and anorexia for a period of 2 days following feeding with chicken bones. Deworming and vaccination were regular. Survey radiography revealed radio-opaque structures in the thoracic oesophagus close to the base of the heart. Endoscopy was performed to visualize and retrieve the bones. The foreign body was successfully recovered using laparoscopic forceps under the guidance of endoscope. The pup was treated for oesophagitis and pup had uneventful recovery.

Keywords: esophageal foreign body, chicken vertebrae, dog, endoscopy

Foreign bodies in the upper gastrointestinal tract are common in dogs and an oesophageal foreign body is an emergency. Acute signs such as choking, retching, coughing, vomiting, regurgitation should prompt consideration of a gastrointestinal foreign body. Bones are the most frequently reported foreign bodies. Foreign bodies lodged in the oesophagus, stomach, and proximal duodenum can be removed endoscopically. Earlier endoscopic intervention can prevent the damage to the oesophageal mucosa, necrosis, and other secondary complications. The advantages of endoscopic removal include low invasiveness, high success rates, and shorter procedure times compared to surgical methods (Poggiani *et al.*, 2020)

Nine months old female Shih-tzu dog weighing 5 kg was presented with the complaint of vomiting undigested food, unable to drink water for a period of two days following feeding of chicken bones. Clinical examination revealed retching and respiratory distress.

Survey radiography showed radio-dense material in the thoracic oesophagus and near the base of the heart (Fig. 1 A and B). Endoscopy examination was carried out using video-gastroscope. The animal was anaesthetised using a combination of xylazine (@ 1 mg/ kg B.wt) with ketamine (@ 10mg/kg B.wt) and maintained using propofol (@ 5mg/ kg B. wt). The endoscope was introduced through the oral cavity and guided toward the dorsal-caudal region of the epiglottis. With insufflation of air through the equipment, the pharyngoesophageal junction was traversed, allowing visualization of the oesophageal lumen. Fairly bigger bone piece was found struck in the thoracic oesophagus and manoeuvring with endoscopic grasping forceps was not effective. Laparoscopic forceps was passed parallel to the endoscope probe and two chicken vertebrae were retrieved successfully from the esophagus (Fig. 2 A, B and C). The dog was administered with amoxicillin (@7 mg/kg B.wt), pantoprazole (@ 1 mg/kg B. wt), and Ringers lactate (@10ml/kg body wt).

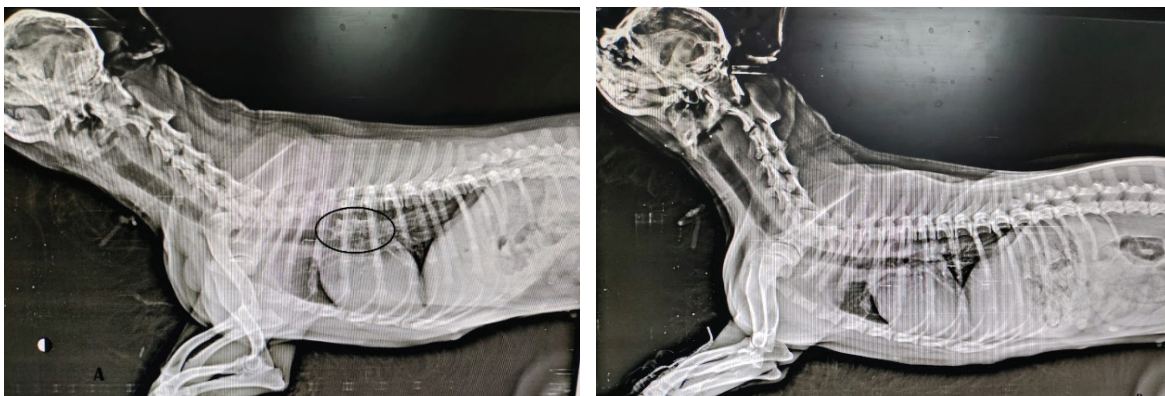


Fig. 1 Lateral X-ray of the dog showing radiopaque structure (circle) in the caudal esophagus (A), absence of the same after retrieval (B)



Fig. 2 Endoscopic retrieval procedure; A. holding the bone with forceps (arrow); retrieval of the bone (B and C)

Young, small breed dogs are overrepresented for oesophageal foreign bodies, with frequently reported breeds including terriers, Shih -Tzus and Chihuahuas. The most commonly reported location is the caudal oesophagus between the heart base and diaphragm. Other common sites include just caudal to the pharynx, the thoracic inlet, and the heart base. Radiographs are commonly used in the initial diagnostic evaluation of dogs with suspected oesophageal foreign bodies. Endoscopic removal is favoured for its low invasiveness, high success rate, and shorter procedure time compared to surgery. Endoscopic removal can occasionally lead to complications such as perforation, hemorrhage, respiratory issues from esophageal perforation, and esophageal stenosis (Thompson *et al.*, 2012). Nine

months old female Shih-tzu dog presented with oesophageal foreign body was successfully retrieved with endoscopy.

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Trichomoniasis in kites in Gujarat state

Solanki. D. M^{1*}, Jadhav. S. S² and Jadhav. K. M³

¹ Veterinary Pathologist, Jivdaya Charitable Trust (JCT), Ahmedabad, Gujarat, 380015

² Former Clinical Director, Jivdaya Charitable Trust (JCT), Ahmedabad, Gujarat, 380015

³ Clinical Director, Jivdaya Charitable Trust (JCT), Ahmedabad, Gujarat, 380015

Abstract

Trichomoniasis, caused by *Trichomonas gallinae* is a significant parasitic disease affecting kites and other birds. The study investigated its prevalence, mortality, and therapeutic efficacy of metronidazole. Among 897 kites studied during 2021, 51.01% were positive for trichomoniasis. Gross lesions consisted of nodules or abscesses in the oesophagus and pharynx. Histopathological findings revealed epithelial and submucosal ulceration with inflammatory cell infiltration. Mortality increased with severity in lesions. The study highlights the high prevalence of trichomoniasis in kites. Treatment with oral was attempted and was beneficial in managing the affected birds.

Keywords: Trichomoniasis, Metronidazole, Kites

Trichomoniasis, caused by the flagellated protozoan parasite *T. gallinae*, is an infectious disease affecting a wide range of avian species worldwide (Schulz *et al.*, 2005). It poses a threat to both wild and domesticated birds, including columbiforms, passerines and raptors (Xiang *et al.*, 2023; Saikia *et al.*, 2021). The parasite *T. gallinae* spreads directly between birds during courtship, feeding or indirectly through contaminated food and water resources. Raptors acquire the parasite by preying on infected columbiform prey, such as feral pigeons, wood pigeons and stock doves (Lawson *et al.*, 2012). The parasite colonizes the upper respiratory and digestive tracts of infected birds, leading to a variety of clinical signs and potentially causing mortality (Bulbul *et al.*, 2018). Despite its global prevalence, the impact of trichomoniasis on bird populations varied considerably depending on factors such as host species, age, immune status and environmental conditions (Clark *et al.*, 2017). While some adult birds may exhibit no overt signs of infection and act as asymptomatic carriers, others may experience weight loss, dysphagia, regurgitation, and death due to severe lesions in the oral cavity and oesophagus (Deplazes and Mathis, 2015). Understanding the prevalence, transmission dynamics and pathological effects of *T. gallinae* infection in different avian groups is crucial for developing effective conservation strategies. This study aims to investigate prevalence of trichomoniasis, impact on kite mortality and efficacy of metronidazole treatment in trichomonas infected kites.

The work was carried out at the Jivdaya Charitable Trust (JCT), Ahmedabad, Gujarat, India. The presence of typical gross lesions or positive detection

of motile protozoa on swab examination and severity was the criterion for identifying and inclusion in the study. The samples of *T. gallinae* were collected from oropharyngeal region using sterile cotton swab. The swabs were stored in round bottom polypropylene tube containing 1 ml normal saline at room temperature. The processing of samples was carried out within 4 hr of collection. *T. gallinae* examined under light microscope at low power objective by hanging drop method. Trichomonas was further confirmed when stained by Giemsa and examined under oil immersion (**Fig. 1**) as described by Levien (1985). The prevalence of trichomoniasis was calculated by number of positive cases as a percentage of the total number of individual birds seen during the year.

Infected birds were treated with the metronidazole @30 mg/kg once a day PO till resolution of lesions. All the cases under study were monitored on 5, 10 and 15 days after the last treatment. Efficacy of Metronidazole was calculated by total number of negative cases as a percentage of the total number of positive cases after course of treatment. Mortality was calculated on the basis of recorded mortality that occurred during study period amongst infected kites. The post-mortem examination of birds died during the course of treatment was carried out and gross lesions were recorded. Tissues like crop and oesophagus were collected in tissue collection bottles containing 10% neutral buffered formalin solution and processed by paraffin embedding technique for histopathological examination. The sections were cut at 4-5µm thickness with the help of an automatic microtome machine

(Leica, Germany) and stained with haematoxylin and eosin (H&E) stains (Luna, 1968). The H&E-stained slides were observed under light microscope and lesions were recorded.

In 2021, a total of 897 kites were admitted to the veterinary hospital at JCT, Ahmedabad, of which 456 cases were diagnosed as avian trichomoniasis. This represented a prevalence of 51.01% in kites examined. Approximately half of the suspected cases were positive for protozoa under wet preparation, but had no detectable gross lesions. The cases of trichomoniasis were recorded throughout the year with highest number during the months of January to April followed by May to August and least during July to December. In the months of January, the Ahmedabad city and Gujarat state celebrates Kite festival, during which large number of injured birds were brought to JCT hospital for treatment which formed part of the study. The raptors predate on pigeon which

usually have high prevalence of trichomoniasis and could be the reason for high prevalence of trichomoniasis in raptors. Begum *et al.* (2008) reported that out of 300 pigeons examined, 67.3% were found infected with trichomoniasis. The trichomoniasis affected birds were given metronidazole @30 mg/kg orally and clinical improvement was noticed in 80.04% of kites. The present findings are in agreement with Abd El-Rahman *et al.* (2008) and Saikia *et al.* (2022) who reported 16% and 100% effectiveness of metronidazole in pigeons infected with trichomoniasis respectively. Lesions were noticed within the cervical oesophagus/pharyngeal region, crop or thoracic/distal oesophageal region in affected kites. Lesions were nodules or abscesses which sometimes nearly occluded the oesophagus when present in the cervical or thoracic region (Fig. 2). Similar lesions were reported by Ecco *et al.* (2012) and Rijks *et al.* (2019) in the cervical oesophagus / pharyngeal region of naturally infected greenfinch and striped owl with *T. gallinae*.

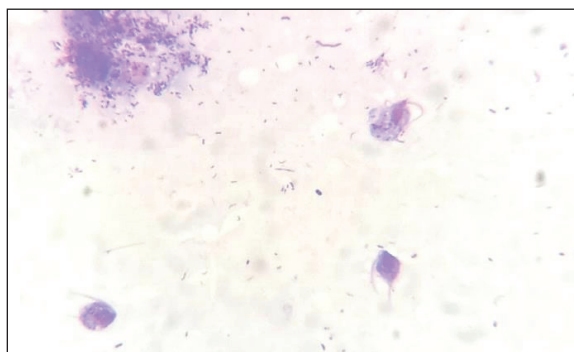


Fig. 1 Three trophozoites of *T. gallinae*, along with bacteria in the background



Fig. 2 Profuse yellow, cheesy material on the oral mucosa that partially occlude the opening of the oesophagus.

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Echocardiographic diagnosis of fibrinous pericarditis in a Saanen goat

Gollapalli Nagarjuna, *Bhavanam Sudhakara Reddy and Sirigireddy Sivajothi

Department of Veterinary Medicine, College of Veterinary Science, Proddatur - 516360

Sri Venkateswara Veterinary University, Andhra Pradesh, India

Abstract

Pericarditis refers to the inflammation of the pericardial sac and is classified into three types based on its morphology: fibrinous, purulent, and constrictive. A case involving a nine-month-old female Saanen goat was presented to the hospital which exhibited symptoms of cough, weight loss, anorexia, reluctance to move or stand and difficulty in respiration. Clinical evaluation indicated respiratory distress, difficulty in walking and thoracic auscultation revealed dull sounds. Microscopic examination of stained blood smears revealed the presence of *Pasteurella* organisms. Thoracic ultrasonography revealed pericardial fluid accumulation. On the day of presentation, it was died and necropsy revealed presence of fibrotic layers in the thoracic cavity and around the pericardium which confirms the case of fibrinous pericarditis. This study concludes that pericarditis in this goat was associated with pasteurellosis, highlighting echocardiography as a crucial diagnostic tool for identifying pericarditis in small ruminants.

Keywords: Fibrinous pericarditis, cough, Saanen goat, *Pasteurella*

Pericarditis is defined as inflammation of the pericardium with an accumulation of serous or fibrinous exudates. Pericarditis is generally caused by penetration of foreign materials like fine wires, nails into the reticulum, diaphragm and pericardial sac finally leads to traumatic pericarditis (Constable *et al.*, 2016). Pericarditis attributable to hematogenous spread of infectious diseases like colibacillosis, pasteurellosis, salmonellosis and anaerobic infections are much less common and is usually masked by signs of septicemia (Catry *et al.*, 2013).

Nine months old female Saanen goat was presented to the Department of Veterinary Medicine, College of Veterinary Science, Proddatur with a history of cough, progressive weight loss, anorexia, reluctance to ambulation, nasal discharges and dyspnoea (Fig.1). Clinical examination revealed the respiratory distress, difficulty in walk, dull sounds on thoracic auscultation. Clinical parameters included rectal temperature of 104.8°F, pink mucus membranes, capillary refill time below 2 seconds, heart rate of 122 bpm, respiratory rate is 48/min and dull sounds on thoracic auscultation. Peripheral blood smears were collected and stained by Giemsa method for examination of haemoparasites. Thoracic and abdominal ultrasonography was carried out by keeping the goat in lateral recumbency with Esaote My Lab Gold 40 Vet ultrasound system with 3.0 to 5.0 MHz multi frequency curvilinear transducer. Peripheral

blood smear examination revealed the presence of *Pasteurella* organisms.

Ultrasonographic examination revealed fibrous strands in the pericardial cavity (Fig.2A, 2B). Goat was administered with ceftiofur sodium (@ 2 mg/kg body weight), flunixin meglumine (@ 2 mg/kg body weight), furosemide (@ 0.5 mg/kg body weight) on the day of presentation. Animal died on the third day of therapy and necropsy was done. Necropsy revealed fibrinous pericarditis.

Fibrinous pericarditis usually occurs as the result of hematogenous microbial infections, but it may be caused by lymphatic infiltration from an inflammatory process in an adjacent tissue (Jubb *et al.*, 2016). In fibrinous pericarditis, there is rarely significant effusion, so distension of the pericardial sac is not expected (Vogiatzidis *et al.*, 2015). Three key infectious agents known to cause pericarditis in small ruminants are *Pasteurella*, *Mycoplasma* species, and *Staphylococcus aureus* (Constable *et al.* 2016). Bacterial pericarditis typically arises from hematogenous spread, infection spreading from adjacent tissues such as the lungs and empyema, progression from myocarditis and endocarditis, or direct inoculation following trauma (Sawaya *et al.*, 2009). Regular vaccination and early detection of clinical signs due to pericarditis can be useful to prevent the mortality in goats.

*Corresponding author : bhavanamvet@gmail.com

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Fig.1. Goat showing the extended head and neck with respiratory discharges

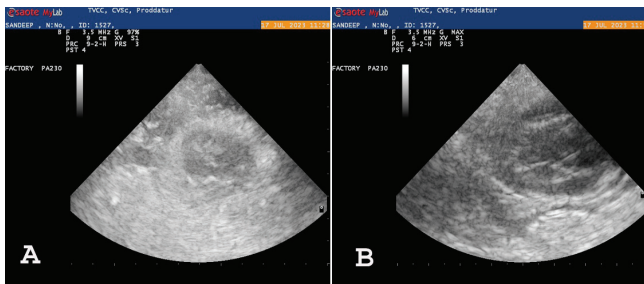


Fig.2A. Cross section of heart 2B. Longitudinal section of heart – Pericardial effusions



Fig.3. Necropsy – Presence of fibrinous material around heart

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Anaplasmosis concurrent with copper deficiency in a Salem Black kid

Sathishkumar. G., Vijayakumar. H*, Gowri. B., Senthil. N. Ra., Raja. Pb and Giridharan. S.

Department of Veterinary Clinical Medicine, Madras Veterinary College,

Tamil Nadu Veterinary and Animal Sciences University, Chennai – 600 007.

Abstract

Four months old Salem black kid was brought to the with the history of alopecia around the face and ear. Clinical examination revealed severe alopecia on ears, face, trunk and easy epilation of hairs along with depigmentation, mild scaling in ear margins, steely appearance, pale mucosa and loss of body condition. Detailed dermatological analysis like skin scrapings and trichogram revealed negative for ectoparasites and hair growth abnormalities. Blood smear examination revealed *Anaplasma ovis* organisms, with blood picture of normochromic microcytic anemia. Amplified Polymerase chain reaction product found to be positive for *Anaplasma ovis*. Serum biochemistry revealed low level of copper (0.0598 mg/L), elevated total bilirubin (3.6 mg/dl), direct bilirubin (2.83 mg/dl), creatinine kinase (73 mg/dl) and LDH (348 U/L). Based on above findings and treatment response, the case was diagnosed as anaplasmosis in a kid with concurrent copper deficiency.

Keywords: Alopecia, Anaplasmosis, Copper deficiency and Salem black kid

Anaplasmosis is a tick-borne disease caused by *Anaplasma ovis*, *A. marginale*, and *A. capra*. In goats, it is frequently a subclinical illness (Smith *et al.*, 2022) and causes mild clinical symptoms but sometimes its adverse effect is aggravated in infected sheep and goats, when the animals are stressed by other factors such as co-infection, poor health conditions, hot weather, vaccination, deworming or heavy tick infestation (Aravind *et al.*, 2020). Chronically infected animals may look clinically normal; have recurrence of infection following stress, or exhibit clinical symptoms of ill-thrift such as poor body condition and poor fleece quality (Pugh and Baird 2011). Copper deficiency in ruminants is a worldwide problem that can occur as a primary deficiency when Cu intake is insufficient, or as a secondary deficiency when other factors in the diet, such as molybdenum (MO) and sulphur (S), interfere with Cu absorption or metabolism (Constable *et al.*, 2016). Ceruloplasmin a copper containing protein is necessary to mobilize stored iron for the production of haemoglobin and myoglobin, which causes anaemia. Hair discoloration, occurs because the melanin formation requires a copper-containing enzyme. Furthermore, copper is essential for the immune system to operate properly (Smith *et al.*, 2022).

Four months old Salem black kid was brought to the Large Animal Medicine unit of Madras Veterinary College Teaching Hospital with the history of hair fall around the face and ear. Clinical examination revealed severe alopecia on ears, face, trunks and effortless epilation of hairs along with depigmentation, mild scaling in ear margins, steely appearance, pale mucosa and loss of body condition (Figure- A). Clinical examination revealed normal rectal temperature (101.4°F), pale conjunctival mucous membrane and elevated heart rate (100 bpm). The lymph node and respiratory rate were normal. Rumen fluid examination revealed normal protozoa numbers (+++) and motility (++)

Blood smear examination revealed positive for *Anaplasma ovis* (Figure-B), confirmed by PCR (Figure C). Reduced haemoglobin, normochromic and microcytic anaemia were noticed along with elevated serum total bilirubin, direct bilirubin, creatine kinase (CK) and lactate dehydrogenase (LDH) (Table-1). Skin scrapings and trichogram revealed negative for ectoparasites and hair growth abnormalities. The faecal sample examination revealed negative for endoparasites infection.

*Corresponding author : vijayvet1985@gmail.com



Figure A - Severe alopecia on both ears, face, trunks along with hair depigmentation, mild scaling in ear margins, steely appearance and emaciation

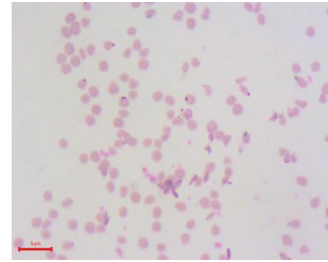


Figure B. *Anaplasma ovis*

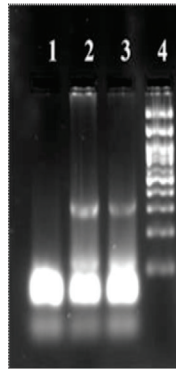


Figure. C PCR for *Anaplasma ovis*
 Lane 1: Negative control
 Lane 2 : Positive control
 Lane 3 : Test sample positive for *Anaplasma ovis* (347 bp)
 Lane 4 : 100 bp ladder

Table 1-Haemato-biochemical values

Parameters	Before treatment (Day-1)	After treatment (Day-5)	Reference value*
Hb (g/dl)	7.4	8.6	8.0-12.0
PCV (%)	23	24.7	22-38
RBC (m/cmm)	14.97	16.08	8.0-18.0
WBC (/cmm)	10,000	12,700	4.0-13.0
Platelets (/cmm)	2,00,000	3,00,000	3.0-6.0
Neutrophils (%)	49	43	30-48
Lymphocytes (%)	47	53	50-70
Monocytes (%)	4	4	1-4
Blood parasite	<i>Anaplasma ovis</i>	Negative	-
Blood picture	Anisocytosis & Polychromasia	NAD	-
Glucose (mg/dl)	78	86	50-75
Total proteins (g/dl)	7	8	6.1-7.5
Albumin (mg/dl)	2.5	3.7	2.3-3.6
BUN (mg/dl)	11.4	19.89	13-26
Creatinine (mg/dl)	0.45	0.75	0.7-1.5
Calcium (mg/dl)	9.68	12.13	9.0 -11.6
Phosphorus (mg/dl)	6.09	6.83	3.7-9.7
ALP (IU/L)	78	111	61-283
T. Bilirubin (mg/dl)	3.6	0.45	0.1-0.2
D. Bilirubin (mg/dl)	2.83	0.39	0.1-0.2
CK (IU/L)	73	60	16-48
LDH (IU/L)	348	250	79-265

*The Merck Veterinary Manual (2015).

Blood sample was collected and serum was separated and subjected to copper concentration estimation by Atomic Absorption Spectrophotometer. The result revealed low level of copper in blood (Table-2).

Table 2 : Copper Concentration Estimation

Parameter	Before treatment (Week – 1)	After treatment		Reference value
		(Week – 4th)	(Week –6th)	
Serum Copper (mg/ L) Or (ppm)	0.0598 mg/L Or 0.05 ppm	0.3540 mg/L Or 0.35 ppm	0.6272 mg/L Or 0.62 ppm	0.6-1.5 mg/dl (Fonteset <i>et al.</i> , 2020) Or >0.80 ppm

The animal was treated with injection Oxytetracycline @ 10 mg/kg diluted with normal saline IV. Injection Vitamin B1, B6, B12 with total dose of 0.5ml IV, and the treatment was followed for 5 days. Following treatment, haematology and serum biochemistry were found to be normal (Table-1) and negative for *Anaplasma spp.* Oral supplementation of copper sulphate was given (@ 2g/kid) for weekly once for six weeks. Changes in hair colour and texture at the 6th week of the treatment (Figure – E) were noticed. Hair depigmentation associated with copper deficiency in cattle may be attributed to reduction in the activity of tyrosinase which is cu-dependent enzyme required for melanin synthesis (Fry, 2011). Deficiency symptoms

occur when dietary copper is less than 7 mg/kg and molybdenum is normal (Smith *et al.*, 2022). A suitable level for ration formulation is 10–20 mg/kg DM (AFRC 1998), and it is generally recommended to keep the Cu: Mo ratio above 2:1 and below 10:1 (Buck 1986) as adult goats are not as susceptible to copper toxicity as in sheep (Søli and Nafstad ,1978), in part because of lower uptake by the liver (Meschy, 2000). Liver copper stores are typically lower in normal goats than in sheep and cattle. Excess copper supplementation to deficient kids may cause death due to haemolytic crisis because of the fact that the pre-ruminant kid absorbs copper more efficiently than does the adult goat (Humphries *et al.*, 1987).



Figure D– Reduction in clinical sign and regrowth of hairs after 4 weeks of treatment



Figure E – Complete recovery noticed after 6 weeks of treatment

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Analysis of serum ascites albumin gradient (SAAG) in cats with hepatic disorder

*Bhavanam Sudhakara Reddy, Kambala Swetha and Sirigireddy Sivajothi

Department of Veterinary Medicine, College of Veterinary Science, Proddatur - 516360

Sri Venkateswara Veterinary University, Andhra Pradesh, India

Abstract

Three Persian breed cats were diagnosed to be having hepatitis. Clinical examination revealed dullness, dehydration, poor body condition and fluid thrill on the abdominal palpation. Radiography and ultrasonography revealed ground glass appearance of the abdomen and anechoic fluid in the abdomen respectively. Elevated serum ascites albumin gradient with elevated serum alanine transaminase levels were noticed in these cats.

Keywords: Cat, ascites, hepatitis, SAAG

Abnormal accumulation of fluid in the peritoneal cavity is considered as ascites. Based on the total protein concentration of ascitic fluid, ascites is classified as transudate, modified transudate and exudate (Beg *et al.*, 2001). The difference between serum albumin and ascitic fluid albumin is more than 1.1 g/dL which is called high gradient ascites, whereas if the difference is less than 1.1 g/dL it is termed low gradient ascites (Burgess, 2004). Tarn and Lapworth (2010) considered the serum ascites albumin gradient as a marker of portal hypertension.

During the one-year period of study at Department of Veterinary Medicine, College of Veterinary Science, Proddatur, three Persian cats were diagnosed to be having ascites with hepatitis. All the cats were reported to be dewormed, vaccinated and fed with commercially available cat food. Clinical examination revealed dullness, fluid thrill on the abdominal palpation, elevated rectal temperature, increased heart rate, increased skin tenting test and poor body condition (Fig.1A). Abdominal radiography and ultrasonography revealed ground glass appearance of the abdomen and anechoic fluid in the abdomen respectively (Fig.1B, 1C). Ascitic fluid, peripheral blood smear and serum were collected for laboratory studies (Fig.1D). Serum total protein (6.22 g/dL; 5.97 g/dL and 6.12 g/dL), albumin (2.71 g/dL; 2.68 g/dL and 2.49 g/dL) and globulin (3.51 g/dL; 3.29 g/dL and 3.63 g/dL), ALT (232 IU/L; 308 IU/L and 392 IU/L) and ascitic fluid albumin (1.08 g/dL; 0.81 g/dL and 0.99 g/dL) were estimated in these cats.

The serum ascites albumin gradient was calculated by subtracting the ascitic fluid albumin

value from the serum albumin value. Serum ascites albumin gradients were 1.63; 1.87 and 1.50 in three cats respectively. Peripheral blood smears did not reveal any blood parasites. Nucleated cells, protein and specific gravity of ascites fluid in these cats were 2890 cell/microlitre, 1612 cells/ microlitre and 2090 cells/ microlitre, 2.8g/dL, 2.9g/dL and 2.62 g/dL & 1.015, 1.025 and 1.025 respectively. Based on the analysis it was considered as modified transudate and further confirms by serum ascites albumen gradient levels.

In cats, modified transudate considered as most common which might be due to congestive heart failure, neoplasia and hepatopathy. In the present study, heart failure was ruled out by electrocardiography and echocardiography, neoplasia was eliminated by the absence of abnormal tumour cells and further hepatopathy was confirmed by elevated serum liver enzymes. Feline infectious peritonitis is considered another common cause of ascites which is characterized by serum hyperproteinemia with high globulin and low albumin levels (Addie *et al.*, 2009) and it was ruled out by the presence of low total protein levels in the present study. In cats, hepatopathy might be due to lymphocytic cholangitis or due to portal hyper tension which increases the hydrostatic pressure. The present findings are in association with Saravanan *et al.* (2013) who documented transudate type of ascites and was depicted by a change in the SAAG levels along with albumin, total cell count, specific gravity and also total protein. Bhadesiya *et al.* (2015) utilized the SAAG for diagnosis of the dogs affected with ascites due to chronic hepatic disease.

Acknowledgement

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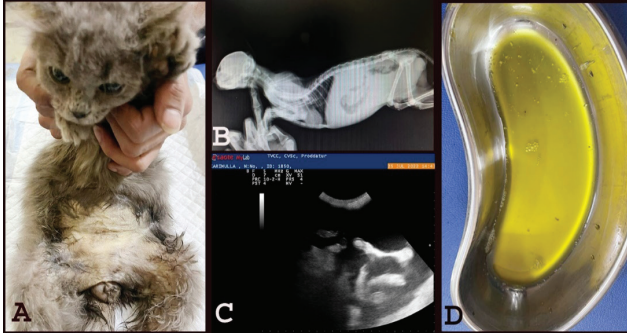


Fig.1A. Abdominal distension; 1B. Ground glass appearance of abdomen in radiography; 1C. Anechoic fluid in the abdomen in ultrasonography; 1D. Collected peritoneal fluid.

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Acute Tumour Lysis Syndrome associated with mediastinal lymphoma in a dog

Sachin Manoj, Rajat Sagare, Karthikeyan. M., Swetha. K., Gopalakrishnan. A* and Kavitha.S.

Department of Clinical Medicine, Madras Veterinary College, Chennai-600007

Tamil Nadu Veterinary and Animal Sciences University, Chennai, Tamil Nadu

Abstract

An eleven-year-old non-descript female dog weighing about 27 kg presented to small animal clinical complex was diagnosed with lymphoma (Stage IV) based on the clinical signs, serum biochemistry, radiography, ultrasonographical examination and histopathological examination of FNAC sample taken from superficial lymph nodes. The University of Wisconsin -Madison Lymphoma CHOP-19 protocol was initiated on day one with vincristine and prednisolone acetate. On day three dog was presented with signs of dyspnoea, vomiting and generalized edema. Metabolic acidosis, hyperphosphatemia, hyperkalemia, hyperchloremia, azotemia were observed. These abnormalities led to a tentative diagnosis of acute tumor lysis syndrome (ATLS). Aggressive Fluid therapy and other supportive therapy was initiated but the animal died due to multiple organ failure.

Keywords: Lymphoma, Dog, ATLS, CHOP

Lymphoma is the most prevalent type of hemopoietic neoplasm in dogs. Acute Tumor Lysis Syndrome (ATLS) is a rare but potentially fatal constellation of metabolic abnormalities leading to oncologic emergency in veterinary patients with hematologic cancer. It occurs consequence of chemotherapy or radiotherapy-induced cellular death, leading to the release of intracellular ions and metabolic products of purine bases into the bloodstream. ATLS is caused by release of the intracellular contents by lysed tumor cells into the blood following rapid cytorreduction of bulky tumors with resultant azotemia, hyperphosphatemia, hyperkalemia, lactic acidosis, and hypocalcaemia (Cohen *et al.*, 1980 and Brooks, 1995). Multiple organ failure may follow and these patients may rapidly deteriorate even with swift intervention (Estrin, 2009)

Case History and Observations

An eleven year old mon-descript female dog weighing 27 kg was presented to Small Animal Medicine Unit with dyspnea, anorexia and vomiting for a period of 3 days and having treated by a veterinarian. Dog was dull, lethargic and dehydrated. Elevated temperature, congested mucus membrane, generalized lymphadenopathy, splenomegaly and

crackles on auscultation of lung were appreciated. Non-regenerative, hypochromic and microcytic anemia with normal leucocyte and platelet counts was noticed. Blood smear did not reveal any blood parasites and the serum biochemistry analysis revealed within normal hepatic and renal parameters. Ultrasonography evaluation of organs revealed reticular pattern of spleen, enlarged inguinal and mesenteric lymph nodes. Thoracic radiography revealed involvement of mediastinal lymph node (Fig 1). Histopathological evaluation of fine needle aspiration smears from the popliteal and right prescapular lymph node revealed a predominance of lymphoblasts and prolymphocytes indicative of lymphoma (Fig 2). The case was diagnosed as canine lymphoma - Stage IV- sub stage b. Wisconsin (UW)-Madison Lymphoma CHOP-19 protocol (cyclophosphamide, doxorubicin, vincristine and prednisone) with Vincristine (@0.5 mg/m²) and prednisolone acetate (@ 2mg/kg) was initiated. By day 3 of treatment, owner reported that animal developed emesis, dyspnoea, and edema. The dog was recumbent, febrile (104^o7F), tachycardic (150 beats/minute), and tachypneic (75 breaths/minute). Congested mucous membrane, weak femoral pulses were noticed. Blood gas analysis revealed severe metabolic acidosis with hyperphosphatemia, hyperkalemia, hyperchloremia and azotemia.

*Corresponding author : gopalvet88@gmail.com

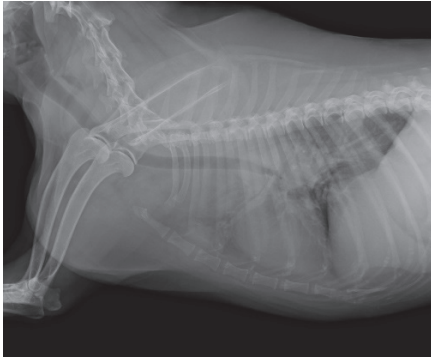


Figure 1. Radiographic image showing mediastinal lymphoma

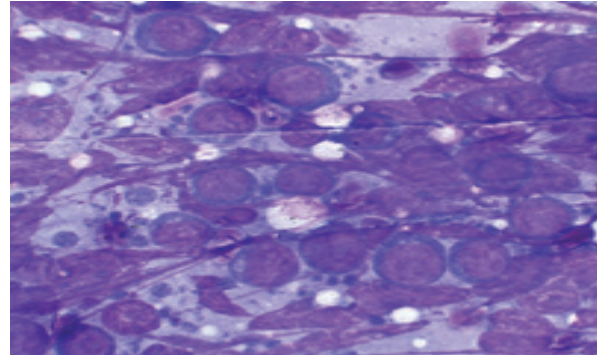


Figure 2. Monomorphic population of lymphocytes with high cellularity and lympho-glandular bodies (Leishman's stain- 100X)

Table 1. Clinical biochemistry findings observed at two time points before and at the onset of acute tumor lysis syndrome in a dog

PARAMETER	DAY 1 (Before Chemotherapy)	DAY 3 (After Chemotherapy)
GLUCOSE (mg/dL)	41.0	117
TOTAL PROTEIN (g/dL)	6.80	6.0
ALBUMIN (g/dL)	2.40	2.5
BUN (mg/dL)	24.11	97.18
CREATININE (mg/dL)	1.011	11.16
ALT (U/L)	95.0	161
ALP (U/L)	119	150
SODIUM (mmol/L)	151.3	144
CHLORIDE (mmol/L)	113.9	161
POTASSIUM (mmol/L)	4.62	8.3
CALCIUM (mg/dL)	11.02	9.49
PHOSPHOROUS (mg/dL)	5.28	19.2
TOTAL BILIRUBIN (mg/dL)	1.71	1.2
DIRECT BILIRUBIN (mg/dL)	1.43	0.9

Table 2. Findings of venous blood gas analysis profile

Parameter	Case value
PH	7.186
PCO2 (mmHg)	21.6
PO2 (mmHg)	60.3
HCO3 (mmol/L)	8.2
BE (mmol/L)	20.1
CO2 (%)	85
TCO2 (mmol/L)	8.5
ANION GAP	CNC (max)
BE (mmol/L)	-20.1
LACTATE (mmol/L)	1.06
UREA (mg/L)	37.5



Figure 3. Dog undergoing oxygen therapy and fluid therapy

Oxygen therapy was initiated (Fig 3) and the dog was administered with normal saline to restore tissue perfusion and reduce the hyperkalemia and hyperphosphatemia. Vital signs were monitored regularly. The dog remained tachycardic, tachypneic, febrile, and had multiple episodes of vomiting. Animal had collapsed few hours after initiation of treatment.

Discussion

Acute tumor lysis syndrome (ATLS) is an uncommon condition in canine practice. ATLS is a potential lethal combination of metabolic abnormalities which may be observed hours to a few days following treatment in individuals with disorders that respond to radiation or chemotherapy, such as lymphomas or lymphoid leukemias. In the following case, metabolic profile indicated azotemia, hyperphosphatemia, hyperkalemia, hypocalcaemia with metabolic acidosis which is in agreement with Brooks (1995). Laing (1987) reported that hyperphosphatemia was an indicator of canine acute tumor lysis syndrome (ATLS), and might be present either in isolation or in conjunction with renal azotemia. Since potassium and phosphates were primarily intracellular ions, the massive death of tumor

cells lead to a rise in their levels in the blood (Estrin, 2009). Once a diagnosis of TLS is made, the mainstays of therapy are restoration of tissue perfusion with aggressive administration of fluids and stabilization of the cardiovascular system in severely affected patients. Secondary end points for therapy will then also include the correction of electrolyte and acid-base disturbances and renal indexes (Bergman, 2009).

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Successful Management of Trypanosomiasis in a Cow

Arun Kumar.L.M¹., Vijayakumar. H² and Kavitha.S³

Department of Veterinary Clinical Medicine, Madras Veterinary College, Chennai -600 007.

1- MVSc scholar

2- Assistant Professor, Department of Clinics, Madras Veterinary College

3- Professor and Head

Abstract

A 6-year-old Jersey cow was presented with signs of respiratory distress and sternal recumbency at the Madras Veterinary College Outpatient Unit. Physical examination revealed congested mucous membrane, enlarged prescapular lymph node and severe dehydration. Musculo skeletal examination was done and the orthopaedic involvement was ruled out. Thrombocytopenia, decreased packed cell volume, and haemoglobin levels were noticed. Peripheral blood smear confirmed the presence of *Trypanosoma evansi*. The animal was treated with isometamidium chloride. The animal had uneventful recovery and was able to walk.

Keywords: Jersey cow, Trypanosomiasis, Isometamidium chloride

Trypanosoma evansi species primarily affects domestic and wild animals, causing a disease known as surra or dourine. *T. evansi* is transmitted mechanically by biting flies and tabanid flies, rather than through a biological vector. Surra affects a wide range of mammalian hosts, including horses, camels, cattle, and dogs, leading to clinical signs such as fever, anaemia, and neurological abnormalities. Diagnosis typically involves microscopic examination of blood, tissue or cerebrospinal fluid for the presence of trypanosomes or their characteristic morphological features. Treatment options vary depending on the species of trypanosome and clinical presentation with available medications targeting the parasite viability and replication.

A 6 year old Jersey cow was presented to Madras Veterinary college Teaching Hospital with history of inappetence, respiratory distress, sunken eye ball and sternal recumbency (Fig.1). On physical examination, rectal temperature was 38.3°C, heart rate was 70 bpm, respiratory rate was 54/minute. Enlargement of prescapular lymph node and bruxism were noticed. Rumen motility was 2/3 min and live rumen protozoas of different sizes were present on rumen liquor examination. Deep and superficial pain reflexes were normal and no bony involvements were noticed in the limbs. Thrombocytopenia, hypoglycemia (33mg/dl) and increased total protein (7.60g/dl) were noticed. Wet film and peripheral blood smear stained with Giemsa were found positive for *Trypanosoma evansi* organisms

(Fig.2). Based on clinical signs and blood results this case was diagnosed as Trypanosomiasis.

Isometamidium chloride at the dose rate of 1mg/kg given deep intramuscularly and intravenous fluid therapy with 20% dextrose and multiple electrolytes @ 10ml/kg were administered. Flunixin meglumine at the dose rate of 1.1mg/kg administered intravenously. Injection chlorpheniramine maleate at total dose of 10ml intramuscularly and vitamin B1 B6 B12 at 10ml were given intramuscularly. Supportive treatment including haematinics and phosphorus supplementation for 5 days were also given. Following treatment with isometamidium chloride animal was able to stand (Fig. 3) and regained mobility within a day and complete recovery was noticed after 3 days of treatment.

Trypanosomiasis has substantial economic implications, causing considerable losses in livestock production (Singh and Chabra, 1993). It is endemic in many regions of the Indian sub-continent, with outbreaks occurring particularly in cattle and buffaloes, resulting in mortality rates ranging from 20 to 90% (Gill, 1991). The clinical signs vary depending on the stage of the disease. Fever is intermittent and ranges from 102°F to 106°F, with rigors and sweating. Superficial lymph node enlargement, knuckling of fetlock joints, reduced milk production (especially in buffaloes), and abortion in pregnant animals may also be observed. Jaundice is rare, and ascites is infrequent. Mainstay of treatment is chemotherapy with drugs such as diminazene and quinapyramine. Singh and Joshi (1991) dealt with a comparative evaluation of diminazene, suramin,

¹Corresponding author : arunkumarmuthuvel2699@gmail.com

quinapyramine and isometamidium in buffaloes naturally infected with *T.evansi*. Isometamidium is used @ 0.5– 2.0 mg/kg body weight intramuscular injection

(Ramakrishna and Rama Devi, 2019). Controlling the fly, the vector responsible for transmitting trypanosoma is crucial for preventing the spread of trypanosomiasis.



Fig.1 Cow in sternal recumbency

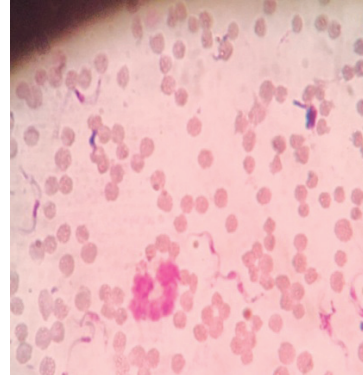


Fig.2 Blood smear positive for *Trypanosoma evansi* (10X)

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Management of proliferative thrombovascular necrosis of pinna in a Chippiparai dog

K. Mounika¹, Sandhya Bhavani.M², Kavitha.S³ and Ashi.R.Krishna⁴

Department of Veterinary Clinical Medicine,
Madras Veterinary College, Chennai 7

¹M.V.Sc Scholar,

²Assistant professor, Department of Clinics, Madras Veterinary College, Chennai 7

³Professor and Head

⁴Ph.D scholar

Abstract

A three-year-old male, Chippiparai dog was presented to the Dermatology unit of Madras Veterinary College Hospital with the complaint of bleeding from right ear tip. History revealed normal appetite, regular deworming and vaccination schedule (recent Anti rabies vaccination). The general clinical examination revealed parameters within the normal range except for the presence of a wedge-shaped ulcerated lesion at the ear tip. Haemogram and serum biochemistry revealed parameters within the normal range. Based on the history of recent vaccination and clinical presentation, the case was diagnosed as proliferative thrombovascular necrosis of the pinna. Treatment was initiated with oral pentoxifylline, doxycycline, niacinamide, vitamin E supplementation and topical tacrolimus application. Uneventful recovery was noticed after one month of treatment.

Keywords: Proliferative Thrombovascular Necrosis, Chippiparai dog, pentoxifylline

Proliferative thrombovascular necrosis of the pinna is a rare condition that affects dogs. Certain breeds, such as Dachshunds and Rhodesian Ridgebacks, appear to be predisposed. Affected pinnae exhibit varying degrees of swelling, crusting, scaling, fissuring, and bleeding. In severe cases, overt progressive necrosis of the pinnae may occur (Innera, 2013).

Three-year-old male Chippiparai dog, was presented to the Dermatology unit of Madras Veterinary College Hospital with complaint of bleeding from the right ear tip. The dog's history revealed a normal appetite, proper deworming, and recent antirabies vaccination, indicating good overall health and care. Upon general clinical examination, all parameters were found to be within the normal range, except for the presence of a wedge-shaped ulcerated lesion at the ear tip. This lesion was the source of the reported bleeding. Haematology

(PCV: 32%, Hemoglobin concentration: 10 g/dL, WBC- 12000 cells / cmm) and serum biochemical analysis (total serum total protein :6.2 g/dL and serum albumin : 2.5 g/dL) revealed no remarkable changes. Skin scraping results were negative for parasites, and the culture of the swab did not reveal any bacterial organisms. Based on the history of recent vaccination and the clinical presentation, the case was diagnosed as proliferative thrombovascular necrosis of pinna. This diagnosis was primarily based on the distinctive lesion observed at the ear tip. Treatment was initiated with pentoxifylline (@15-30mg/kg q8-12hr), vitamin E (@600IUq12hr), topical application of tacrolimus. Doxycycline (@5mg/kgbw q12hr) and niacinamide (@500 mg q8H >10 kg) are administered. The treatment plan proved effective, with an uneventful recovery noticed after one month of treatment.



Fig. 1. Pinnal Vasculitis-Wedge Shaped Ulcerated Lesion At Ear Tip



Fig. 2. After Recovery

Proliferative thrombovascular necrosis also known as pinnal vasculitis, is a common cause of ischemic pinnal dermatopathy. While the exact etiology is often idiopathic, it may be associated with food allergies or vaccinations (Wilcock and Yager, 1986 ; Miller *et al.*, 2013). Generally, there are no significant systemic signs except for mild malaise. One or both pinnae may appear cyanotic, swollen, and painful. As the disease progresses, the pinnal margins become thickened, necrotic, crusted, and scalloped. If not treated large wedge-shaped areas of pinnal tissue may be lost (Parker and Foster, 1996). Pentoxifylline (@15-30mg/kg q8-12hr), a methylxanthine derivative has both immunomodulatory and rheologic effects, making it a useful therapy for vasculitis. It improves peripheral blood flow and decreases inflammation by reducing platelet aggregation, leukocyte response to IL-1 and TNF- α , and production of TNF- α , IL-1, IL-4, and IL-12. Clinical response to pentoxifylline may take 1-3 months, and it is often used as initial therapy for less severe cases due to its relative lack of side effects. Niacinamide along with doxycycline possesses various anti-inflammatory and immunomodulating properties. Doxycycline (@

5mg/kg q 12hr) and Niacinamide (250 mg q8H for Bwt <10 kg) 500 mg q8H for Bwt >10 kg) (Nichols *et al.*, 2001). Essential fatty acids and vitamin E (400–800 IU dose) have anti-inflammatory and antioxidant qualities. Tacrolimus ointment (0.1%) can be applied twice weekly to maintain remission without the need for systemic therapy.

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Successful management of viper envenomation in a Labrador dog

Sai Sowmya Konjeti^{1*}, Chaitanya Yalavarthi², Suresh K³

¹MVSc Scholar, Department of Veterinary Medicine, NTR College of Veterinary Science, Gannavaram, Sri Venkateswara Veterinary University (SVVU), Tirupati-517502 (AP), India.

²Assistant Professor, Department of Veterinary Clinical Complex, NTR College of Veterinary Science, Gannavaram, SVVU(AP), India.

³Professor and Head, Department of Veterinary Clinical Complex, NTR College of Veterinary Science, Gannavaram, SVVU (AP), India.

Abstract

A nine months old male Labrador dog was presented to the Veterinary Clinical Complex, Gannavaram with a history of snake bite. Clinical signs exhibited include dullness, depression, frothy salivation, ataxia, edema and discoloration at paw region. Upon clinical examination fang marks were observed at left metatarsal region. Based on the history, identification of snake by the owner, clinical signs and whole blood clotting test it was diagnosed as viper snakebite. Neutrophilia, polycythemia and marginal lymphocytopenia were noticed. Treatment with poly valent anti snake venom, fluid therapy, tetanus toxoid, an antibiotic was carried out and the dog had uneventful recovery

Keywords: Dog, viper bite, Polyvalent Anti snake Venom

In rural areas especially in forest and forest fringe villages bio- toxins like snake bites and insect stings are most commonly noticed among humans and animal species (Kathiravan *et al.*,2020). In dogs and horses, snake bites are more common when compared to other animals such as cattle, sheep and goat (Yogeshpriya *et al.*,2017). Snake envenomation is an emergency, which needs rapid examination and proper treatment (Vijayakumar *et al.*, 2001). Animals exhibit various symptoms like local tissue damage, blood coagulation defects, pulmonary dysfunction and ataxia (Bhardwaj, 2011). This present paper reports successful management of viper snake envenomation in a Labrador dog.

Case History and Observations

A nine month old male Labrador dog weighing about 20 kg was presented to Veterinary Clinical Complex, Gannavaram with the history of dullness, depression, swollen left hind limb, salivation and ataxia. On clinical examination fang marks were noticed at left metatarsal region and blackish discoloration of the left hind limb was noticed. Pain was evidenced during palpation of the affected area. Hematological examination revealed haemoconcentration, severe neutrophilia, polycythemia and marginal lymphocytopenia. Examination of Leishman's stained blood smear revealed absence

of haemoprotozoans. Based on the history, clinical examination and WBCT the case was diagnosed as snake bite.



Figure: 1. Fang marks on left hind limb



Figure: 2. Edema of the affected limb

*Corresponding author : konjetisowmya20@gmail.com

Table 1: Hematological findings of dog with snake envenomation (before and after treatment)

S.No.	Parameter	Before treatment (0 th day)	After treatment (7 th day)
1.	Haemoglobin (g/dL)	21.0	13.8
2.	Packed cell volume (%)	59	42
3.	Total erythrocyte count ($\times 10^6/\mu\text{L}$)	4.8	6.1
4.	Total leucocyte count ($\times 10^3/\mu\text{L}$)	18,500	12,400
5.	Neutrophils (%)	93	68
6.	Lymphocytes (%)	05	30
7.	Eosinophils (%)	0	0
8.	Monocytes (%)	02	02
9.	Platelet count	85,000	214000

Table 2: Serum biochemical findings of dog with snake envenomation (before and after treatment)

S.No.	Parameter	Before treatment (0 th day)	After treatment (7 th day)
1.	Total bilirubin (mg/dl)	0.8	0.6
2.	Total Protein (g/dl)	6.8	6.8
3.	SGPT(U/L)	184	39
4.	BUN (mg/dl)	28.1	22
5.	Creatinine (mg/dl)	1.5	0.8

The dog was administered with two doses of polyvalent anti-snake venom along with 200 ml of normal saline intravenously. Amoxicillin with sulbactam sodium (@20 mg/kg body weight, BID) and tetanus toxoid were administered. Cessation of salivation was noticed within 30 min after the onset of therapy. Antibiotic and fluid therapy were continued for 4 days and the dog had uneventful recovery.

Discussion

In the present study, the dog exhibited had oedema of left hind limb, congested conjunctival mucus membrane, oozing of dark colored blood at the site of bite, discoloration and staggering gait which were in agreement with that of Ananda *et al.* (2009). Ananda *et al.* (2009) stated that snake venom was a complex mixture of proteins and peptides, consisting of both enzymatic and non-enzymatic compounds which contribute to the development of clinical signs. Blaylock (2001) stated that systemic infection might be noticed in snake bite cases, as snake fangs and oral cavity has bacterial contaminants. Antivenom was administered slowly as IV infusion initially to reduce the severity of anaphylactic reactions. Shukla (2009) opined that tetanus toxoid should be administered in snake bite to provide protection against the tetanus spores which had entered the animal body from contaminated snake

mouth. Expedient transportation of the bitten dog to the nearest veterinary facility followed by aggressive therapy were the cornerstone for successful outcome.

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Juvenile Cellulitis in a labrador retriever- A case report

Jayanthi.C¹, Ranjith Vimalraj.T², Pothiappan.P³, Vijayakumar.H⁴, Rajat Sagare⁵, Kavitha.S⁶
Department of Veterinary Clinical Medicine, Madras Veterinary College, Chennai-600007.

¹Assistant professor, Department of Clinics, Madras Veterinary College, Chennai 7.

²M.V.Sc Scholar,

³Assistant Professor, Department of Clinics, Madras Veterinary College, Chennai 7

⁴Assistant professor, Department of Clinics, Madras Veterinary College, Chennai 7

⁵Ph.D scholar, Department of Clinics, Madras Veterinary College, Chennai 7

⁶Professor and Head, Department of Veterinary Clinical Medicine, Madras Veterinary college, Chennai-600007.

Abstract

A labrador retriever pup aged 50 days was brought to Madras Veterinary College Small animal outpatient Unit with a history of anorexia, pyrexia, dullness with papules and pustules over muzzle and ear pinnae since three days. Facial edema, periocular edema and enlargement of pre scapular and submandibular lymphnodes were noticed on clinical examination. After complete physical examination, blood samples, skin scrapings, samples for bacterial culture and cytology were taken. Hemogram revealed anemia, serum biochemistry revealed low serum total protein concentration, skin scrapings were negative for parasites, no growth was present on bacterial culture from aspirated pustules, cytology from moist lesions showed presence of neutrophils and cocci. Based on the physical examination, hematological, biochemical and microbiological investigations, the present case was diagnosed as Canine Juvenile cellulitis and treatment initiated with antibiotic and corticosteroid parenterally for three days. There was a remarkable improvement noticed with reduced facial edema, reduced periocular edema and dry external ear pinnae. Treatment was continued with oral antibiotic for seven days and the pup recovered uneventfully.

Keywords: Canine Juvenile cellulitis, puppy strangles

Juvenile cellulitis is a progressive granulomatous pustular disorder of puppies. It is most common in dogs younger than four months of age, occasionally reported in dogs up to 4 years old. Daschund, Golden retriever, Labrador retriever, Golden setter, Beagle, pointer puppies are predisposed. Cause and pathogenesis are unknown. The eyelids, pinnae, lips, chin, muzzle, paws, abdomen, thorax, prepuce and anus can be affected with lesions that fistulate, drain and crust.

Lymphadenomegaly most commonly submandibular, superficial cervical can be distant from the affected sites and is often painful. The ear pinnae may be swollen and exudative. vesicles, pustules, serous to purulent exudate, crusts, cellulitis and alopecia develop on lips, muzzle and eyelid margins. Lesions may also involve the anus and prepuce and lesions may be mild to severe and are often painful but not pruritic (Keith *et al.*, 2011).

Case History and Treatment

A 50 days old, 2 kg body weight, female Labrador retriever puppy was presented to Madras veterinary college Small animal clinic outpatient Unit with history of fever, inappetence followed by progressive development of granulomatous abscess-like lesions, moist exudation on pinna and muzzle, lips, periocular region as well as facial perioral papules, swollen face and constant shaking of its head. Vaccination was done on 45th day of age against Distemper and Parvo virus. Littermates were not affected. On physical examination, the rectal temperature was 103.5°F, heart rate - 136 beats / min. facial edema, papules, pustules and crusts localized periocularly, periorally, on the chin and muzzle of this dog were detected (Fig.1). Affected skin was painful but not pruritic. Lethargy, and anorexia was noticed. Moist dermatitis was also present around the pustules and pinnae (Fig.2). Submandibular and prescapular lymphadenopathy was also observed (Fig.3).

On the day of Presentation



Fig.1 Papular rash with pustules and moist exudates on the muzzle and periocular region and swollen face before treatment.



Fig.2 Typical moist dermatitis associated with juvenile cellulitis (Right ear)



Fig.3 Submandibular and preescapular lymphadenopathy

Routine hematology revealed anemia (PCV: 26.6%, Hemoglobin concentration: 8.6 g/dL, WBC- 12000 cells / cmm. On Serum Biochemical analysis the total serum total protein concentration was 6.08 g/dL and serum albumin level was 1.7 g/dL. No remarkable

changes in serum biochemical and hematological examination were observed except low albumin level. Skin scraping was negative for parasites. Culture of intact pustules was negative for bacterial organisms. The moist lesions had *Staphylococci* growth and cytology revealed neutrophils and cocci.

3rd day post treatment



Fig 4 - Dry and muzzle, chin and reduced facial edema, periocular edema, submandibular and healing lesions in lips, preescapular lymph node



Fig.5 Dry external ear pinna with no secretions

8th day post treatment

Fig. 6. No papular rash and pustules with complete recovery.

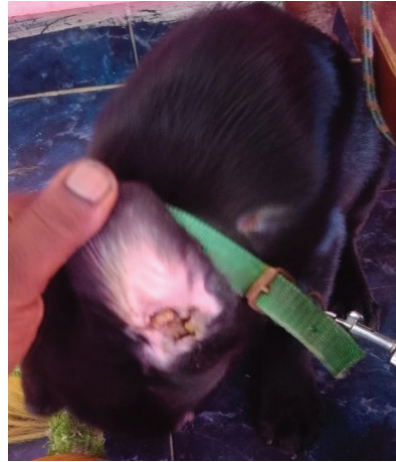


Fig.7. Completely recovered ear pinnae

Aspirates from intact pustules were negative for bacterial growth. Exudative cytology of lesion revealed presence of neutrophils, macrophages, epithelial cells and cocci. Based on the results and clinical signs the case was diagnosed as juvenile cellulitis. Cefotaxime was given at dose rate of 50 mg/kg intravenously twice daily for three days, Prednisolone at a dose rate of 2 mg/kg IM for first three days along with Ringer's lactate followed by Cefpodoxime proxetil at a dose rate of 10 mg/kg orally once a day for seven days. Following first 3 days treatment with Cefotaxime and Prednisolone facial edema reduced, external ear pinnae dried with no secretions, reduced periocular edema, size of submandibular and pre-scapular lymphnodes got reduced (Fig.4, Fig.5). On 8th day during treatment, complete healing was noticed with no papular lesions, dry ear pinnae and lymphnodes were reduced in size (Fig.6, Fig.7).

Discussion

Juvenile cellulitis (Juvenile pyoderma, puppy strangles, juvenile sterile granulomatous dermatitis and lymphadenitis) is an uncommon granulomatous and pustular disorder of the face, pinnae and submandibular lymph nodes, usually of puppies (Gross *et al.*, 2005 and Reimann *et al.*, 1989). Puppies are affected between the ages of 3 weeks and 4 months and one or several puppies in a litter may have this condition. A few reports of dogs with older age onset and typical lesions and findings have been reported (Gross *et al.*, 2005; Reimann *et al.*, 1989 and Jeffers *et al.*, 1995). Although numerous breeds have experienced the disorder, Golden retrievers,

Daschunds and Gordon setters appear to be predisposed (White *et al.*, 1988 and Mason *et al.*, 1989). Other breeds such as English cocker spaniel, Labrador retriever and Lhasa Apso may be predisposed, but better studies are needed to validate breed observations, as many breeds have been affected (Gross *et al.*, 2005; Park *et al.*, 2010 and Park *et al.*, 2004). In the present case, the dog was 50 days old female Labrador retriever.

The cause and pathogenesis are unknown. Heritability is supported by an increased occurrence in certain breeds and by familial histories of disease (Gross *et al.*, 2005 and Park *et al.*, 2010). Other authors (Moriello *et al.*, 1992 and Kummel *et al.*, 1990) reported that some juveniles cases associated with vaccination and a hypersensitivity of the immune system. In this case, pup was vaccinated on 45th day against Distemper and parvo virus. In addition, the disease may be hereditary (Scott *et al.*, 1995), but no signs of the disease have been observed in the littermates of the case. In this case, *staphylococci* organisms were identified from impression cytology of drained lesions.

The culture results of intact pustules were negative for bacterial growth suggests a non-bacterial cause for this case. The occurrence of sterile pustules that respond dramatically to glucocorticoids suggests an underlying immune dysfunction. Clinical signs in juvenile cellulitis include lymphadenopathy (submandibular and prescapular), swollen face, lesions most common on the lips, muzzle, chin, bridge of nose and periocular area as observed in the reported case. Otitis externa is common and pinnae are frequently

thickened and edematous with pyrexia, anorexia and lethargy.(Scott *et al.*, 1995; Rosychuck *et al.*, 2000, Reimann *et al.*, 1989 and Nagarajan *et al.*, 2012). The signs of the case reported are similar. Hematological report showed anemia, which were consistent with previous report on hematological changes induced by juvenile cellulitis. Anemia in this case may be attributed to inflammatory condition and serum biochemistry report showed increase in serum total protein concentration as reported by jain (Jain *et al.*, 1986) which is probably related with the acute inflammatory inflammation. It has been reported that a combination of a cephalosporin (at a dose of 20-30 mg/kg) and glucocorticoids (at a dose of 1-2 mg/kg) is effective in the treatment of dogs with juvenile cellulitis (Scott *et al.*, 1995 and Mason *et al.*, 1989). In the present case cefotaxime 50 mg/kg BID, prednisolone at initial dose 2 mg/kg for first three days followed by Cefpodoxime proxetil tablet at a dose rate of 10 mg/kg orally once a day for three days had favourable response.

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A case report on cutaneous histiocytoma in a dog

Kambala Swetha¹, S. Kavitha²

Department of Veterinary Clinical Medicine, Madras Veterinary College, Chennai-600007

Tamilnadu Veterinary and Animal Sciences University, India.

¹Ph.D Scholar, ²Professor and Head

Abstract

A two-year-old, female Golden Retriever dog weighting 36 kg was presented to the private clinic with the history of solitary growth over the elbow region. Sample was collected for biopsy and it revealed cutaneous histiocytoma. On thoracic ultrasonography no metastasis of lungs was noticed. Microscopic examination of biopsy samples revealed sheets of densely packed round cells, with round to oval nuclei and nucleoli, some cells showed multinucleation and bi-nucleation, moderate amount of pale blue cytoplasm was also observed.

Keywords: Histiocytoma, dog, biopsy, tumor

Cutaneous histiocytoma and histiocytic sarcoma are the forms of canine histiocytic neoplasms, which display significantly variable biological behaviours. Histiocytic diseases are more commonly noticed in dogs than in cats. Histiocytoma typically present as solitary cutaneous nodules, characterized by a distinctive dome-like projection above the surrounding epidermis, which is commonly regress on their own within 4-8 weeks of time. During the regenerative process, there is notable infiltration of mature leucocytes in the FNA slides (Gross *et al.*, 1992; Reddy *et al.*, 2018). Histiocytomas often grow rapidly with significant epidermal ulceration. Recurrence at the surgical excision site or development in a new location is highly uncommon, and malignant transformation is a rare occurrence (Goldschmidt and Hendrick, 2002). Immunophenotype and ultrastructural studies have confirmed that cutaneous histiocytoma is characterized by a proliferation of intraepidermal dendritic antigen-presenting cells, known as Langerhans cells. These cells express specific markers including CD1a, CD1b, CD1c, major histocompatibility complex (MHC) class II, and CD11c (Kipar *et al.*, 1998; Pires *et al.*, 2009). Cutaneous histiocytoma is diagnosed by histopathological evaluation, combined with novel immune-histochemical staining protocols. In the present study diagnosis was done by histopathologic examination of biopsy sample collected from the lesion at elbow region.

Case history and observations

A two-year-old female Golden Retriever dog weighing about 36 kg was brought to the clinic due to solitary growth of 4 x 6 cm size over the elbow region

Corresponding author: kavikrithigaa@gmail.com

persisting for a month (Fig. 1). Previously it was treated with antibiotic cephalexin, and topical medications containing antiseptic and antibacterial properties. Upon clinical examination, the dog was active and slight pale mucous membranes, with normal hydration status and epidermal ulceration of mass is noticed (Fig 2). Vital signs included a rectal temperature of (101.4°F), heart rate (78/min) and respiratory rate (24/min). Blood analysis indicated a haemoglobin level of 10.9 g/dL, packed cell volume 34.2%, total erythrocyte count $5.06 \times 10^6 / \mu\text{L}$, total leucocyte count $29.60 \times 10^3 / \mu\text{L}$, with 86% neutrophils, 8% lymphocytes, 2% eosinophils and 4% monocytes. Serum biochemistry revealed total protein of 6.70g/dL, albumin 3.1g/dL, alanine transaminase 54 IU/L, bilirubin 0.52 mg/dL, BUN 38.18mg/dL, creatinine 1.55mg/dL. A plain lateral thoracic radiograph displayed no circumscribed nodules in the lungs, without metastasis in lungs. By using punch biopsy needles, samples was collected and preserved in 10% buffered formalin solution. These samples send to the laboratory for histopathological techniques. On microscopic examination, sheets of densely packed round cells, with round to oval nuclei and nucleoli are observed, some cells showed multinucleation and bi-nucleation, moderate amount of pale blue cytoplasm is also observed (Fig 3). Advised the owner for surgical excision of mass.

Discussion

The most prevalent skin tumour of dogs is cutaneous histiocytoma (Goldschmidt and Hendrick, 2002), constituting around 18% of all canine skin tumours (Reddy *et al.*, 2009). Histiocytoma is a common, benign, cutaneous neoplasm of the dog.

Roshini *et al.* (2013) documented an 8.6% incidence of canine cutaneous histiocytoma among 41 canine tumorous growths studied, ranked second to mammary gland tumour. In the present study age of the affected animal was 2 years, although it can occur in dogs of any age, predominantly noticed in dogs below three years of age (Goldschmidt and Hendrick, 2002). Certain pure breed dogs includes Scottish terriers, Bull terriers, Boxers, English cocker spaniels, Doberman pinschers, and Shetland sheepdogs are noted to be more susceptible to cutaneous histiocytoma (Taylor *et al.*, 1969). Most of the histiocytic diseases of canines involve proliferations of cells from various dendritic cell lineages. Histological findings like sheets of densely packed round cells, with

round to oval nuclei and nucleoli observed in the present study were similar to those described previously that Histologically, the nuclei in histiocytomas shows various shapes, extending from round to oval or complexly folded (Goldschmidt and Hendrick, 2002; Baba and Toi, 2007; Reddy *et al.*, 2009). Mitotic counts within histiocytomas can vary significantly, often being substantial, while the cytoplasm typically display abundant and eosinophilic (Guvenc *et al.*, 2002). Immunohistochemistry plays a vital role in differentiating histiocytic tumors from other neoplasms with similar histological appearances, offering a definitive diagnosis, prognosis, and assessment of treatment efficacy.



Fig 1. Dog having mass at the elbow region of left forelimb



Fig 2. Mass at elbow region showing epidermal ulceration

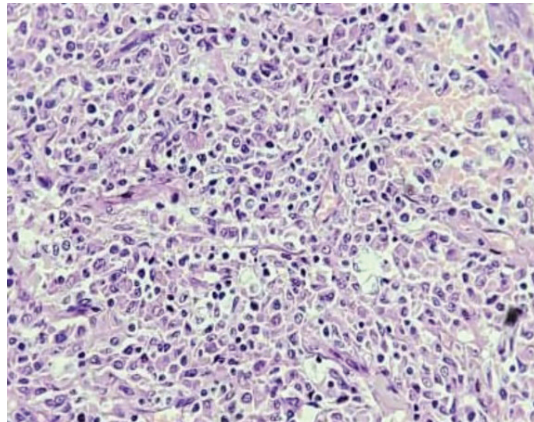


Fig 3. Sheets of densely packed round cells, with round to oval nuclei, nucleoli and moderate amount of pale blue cytoplasm was observed.

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Congenital Megaesophagus in a Pup- A case report

Abboori Sangeetha and K. Satish Kumar*

Department of Veterinary Medicine, College of Veterinary Science, Rajendranagar, PVNRTVU, Hyderabad, Telangana-500030

Abstract

A 3 month old GSD pup was presented to VCC, CVSc, Rajendranagar, with history of vomiting for a couple of weeks. Deworming and vaccination was regular. Physical examination revealed emaciation and poor body score. Plain X Ray did not reveal any abnormality except ventral deviation of thoracic trachea. Barium contrast radiography revealed dilation of the oesophagus and the pup was diagnosed with congenital megaesophagus. Subsequently, the pup was managed with elevated feeding and dietary changes, which showed a marked improvement.

Keywords: Congenital megaesophagus, GSD Pup, management

Megaesophagus is defined as the dilation of oesophagus (Tams, 2003) and is a condition characterized by decreased or absent movement in the oesophagus, hindering the normal passage of food. In young dogs, congenital megaesophagus can be inherited or result from developmental issues affecting the nerves that control the oesophagus. Symptoms typically become apparent when the affected puppy starts consuming solid food (Saravanan *et al.*, 2010).

Case history and observations

A 3-month-old male German Shepherd pup was presented with a complaint of vomiting sometime after

feeding since a couple of weeks. It was reported that the pup was throwing out undigested food. However, vomiting was not reported when the pup was not consuming any food or water. On physical examination the animal was emaciated with a poor body condition score. The pup was subjected to a plain radiography initially which revealed no significant abnormality except ventral deviation of thoracic trachea and slight bronchitis. However, lateral thoracic X ray with barium sulphate contrast media revealed pooling of contrast material and volume in the middle oesophagus, near the base of the heart where dilated oesophagus was visualised (Fig.1 A and & B).

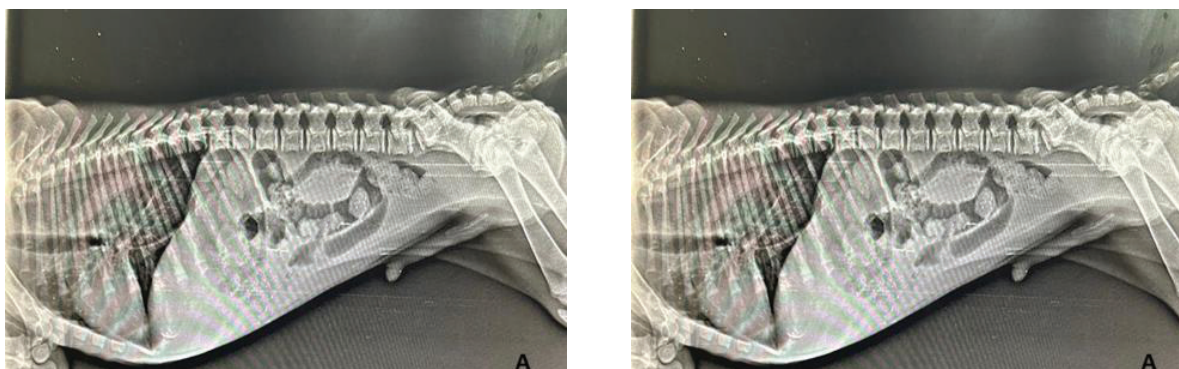


Fig. 1 Lateral plain radiograph (A) and with barium contrast (B). Note the radio contrast material in the dilated esophagus with ventral deviation of trachea (arrow)

Discussion

Dietary adjustments and posture changes were recommended for the animal during and after feeding to promote normal food transit and prevent food withholding or regurgitation. This included pasty diet

several times a day with the patient in bipedal position during and after meals. It was advised to keep the animal in an elevated position for 10-15 minutes following each meal. The patient got acclimatised to the managerial corrections and experienced a notable improvement in body condition score and a reduction in regurgitation episodes (Fig.2 A & B). Congenital megaesophagus in

dogs, often seen in certain breeds, results in oesophageal dilation and impaired motility, leading to regurgitation and stunted growth, with suspected vagal nerve abnormalities. Acquired Secondary Megaesophagus (ASM) in dogs may arise from various conditions like myasthenia gravis and hypoadrenocorticism, possibly due to neural defects akin to congenital cases. Associated conditions encompass hypoadrenocorticism, lupus myositis, polymyopathies, polyneuropathies, dysautonomia, lead poisoning, and severe esophagitis. Management includes offering small, frequent meals while the dog is in an elevated or upright position, such as using a Bailey chair. Ettinger and Feldman (2017) had recommended to vary the consistency of the food to identify the types that were better tolerated. Percutaneous gastric tubing can be tried if the elevated feeding do not provide adequate nutrition to the dog. Gastric tube enables direct delivery of food into the stomach, bypassing the dysfunctional oesophagus.



Fig. 2 The GSD pup with poor body condition score (A) which showed marked improvement with increased weight and proper growth after 4 months (B)

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Management of pyoderma associated with demodicosis in a dog-A case report

Balusupati Indhu Teja, Jyothi. J., Sangeetha. A., Balakrishna, A. and Satish Kumar.K.*

Department of Veterinary Medicine, College of Veterinary Science, Rajendranagar, PVRNRTVU, Hyderabad, Telangana-500030

Abstract

Demodicosis is a very common parasitic skin disease caused by the mite *Demodex canis*. Demodicosis can occur in dogs of all ages. One-year-old adult male dog was presented with a history of pruritis and clinical signs such as alopecia, erythema and pustules on the face with keratinization of forelimbs and ventral side of the abdomen. Impression smear revealed Staphylococcus bacteria when stained with gram stain. Deep skin scrapping examination revealed presence of *Demodex canis*. Treatment with ivermectin, external application of amitraz, cephalixin, vitamin supplement with liver extract, was successful in managing demodicosis in this case.

Keywords: Demodicosis, pyoderma, dog, Ivermectin

Demodicosis is a common skin disease of the dog. Despite a number of studies evaluating pathogenesis and therapeutic options, treatment of canine demodicosis is still a matter of discussion in many conferences and continuing education courses (Mueller *et al.*, 2011). Demodicosis, also known as Red Mange, Acarus Mange, and Follicular Mange, is a skin disease caused by *Demodex canis* mites (Diwakar *et al.*, 2017). *D. canis*, *D. injai*, and *D. cornei* are three different species of demodex mite (Izdebska *et al.*, 2010). Predilection sites for *D. canis* and *D. injai* are Hair follicles, glands, and sebaceous ducts. Whereas, *D. cornei* can be found in the superficial layer of the stratum corneum. The species with the greatest prevalence is *D. canis*, while the other two species are far less common. *D. canis* inhabits primarily the hair follicles on the head – usually in the periorbital region, and on the cheeks and upper lip. Only when the level of infection is high these mites are to be found in other skin regions (Izdebska *et al.*, 2010). Immune suppression due to endoparasitism or malnutrition in young dogs are considered predisposing factors and should be diagnosed and treated to optimize

the therapeutic outcome. Secondary bacterial skin infections frequently complicate the disease due to immune suppression and require topical and/or systemic antimicrobial therapy. (Mueller *et al.*, 2011).

Case history and observations

A one year old male dog was presented to the V.C.C, Rajendranagar with a history of pruritis and clinical signs such as alopecia, generalized edema, redness of skin and pustules mainly on the face, forelimbs and ventral side of the abdomen (Fig. 1 A and B). The lesions were tangled with bacterial infection leading to pustules on the ventral abdomen. The clinical signs presented are in accordance with (Gelagar *et al.*, 2023) (Diwakar and Diwakar, 2017) who documented that severe alopecia, hair loss, crusts, pruritus, inflammation, erythema of the skin, and even crust formation and keratinization are common signs of demodicosis in dogs. Secondary infections are usually caused by *Staphylococcus aureus* bacteria. Deep skin scrapings revealed several carrot shaped parasite with four pairs of legs arising from thorax suggestive of *Demodex canis* (Fig. 1 C).



A



B



Fig.1. Erythema of skin crust formation (A); pustules on ventral side of abdomen (B); skin scrapings revealing *Demodex canis* (C); recovered dog on day 30 (D).

Discussion

The affected dog was treated with Inj. Ivermectin @ 400 µg/kg body weight subcutaneously once a week for four weeks. This finding is in contradiction with Mueller, (2004) who stated that the weekly ivermectin protocol did not demonstrate much efficacy. However, Mueller *et al.*, (2011) also stated that daily dose of administration causes ivermectin toxicity and thus daily administration was not practiced in the present case. In addition, amitraz was applied topically once in a week for four weeks. Amitraz is a monoamine oxidase inhibitor, an alpha 2-adrenergic agonist and inhibits prostaglandin synthesis that leads to overexcitation and consequently paralysis and death in insects (Corta *et al.*, 1999). It was also advised to use benzoyl peroxide shampoo bath once in a week and topical application of clobetasol, miconazole and Ofloxacin lotion, vitamin supplement and liver extract and antibiotic cephalixin @15 mg/kg PO. The dog began to show improvement of signs (Fig.1 D& E) , and after receiving medication for 30 days, the animal underwent the same round diagnostic testing as before. Blood values showed satisfactory recovery. Following a 30-day course of treatment, the animal underwent a skin scraping test, and the results showed that there was no evidence of mite infestation or other clinical symptoms. It is recommended to continue treatment for one month after obtaining the second consecutive set of negative monthly skin scrapings (Mueller *et al.*, 2011).

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Hepatozoon Canis in a Labrador Dog with Azotaemia and its Therapeutic Management

Suryawanshi A. A.¹, Gaikawad R. V.², Galdhar C. N.² and Patil J. U.³

¹Department of Teaching Veterinary Clinical Complex, ²Department of Clinical Medicine, Ethics and Jurisprudence, ³Department of Veterinary Epidemiology and Preventive Medicine, Mumbai Veterinary College, Parel, Mumbai-400012.

Abstract

A 10 year old female Labrador dog weighing around 30 kg was presented at Department of Teaching Veterinary Clinical Complex, Mumbai Veterinary College, Parel, Mumbai (Maharashtra). Previous history of oral medications of doxycycline that leads to vomition, recent tooth eruption which leads to anorexia, dull in appearance, lethargic. Clinical examination revealed pyrexia (103°F), pale mucous membrane, dehydration (+), azotemic. Upon blood reports revels low haemoglobin and platelet count and high kidney and liver enzyme values. The dogs were treated with inj. Imidocarb dipropionate @5 mg/ kg B.W. twice in month and inj. Metronidazole @ 20mg/kg B.W. for 10 days along with haematinics, liver tonics and antacids. Dogs showed complete recovery after 8 days of therapy.

Keywords: *Hepatozoon Canis*, Azotaemia, Labrador Dog.

Old World hepatozoonosis is a tick-borne disease of wild and domestic canids caused by the protozoal agent *Hepatozoon canis*. The organism is transmitted by the brown dog tick, *Rhipicephalus sanguineus*. *H canis* is reported in many regions of the world, including Asia, Africa, the Caribbean islands, Europe, and South America. The mode of transmission of hepatozoonosis is not typical in the classical sense of a tickborne disease; like other species in the genus, *H canis* and *H americanum* infections occur when infected ticks, the definitive host, are ingested by canine hosts. *H canis* tissue stages reside within bone marrow, lymph nodes, and spleen, and unlike ACH patients, dogs infected with the Old World parasite do not appear to be in pain at presentation; in dogs with overt disease, nonspecific clinical signs including fever, lethargy, depression, and anemia may be observed (Allen, 2022). The present paper deals with a case of *Hepatozoon canis* in Labrador dog with azotaemia and its therapeutic management.

Case History and Observation

A 10-year-old female Labrador dog weighing about 30 kg was presented to Department of Teaching Veterinary Clinical Complex, Mumbai Veterinary College, Parel, Mumbai. Previous history of *E. canis* positive with oral medications of doxycycline that leads to vomiting, so owner did not continue oral medicines.

Dog had sensitivity towards oral doxycycline which leads acidity and vomiting. Recent history of tooth eruption which leads to bleeding, pyrexia, anxiety, anorexia, dull in appearance, and lethargic

Clinical examination revealed pyrexia (103°F), pale mucous membrane, dehydration (+), azotemic, bleeding from gums due tooth eruption, lethargic, blood in urine. Previous history of azotemic (Creatinine 2.7 mg/ dl). Upon blood reports revels low haemoglobin and platelet count and high kidney and liver enzyme values (Table 1). On X- ray examination revealed severe hepatomegaly and splenomegaly and spur formation on lumbar vertebrae (Fig 1). Blood smear examination revels positive for *Hepatozoon canis* (Fig. 2).

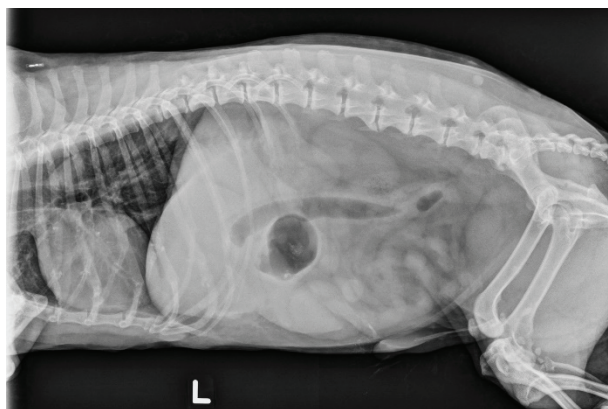


Fig. 1: Severe hepatomegaly in Labrador

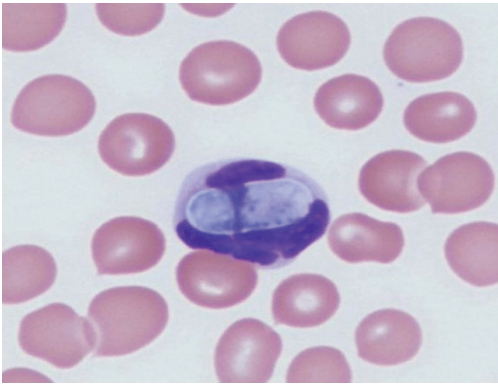


Fig. 2: *Hepatozoon canis* gamont within canine leukocyte

Results and Discussion

On the basis of history of owner, dogs had Dog had sensitivity towards oral doxycycline which leads acidity and vomition. Recent history of tooth eruption which leads to bleeding, pyrexia, anxiety, anorexia, dull in appearance, and lethargic. Haematological examination revels low haemoglobin (11.6 gm %), thrombocytopenia (97k/ μ L), elevated levels of creatinine (2.7 mg/dl) and SGPT (144 IU/L). There is previous history of sensitivity towards oral doxycycline, so dog shifted to inj. Imidocarb dipropionate @5 mg/ kg B.W. twice in month and inj. Metronidazole @ 20mg/ kg B.W. for 10 days. Dog has azotaemia (Creatinine 2.7 mg/kg) so, aggressive fluid therapy along with inj. Astyamin @ 2ml/ kg B.W., inj. Fructodex @5ml/

kg B.W., Inj. Imferon 1.5 ml, Inj. Vitcofol 1 ml along with oral medications of haematinics, liver tonics and antacids. After 8 days of treatment dog were recovered with normal food intake.

According to Sarma (2012), *Hepatozoon canis* positive dog serum biochemical analysis indicated increase ALP, ALT, globulin BUN and creatinine and decrease in the value of total protein and albumin, similar findings were reported in above case. Blood urea nitrogen (BUN) increase was similar to findings of Pawar and Gatne (2005) which might be due to dehydration or due to secondary glomerulonephritis or renal amyloidosis in the chronic stage of the disease. Increased levels of BUN and creatinine points towards damage to kidney as *H. canis* has also been incriminated as cause of glomerulonephritis, schizogony can also progress in kidney, Harikrishnan *et al.*, (2003). Similar suggestions by Medici and Heseltine, (2008). Hypoalbuminemia is attributed to decreased protein intake, chronic inflammation, or protein-losing nephropathy. According to Klopfer *et al.*, (1973) Hypoproteinemia may be due to increased destruction of hepatocytes as *H. canis* is believed to affect liver and spleen on a great scale. According to Mondal *et al.*, (2021) combination therapy of imidocarb dipropionate and doxycycline along with supportive therapy (fluids, antiemetics, hematinic and hepato-protectives) might be a successful choice for proper management of hepatozoonosis induced acute hepatitis in canine.

Table 1

Sr. No.	Parameter	Day 1	Day 4	Day 8	Reference Range
1	Hb (g %)	11.6	8	9.1	12 - 18 gm %
2	TEC (million/cmm)	4.94	3.06	3.65	5.5 - 8.5 million / cmm
3	PCV (%)	34.98	23.48	26.83	37 - 55 %
4	TLC (thousand/cmm)	10.2	7.6	13.0	6.0 - 17 x 10 ³ / cmm
5	Neutrophils (%)	77	86	81	60 - 77 %
6	Lymphocyte (%)	22	13	17	12 - 30 %
7	Monocyte (%)	01	01	02	03 - 10 %
8	Eosinophil (%)	00	00	00	02 - 10 %
9	Platelets(thousand/cmm)	97000	202000	215000	200000 - 500000 /cmm
10	Total bilirubin (mg/dl)	0.4	0.3	0.3	0 - 0.4 mg/dl
11	Direct bilirubin (mg/dl)	0.3	0.1	0.2	0.0 - 0.1 mg/dl
12	Indirect bilirubin (mg/dl)	0.1	0.2	0.1	0 - 0.3 mg/dl
13	SGOT (IU/L)	25	26	34	05 - 55 IU/L
14	SGPT (IU/L)	144	77	63	05- 60 IU/L
15	Albumin (g/dl)	2	2.2	2.1	2.6 - 4.3 g/dl
16	Globulin (g/dl)	2.7	2.6	3.0	2.3 - 4.5 g/dl
17	Total Protein (g/dl)	4.7	4.8	5.1	5.1 - 7.8 g/dl
18	Blood Urea Nitrogen	40.1	9.8	25.1	7 - 27 mg/dl
19	Serum creatinine (mg %)	2.7	1.2	0.8	0.4 - 1.8 mg/dl

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Endoscopic retrieval of oesophageal foreign body in a dachshund

Pothiappan. P¹., Giridharan. S²., Jayanthi. C³., Sathishkumar. G⁴ and Kavitha. S⁵

Department of Veterinary Clinical Medicine, Madras Veterinary College, Chennai – 600 007

¹Assistant professor, Department of Veterinary Clinical Medicine

^{2,4}M.V.Sc. Scholar of Veterinary Medicine, ³Assistant professor, Department of Clinics

⁵Professor and Head

Abstract

Four-year-old male Dachshund dog was presented to Madras Veterinary College Hospital with the history of gradual weight loss and chronic vomiting for more than twenty days. Previously the dog was treated in several places with anti-emetics, proton pump inhibitors, H2 blockers, fluid therapy and antibiotics but there was no improvement. On clinical examination the dog was severely dehydrated, increased skin tenting time and increased capillary refill time. Hematobiochemical assessment revealed mild hypoproteinemia and hypoalbuminemia. Radiographic examination of thorax and abdomen revealed no radio-opaque foreign body in the gastrointestinal tract and ultrasound examination also confirmed the same. Contrast radiographic examination revealed absence of megaesophagus and foreign body in gastrointestinal tract. Hence upper gastrointestinal endoscopy was performed and which revealed presence of plastic thread twine along the esophagus from the level of pharynx to cardia and the foreign body was retrieved using endoscopic forceps. Further the animal was treated with fluid therapy alongwith other supportive therapy. The dog was shown the clinical improvement after third day.

Keywords: Dog, Endoscopy, Esophagus, Linear foreign body

Introduction

Gastrointestinal foreign body is more common in dogs and cats (Tams and Rawlings, 2011). The nature of foreign body, degree of obstruction (complete or partial) and presence of perforation have an influence on clinical presentation and treatment. The most frequently reported esophageal foreign body in companion animals are bones, treats (dental chews), trichobezoars and sharp objects like needles and fish hook (Hayes, 2009). Animals with acute signs of vomiting, dysphagia, retching, coughing, ptyalism and regurgitation should have the presence of foreign body in esophagus (Thompson *et al.*, 2012). Foreign bodies lodged in esophagus, stomach and proximal duodenum can be removed through endoscopy. Upper gastrointestinal endoscopy is a minimally invasive treatment with high success rate (Poggiani *et al.*, 2020). Endoscopic procedures are the first choice of removing foreign bodies from esophagus and gastric region of gastrointestinal tract. The present case report describes unusual plastic thread twine foreign body was retrieved through endoscopic procedures.

Case history and clinical observation

Four-year-old male Dachshund reported to MVC Hospital with the history of gradual weight loss and chronic vomiting for more than twenty days. Previously

the animal was treated with antibiotics, anti-emetics, proton pump inhibitors, H2 blockers and fluid therapy but there was no improvement. On clinical examination the dog was found to be severely dehydrated.

Results and discussion

Hemato-biochemical examination revealed mild hypoproteinemia and hypoalbuminemia. Survey radiographic examination of thorax and abdomen shown no evidence of megaesophagus and radiopaque foreign body in gastrointestinal tract (Fig. 1A and 1B). Ultrasound examination revealed the absence of foreign body. Contrast radiographic examination using barium meal was taken immediately, 2hrs and 24hrs after administration and it also revealed no evidence of megaesophagus and radiolucent foreign body in gastrointestinal tract (Fig. 1C, 1D, 1E and 1F). Hence the upper GI endoscopy was performed with prior fasting. The animal was medicated with xylazine (1 mg kg⁻¹)i/m. Anesthesia was induced by injection ketamine @ (7.00 mg kg⁻¹) and diazepam @ (0.20 mg kg⁻¹) i/v. Endotracheal intubation was done and anesthesia was maintained with ketamine (3 mg kg⁻¹) and diazepam (0.1 mg kg⁻¹). The animal was kept in left lateral recumbency and upper GI video-gastroscope with 130 cm long, 9.8 mm diameter insertion tube with a 2.2-mm working channel was inserted and found a radiolucent linear

foreign body (plastic thread twine) in the esophagus at the level of pharynx which extends to cardia of the stomach and it was retrieved using alligator forceps (Fig. 2A, 2B and 2C). The dog was administered with antibiotic, pantoprazole and ondansetron for a week. The dog showed uneventful recovery after a week.

Table I: Hemato-biochemical parameters

Parameters	Observed value	Reference value
PCV (%)	38.4	35 – 57
Hb (g/dL)	11.5	11.9 – 18.9
RBC ($\times 10^6/\mu\text{L}$)	5.03	4.95 – 7.87
WBC ($\times 10^3/\mu\text{L}$)	8.8	5.0 – 14.1
Platelets ($\times 10^3/\mu\text{L}$)	265	211 – 621
Neutrophils	72	68 ± 2
Lymphocytes	22	25 ± 2
Monocytes	4	3 – 5
Eosinophils	3	2 – 5
ALT (IU/L)	41	21 – 102
ALP (IU/L)	96	20 – 156
Creatinine (mg/dL)	1.08	0.5 – 1.5
Total Protein (g/dL)	5.2	5.4 – 7.1
Albumin (g/dL)	1.9	2.30 - 3.8

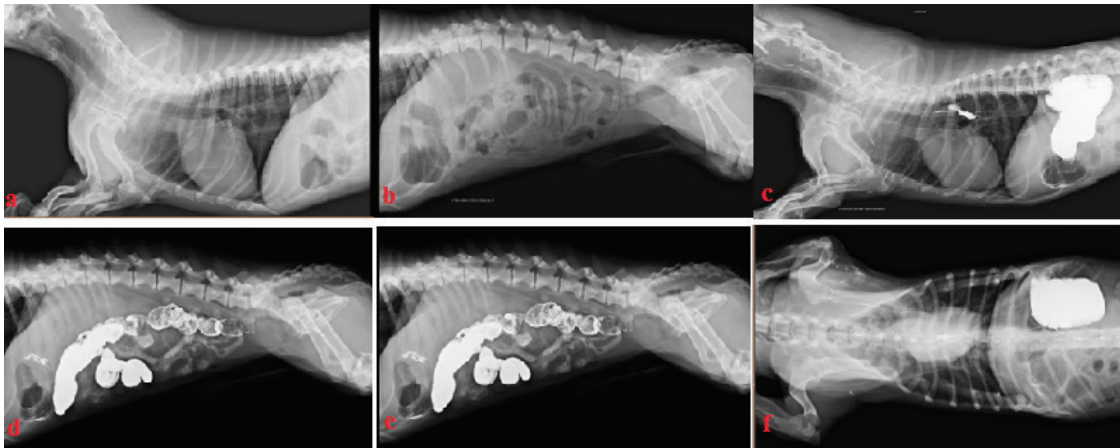


Figure 1: (a and b) survey radiography shows no foreign body in GI tract. (c) contrast radiography image taken 2hrs after barium meal. (d and e) left lateral view taken 24hrs after barium meal shows impacted feces only. (e) dorsoventral view which also taken 24hrs after barium meal.

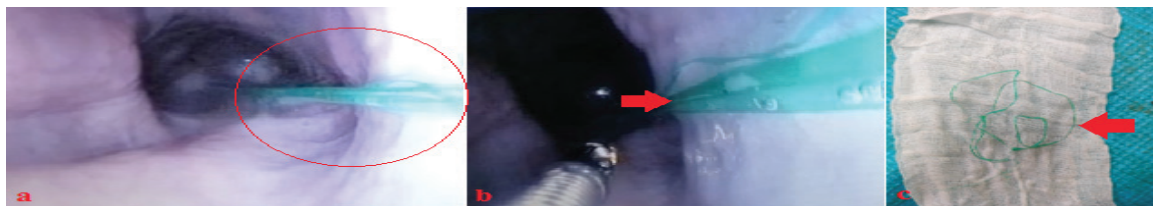


Figure 2: Red circle and arrow indicate the presence of linear foreign body in esophagus at the level of pharynx which extends to cardia of the stomach. (c) the retrieved foreign body (plastic thread twine) from the esophagus.

FB ingestion was associated with behavioral disorders, such as anxiety, attachment and hypersensitivity–hyperactivity syndrome, which occur more commonly in male than female dogs. Thoracic inlet, the base of heart and diaphragmatic hiatus are the most common sites where EFBs are trapped (Palma, 2022). In the present study, linear foreign body was removed from the esophagus and no postoperative complications were observed after endoscopic procedure. Linear foreign bodies were rarely discovered under the tongue during physical examination of affected dogs and most were lodged at the pylorus. The types of linear foreign body removed were more variable in the dog; fabric, carpet, string, and plastic were the most common (Evans *et al.*, 1994). The unusual foreign body of plastic thread twine lodged throughout the entire esophagus was diagnosed through endoscopy and retrieved successfully by using endoscopic forceps.

Conclusion

To make the diagnosis of presence of foreign body, it is essential to use imaging resources like ultrasound and radiography that help in the clinical confirmation of the existence of foreign body in esophagus and stomach. Compared to radiography and ultrasound, endoscopy has the advantage of making tissue analysis feasible and being curative in cases of gastrointestinal foreign bodies (Thompson *et al.*, 2012). Thus, it is inferred that endoscopy is considered a standard procedure in the identification of foreign bodies in the esophageal and gastric lumen. Most of the

time the linear foreign body was undiagnosed with other imaging sources.

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Insulinoma in a Boxer- A case report

Ashi. R. Krishna, Jeyaraja. K., Akshatha Bhand, and Kavitha. S

Department of Veterinary Clinical Medicine, Madras Veterinary College, Chennai – 600007

Tamil Nadu Veterinary and Animal Sciences University

Abstract

A nine-year-old female Boxer was presented to the Small Animal Medicine outpatient unit of Teaching Veterinary Hospital, Madras Veterinary College with the complaint of weakness and occasional ataxia. The general clinical, physical and neurological examinations were found to be normal except for the history of weakness and ataxia. The complete blood count was normal. Serum biochemistry revealed hypoglycemia and the amended insulin to glucose ratio was 187.4. Abdominal ultrasonography and radiography examination were unrewarding. Contrast CT revealed presence of multiple nodular lesions over the pancreas suggestive of insulinoma. The hypoglycemic episodes were managed with dextrose solution followed by dietary management, prednisolone and octreotide. The animal responded to treatment with an improvement in blood glucose level.

Keywords: Insulinoma, Boxer, hypoglycemia, beta cells

Insulinoma is a malignant tumor which secretes excessive amount of insulin to result in profound hypoglycemia (Goutal *et al.*, 2012). Any breed of dog can be affected with insulinoma but usually large breed dogs are overrepresented. Animals with insulinoma will be apparently normal except for the presence of clinical signs of hypoglycemia. Exercise, fasting (increased glucose use), and food consumption (stimulation of insulin release) are common triggers for hypoglycemic episodes in insulinoma.

Case history and treatment

A nine-year-old female Boxer (Figure 1) was presented to the Small Animal Medicine outpatient unit of Teaching Veterinary Hospital, Madras Veterinary College with history of normal appetite, normal voiding habits but occasional episodes of weakness and ataxia. No abnormality was detected during clinical, physical and neurological examinations of the animal. The complete blood count was normal while the serum biochemistry revealed presence hypoglycemia (40 mg/dL). Therefore, multiple tests of blood glucose were carried out on the subsequent days. The multiple blood glucose tests revealed persistent hypoglycemia with a blood glucose level of around 40 mg/dL. The paired serum samples were collected on the following day, measuring serum insulin and blood glucose values which revealed values of 18.74 μ U/ml and 40 mg/dL respectively. The amended insulin to glucose ratio was found to be 187.4.

$$\text{Amended insulin glucose ratio} = (\text{Serum insulin } (\mu\text{U/ml}) \times 100) / (\text{Serum glucose (mg/dl)} - 30)$$

The abdominal ultrasonography and thoracic and abdominal radiography did not revealed any abnormalities. Contrast CT scan revealed presence of multiple nodular lesions over the pancreas. The owner was not willing for surgical correction and chemotherapy. Hence treatment with dextrose (25% @ 1 ml/Kg body weight intravenously), prednisolone (@ 0.5 mg/Kg body weight OD PO) and octreotide (@ 20 μ g SC q 8hr) was advised. The dietary management included multiple small meals of high protein, fat and complex carbohydrates. Animal responded to the treatment with improved blood glucose value of around 60 mg/dl.

Discussion

Insulinoma is defined as an insulin-secreting tumor of pancreatic beta-cells (Feldman and Nelson, 2004). The majority of insulinoma's clinical symptoms are caused by neuroglycopenia in the central nervous system, and by the release of large amounts of counter-regulatory hormones in reaction to hypoglycemia, particularly catecholamines (Kruth *et al.*, 1982 and Tobin *et al.*, 1999). Clinical symptoms including weakness, collapse, ataxia, confusion, and seizure activity. Dogs with insulinoma typically have normal physical examination findings as reported by Dunn *et al.* (1993). Some dogs with insulinoma were found to have peripheral polyneuropathy, which is characterized by pelvic limb paresis or tetraparesis with diminished to nonexistent appendicular reflexes. Concurrent hypoglycemia (<3 mmol/L) and hyperinsulinism

(serum insulin within or above the reference range) are characteristics of insulinoma (Dunn *et al.*, 1993). In dogs with insulinomas, thoracic and abdominal radiography is typically normal. Pancreatic mass can be seen on ultrasound in about 56% of dogs with insulinoma. With a reported sensitivity of 71%, dual-phase computed tomography (CT) seems to be the most useful method for detecting a pancreatic mass (Tucker *et al.*, 2006).

Treatment includes surgical correction and medical management. Surgical removal of tumor provides

best relief from the clinical signs of insulinoma. Medical management includes the use of dietary management as well as prednisone, diazoxide, and octreotide (Tobin *et al.*, 1999; Polton *et al.*, 2007 and Goutal *et al.*, 2012). Octreotide is used to treat hypoglycemia in dogs with insulinomas as it inhibits insulin release. This somatostatin analog is available for injection as a SC, IM, or IV (Simpson *et al.*, 1995). Metastatic disease can be managed with either streptozocin or tyrosine kinase inhibitors (Grant and Burgess, 2016).



Fig. 1. Dog with insulinoma

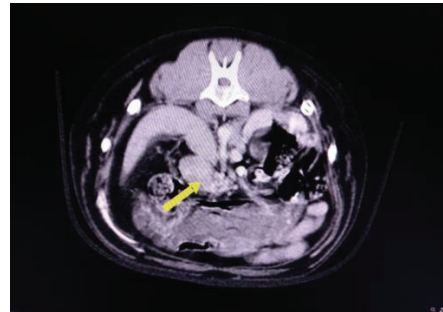


Fig. 2. CT reveals nodular lesions in pancreas

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Body weight	b wt	Litre	l	Calory	cal
Meter	m	Centimeter	cm	Microlitre	μl
Counts per minute	cpm	Milligram	mg	Cubic centimeter	cm ³
Millilitre	ml	Degree centigrade	°C	Minute(s)	min
Degree Fahrenheit	°F	Once a day	od	Decilitre	dl
Parts per million	ppm	Gram	g	Percent	%
Hour(s)	hr	Picogram	pg	Inch	in
Revolution per min	rpm	Intramuscular	im	Seconds(s)	sec
Intraperitoneal	ip	Square centimeter	cm ²	Intravenous	iv
Subcutaneous	sc	Kilo calories	kcal	Thrice a day	tid
Kilogram	Kg	Year(s)	yr	Twice a day	bid
Volts	V				

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Dated: 21st June, 2024

Dr. G. Vijayakumar