



ISSN: 2456-2912

VET 2024; 9(1): 754-756

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www.veterinarypaper.com

Received: 26-11-2023

Accepted: 30-12-2023

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Study on the prevalence of ascites in canines

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Abstract

Ascites is the overabundance of transudate within the peritoneal cavity. It is one of the most prevalent canine abdominal anomalies. The current study aimed to determine the clinical prevalence of ascites in canines in and around the Jaipur region of Rajasthan. The main diagnostic methods used to diagnose canine ascites were history, overt clinical examinations, haemato-biochemical profile, radiography, and ultrasonography. The study was conducted from August 2021 to January 2022. The prevalence of ascites related to hepatopathy was 2.6%, with a total prevalence of 4.7%. Male Spitz dogs have a higher predominance than female Spitz dogs. Male dogs were more common than female dogs. The highest prevalence was found in dogs older than 7 years of age. The winter months were discovered to be more prone to ascites. The Major clinical indicators included an enlarged abdomen, lethargy, pale mucous membranes, laboured breathing, diarrhea and vomiting.

Keywords: Ascites, canine, prevalence, hepatopathy, spitz, vomition

1. Introduction

Ascites, a common clinical symptom in dogs, is caused by fluid accumulation in the peritoneal cavity. Ascites treatment requires accurate diagnosis because the underlying cause can be chronic hepatic failure, congestive heart failure, malnutrition, or ancylostomiasis (Randhawa *et al.*, 1988) [11]. The liver is the most significant and metabolically active parenchymal organ in the body, performing functions such as protein, glucose, lipid, mineral, and vitamin metabolism, detoxification, and immunoregulation. In carnivores, the liver accounts for around 3-8% of total body weight and plays a vital role in a variety of metabolic activities that contribute to the body's regular homeostatic system (Center *et al.*, 1989; Strombeck *et al.*, 1990) [2, 16].

Meyer (2005) [9] found that hepatobiliary disorders affect 2-3% of all animals seen at the companion animal clinic. Over 60% of these patients have hereditary portosystemic shunts, malignancies (metastasis, malignant lymphoma, and original liver tumors), and chronic active hepatitis. When chronic hepatitis worsens, it causes irreversible fibrosis, which leads to cirrhosis and ascites (Rothuizen *et al.*, 2005) [13].

According to Hunt (2002) [6] ascites is a common abdominal abnormality in dogs. Ascites is the abnormal buildup of serous fluid in the abdomen (peritoneal cavity) and is normally reserved for a transudate connected to liver or right side coronary heart failure (Richter *et al.*, 2003) [12]. The lowered oncotic stress caused by hypoalbuminemia caused by protein losing enteropathy (PLE), protein losing nephropathy (PLN), and liver failure (persistent) Abdominal distension, respiratory distress, diarrhea, and weight loss in PLE, polyuria/polydipsia in chronic renal illness, thrombo-embolic disease in PLE and PLN, jaundice in liver failure or bile peritonitis, exercise intolerance and collapse in heart failure, and cardiac tamponade. Anuria and uremia in the uro-abdomen are clinical indications of ascites that can be lethal if not treated (Hall, 2005; James *et al.*, 2008) [3, 7].

For screening purposes, complete blood count, serum biochemical profile, urine analysis, faecal analysis, review of abdominal radiography (Varshney and Hoque, 2002) [17], and ultrasound (Vijayakumar *et al.*, 2011) [18] are evaluated. Surprisingly, certain liver disorders are characterized by minor alterations in hepatic enzyme activity in the presence of normal functional indicators, complicating diagnosis. Although the frequency of ascites in canines is

observed in India from puppyhood to old age and is associated with a high death rate, scientific literature on the subject is limited and requires comprehensive work on the prevalence status, diagnostic, and therapy aspects.

Materials and Methods

During the study period, August 2021 to January 2022, 647 dogs were taken to the Veterinary Clinical Complex in Jaipur for various disorders. All of the canines were subjected to a preliminary ascites screening. It included obtaining a history, monitoring temperature, pulse, respiration rate, heart rate, and level of dehydration. Dogs with clinical signs of enlarged abdomen, lethargy, vomiting, diarrhea, weight loss, and mild jaundice underwent a thorough clinical examination that included a detailed physical and clinical investigation, as well as haemato-biochemical estimation, ultrasonography, and radiography.

Blood collection and storage

Total 5.0 mL of venous blood sample was collected from each dog using a dry disposable syringe through the saphenous or cephalic vein. Immediately after collection, 2.0 mL of blood was transferred to EDTA (@1.5 mg/ml) vials for complete blood count (CBC), which was performed within four hours of collection. 3.0 ml of blood was placed into a clean and dry test tube without any anticoagulant and left to clot in a slanting posture for around an hour before being gently centrifuged for 5 minutes at 3,000 rpm to extract separated serum. The supernatant serum was carefully collected in a dry Eppendorf tube using a micropipette, and the well-labeled sera samples were then stored at -200C in a deep freezer.

Diagnosis

Clinical signs: On percussion, all 17 dogs had an expanded abdomen and a fluid thrill, which was followed by clinical

symptoms (Table 4) such as lethargy (13/17), pale mucous membrane (13/17), labored breathing (9/17), diarrhea (8/17) and vomiting (7/18). All of the dogs' clinical findings in terms of rectal temperature, heart rate, pulse rate, and respiration rate were within the normal range. Dogs' lateral radiographs were taken to establish the presence of ascitic fluid. This includes any anomalies in the abdomen's form and size. Johnson (1992) [8] observed that abdominal radiographs were rarely informative in dogs with considerable ascites beyond verifying the presence of fluid since the loss of abdominal contrast rendered all details unclear ("ground glass appearance") (Bray, 1996;Hall, 2005) [1,3].

Nyland and Mattoon (2014) [10] discussed the process for performing ultrasonography imaging on dogs based on clinical indicators. A transducer was inserted just behind the xiphisternum on the midline and slanted cranio-dorsally to film a transverse segment of liver for ultrasonographic assessment. The transducer was gradually pushed caudally while remaining on the midline, and the transducer head was rotated through 90 degrees to photograph a longitudinal segment of liver on the midline. For a right-sided transverse imaging of the gallbladder, put the transducer 6-8 cm cranial to the xiphoid and 4-5 cm dorsal to the sternum. The transducer is positioned toward the midline between the costal cartilages. The transducer was placed on the right 10th - 11th position for a left sided transverse image of the gall bladder.

Results and Discussion

Out of the 647 cases, 17 dogs were diagnosed with ascites related to hepatic failure, implying a 2.6% overall frequency. During the study period, 31 of the 647 cases tested positive for ascites. Of them, 17 dogs were found to have ascites due to hepatopathy. When compared to other months, the winter months had the highest prevalence of ascites in dogs, followed by January and December [Table 1].

Table 1: Month wise prevalence of ascites due to hepatopathy in dogs

Month	Total No. of dogs	Ascites dogs	Ascites due to hepatopathy
August	69	2	1
September	109	3	2
October	119	6	3
November	128	4	2
December	106	7	3
January	116	9	6
Total	647	31 (4.7%)	17 (2.6%)

Eight of the 17 instances of ascites were in dogs of the breed Spitz, which had the highest prevalence of 47.05% among the breeds, followed by four in Labrador retrievers (23.52%), two in Golden retrievers (11.76%), and one each in German shepherd, Doberman pinscher (5.88%), and pug (5.88%) [Table 2]. Male dogs were found to have a larger prevalence

(70.59%) than female dogs (29.41%). Spitz dogs had a higher prevalence in both the male (62.5%) and female (37.5%) groups [Table 2]. Saravanan *et al.* (2014) [14] also said that the overall sex distribution of ascites showed that male dogs (54.2%) had a greater prevalence.

Table 2: Breed and sex wise distribution of ascites due to hepatopathy in dogs (n=17)

Breeds	Ascitic dogs (%)	Sex wise distribution	
		Male (%)	Female (%)
Spitz	8 (47.05%)	5 (62.5%)	3 (37.5%)
Labrador Retriever	4 (23.52%)	3 (75%)	1 (25%)
German Shepherd	1 (5.88%)	1 (100%)	0
Golden Retriever	2 (11.76%)	1 (50%)	1 (50%)
Doberman Pinscher	1 (5.88%)	1 (100%)	0
Pug	1 (5.88%)	1 (100%)	0
Total	17	12 (70.59%)	5 (29.41%)

Ascites was diagnosed in a variety of dogs of various ages. 2 dogs were in the age category of 1-3 years (11.77%), 3 dogs were in the age group of 3-5 years (17.64%), 5 dogs were in the age group of 5-7 years (29.41%), and the majority of the ascites dogs (7) were in the age group of above 7 years (41.18%) [Table 2]. Male canines over 7 years old (71.42%) had a higher frequency of ascites, while females 5-7 years old followed by >7 years old had a lower prevalence [Table 3].

Table 3: Age and sex wise distribution of ascites due to hepatopathy in dogs (n=17)

	Ascitic dogs (%)	Male (%)	Female (%)
1-3 years	2(11.77%)	1(50%)	1(50%)
3-5 years	3(17.64%)	2(66.67%)	1(33.33%)
5-7 years	5(29.41%)	3(60%)	2(40%)
>7 years	7(41.18%)	5(71.42%)	2(28.58%)
Total	17	11(64.70%)	6(35.30%)

In our study, all 17 dogs had enlarged abdomens, while 13 dogs had lethargy and pale mucous membranes (76.47%). Other clinical signs included laboured breathing in nine dogs, diarrhea in eight, and vomiting in seven (Table 4).

Table 4: Common clinical signs recorded in ascetic dogs

Clinical signs	No. of cases (n = 17)	Percentage (%)
Enlarged abdomen	17	100
Lethargy	13	76.47
Pale mucus membrane	13	76.47
Laboured breathing	9	52.94
Diarrhoea	8	47.05
Vomiting	7	41.17

Conclusion

According to the findings of this study, the overall prevalence of ascites owing to hepatopathy in dogs in and around the Jaipur region of Rajasthan during the study period was 2.6%. Male Spitz dogs had the highest prevalence of ascites, followed by Labrador and Golden retrievers, especially in dogs older than 7 years old. Winter was determined to be the most prone season for ascites, with clinical symptoms such as swollen abdomen, pale mucous membrane, lethargy, labored breathing, diarrhea, and vomition being common. The clinical signs seen in this study were comparable to those observed by other workers who recognized that clinical indicators such as enlarged abdomen and respiratory distress arise due to the presence of substantial fluid buildup (Hall, 2005; Saravanan *et al.*, 2012) [3, 14].

There is a loss of appetite, vomiting, diarrhea, anemia, and polyuria/polydipsia (Rothuizen *et al.*, 2005; Vijaykumar *et al.*, 2011; Watson *et al.*, 2009) [13, 18, 19]. Clinical signs vary greatly and are frequently associated with gastrointestinal and neurological symptoms (Hotl *et al.*, 1995) [5]. The most prevalent symptoms in ascites associated with hepatic dysfunction vary depending on the cause and extent of liver injury (Sharma *et al.*, 2011) [15]. Cold weather may disrupt the immune system while promoting pathogen multiplication, allowing bacteria to take advantage of the host's reduced immunological condition to enter and induce septicemia (Heikki, 2007) [4].

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