A Study on Occurrence of Ascites associated with Hepatic origin in Dogs

ABSTRACT

The present study was undertaken to investigate the diagnosis and therapeutic management of ascites in dogs associated with hepatic origin. During the study period, from May 2024 to October 2024, a total of 2948 dogs presented at VCC, College of Veterinary Science and Animal Husbandry, Jabalpur (M.P.) were screened. Among them, 186 dogs had abdominal distension, out of which 44 cases of ascites were confirmed after ultrasonography.The parameters like age, sex and breed pertaining to ascitic dogs were recorded to study the epidemiological pattern of canine ascites. The overall occurrence of ascites in dogs among the total dog population was recorded as 1.49% and among the suspected dogs, the occurrence was 23.66%. Age wise occurrence was significantly higher in 3-6 years of age i.e. 31.03%. The breed wise highest occurrence of ascites was recorded in the Non-descript breed of dogs i.e. 33.33%. Gender wise occurrence was observed significantly higher in females i.e. 24.51%. Ascites associated with hepatic origin was identified as the underlying cause in 52.27% (23/44).

Key words- Ascites, Hepatic origin, Ultrasonography, Non-descript.

1.INTRODUCTION

Dogs are always known to be the best friend of human beings. Since Mesolithic ages, dating back 4000 B.C. of civilization dogs are one of the most favoured animal domesticated by the mankind till date for the purpose of hunting, shows, warrior, search etc.Ascites is also known as abdominal effusion. It is the abnormal build-up of fluid in the peritoneal cavity both in animals and humans, especially more important in dogs. Clinically it is characterized by distended abdomen, anorexia, lethargy, dyspnoea, weakness, discomfort and occasionally vomition (Samad, 2019). Physicians have been aware of ascites since Hippocrates (circa 400 BC), when the only known treatment was paracentesis. The name ascites is derived from the Greek word “ASKOS”, which means bag or sac. The pathophysiology of ascites differs depending on the organ involved. There are two theories have been postulated about how ascites occurs, which are ‘Overfill theory’ and ‘Classic theory’ (Leib, 1997). The predominant disturbance in internal homeostasis is decrease in oncotic pressure of plasma, enhancing the vascular permeability and leakage of fluid in the abdominal cavity which leads to ascites (Gines *et al*., 2010).

2.MATERIALS AND METHODS

This study was conducted in the Department of Veterinary Medicine, College of Veterinary Science and Animal Husbandry, Nanaji Deshmukh Veterinary Science University, Jabalpur (M.P.). The proposed study was conducted for the period of 06 months i.e. from May 2024 to October 2024. A total of 186 dogs brought to Veterinary Clinical Complex (VCC) with complaint of abdominal distension were screened for ascites and were subjected to detail

study. Out of 44 dogs, 18 dogs were selected for therapeutic study along with six apparently healthy dogs as healthy control group. However, the dog population having abdominal distension was examined physically (tactile percussion) and on the basis of ultrasonography for confirmation of ascitic fluid in the abdominal cavity.

2.1 Statistical analysis

The recorded data was analysed as per the standard procedures outlined by Snedecor and Cochran (1994). The chi-square test of significance was applied for the qualitative data about the occurrence of disease, as per the standard procedure IBM SPSS computer software version 25.

3.RESULTS AND DISCUSSION

3.1 Occurrence

The present study was aimed to evaluate the diagnosis and therapeutic management of ascites in dogs associated with hepatic origin. A total of 2948 dogs of various ages and breeds, presented to the Veterinary Clinical Complex (VCC), College of Veterinary Science & Animal Husbandry, N.D.V.S.U., Jabalpur, Madhya Pradesh, from May to October, 2024 were screened. Among dog population, 186 suspected dogs (abdominal distension) were subjected to thorough investigation for confirmation of the ascites.

3.1.1 Overall occurrence of ascites in dog at VCC Jabalpur

The overall occurrence of ascites in dogs among the total dog population was recorded as 1.49% and among the suspected dogs, the occurrence was 23.66% (Table 01 and Figure 01).

Table 01: Overall occurrence of ascites in dog at VCC Jabalpur

Particulars	No. Screened	No. Affected	Occurrence (%)
Dog screened	2948	44	1.49
Suspected dogs	186	44	23.66

The literature regarding reports of occurrence of ascites in dogs at VCC, Jabalpur is meagre. However, Phom *et al.* (2019) reported an incidence of ascites in Mizoram was 1.9%; Singh *et al.* (2019) reported an overall prevalence in tarai region of Uttarakhand was 1.4%; Sharma *et al*. (2023) reported an overall prevalence of ascites in Jaipur (Rajasthan) was 2.87% and in our contrary Dixit (2012) reported an occurrence in Jabalpur (M.P) was 0.62%; Kumar *et al.* (2024) reported an overall occurrence of ascites in Jabalpur (M.P) was 0.68% and Patowary*et al.* (2024) reported an overall occurrence in Khanapara (Assam) was 0.41%.

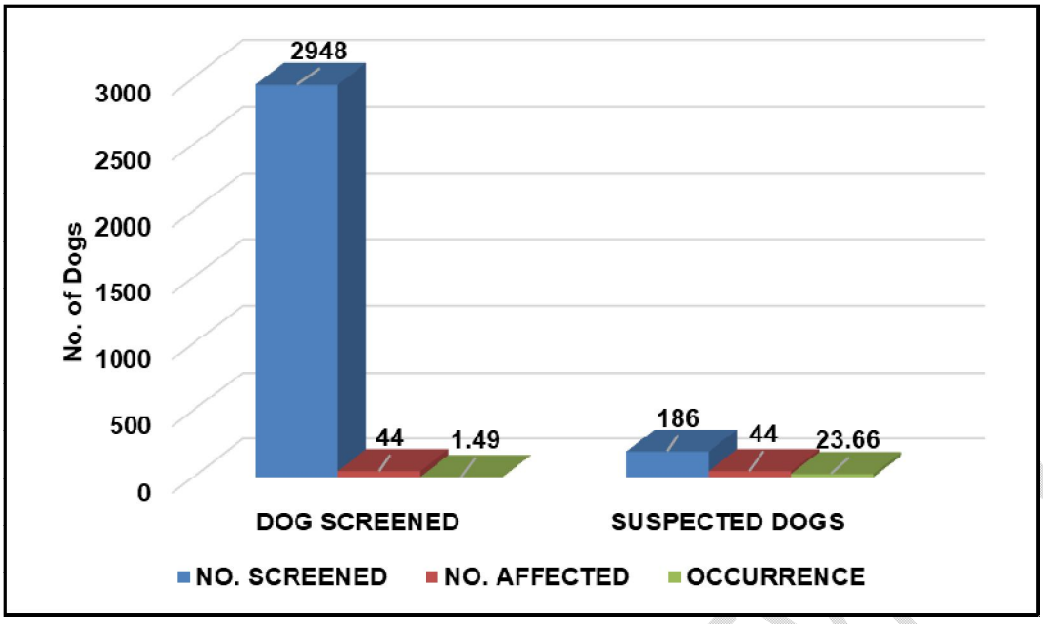

Figure 01: Overall occurrence of ascites in dog at VCC Jabalpur

3.1.2 Distribution of cases of abdominal distension in suspected dogs

A 2948 dogs were screened of which 186 were suspected of having clinical condition related to ascites. Among these suspected cases, the distribution of cases of abdominal distension was the highest in pregnancy cases (35.48%) followed by ascites (23.66%), pyometra (22.04), potbellied (9.68%) and obesity (9.14%) (Table 02 and Figure 02).

Table 02: Distribution of cases of abdominal distension in suspected dogs

Clinical condition	No. of cases	Percent (%)
Pregnancy	66	35.48
Ascites	44	23.66
Pyometra	41	22.04
Pot bellied	18	09.68
Obesity	17	09.14

Abdominal distension in dogs can result from various conditions affecting the abdomen and abdominal organs, including disorders like pyometra, pot belly and obesity. However, pregnancy remains the most common physiological cause of abdominal distension in the dog population.

The occurrence of pot-bellied abdomen in dogs may be attributed to a lack of owner awareness regarding de-worming, as highlighted by Kumar *et al.* (2024). Our findings on canine obesity align with those of Lund *et al.* (2006), who reported a significant prevalence

of obesity in dogs. Additionally, other studies have linked canine obesity to cardiovascular and hepatic issues, which could contribute to the development of ascites.

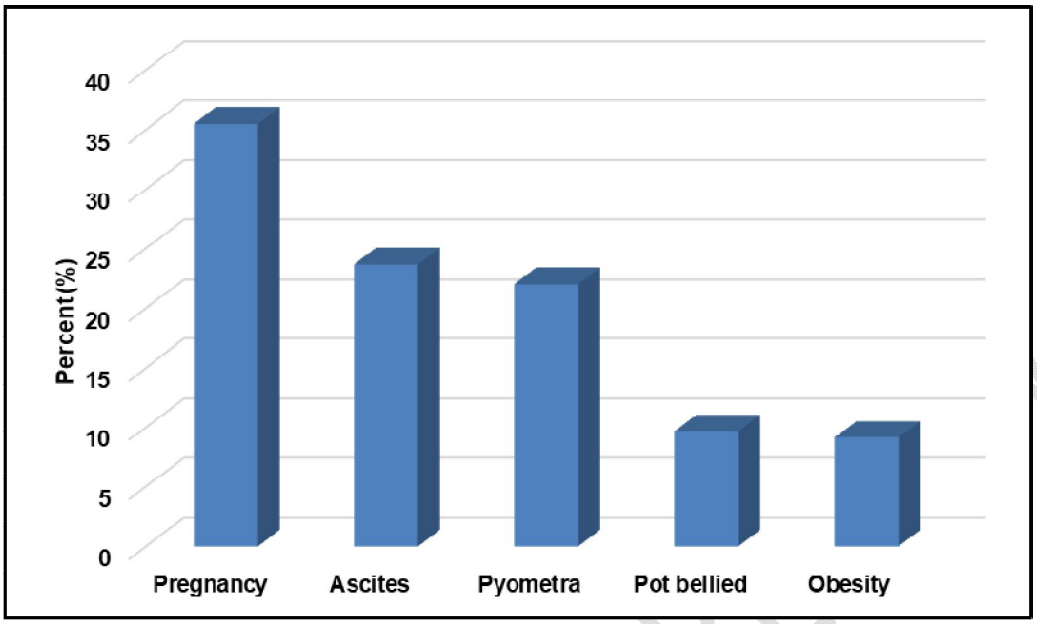

Figure 02: Distribution of cases of abdominal distension in suspected dogs

3.1.3 Distribution of cases of ascites on etiological basis

All 44 cases of ascites were categorized into five causative groups based on primary organ involvement, diagnosed through clinical symptoms, physical examination, ultrasonography and haemato-biochemical analysis out of these, 23 cases (52.27%) were of hepatic origin, 14 cases (31.82%) were of cardiac origin, 3 cases (6.82%) were of renal origin, 2 cases (4.55%) were due to neoplastic causes and 2 cases (4.55%) involved multiple origins. Among the mixed-origin cases, one involved both hepatic and renal issues, while the other involved cardiac and renal dysfunction (Table 03 and Figure 03).

Table 03: Distribution of cases of ascites on etiological basis

Etiology	No. of cases	Percent (%)
Hepatic	23	52.27
Cardiac	14	31.82
Renal	3	06.82
Neoplasm	2	04.55
Multiple causes	2	04.55

Similar findings were reported by Saravanan *et al*. (2014), Padhi *et al.* (2022) and Patowary*et al.* (2024), who noted a higher incidence of ascites in dogs associated with liver disorders. Ascites is often regarded as a common complication of chronic hepatitis in dogs, potentially exacerbated by the activation of hepatic stellate cells. This activation leads to presinusoidal

collagen deposition and fibrosis, causing sinusoidal obstruction, portal hypertension and subsequent fluid accumulation.

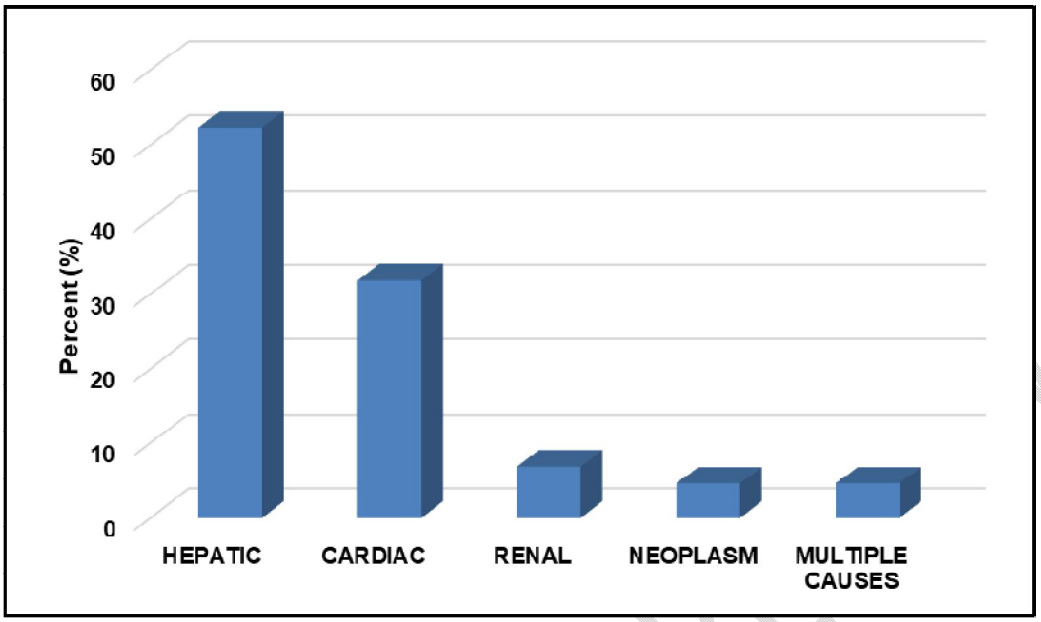

Figure 03: Distribution of cases of ascites on etiological basis

3.1.4 Age wise occurrence of ascites among the suspected dogs

To know the age wise occurrence of ascites all the dogs were categorized into five category of age group. The highest occurrence of ascites (31.03%) was observed in dogs aged 3-6 years, followed by 26.92% in the 6-9 years age group, 18.18% in dogs aged 0-1 year, 15.79% in the 1-3 years group and 14.81% in dogs older than 9 years (Table 04 and Figure 04).

Table 04: Age wise occurrence of ascites among the suspected dogs

Age group	No. suspected	No. positive	Occurrence (%)
0 TO 1	11	2	18.18
1 TO 3	38	6	15.79
3 TO 6	58	18	31.03
6 TO 9	52	14	26.92
>9	27	4	14.81
X^2 = 197.098*		**Significant at p-value ≤ 0.05**	

The current findings align with those reported by Padhi *et al.* (2022), Baria *et al.* (2024) and Mittal *et al.* (2024), which noted a significantly higher occurrence of ascites in middle-aged dogs. This may be attributed to an increased likelihood of vital organ insufficiency such as heart, liver and kidney dysfunction, in this age group. In contrast, studies by Nottidge*et al.*

(2003) and James *et al*. (2008) observed a higher incidence of ascites in younger dogs (<3 years), which was associated with severe hypoproteinemia and anemia in ascitic puppies. High incidence of ascites of hepatic origin in young age group might be due to indiscriminate use of drugs like antibiotics and dewormers (Behera *et al*., 2017).

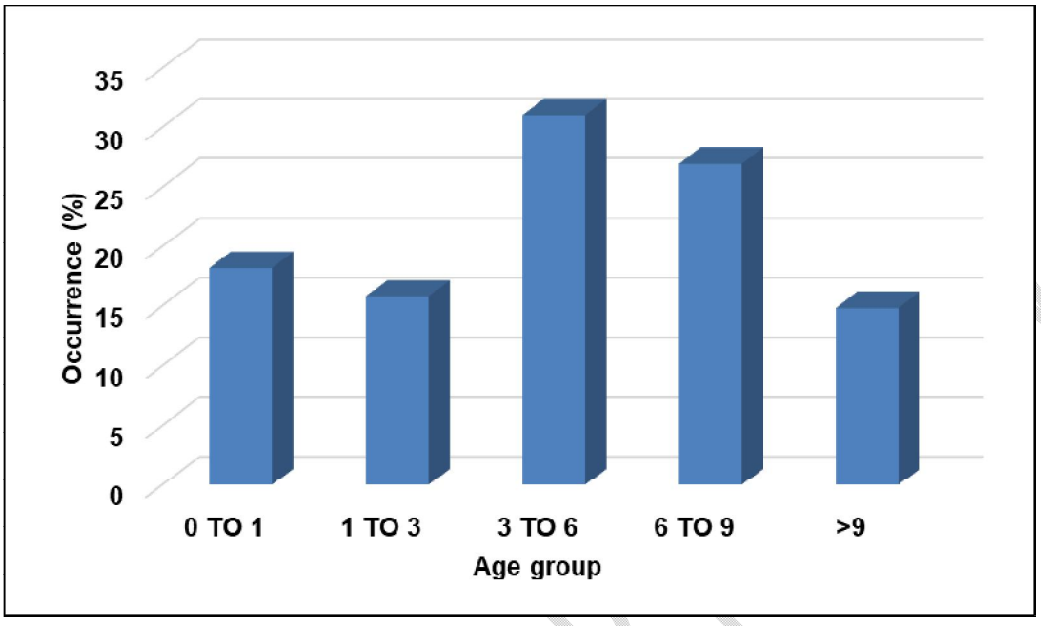

Figure 04:Age wise occurrence of ascites among the suspected dogs

3.1.5 Breed wise occurrence of ascites among the suspected dogs

The highest occurrence of ascites was recorded in the Non-descript breed (33.33%) of dogs, followed by Labrador retriever (30.30%), others breed (29.17%) of dogs, German shepherd (16.22%), Indian spitz (13.04%) and Golden retriever (12.50%) (Table 05 and Figure 05).

Table 05: Breed wise occurrence of ascites among the suspected dogs

Breed	No. suspected	No. positive	Occurrence (%)
German shepherd	37	6	16.22
Golden retriever	24	3	12.50
Indian spitz	23	3	13.04
Labrador retriever	33	10	30.30
Non descript	45	15	33.33

Others (bull mastiff, schitzu, husky, pitbull, saint bernard, dachshund)	24	7	29.17
X^2 = 198.97*		**Significant at p-value≤ 0.05**	

Our findings are consistent with the observations of Prajapati *et al*. (2022), who reported a higher prevalence of ascites in non-descript dogs (1.28%), followed by German Shepherds (0.34%) and Labradors (0.20%). In contrast, Saravanan *et al*. (2014) recorded the highest incidence in Spitz dogs (54.20%), while Baria *et al*. (2024) and Kumar *et al*. (2024) observed a higher prevalence in Labrador Retrievers, at 31.03% and 6.89%, respectively. The higher incidence of ascites in non-descript dogs may be attributed to factors such as malnutrition, lack of awareness to owner regarding proper deworming and poor hygiene practices.

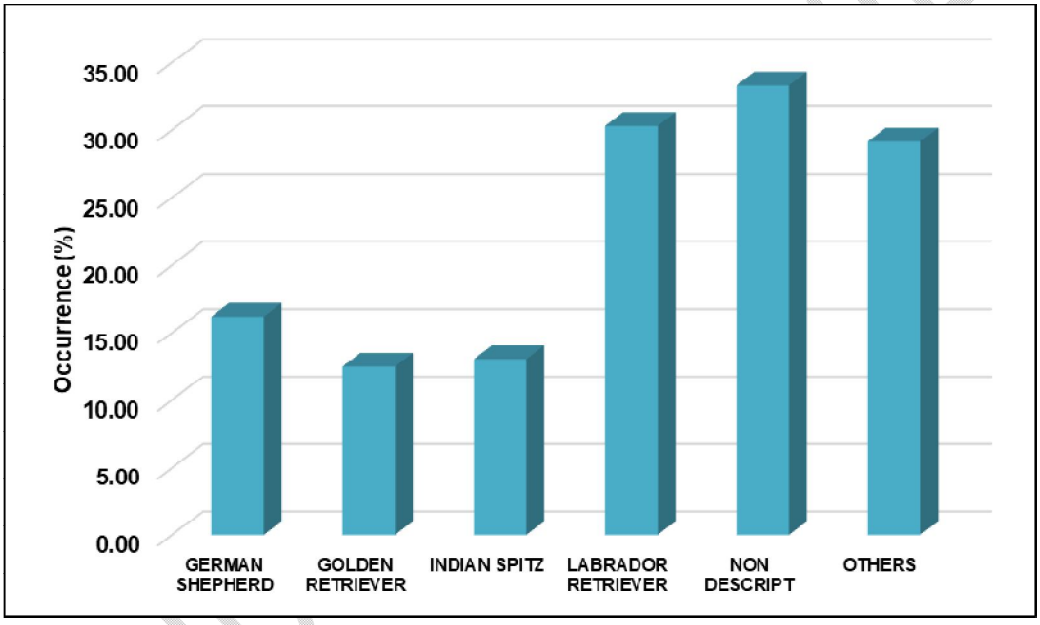

Figure 05:Breed wise occurrence of ascites among the suspected dogs

3.1.6 Gender wise occurrence of ascites among the suspected dogs

Out of 186 suspected dogs, 102 were female and 84 were male. The overall occurrence of ascites was higher in female dogs i.e. 24.51% as compared to male dogs i.e. 22.62%. Significant difference was observed in gender wise occurrence of ascites in dogs (Table 06 and Figure 06).

Table 06:Gender wise occurrence of ascites among the suspected dogs

Gender	No. Suspected	No. Positive	Occurrence (%)
Male	84	19	22.62

Female	102	25	24.51
X^2=191.09*		**Significant at p-value ≤ 0.05**	

Saravanan *et al.* (2014) observed higher incidence in female dogs (51.72%) as compared to male (48.28%). Padhi *et al.* (2022) and Baria *et al.* (2024) have recorded higher incidence in female dogs. In contrary Meena *et al.* (2024) and Patowary*et al.* (2024) recorded higher prevalence in male dogs. The variation in the present findings might be due to their incidental higher proportion among cases presented and preference of pet owners in this region.

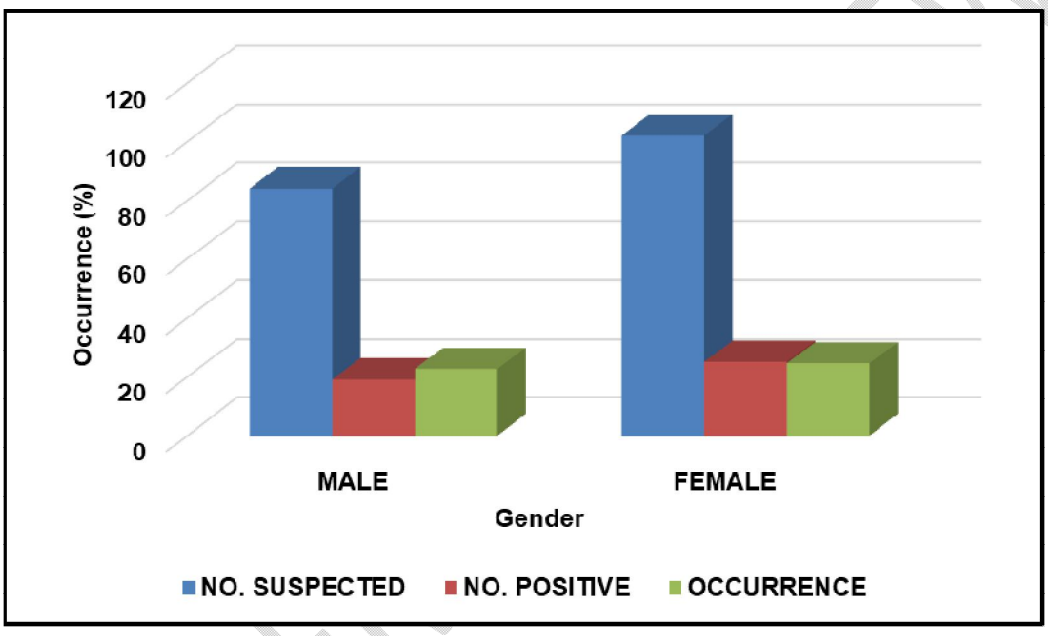

Figure 06: Gender wise occurrence of ascites among the suspected dogs

Conclusion

Overall occurrence of ascites was 1.49% with 52.27% associated with hepatic origin and age, gender and breed wise occurrence was significant.

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