

CHRONIC HEPATITIS IN DOGS: FINDING INCIDENCE, HAEMATOLOGICAL AND PERITONEAL FLUID CHANGES IN HISTOLOGICALLY CONFIRMED CASES

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Abstract: Chronic hepatitis is common in dogs which often perceived as most frustrating disease. Liver biopsy is always required for definitive diagnosis. Based on histopathological lesions it is classified in to four groups' viz., chronic progressive hepatitis, chronic nonspecific hepatitis, chronic cholangio hepatitis and liver cirrhosis. The incidence, predominant clinical signs, haematological and peritoneal fluid changes were not clear among the different types chronic hepatitis. The study was carried out to address the above said problems in natural cases of chronic hepatitis dogs. Our study found that overall incidence was 0.25% with more occurrence of chronic progressive hepatitis (43.34%) followed by others in it. Mongrels (33.34 %) were suffered more frequently followed by Doberman pinschers (15.38 %) and German shepherd (15.38 %) dogs. The predominant clinical signs of chronic hepatitis were inappetance to anorexia (92.30 %), depression (74.35 %) and vomition (56.41 %). Haemoglobin values and eosinophils were significantly altered when compared to control. Neutrophil counts were increased significantly in liver cirrhosis animals. Peritoneal fluid analysis in nine cases confirms it as trasudate to modified transudate with total protein and cell count values of 4.07 gm/dl and 5.21×10^3 /cumm respectively.

Keywords: Chronic hepatitis; incidence; haematology; peritoneal fluid.

Introduction

The liver plays wide-ranging roles like metabolic, synthetic, storage, catabolic and excretory functions of the body. Chronic hepatitis is often perceived as a frustrating disease with inevitable progression to cirrhosis and thus a poor prognosis (Watson, 2004). The specific cause and pathogenesis are unknown. Sevelius (1995) has classified chronic hepatitis into four groups based on histopathological lesions viz., chronic progressive hepatitis, chronic nonspecific hepatitis, chronic cholangio hepatitis and liver cirrhosis. The occurrence of the various forms of this disease in a clinical population is not clear (Poldervaart et al., 2009). The liver biopsy is always required for definitive diagnosis i.e., morphology and severity of histopathologic lesions (Sterczer et al., 2001; Favier, 2009). Clinical signs of chronic hepatitis are in general non specific. Dogs with early signs may be asymptomatic or have vague signs

(Sterczer *et al.*, 2001). The signs vary with the severity of hepatic dysfunction (Shih *et al.*, 2007). The predominant clinical signs were not clearly elucidated among the different types of histopathologically proven clinical cases of chronic hepatitis.

Chronic hepatitis has been recognized in dogs of many breeds. Mandigers *et al.* (2004) found a high incidence of chronic hepatitis in Doberman Pinschers compared to other breeds. Shih *et al.* (2007) reported that Labrador Retrievers were predisposed to develop chronic hepatitis that progress to hepatic failure. The incidence and breed predisposition in Indian conditions were not known. Hematological changes usually are non specific. Fuentealba *et al.* (1997) stated that hematological values were unremarkable. Leucocytosis is not present in most dogs with chronic hepatitis. Many of these dogs have slight anemia of chronic disease, but this is not specific for chronic hepatitis (Sterczer *et al.*, 2001). To our knowledge very limited data are available in clinical signs of different types of chronic hepatitis. Further breed predisposition with incidence, haematologic and peritoneal fluid changes were also not known. Hence this study was carried out to address the above said parameters.

Materials and Methods

The study was carried at outpatient unit of Madras Veterinary College, Chennai, India. The ailing dogs with clinical signs suggestive of liver disease were screened by serum biochemistry and ultrasonographic examinations. The identified dogs were confirmed by liver biopsy. Six animals brought from the Chennai city police for routine health check-up acted as healthy control. The dogs were maintained under prescribed diet and routine health care activities. The health status was analyzed by their records and physical and haematological examination. The biochemical parameters like alanine amino transferase (ALT), alkaline phosphatase (ALP/SAP), gamma glutamyl transpeptidase (GGT), total and direct bilirubin, total protein and albumin, glucose, total bile acids, cholesterol, blood urea nitrogen (BUN) and creatinine were analyzed by using commercial kits through spectrophotometrically. Blind percutaneous transabdominal technique as described by Center (1996) was followed by using 14G true-cut disposable biopsy needle. In few cases, necropsy samples were collected because of owner's inconvenience or failure of biopsy attempts at treatment or owing to the end stage of disease. The samples were collected and stored in 10% formalin and processed routinely. The changes were read under light microscope.

For peritoneal fluid collection the site, 2 to 3 cm caudal to the umbilicus was shaved and prepared aseptically. The animal was restrained on lateral recumbency and the ascitic fluid was collected using eighteen gauge intravenous catheter. Total protein and cytology of ascitic

fluid were studied. Based on the histopathological lesions, animals were classified into four groups as per the guidelines of Sevelius (1995). One way ANOVA was used to compare the means of haematological changes by SPSS software version 13.

Result

During the period of study, a total of 15026 cases were presented to the small animal clinics of Madras Veterinary College Hospital, out of which 39 cases were found to have chronic hepatitis accounting for an incidence of 0.25%. Out of 39 animals, 30 had histopathology report from biopsy and/or necropsy specimens. In rest of the cases, tissue samples could not be collected mostly due to the owner's non compliance for undertaking biopsy or necropsy. Based on this the incidence of different types of chronic hepatitis were chronic progressive hepatitis 43.34 % (13 cases), chronic cholangio hepatitis 23.33 % (7 cases), liver cirrhosis 30 % (9 cases) and chronic non-specific hepatitis 3.33 % (1 case). Mongrels were suffered more followed by Doberman pinschers and German shepherd representing 33.34 %, 15.38 % and 15.38 % cases respectively.

Clinical signs of chronic hepatitis were presented in Fig. 1. The predominant clinical signs of chronic hepatitis were inappetance to anorexia (92.30 %), depression (74.35 %) (Fig 5) and vomition (56.41%). The other clinical signs included diarrhoea/constipation (38.48 %), weight loss (35.89 %), ascites (26.20 %) (Fig 6), bleeding tendency (25.48 %), jaundice (15.38 %) (Fig 7 & 8) and polyuria and polydipsia (PD/PU) (10.25 %). The predominant clinical signs in the various types of chronic hepatitis were given in figures 2 - 4. Diarrhoea / constipation in different types of chronic hepatitis varied between 22.22 % and 38.46 %. Ascites was observed almost in equal percentage (28.57 % to 33.33 %) in various types of chronic hepatitis. The other clinical signs noted in different types of chronic hepatitis were: weight loss (23.07 % to 33.33 %), jaundice (11.11 % to 15.38 %) and bleeding tendency (7.69 % to 33.33 %). Polydipsia and polyuria was observed only in liver cirrhosis (33.33 %). The mean \pm S.E values for haemogram in different types of chronic hepatitis were presented in Table 1. Haemoglobin values in different types of chronic hepatitis were significantly reduced when compared to that of control group. However, a non significant reduction in haematocrit and RBC were noticed in all types of chronic hepatitis when compared to that of control group. Neutrophil counts were increased significantly in liver cirrhosis animals. Significant eosinophilia was noticed in all types of chronic hepatitis. Others like total leucocytes, lymphocytes and monocytes varied insignificantly when compared to that of control.

Peritoneal fluid analysis was available in nine cases of chronic hepatitis. The fluid was transudate to modified transudate. The median total protein and cell count in ascitic fluid were 4.07 gm/dl and 5.21×10^3 /cumm respectively.

Discussion

There are many forms of chronic liver disease that can progress to fibrosis or cirrhosis. Fuentealba *et al.* (1997) observed in his retrospective study on chronic hepatitis that Doberman pinschers, Cocker spaniels and Poodles were diagnosed for chronic hepatitis more frequently. Anderson and Sevelius (1991) reported that Doberman pinschers were most commonly affected than other breeds. In another study by Poldervaart *et al.*, (2009) English and American Cocker Spaniels were over represented followed by Labrador retriever. In our study incidence was more common in Mongrels than other breeds and which was contrary to the observations of other researchers. The higher incidence in Mongrel could be related to their higher proportion in canine population in Chennai city and their socio-economic conditions of their owners. The clinical signs recorded in this study were in agreement with findings of Sevelius (1995). Shih *et al.* (2007) reported that most of the animals presented with vague signs of decreased appetite, vomiting, lethargy and weight loss and some were asymptomatic. Sterczer *et al.* (2001) reported that signs were nonspecific in early stages and included anorexia, depression, weakness, fatigue, weight loss, vomiting, diarrhoea, polydipsia and polyuria. In more advanced cases, icterus, ascites and hepato encephalopathy could develop. Icterus occurred only in a minority of cases.

In this study, it was observed that gastrointestinal signs like inappetance to anorexia and diarrhoea or constipation were higher in chronic progressive hepatitis than cholangiohepatitis and liver cirrhosis. This could be attributed to the progression of hepatic inflammation or necrosis. Higher incidence of chronic progressive hepatitis was also because of ongoing inflammation or infection. The weight loss and bleeding tendency were more in liver cirrhosis followed by cholangio hepatitis and chronic progressive hepatitis. This might be due to reduced synthesis of plasma proteins and coagulation factors in liver cirrhosis and cholestasis in the cholangiohepatitis as it may cause poor absorption of vitamin K (Center, 1996). In our study the percentage of ascites was more in liver cirrhosis (33.33 per cent) and chronic progressive hepatitis (30.76 %) than chronic cholangio hepatitis (28.57 %). These findings were in agreement with the findings of Sevelius (1995) in that ascites was seen predominantly in liver cirrhosis and chronic progressive hepatitis and randomly with other types. A fairly common finding in liver cirrhosis was polyuria and polydipsia (33.33 %). The

reason might be decreased hepatic production of urea, a major contributor to medullary hypertonicity. Without urea, the osmolality of the renal medulla decreases, reducing the ability of the kidney to reabsorb water. Another postulated mechanism is increased serum concentration of ammonia, resulting from decreased hepatic conversion of ammonia to urea as a direct result of renal tubule toxin (Barsanti *et al*, 2000).

The significant reduction in haemoglobin in chronic hepatitis might be due to higher incidence of Mongrels in our study with poor history of regular deworming. PCV and RBC values in different types of chronic hepatitis were lesser than control group; however the decrease was insignificant. Sterczer *et al*. (2001) stated that many of the dogs with chronic hepatitis had slight anaemia due to a combination of causes, such as in anaemia of chronic disease. Shih *et al*. (2007) found that leukocytosis with neutrophilia and two dogs had even neutropenia and monocytosis each. In our study there was a non significant increase in the leucocytes and lymphocytes and significant increase in the neutrophils and eosinophils. The present study was in agreement with earlier study. The reason for leucocytosis with neutrophilia in chronic hepatitis might be chronic infection or inflammatory processes observed in the liver as evident from histopathological examination. The significant increase in eosinophil count in all types of chronic hepatitis might be the consequence of leucocytosis and /or worm load in Mongrel dogs. It has been our observation that mongrels are normally maintained by people belonging to economically weaker sections and hence they do not receive routine standard health care practices. Thus, they are exposed to worminal infestation. The peritoneal fluid observations were suggestive of transudate and modified transudate. Kruth (2005) characterized peritoneal fluid as pure transudate, modified transudate, exudate, chyle and blood. Modified transudate was to be clear and straw colored with specific gravity 1.015-1.025, >2.5 gm per cent protein and 1000-7000 cells with increasing number of neutrophils and lymphocytes commonly occurred in liver disease. The findings in this study concurred with Kruth (2005).

From our study we conclude that the overall incidence was 0.25% with more occurrence of chronic progressive hepatitis (43.34%) followed by others in it. Mongrels (33.34 %) were suffered more frequently followed by Doberman pinschers (15.38 %) and German shepherd (15.38 %) dogs. The predominant clinical signs of chronic hepatitis were inappetance to anorexia (92.30 %), depression (74.35 %) and vomition (56.41 %). Haemoglobin values and eosinophils were significantly altered when compared to control. Neutrophil counts were increased significantly in liver cirrhosis animals. Peritoneal fluid analysis in nine cases

confirms it as transudate to modified transudate with total protein and cell count values of 4.07 gm/dl and 5.21×10^3 /cumm respectively.

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Table 1. Mean \pm S.E. Values of haematological parameters in different types of chronic hepatitis

Parameters	Control (n=10)	Chronic progressive hepatitis (n=13)	Chronic cholangiohepatitis (n=7)	Chronic liver cirrhosis (n=9)	F value
Haemoglobin (g/dl)	12.68 \pm 0.45 ^b	10.10 \pm 0.36 ^a	10.14 \pm 0.97 ^a	10.13 \pm 0.59 ^a	5.43 [*]
Packed cell volume (%)	37.90 \pm 0.79	35.00 \pm 1.18	32.86 \pm 2.60	35.00 \pm 1.20	1.38
Red blood cell count (10 ⁶ /cumm)	5.80 \pm 0.12	5.27 \pm 0.19	5.09 \pm 0.47	5.14 \pm 0.24	1.64
White blood cell count (%)	8240 \pm 617	9669 \pm 792	10385 \pm 1222	11600 \pm 1294	2.06
Nutrophils (%)	5416 \pm 376 ^a	6681 \pm 594 ^{ab}	7268 \pm 987 ^{ab}	8143 \pm 940 ^b	2.51 [*]
Lymphocytes (%)	2292 \pm 232	2307 \pm 155	2382 \pm 224	2640 \pm 256	0.56
Monocytes (%)	319 \pm 42	216 \pm 40	240 \pm 63	203 \pm 29	1.46
Eosinophils (%)	232 \pm 31 ^a	510 \pm 47 ^b	507 \pm 52 ^b	613 \pm 91 ^b	7.73 ^{**}

* Significant, ** Highly significant, Mean bearing the different superscript in the same row differ significantly.

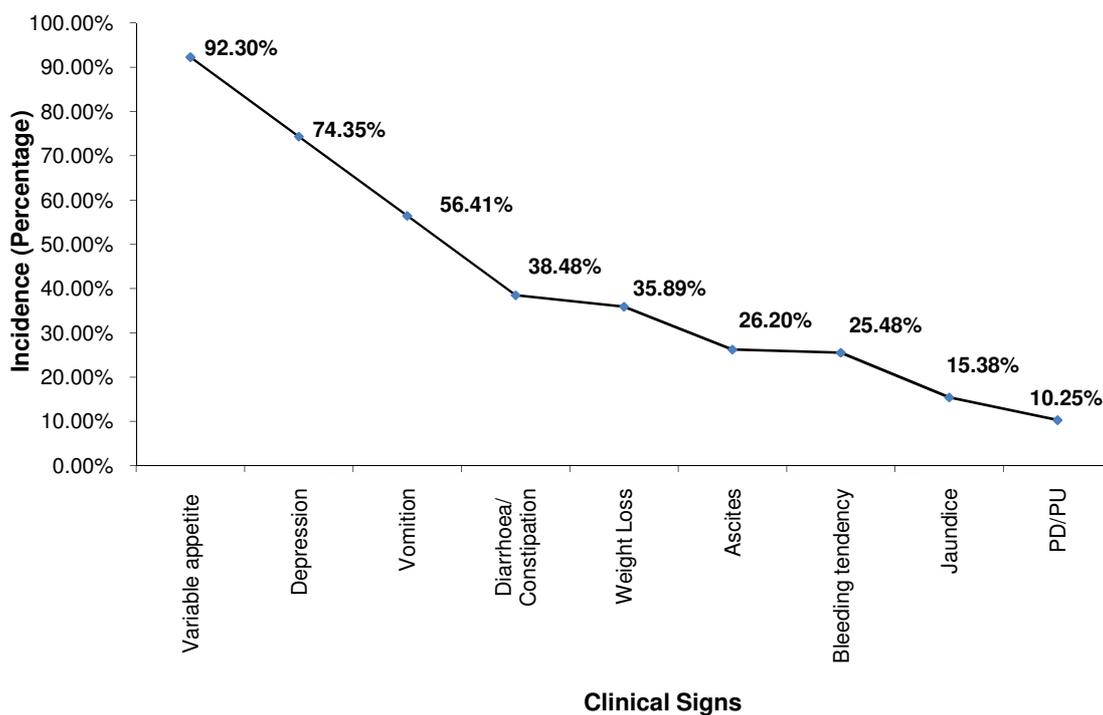


Fig. 1. Clinical Manifestations in Dogs with Chronic Hepatitis

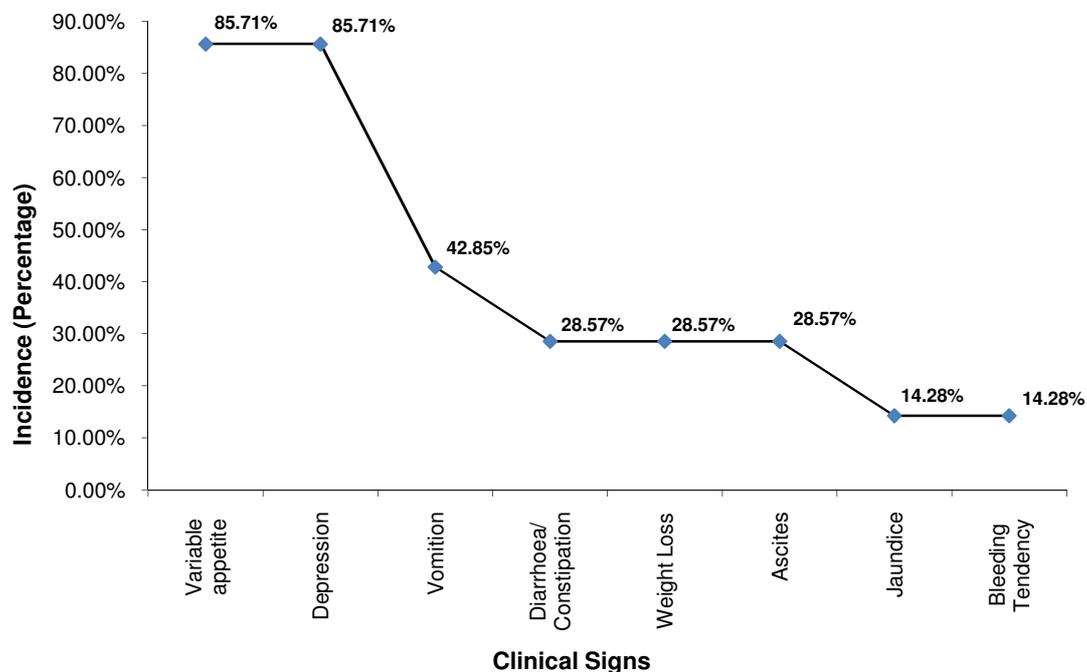


Fig. 2. Clinical Manifestations in Dogs with Chronic Progressive Hepatitis

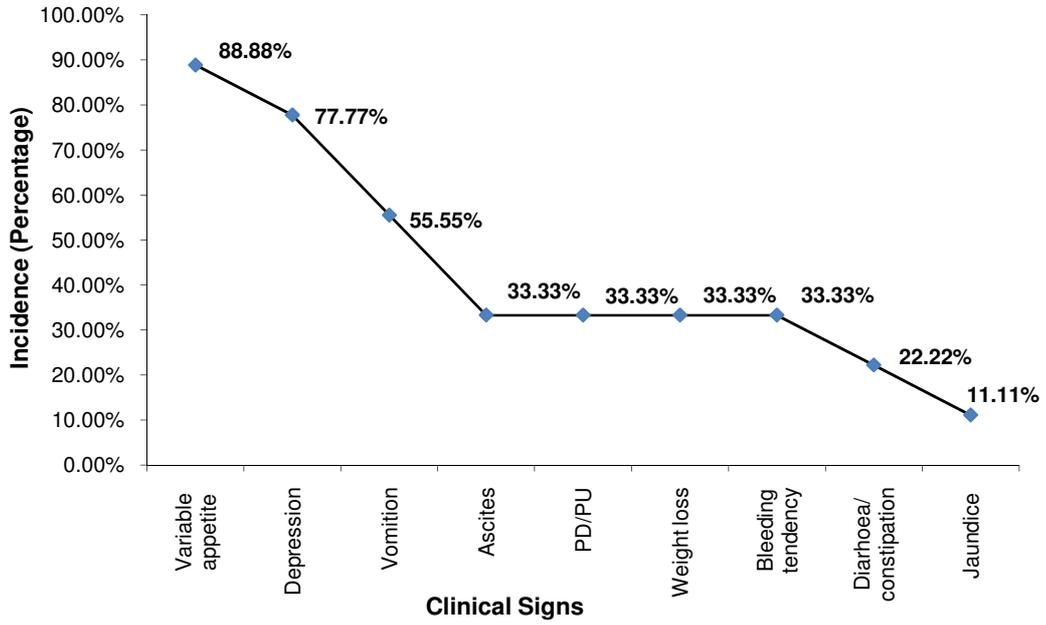


Fig. 3. Clinical Manifestations in Dogs with Chronic Cholangio Hepatitis

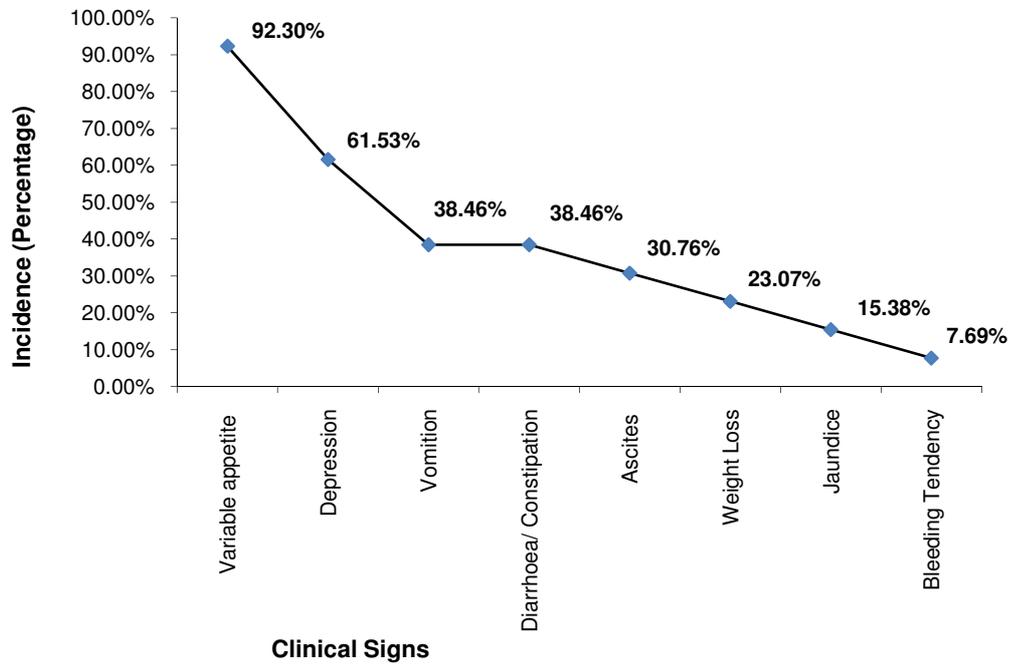


Fig. 4. Clinical Manifestations in Dogs with Liver Cirrhosis



Fig 5. Dull and depressed dog having jaundice and bleeding tendency



Fig 6. Dog with ascites



Fig 7. Icteric conjunctival mucous membrane



Fig 8. Icteric oral mucous membrane