Journal of Animal Research: v.13 n.05, p. 855-858. October 2023

DOI: 10.30954/2277-940X.05.2023.28

SHORT COMMUNICATION

Acute Hepatitis in Dogs- A Histopathological Study

K. Lakshmi[1]*, K. Padmaja[2] and D. Madhuri[3]

[1]Department of Veterinary Medicine, College of Veterinary Science, Korutla, Jagityal District, Telangana State, INDIA
[2]Animal Husbandry Polytechnic, Mahaboobnagar, Telangana State, INDIA
[3]Department of Veterinary Pathology, College of Veterinary Science, Korutla, Jagityal, Telangana State, INDIA

**Corresponding author: K Lakshmi; E-mail: drklakshmi82@gmail.com*

Received: 09 Aug., 2023 **Revised:** 20 Sept., 2023 **Accepted:** 16 Sept., 2023

ABSTRACT

A study was conducted on dogs suspected for hepatic disorders. These suspected dogs were screened by clinical, laboratory investigation and ultrasound examination. Thirty-two dogs were diagnosed ultrasonographically with diffuse hepatic parenchymal disorders without ascites. These dogs were further subjected to ultrasound guided biopsy to collect the liver samples and Acute hepatitis were histopathologically confirmed among 8 (25.00 %) dogs.

HIGH LIGHTS

- Hepatic disorders can be diagnosed by clinical signs, hemato-biochemistry and Diagnostic imaging and Histopathology.
- About 26.67% ascetic dogs showed acute hepatitis.

Keywords: Dogs, Histopathology, Acute hepatitis, diagnosis

Liver hasamajorrolein various function including protein, carbohydrate, fat, mineral and vitamin metabolism along with detoxification and immune regulation. The ability of replicating differentiated hepatocytes and cholangiocytes helps liver in compensation and regeneration thus maintaining its diverse functions even during a disease process (Tantary *et al.* 2014). Liver plays a very important role in digestive process, helps to convert vital micronutrients into usable forms for the body, and fulfills over 500 different functions like synthesis of fats, plasma proteins and various clotting factors; metabolism of carbohydrates, fats and amino acids, storage of glycogen as a source of energy; secretion of bile for ideal digestion and excretion of drugs and toxins (Moradi *et al.* 2016).

Primary hepatitis is one of the most frequently diagnosed parenchymal liver diseases in the dog. Examples of PH include acute hepatitis (AH), chronic hepatitis (CH), lobular dissecting hepatitis, and granulomatous hepatitis. Acute Hepatitis can be induced by a variety of stimuli, including toxins, adverse drug reactions, infectious disease (*i.e.,* canine adenovirus-1 infection, leptospirosis), or is considered idiopathic (Dirksen, 2017). The causes of Acute hepatitis included neoplasia, presumptive leptospirosis and ischemia. The remaining cases were idiopathic although 15 of these dogs had exposure to possible hepatotoxins. Canine Acute liver failure is associated with multiple etiologies and a high mortality rate (Carrie, 2016).

In the present study, ultrasound guided biopsy was performed by free hand technique using ultrasound guidance in dogs with diffuse parenchymal disorders, which did not show hepatic congestion that was characterized by dilated portal and hepatic veins, enlarged liver size/ hepatomegaly and diffuse hypoechogenecity. Diffuse parenchymal disorders in dogs were confirmed based upon histopathological examination. The needle

How to cite this article: Lakshmi, K., Padmaja, K. and Madhuri, D. (2023). Acute Hepatitis in Dogs- A Histopathological Study. *J. Anim. Res.*, **13**(05): 855-858.

Source of Support: None; **Conflict of Interest:** None

after piercing the hepatic parenchyma was visualized as hyper echoic line.

Dogs suspected for diffuse parenchymal disorders were subjected to ultrasound guided liver biopsy technique using disposable tru cut biopsy needle measuring 14 gauge thickness,15-20 cm canula and 20 mm specimen notch. Dogs were placed on right lateral recumbency and biopsy needle was inserted after infiltrating the site with 2% lignocaine HCl. When the needle enters the liver it would be displayed on the image, which can be detected upon gentle movement of the needle. Once the needle in the liver is visualized, the cutting action of the needle was employed to remove the core of the hepatic tissue. Then the needle was removed and the liver tissue within the specimen notch was transferred into 10% formalin (Rothuizen, 2008). The liver biopsy samples collected were embedded in paraffin, then 4 µm thick sections and slides were prepared and stained with haematoxylin and eosin stain for histopathological evaluation according to standard techniques (Prins *et al*., 2010). Further, diffuse parenchymal disorders without ascites were confirmed based on histopathologic changes in the liver tissue as described by Vanden Ingh *et al.* (2006).

In the present Investigation, thirty-two dogs were diagnosed through ultrasound as Diffuse parenchymal disorders without ascites. Among these dogs, liver size were normal and enlarged with diffuse hyper, hypo and mixed echogenecity. The liver margins were sharp and rounded in with normal, dilated and in apparent portal and hepatic veins.

Fig. 1: Ultrasonogram in DPD without ascites- hypo echogenecity of hepatic parenchyma along with prominent vessels with as compared with spleen

The echo texture was coarse and heterogenous with hypoechoic masses. Gall bladder distension and gall bladder sludge were noticed. These findings were in agreement with Webster (2010), who opined that hypoechoic liver is less echogenic than renal cortices or isoechoic than spleen with enhanced visualization of portal vasculature and seen in suppurative hepatic disease, passive congestion, lymphoma and amyloidosis were confirmed through histopathological examination of ultrasound guided biopsy liver samples.

Among 32 dogs diagnosed ultrasonographically with diffuse parenchymal disorders without ascites, were histopathologically confirmed ashepatic lipidosis, acute hepatitis, steroid hepatopathy, hepaticcongestion and vacuolar hepatopathy among 10 (31.25%), 8 (25.00 %), 6 (18.75%), 5 (15.63%) and 3 (9.37%) dogs respectively. (Table 1). While, 1 dog affected with acute hepatitis died on day 21 in which post-mortem examination was conducted and subjected to histopathology.

Table 1: Histopathological diagnosis of diffuse hepatic parenchymal disorders in dogs

Sl. No.	Diagnosis	No. of Dogs	Percentage
1	Hepatic lipidosis	10	31.25
2	Acute hepatitis	8	25.00
3	Steroid hepatopathy	6	18.75
4	Hepatic congestion	5	15.63
	Total	**32**	**100**

Dogs diagnosed for acute hepatitis revealed focal necrosis in the hepatic parenchyma infiltrated with neutrophils (Fig. 2), along with mild infiltration of mononuclear cells in the hepatic parenchyma. Hepatocytes had coagulative type of necrosis and liquefactive necrosis wherein the dead tissue was surrounded by large number of neutrophils (Fig. 3). Loss of hepatocyte cellular and architectural details (Fig. 4) and zone of hyperemia separating normal and dead tissue was noticed (Fig. 5). Grossly, the liver was darker in color (Fig. 6) upon post mortem examination. Ultrasound examination was a non-invasive diagnostic technique liver which allows detailed evaluation of hepatic internal architecture, hepatic vasculature and biliary system. Dogs diagnosed for acute hepatitis revealed focal necrosis in the hepatic parenchyma infiltrated with neutrophils, mononuclear cells in the hepatic parenchyma along with coagulative and liquifactive necrosis. These present findings corroborate with Cullen *et al.* (2013), who stated that regardless of the cause, acute hepatitis was

characterized by hepatocellular necrosis or apoptosis, inflammation and possibly regeneration. Acute infections can produce multifocal areas of necrosis with neutrophilic infiltration. The degree and extent of necrosis can vary considerably from lobe to lobe and within lobes and is non-specific in response to the cell injury and death.

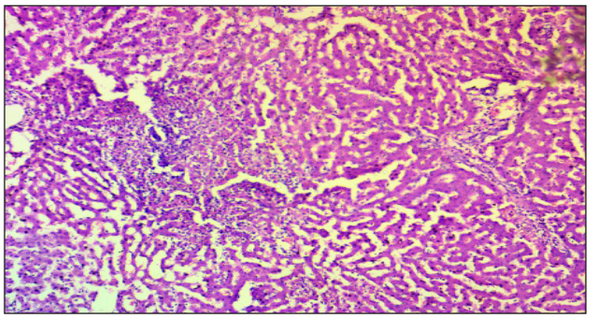

Fig. 2: Acute hepatitis- focal necrosis in hepatic parenchyma infiltrated with round cells (R) – 100×HE

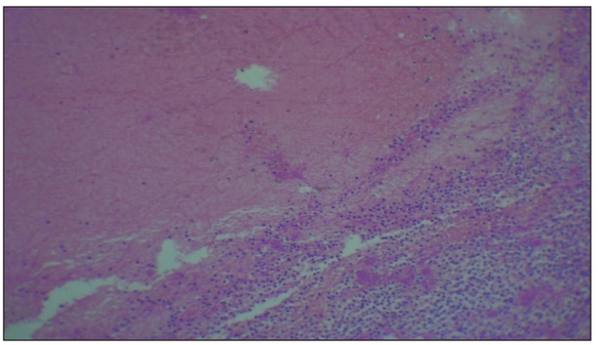

Fig. 3: Acute hepatitis- liquefactive necrosis of hepatocytes, dead tissue is surrounded by large no of neutrophils-400 × HE

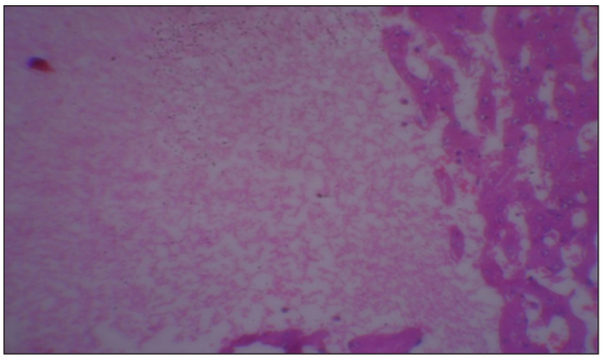

Fig. 4: Acute hepatitis - Loss of hepatocytes cellular and architectural details-100 × HE

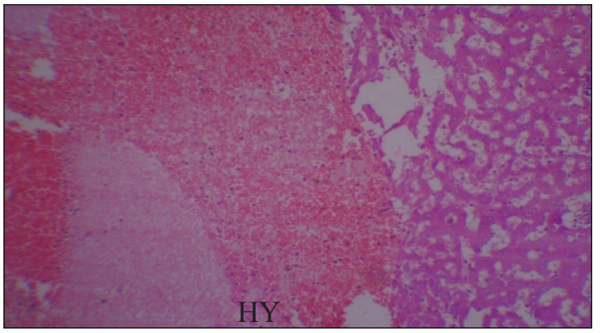

Fig. 5: Acute hepatitis – Zone of hyperemia (HY) separating normal and dead tissue of hepatic parenchyma- 100 × HE

Fig. 6: Acute hepatitis – Appearance of dark colored and swollen liver with focal necrotic changes

CONCLUSION

Dogs diagnosed with diffuse parenchymal disorders without ascites ultrasonographically were confirmed by histopathological examination. Out of which, 8 (25%) dogs were diagnosed with Acute Hepatitis.

ACKNOWLEDGEMENTS

I convey my gratitude to P.V. Narsimha Rao Veterinary University, Rajendranagar, Hyderabad for providing facilities to undertake my research work in Department of Veterinary Medicine, CVSc., Rajendranagar. I convey my heartfelt gratitude to my major guide Dr. K. Padmaja, Professor and special thanks Dr. D. Madhuri, Professor, for providing the facilities in the Pathology lab for Histopathological study.

REFERENCES

Brovida, S. and Rothuizen, J. 2010. Liver and pancreatic diseases. *In:* Ettinger, S.J. and Feldman, E.C. (eds). Text book of Veterinary Internal Medicine. 7th edn. Elsevier Saunders Co., St Lois: 1609-1690.

Carrie, L., Cooper, J., Rachel, M., Peters, Cynthia, R.L. and Webster. 2016. Retrospective evaluation of acute liver failure in dogs (1995 –2012): 49 cases. *Vet. Emerg. Crit.,* **26**(4): 559-567.

Cullen, J.M. 2013. Histopathology of Hepatobiliary system. *In:* Washabau, R.J. and Day, M.J. Textbook of canine and feline gastroenterology, Chapter-29. Elsevier publishers: 362- 385.

Dirksen, K., Burgener, I.A., Rothuizen, J., Van den Ingh, T.S.G.A.M., Penning, L.C., Spee, B., Fieten, H. 2017. Sensitivity and Specificity of Plasma ALT, ALP, and Bile Acids for Hepatitis in Labrador Retrievers. *J. Vet. Intern. Med.*, **31**:1017–1027.

Moradi, M.T., Asadi-Samani, M., Bahmani, M. and Shahrani, M. 2016. Medicinal plants used for liver disorders based on the Ethnobotanical documents of Iran: A Review. *Intern. J. Pharm. Tech. Res*., **9**: 407-415.

Nelson, R.W. and Counto, C.G. 1998. Diagnostic tests for Hepatobiliary system. *In:* Text book of small animal Internal Medicine. 2nd edition, Chapter 36, Mosby publishers: 487-508.

Prins, M., Schellens, C.J.M.M., Van Leeuwen, M.W., Rothuizen, J. and Teske, E. 2010. Coagulation disorders in dogs with hepatic disease. *The. Vet. J.,* **185**: 163-168.

Rothuizen, J. 2008. Liver. Chapter 7. *In:* Text book of Small animal gastroenterology. Edited by Jorg M. Steiner. Schlutersche verlagsgesells chaft MBH & co. KG, Germany. Pp:241-272.

Tantary, H.A., Soodan, J.S., Sahrish, C., Ansari, M.M., Sandeep, K. and Taziyun, I. 2014. Diagnostic studies in dogs with hepatic disorders. *Int. J. Vet. Sci.,* **3**(4): 210-215.

Vanden Ingh, T.S.G. A. M., Vanwinkle, T., Cullen, J.M., Charles, J.A. and Desmet, V.J. 2006. Morphological classification of parenchymal disorders of canine and feline liver. *In:* WSAVA standards for clinical and histological diagnosis of canine and feline liver disease. 1st edn (WSAVA liver standardization group. ed.) Elsevier ltd, Oxford: 85-101.

Webster, C.R.L. 2010. History, clinical signs and physical findings in hepatobiliary disease. *In:* Textbook of Veterinary Internal Medicine*,* Ettinger S.J. and Feldman E (eds) 7th edition, St. Louis, Elsevier Saunders, pp:1612-1618.