

Studies on Therapeutic Efficacy of Liv.52 in Dogs Suffering From Hepatic Disorders

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ABSTRACT: Liver disorders are encountered in dogs of all age groups accounting for three per cent of all diseases. In this study six dogs with hepatic disorders were taken for therapeutic trial. Six apparently healthy dogs were kept as control group. Affected dogs were treated with Liv.52, and supportive therapy. In the dogs of therapy group, two mild cases showed almost complete improvement in clinical symptoms of appetite and general activity by the end of trial *i.e.*, on 7th day, same symptoms were considerably improved by 7th day in moderate cases, also other symptoms like emesis was stopped by 2nd day and hydration status improved by 3rd day of therapy. But in severe cases the clinical symptoms showed only slight improvement without much recovery in cases. Haematological values *viz.*, Hb, PCV were found to be significant ($P<0.01$) decreased and followed by therapy they showed significant ($P<0.01$) elevation. One anaemic dog included in this group also showed same response. The significant ($P<0.01$) leukocytosis, neutrophilia were also reduced following therapy. The elevated ALT, ALP and bilirubin (in icteric dog) were significantly decreased when compared to pre therapeutic values. Decreased total proteins, albumin in this group of dogs were improved by 7th day of therapy. Similar finding was noticed in glucose level also. Though the laboratory findings were significantly improved after therapy, none of them reached normalcy (control value) by 7th day.

KEYWORDS: hepatic disorders, Liv.52, ALT, hyperechogenicity and silymarin

I. INTRODUCTION

Liver disorders are encountered in dogs of all age groups accounting for three per cent of all diseases (Hardy, 1983). As the cellular guardian of gastrointestinal tract, the liver is pivotal in its regulation, digestion and metabolism. Liver plays a central role in diverse array of processes, including metabolism, detoxification, storage of vitamins and trace minerals and immunogenic surveillance. Additionally, liver's dual blood supply and high blood flow make it uniquely sensitive to injury from other systems and organs (Cooper, 2006). Liver disease can occur due to direct damage to the liver by toxins, infectious agents as well as metabolic, immune mediated and neoplastic problems (Cornelius and Bjorling, 1992)

II. RELATED WORK

Several drugs have been advocated for the treatment of hepatic disorders. From ancient days, the herbal drugs are known for their vital role in improving the regenerative capacity of liver. Liv.52 is one such drug which has been in use since many years.

III. MATERIALS AND METHODS

The dogs presented to the college clinic formed the material for study. Affected dogs were arbitrarily divided into mild, moderate and severe cases based on clinical symptoms alone. Out of 6 dogs, two were presented with clinical signs of inappetence, occasional vomiting and dullness since 3 days, among two dogs one was febrile (mild cases). Two dogs had anorexia, depression, occasional vomiting one had fever with dehydration of 8% of b.w. (moderate cases) and

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remaining two were anorectic, lethargic and one dog had ascites and one had icterus (severe cases). affected dogs were treated with Liv.52 along with supportive therapy which includes antibiotics, multivitamins, diuretic (Adams, 2001), fluids (Bunch *et al.*, 2001) and dietary alterations (Rutgers and Haywood, 1988).

IV. RESULTS AND DISCUSSION

Six dogs were confirmed for hepatic disorders by history clinical signs, and laboratory examinations were taken for therapeutic studies and six apparently healthy dogs were kept as control. The affected dogs were arbitrarily divided into mild, moderate and severe cases based on clinical symptoms. Out of 6 dogs, two were presented with clinical signs of inappetence, occasional vomiting and dullness since 3 days, they were not vaccinated with DHPPI+L regularly and had normal body condition and hair coat, among two dogs one was febrile (103°F) with PR of 172/min. These were considered as mild cases. Two dogs had anorexia, depression, occasional vomiting and anaemia since a week, they were vaccinated (DHPPI+L) regularly, thin body condition dull hair coat, and one had fever (103.2 F) with high PR (186/min) and rapid breathing and dehydration of 8% of b.w. (moderate cases) and remaining two were anorectic, lethargic and one dog had ascites and one had icterus.

Ascitic dog had illness since 15 days, it was emaciated, non febrile vaccinated regularly for DHPPI+L and had poor hair coat. Icteric dog had ailment since 10 days, it had fever (103.4 F with high PR (190/min) and rapid RR, normal body condition and dull hair coat. These were considered as severe cases and their biochemical estimation revealed hypoproteinemia and hypoalbuminemia. All the 6 dogs were given therapy. In mild cases there was slight improvement in appetite and general activity by 3rd day, also the fever was reduced in febrile dog by 3rd day and marked improvement was noticed only by 7th day. In moderate cases vomiting stopped by 2nd day but appetite and alertness improved partially only by 5th day and hydration status was regained by 3rd day of therapy. Marked improvement was observed in appetite, general activity and anaemia by 7th day. In severe cases, appetite was slightly and abdominal fluid in ascitic dog reduced markedly by 7th day, but there was no much considerable improvement in icteric visible mucus membrane, while the fever was reduced by 5th day of therapy. Haematological investigation on the day of presentation ('0' day) of this group dogs showed significant decrease in Hb (8.65±0.57 g/dl) and PCV (32±4.86%) with one dog truly anaemic. Leukocytosis (TLC: 15518±1137µl) and neutrophilia (80.5±3.81%) was observed when compared to control dogs. But significant increase in Hb and PCV and reduction in TLC and neutrophils was observed on 7th day of haematological investigation after therapy.

Table 1 :Haematological findings in dogs with hepatic disorders before and after treatment

Sl. No.	Parameter	Apparently healthy dogs (n = 6)	Dogs with hepatic disorders (n = 6) '0' day	7 th day (after therapy)
1.	Hb (g/dl)	15.17 ± 0.83	8.65 ± 0.57 ^{##}	10.9 ± 0.51 ^{**}
2.	PCV (%)	44 ± 2.08	32 ± 4.86 ^{##}	36.17 ± 2.41 ^{NS}
3.	TLC (Cells / µl)	9.596 ± 908	15518 ± 1137 ^{##}	11096 ± 842 ^{**}
4.	Neutrophils (%)	65.33 ± 2.12	80.5 ± 3.8133 ^{##}	73.83 ± 2.54 [*]
5.	Lymphocytes (%)	23.5 ± 1.78	13.5 ± 2.43 ^{##}	19.5 ± 2.74 [*]
6.	Monocytes (%)	8.33 ± 0.42	4.67 ± 1.51 [#]	5.17 ± 1.3 ^{NS}
7.	Eosinophils (%)	2.83 ± 0.4	1.33 ± 0.33 [#]	1.5 ± 0.22 ^{NS}
8.	Basophils (%)	---	---	---

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- # : Significant at $P < 0.05$ with relation to apparently healthy dogs
: Significant at $P < 0.01$ with relation to apparently healthy dogs.
* : Significant at $P < 0.05$ when compared to '0' day.
** : Significant at $P < 0.01$ when compared to '0' day.
NS : Not Significant ($P > 0.01$ and $P > 0.05$)

Serum biochemistry in dogs with hepatic disorders on '0' day showed significant elevation of liver enzymes *viz.*, ALT and ALP (with 2 dogs showing more elevation in ALP) with the mean values 121.7 ± 34 U/L and 43 ± 5.44 KA respectively, as compared to control values (21.78 ± 2.09 U/L and 5.79 ± 1.76 KA).

Mean total bilirubin (2.49 ± 1.28 mg/dl) was also increased but did not show statistically significant elevation when compared to control (0.2 ± 0.03 mg/dl), as the group contained only one jaundiced dog with a bilirubin value of 8.37 mg/dl. Serum total protein (4.12 ± 0.44 g/dl), albumin (1.77 ± 0.28 g/dl) and glucose (61.43 ± 6.37 mg/dl) were significantly ($P < 0.01$) reduced in this therapeutic group of dogs.

Upon treatment by 7th day, significant reduction in the levels of liver enzymes (ALP) and bilirubin was observed though not reached normalcy. Also serum total protein, albumin and glucose values improved significantly ($P < 0.01$) when compared to '0' day (before therapy) values.

Following therapy mild cases showed slight improvement in appetite by 3rd day and by 5th day it was partially improved in moderate cases. In severe cases appetite was slightly improved by 7th day of therapy. The general activity and alertness of the affected dogs was improved by 3rd day in mild cases, by 5th day of treatment in moderate cases and by the last day of therapeutic trial in severe cases. Emesis (in vomiting cases) was stopped by 2nd day of therapy, hydration status in dehydrated dog was corrected by 3rd day of therapy. The ascites was markedly reduced by 7th day, but in icteric dog, there was not much improvement by 7th day of therapy. The improvement in this group of dogs could be attributed to the therapeutic regimen of Liv.52, and supportive therapy.

In the therapy group dogs, the mean Hb and PCV levels improved significantly by 7th day of therapeutic trial, including the truly anaemic dogs. This improvement could be due to the combined effect of hematinics, better nutrition and functional status of liver. The findings are in concurrence with Anupbhaumik and Sharma (2002).

The neutrophilic leukocytosis was significantly reduced after therapy. The reduction could be due to antibiotics as suggested by Vijayakumaret al. (2001) and acceleration property of Liv.52 on liver cells which can be comparable to the effect observed with broad spectrum antibiotics (Agarwal and Sareen, 1976).

The elevated mean ALT level, in this group was reduced by 7th day, same reduction was observed in individual cases also. The reduction could be due to the protective effect on hepatic parenchyma against toxic insult and faster regeneration of liver cells by Liv.52 (Dave *et al.*, 1972) and by removal of existing infection by penicillin (Vijayakumaret al., 2001) and Kirmizigulet al., 2005). Umesh (2000) also reported reduced ALT levels in ascitic dogs and Huseiniet al. (2005) noticed reduced ALT levels in cirrhotic human patients after Liv.52 therapy. Anupbhaumik and Sharma (2002) also observed reduction in elevated ALT value after Liv.52 therapy. The findings of the present study are in similarity with above reports.

Upon therapy there was a reduction in the ALP values in the two dogs which had higher ALP values compared to others and also the mean ALP value of the group was significantly reduced. This could be attributed to the Liv.52, as it protects the hepatic parenchyma against toxic agents, has an anabolic, choleric, stomachic and diuretic action (Suleet al., 1956, Murkibhavi and Sheth, 1957 and Captain and Syed, 1966). Udayasreeet al. (2006) reported complete recovery in a dog with cholestatic hepatitis (ALP : 586 IU/L) by 7th day after treatment with Liv.52 and other supportive therapy. Similar finding was observed by Agarwal and Sareen (1976) in infective hepatitis (with ALP elevation) in humans. These findings would support the present findings of the study.

Hypoproteinaemia and hypoalbuminaemia of affected Group dogs (in severe cases) showed significant improvement, by 7th day of therapy even though the post therapeutic increase was apparently little. This could be due to the effect of Liv.52 resulting in improved synthesis of proteins, improved appetite and alleviation of inflammatory or stress reaction, atleast partially. Similar observations have been made by Mehrotra and Tandan (1973) in hepatic cirrhosis of humans, Umesh (2000) in ascitic dogs and Anupbhaumik and Sharma (2002) in lab animals.

The decreased glucose levels in the affected Group dogs were markedly increased by 7th day of therapeutic trial though not touched normalcy. Prasad (1974) indicated Liv.52 in hepatic diseases as it induced the liver regeneration, helped in glycogenesis and decreased the fibrotic change.

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The elevated mean bilirubin level showed significant reduction after therapy, same was true for the icteric dog also (a reduction by 1.77 mg/dl). This reduction could be due to the therapy bringing relief from the hepatocellular damage as jaundice was suggestive of hepatotoxic based on the laboratory data. Previous studies also reported the similar findings viz., Murkhibhavi and Sheth (1957), Captain and Syed (1966), Anupbhaumik and Sharma (2002) and Udayasreeet *al.* (2006).

Table 2 : Serum biochemical findings in dogs dogs with hepatic disorders before and after treatment

Sl. No.	Parameter	Apparently healthy dogs (n = 6)	Dogs with hepatic disorders (n = 6) '0' day	7 th day (after therapy)
1.	ALT (U/L)	21.78 ± 2.09	121.7 ± 34 ^{##}	94.34 ± 7.82 ^{**}
2.	ALP (KA Units)	5.79 ± 1.76	43 ± 5.44 [#]	31.73 ± 8.9 ^{**}
3.	Total Serum Protein (g/dl)	6.79 ± 0.26	4.12 ± 0.44 ^{##}	4.54 ± 0.49 ^{**}
4.	Serum Albumin (g/dl)	3.52 ± 0.24	1.77 ± 0.28 ^{##}	2.32 ± 0.33 ^{**}
5.	Glucose (mg/dl)	95.93 ± 4.97	61.43 ± 6.37 ^{##}	70.45 ± 5.58 ^{**}
6.	Total Bilirubin (mg/dl)	0.2 ± 0.03	2.49 ± 1.28 ^{NS}	1.75 ± 0.89 [*]

- # : Significant at P < 0.05 with relation to apparently healthy dogs.
: Significant at P < 0.05 with relation to apparently healthy dogs.
* : Significant at P < 0.05 when compared to '0' day.
** : Significant at P < 0.01 when compared to '0' day
NS : Not Significant (P > 0.01 and P > 0.05)

V. CONCLUSION

From the present study it is observed that therapeutic regimen with Liv.52 (hepatoprotectant), antibiotics and supportive therapy proved to be useful as there was varied levels of improvement in clinical signs like appetite and alertness (more and relatively early in mild and moderate cases, less and delayed in severe cases); similarly improvement was noticed in haematology (including anaemic dogs) and biochemical parameters (but with little improvement in clinical cases with ascitic and icteric dogs).

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