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RESEARCH ARTICLE

Hepatogenic Efficacy of *Boerhaavia Diffusa* (Punarnava) on Clinical Cases of Liver Disorders in Dogs

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ABSTRACT

The present study was aimed to investigate the hepatogenic efficacy of Boerhaavia diffusa (Punarnava) on clinical cases of liver disorders in dogs referred to Teaching Veterinary Clinical Service Complex (T.V.C.S.C.) Polyclinic, Veterinary College, Jabalpur. Afore-mentioned treatment with Boerhaavia diffusa showed hepatogenic activity causing altered histological changes returning to normal architecture of the liver. Hence Boerhaavia diffusa (punarnava) may be used as a hepatogenic agent in clinical cases of liver disorders in dogs.

KEYWORDS

Boerhaavia diffusa, Teaching veterinary clinical service complex, Thin layer chromatography.

INTRODUCTION

Indigenous plant; *Boerhaavia diffusa* commonly known as 'Punarnava' belonging to family Nyctaginaceae. The root of *Boerhaavia diffusa* has been claimed to possess hepatoprotective, anticonvulsant, anti-inflammatory, antibacterial and antidiuretic actions[1]. The research work carried out in our laboratory has indicated the pharmaco-therapeutics of *Boerhaavia diffusa viz.*, analgesic and antipyretic[2], antistress[3], antibacterial[4] and hepatoprotective and hepatogenic activities[5].

The present study was aimed to investigate the hepatogenic efficacy of *Boerhaavia diffusa* (Punarnava) on clinical cases of liver disorders in dogs referred to Teaching Veterinary Clinical Service Complex (T.V.C.S.C.) Polyclinic, Veterinary College, Jabalpur.

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MATERIALS AND METHODS

The study was conducted on 6 clinical cases of liver dysfunctions in dogs irrespective of their breed, sex and age referred to Teaching Veterinary Clinical Service Complex (T.V.C.S.C.), College of Veterinary Science and Animal Husbandry, Jabalpur, Madhya Pradesh.

The indigenous plant *Boerhaavia diffusa* (Punarnava) was obtained from the Department of Aromatic and Medicinal Plants, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur. The roots of *B. diffusa* were shade dried at room temperature for 7-10 days, powdered and sieved through muslin cloth. The alcoholic extract of *Boerhaavia diffusa* was prepared by using a Soxhlet apparatus as per the method[6]. The bioactive constituent of *Boerhaavia diffusa* (Punarnava) was characterized by TLC (Thin Layer Chromatography) using mobile phase with chloroform and methanol separated and used for clinical evaluation.

Animals presented with the history of anorexia, vomition, diarrhea and melena were examined. Temperature, pulse rate, respiration rate and color of the mucus membrane of all the animals were recorded prior to the treatment followed by abdominal palpation to detect any abnormality of abdominal cavity. The ultrasonographic examination was done by using ultrasound machine of Famio 5 (SSA-510A) (Toshiba Medical Solutions, Goa, India) with the help of convex transducer (3.7/5 MHz) and linear transducer (8/10 MHz). Ultrasonographic study was performed on day 0 (pre-treatment) and day 10 (post-treatment) of the experiment. The data were subjected to statistical analysis[7].

In vitro determination of serum glutamic pyruvic transaminase (SGPT), serum glutamic oxaloacetic transaminase (SGOT), alkaline phosphatase (ALP), total protein (TP), albumin (ALB), total bilirubin (BIT) and direct bilirubin (BID) were done by using diagnostic kits from Aspan Laboratories Pvt. Ltd., Delhi. The estimation was done by using semi auto-analyzer (ERBA, CHEM-5) on day 0 (pre-treatment) and day 5 and 10 (post-treatment).

RESULTS AND DISCUSSION

The hepatogenic efficacy of *Boerhaavia diffusa* (40 mg/kg b. wt. daily for 10 consecutive days) was assessed on the basis of clinical, biochemical and ultrasonographic examinations in dogs. The dogs suspected for liver dysfunctions showed high rectal temperature 102.0 - 104.8ºF, elevated pulse rate and respiration rate on day 0 which was found to be reduced to almost normal on day 10 (post-treatment). Color of the mucus membrane of dogs restored to normal showing roseate and pink color following treatment with *Boerhaavia diffusa*,

Results indicated that bioactive constituents of *Boerhaavia diffusa* showed a significant reduction in SGPT, ALP and direct bilirubin activities from day 0 (Pre-treatment) to day 5 and 10 (post-treatment), respectively. A significant increase the levels of total protein and albumin from day 0 to day 5 and day 10 of the treatment, respectively. However, non significant reduction in SGOT and total bilirubin values on day 5 and day 10 of the treatment as shown in table 1.

Ultrasonographic examination was subjected to shape, size, contour, texture and internal architecture of the liver. In addition to this, the hepatic vasculature was also observed to determine the severity of liver dysfunctions. Ultrasonographic examination of clinical cases of liver dysfunction revealed a large amount of anechoic fluid in the peritoneal cavity. Ascitic fluid showed several hyperechoic particles in the fluid. The liver lobes were separated from each other. The texture of right liver lobe was severely altered; however, caudal liver lobe was almost normal. The case was tentatively diagnosed as diffuse liver disease with ascites (Plate-1). Following treatment with *Boerhaavia diffusa*, ultrasonographic examination on day 10 depicted few anechoic pockets in peritoneal cavity, suggestive of moderate ascites (Plate-2).

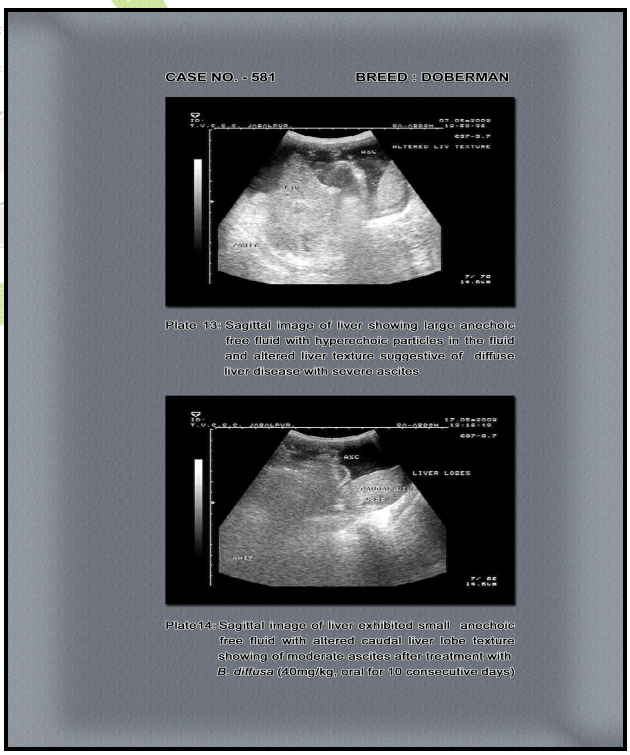

Plate 1: Sagittal Image of Liver Showing Large Anechoic Free Fluid with Altered Liver Texture.

Plate 2: Sagittal Image of Liver Showing Small Anechoic Free Fluid with Normal Liver texture After Treatment.

Table 1: Biochemical Parameters: Hepatogenic Activity of *Boerhaavia diffusa* (punarnava) on Clinical Cases of Liver Disorders in Dogs

Biochemical parameters	Mean values			Percent hepatogenic activity		SEM	CD at p< 0.05
	Pre-treatment	Post-treatment					
	Day 0	Day 5	Day10	Day 5	Day10		
SGPT (IU/L)	81.25[a]	54.90[ab]	35.57[b]	38.21	68.24	11.90	35.88
SGOT (IU/L)	52.73	38.97	25.07	34.66	68.19	7.30	NS
Alkaline phosphatase(IU/L)	266.79[a]	188.04[ab]	103.83[b]	34.06	69.09	35.48	106.94
Total protein (g/dl)	4.79[c]	5.55[b]	6.25[a]	34.41	66.12	0.13	0.39
Albumin (g/dl)	1.88[c]	2.81[b]	3.61[a]	35.66	66.53	0.12	0.37
Total bilirubin (mg/dl)	1.66	1.30	0.99	34.67	64.19	0.20	NS
Direct bilirubin (mg/dl)	0.62[a]	0.49[b]	0.38[c]	35.57	65.30	0.01	0.04

- Values are mean of six observations.
- The mean values with common alphabet as superscript in a row do not differ significantly from each other.
- SEM: Standard Error Mean; CD: Critical Difference; NS: Non Significant

The findings gathered in the present study on hepatogenic activity of *Boerhaavia diffusa* in clinical cases of liver damage, strongly substantiate the inputs documented by earlier workers on ethanol, paracetamol[8] and isoniazid -rifampicin combination[9] induced hepatotoxicity respectively in albino rats, and therefore, suggested the hepatogenic activity of *Boerhaavia diffusa.*

CONCLUSION

The present investigation was aimed to evaluate the hepatogenic efficacy of B*oerhaavia diffusa* (Punarnava) on six clinical cases of liver disorders in dogs irrespective of their breed, sex and age referred to Teaching Veterinary Clinical Service Complex (T.V.C.S.C.), Veterinary College, Jabalpur. Bioactive form of *Boerhaavia diffusa* @ 40 mg/kg b. wt. orally, daily for 10 consecutive days showed non-significant reduction in SGOT and total bilirubin activities, whereas, a significant reduction in SGPT, ALP and direct bilirubin values was found on day 5 and day 10 post-treatment. However, a significant rise in the values of total protein and albumin was found on day 5 and day 10 post-treatment, respectively. Ultrasonographic examination revealed altered liver texture and anechoic free fluid in abdominal cavity in most of the clinical cases on day 0 (pre-treatment) of liver in dogs. Afore-mentioned treatment with *B. diffusa*

showed hepatogenic activity causing altered histological changes returning to normal architecture of the liver. Hence *Boerhaavia diffusa* (punarnava) may be used as hepatogenic agent in clinical cases of liver disorders in dogs.

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