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Therapeutic efficacy of Hepatiale®Forte in treatment of the dogs with hepatodystrophy

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Abstract. The article shows the results of treating the dogs suffering from hepatodystrophy and proven therapeutic efficacy of the hepatoprotector Hepatiale®Forte. In dogs suffering from hepatodystrophy there was found increased serum activity of alanine aminotransferase (ALT), aspartate aminotransferase (AST), glutamate dehydrogenase (GLDH), alkaline phosphatase (ALP), gamaglutamiltransferase (GGT), an increase in total bilirubin level, concentration of bile acids, hypo- and hypercholesterolemia. Use of the hepatoprotector in a complex treatment scheme for dogs with hepatodystrophy gradually restores functional status of hepatocytes due to combination of L-ornithine and soybean phospholipids.

Keywords: *dogs, hepatodystrophy, enzymes, bilirubin, cholesterol, bile acids, treatment*

Introduction. The liver is a central organ of homeostasis performing more than 500 metabolic functions, particularly carbonaceous, lipidic, protein, macro- and microelemental, vitamin as well as biligenic and bile-excreting ones. Often its damages are only partial reflection of general pathology [1].

Hepatodystrophy is one of the most spread liver diseases, characterized by dystrophy, necrosis and lysis of hepatocytes, liver failure and toxicity [1]. The etiological factors of hepatosis are the use of poor quality forages, deficiency of vitamins and essential amino acids in the diet and use of drugs having hepatotoxic effects. Unfortunately Ukrainian veterinary pharmacy does not provide the veterinary professionals with the medicines having hepatoprotective properties, that were tested specially for small domestic animals [1, 2]. Practicing doctors often apply the medicines, that the human medicine uses (Gepabene, Glutargin, Antral, Liv 52 Symepar, Essenciale, Erbisol, etc.). The practitioners assort the dose of such medicines empirically, that, of course, hinders the achievement of positive clinical effect, sometimes it is irrational, and in turn could be even detrimental. In connection with the above it is appropriate to develop and apply effective complex scheme for treatment of the dogs with hepatodystrophy.

Brief summary of relevant publications. Liver diseases are widespread in all kinds of domestic animals, particularly, hepatodystrophy is diagnosed in 30–40 % of dogs [2]. Ukrainian and foreign scientists pay much attention to studying clinical status of the functional and morphological condition of the dog's liver with hepatodystrophy and to development of treatment schemes [3–6]. However, most proposed hepatodystrophy treatment schemes are not used in modern veterinary medicine. Thus, it is important to find methods requiring minimum material expences and providing rapid recovery.

Research objective of our research work was to elaborate the efficient treatment scheme for dogs with hepatodystrophy.

Materials and methods. The object of the research was the German shepherd (n=8), spaniel (n=5), Yorkshire terrier (n=3) and mix-breeds (n=4); all the dogs were kept in domestic conditions.

The dogs treatment was complex and covered application of the diet (Royal Canin Hepatic); hepatoprotector Hepatiale®Forte, produced by Vet Planet (Poland), at the rate of 1 tablet per 15 kg of live weight once a day and complex of B-vitamins (Hepavi Kel) 1 ml per 10 kg of live weight subcutaneously.

Blood for the study was obtained from the jugular vein: firstly before the morning feeding and secondly 2 hours after it to determine the postprandial level of bile acids. The repeated of blood serum tests was performed on the 30^{th} day after the treatment begins.

Serum samples were tested for total bilirubin (TB), cholesterol; activity of aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), gamaglutamiltransferase (GGT), glutamate dehydrogenase (GLDH); concentration of bile acids (BA) by enzymatic method using test-systems of company "Audit Diagnostic". Biochemical blood tests were performed at the laboratory of internal diseases and clinical diagnostics at Lviv National University of Veterinary Medicine and Biotechnologies named after S.Z. Gzhytskyj using biochemical analyzer BS-120 (Shenzhen Mindray Bio-Medical Electronics Co., Ltd., China) with PZ Cormay S.A. (Poland) reagents.

The statistical processing of the obtained findings was performed by the software StatWin and Microsoft Excel using Student's t-test and statistical programme.

Results and discussion. Use of complex therapy for 30 days had a positive effect on the body and blood parameters of the dogs.

70 % of the dogs were found to be suffering from hyperbilirubinemia, that, in our opinion, in this case indicates not only on a violation of pigment function of the liver, but also on cholestasis. After treatment, the content of bilirubin in serum was significantly ($p<0,01$) lower at 28.6 % compared to the one before treatment.

In the blood serum of all ill dogs there was found hyperenzymemia (ALT and AST) (Table 1).

Treatment of dogs suffering from hepatodystrophy contributed to normalization of the indexes of functional liver condition, that was manifested by decreased activity of ALT and AST compared to before treatment for 55.2% ($p<0,001$) and 49.3% ($p<0,001$) respectively (Table 1).

Performed researches have shown that the activity of GLDH in serum of the dogs with hepatodystrophy increased in case of all examined animals, that indicates on the violation of the hepatocytes structure [7–9]. After applied treatment there was revealed decreased activity of GLDH for 54.9 % ($p<0,001$) compared to dogs before treatment that indicates of hepatocytes recovery. The activity of ALP and GGT in serum was high in all examined dogs (Table 1), that indicates on the development of intrahepatic cholestasis. After the applied therapy the ALP and GGT activity decreased by 60.6 % ($p<0,001$) and 49.3 % ($p<0,001$), compared with the dogs before treatment.

Table 1. Serum biochemical parameters in dogs (n=20)

Parameter	Biometric indicator	Before treatment	After treatment
TB, mkmol/l	lim M±m	1,03 - 7,5 4,2±0,29	1,5-4,1 3,03±0,17
	p<	0,01	
ALT, U/l	lim M±m	65,7- 95,3 82,0±1,57	24,1-49,4 36,7±1,67
	p<	0,001	
AST, U/l	lim M±m	45,7 - 74,5 55,6±2,00	20,3-41,1 28,2±1,37
	p<	0,001	
GLDH, U/l	lim M±m	6,7- 7,6 7,1±0,06	1,4-5,2 3,2±0,22
	p<	0,001	
ALP, U/l	lim M±m	155,5 - 215,0 180,8±3,59	54,3-98,6 71,2±3,17
	p<	0,001	
GGT, U/l	lim M±m	6,6 - 8,7 7,5±0,13	2,8-5,1 3,8±0,16
	p<	0,001	
Cholesterol, mmol/l	lim M±m	2,7 - 9,7 5,0±0,53	4,0-5,8 4,7±0,12
	p<	0,5	
BA, mkmol/l before feeding	lim M±m	11,1 - 32,3 16,2±1,12	3,1-8,3 4,9±0,40
	p<	0,001	
BA, mkmol/l 2 hours after feeding	lim M±m	25,3 - 59,9 36,6±2,55	12,0-18,1 15,3±1,31
	p<	0,001	

–p < probable difference compared to dogs before treatment

In 40% of ill dogs were diagnosed with hypercholesterolemia, that indicates on liver disease associated with violation of the processes of bile acids formation and bile-extraction [7], in 45% – hypercholesterolemia – reduction of synthetic function of hepatocytes [7–9]. After the complex of therapeutic means has been applied, the average content of cholesterol in dog's blood serum was lower for 6 % ($p<0,5$) than in case before treatment.

Determination of the concentration of bile acids in serum is a specific and sensitive test for the detection of hepatobiliary diseases. The sensitivity of the test increases provided that the cholates are determined before feeding and 2 hours after it [9–13].

Our research has shown that the concentration of BA in serum before feeding as well as after it increased in ill dogs (Table 1). After applied treatment the concentration of bile acids in serum before feeding and 2 hours after it went down by 69.8 % ($p<0,001$) and 58.2 % ($p<0,001$) respectively. These positive changes, in our opinion, are related to the restoration of bile-extracting function of the liver and enterohepatic circulation of bile acids.

Thus, the combination of L-ornithine and soybean phospholipids for dogs regulates liver functions and has protective properties in the treatment of liver failure. L-ornithine regulates the urea cycle in dogs and plays a role in transformation of ammonia, as well as reduces its toxicity level. Phospholipids together with bile acids play a vital role in the digestion and absorption of fat-soluble vitamins.

Conclusions

1. In dogs suffering from hepatodystrophy there was found increased activity of ALT, AST, GLDH, ALP, GGT, an increase in total bilirubin level, concentration of bile acids, hypo- and hypercholesterolemia.

2. Use of the hepatoprotector in a complex treatment scheme for dogs with hepatodystrophy gradually restores functional status of hepatocytes due to combination of L-ornithine and soybean phospholipids.

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Гудыма Т.М., Сливинская Л.Г.

Терапевтическая эффективность Гепатиале Форте при лечении собак за гепатодистрофии

Аннотация. В статье приведены результаты лечения собак за гепатодистрофии и доказана терапевтическая эффективность гепатопротектора Гепатиале Форте (Hepatiale®Forte). В сыворотке крови больных собак выявлены нарушения функционального состояния печени, в частности рост активности АлАТ, АсАТ, ГЛДГ, содержимое общего билирубина, активности ЛФ, ГГТП, гипо- и гиперхолестеролемия, повышение концентрации желчных кислот. Установлено, что использование гепатопротектора в комплексной схеме лечения собак за гепатодистрофии постепенно восстанавливает функциональное состояние гепатоцитов благодаря комбинации L-орнитина с эссенциальными фосфолипидами сои.

Ключевые слова: *собаки, гепатодистрофия, ферменты, билирубин, холестерин, желчные кислоты, лечение*