

ABSTRACT

Keywords: cattle, nutritional hepatitis, paraclinical diagnosis, profilaxy, treatment.

The PhD thesis entitled "*Diagnosis and treatment of nutritional liver disease in cattles*" extends on a number of 217 pages and is divided into two representative parts in accordance with the current legislation. The first part or bibliographic study of the given topic is 38 pages of work (24.68%) and the second part or personal researches presented in 116 pages of the total (75.32%). The results obtained are supported by 15 tables, 54 figures and graphics.

The first part is devoted to the bibliographic study and contains summarized data from the literature on the subject studied. This part is divided into three chapters.

In the first chapter, entitled "*The symptoms of liver diseases in cattle*" are addressed basics notions targeting major liver diseases in ruminants and their medical importance by frequency, severity, means of prevention and treatment as well as economic importance.

In the second chapter, entitled "*Clinical signs of liver problems and their limitations*" it is presented a classification of the clinical signs specific to this complex disorder. Since the liver is characterized by a remarkable capacity of compensation and regeneration, clinical signs are manifested only when one or more of its functions are severely affected.

In chapter three which called "*Complementary examinations of liver disease*" are listed the main diagnostic methods under these conditions with the presentation of the main steps to be followed in establishing a clinical diagnosis. The study observed issues regarding the anamnesis, the approach and the particular clinical examination of the animal, the clinical examination of the liver in cattle and the paraclinical examination methodology for hepatopathy represented by ultrasound examination, blood biochemical and hematological tests. The information presented in this study represented the basis for the development, interpretation and comparison of results obtained in the following researches.

The second part of the thesis entitled "*Personal Contributions*" includes personal reaserches, part that is systematized in four chapters. Each chapter of this part consisting of under-chapters, showing the material and methods, results and conclusions obtained from the research part of the survey.

References counts a total number of 217 titles of national and international literature. In the thesis are found personal research results published in the volumes of scientific papers presented at the symposia with international participation.

The eight chapters cover the purpose and objectives, materials and methods used for the thesis work, the results and conclusions drawn from these results.

The main objectives of the thesis were:

- to establish nutritional hepatopathies incidence in cattle;
- to establish a therapeutic conduct in liver disease;
- to develop a prophylactic protocol applicable to production conditions;

In order to achieve the proposed study, research was conducted in two cattle farms in Romania and Belgium. Clinical and laboratory investigations were conducted in the laboratories of the Medical Clinic of the Faculty of Veterinary Medicine, University of Agricultural Sciences and Veterinary Medicine "Ion Ionescu de la Brad" Iasi and the Clinic Department of Production Animals regrouped in Ruminants and Pigs, Faculty of Veterinary Medicine, Liege, Belgium. Clinical work of the department is divided into three sectors: the treatment of individual cases, treatment of cases on farms, herd monitoring being carried out in parallel with research.

In Chapter V entitled "*Etiopathogenic and epidemiological research of nutritional liver disease in cattle*", in the first study observations were made on a total of 42 lactating cows from a dairy cattle farm to establish correlations between the main indices of production and herd health. A second study was done to establish forage rations given to farm animals under study, then passed to the sampling of fodder rations structure which came into question, in order to perform chemical analyzes. From data analysis on chemical determinations of feed ration was found that: the UFL intake was 0.91, which shows an optimum value but with a higher starch content superior to maximum values. Cellulose content of the ration calculated presented optimal values. Regarding mineral content, feed ration provides coverage of body needs of 94 % for P and 70% for Ca. The

content of trace elements and vitamins intake was below the minimum, thus presenting an overall deficit in minerals. In addition to the study, we proceeded to taking blood samples to perform metabolic profile. Through analysis of data on biochemical examinations of blood serum, we ascertained that GGT, PAL, LDH and TG activity showed high average values in most cases studied. On protein profile highlighted both groups of cows in late gestation and in the recently calved a hypoproteinemia translating a reduction in liver synthetic function.

Chapter VI, bearing the title "*Clinical and paraclinical investigation for the diagnosis of hepatic diseases in cattle nutrition*" presents observations on 23 cows of Holstein and Black Spotted Romanian. Clinical signs noted in cows examined included: reduced appetite 5/23 (21.7%), decreased milk production 10/23 (43.4 %), nervous signs with comatose forms 2/23 (8.68%), deviation 4 /23 (17.36 %), painful reactions 1/23 (4.34 %), bruxism 2/23 (8.68 %), lordosis 2/23 (8.68%), hypothermia 4/23 (17.36 %), hyperthermia 7/23 (30.38 %), sclerocorneal-integumentary jaundice 3/23 (13.02 %), mucosal congestion 7/23 (30.38 %), dehydration 7/23 (30, 38 %), ruminal hypotraction, 4/23 (17.36 %) and digestive syndrome 4/23 (17.36 %). Ultrasound technique examine revealed the following changes in the liver parenchyma: increased echogenicity associated with poor visualization of the blood vessels (in lipid infiltration) of the liver; the presence of multiple hyperechoic foci disseminated uniform or a single mass (purulent hepatitis), diffuse thickening of the wall of the gallbladder (cholecystitis). Biochemical parameters analyzed were liver enzyme profile, primarily the activity of AST, GGT, markers, used when there is suspicion of liver destructions. Biochemical profile showed a BHB's mean of 2.05 ± 1.97 mmol/L, mean values of liver enzymes AST and GGT on examined cows 166.22 ± 118.88 and 45.74 ± 45.346 IU / L exceeded the physiological limits of adult cattle, respectively 78-132 IU/L and 15-38 IU/L. AST is a commonly used marker for detecting hepatic insufficiency, its activity is considered the most sensitive indicator in the diagnosis of fatty liver in ruminants. Elevated GGT values show significance in hepatobiliary system diseases, related to cholestasis. Clinical and laboratory examine allowed the classification animals examined as liver failure 48 %, 26 % steatosis, cholestasis or cholecystitis 17 %, and abscess hepatitis 9%.

In Chapter VII entitled "*Treatment and prevention of nutritional hepatopathies in cattle*" was evaluated the effect of parenteral administration of a product based on propilengligol PG, supplemented with vitamins in the treatment and prevention of liver disease in postpartum dairy large cows on 2 groups of cows, each group contained 15 animals. In the case of the therapeutic protocol (Lot T) after the diagnosis of ketosis, 200 ml of the product was administered orally 2 times/day for 3 days. In prophylactic protocol (Lot P), the distribution of animals was done randomly after parturition time. Evaluating the effect of a substrate readily convertible supplementation on blood and urinary biochemical evolution was performed at an interval of 3 days, 7 days and 30 days. On a semiquantitative scale, mean peak urine ketones in group T was 2.83 ± 1.29 mmol/L. For group P, the test was negative from the day 0. The effect of supplementing rations with the tested product on this rapid test was the reduction to extinction of ketone bodies in urine after the second day of administration. This result was interpreted as a quick way to reduce fat mobilization and consequently to limit the formation of ketone bodies with the objective of minimizing the risk of ketosis and fatty liver. From the results, it appears that the mean blood glucose values for the groups of animals were statistically significant ($p < 0,05$). The mean concentration of glucose for the group T was admitted to the lower limit, 53.03 ± 8.77 mg/dL, as a result of ketosis with liver damage. Mean blood glucose values for group P were found at the upper limit of reference 73.32 ± 15.53 mg/dL. Ketosis with hypoglycemia occurs in cows with energy deficit during peak lactation. These cows had the lowest body count. The dynamic evolution of serum glucose media showed an upward trend. Mean baseline serum cholesterol concentration showed significant differences between the two groups of cows ($p < 0.05$.) maintaining a trend towards lower values for the group T. In liver disease, it is observed an increase in the concentration in inflammatory degenerative processes and a decrease more frequently in chronic processes: biliary obstruction and acetoanaemia with liver overload. The total protein was also determined in order to assess liver's synthetic function. The mean concentration of total protein in serum was below the lower limit of the reference range for both groups: 5.59 ± 0.51 g P/l, as to 6.04 ± 0.71 translating a dysfunction at this level. AST showed statistical differences between the two groups for measurements from day 0 ($p < 0,05$). The mean values of AST were higher in the first stage, 134 ± 24.45 IU/L, the

reference interval, followed by a transient increase and then normal level for the species. The mean AST for group P were within the permissible values throughout the study. Elevations of AST in serum are found in cows with varying degrees of hepatic impairment and upper threshold levels 100 IU/L are considered to be coexisting with hepatic steatosis. In this study GGT mean values obtained for both groups were within the normal range of physiologically with statistical differences ($p = 0.03$). Average concentrations determined for group T (25.2 ± 3.73 IU/L) were very close to the upper limit of reference translating a predisposition to cholestasis. Regarding PAL measurements, the study revealed the existence of the average higher for group P, with statistically significant differences ($p < 0.05$) in the first two determinations: day 0 and day 3. In the case of successive measurements, LDH levels were within the medium physiological range for each fixed time reference, the differences were statistically significant on day 0 ($p = 0.027$). The economic losses prevented by the treatment were 780 ron/ cow. By treating sick cattle the farm made an economic efficiency coefficient of 5.19 ron per 1 ron spent.