PATHOLOGIES OF THE LIVER AND GALLBLADDER AT DOGS AND THEIR IMAGISTICS – STATISTIC ANALYSES

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Abstract

Pathologies of the liver and gallbladder present very diversified clinical signs, needing additional exams, like imagistic ones.
The radiological and ultrasonography exam represent the main imagistic methods for diagnosing this pathologies at dogs. Radiography brings data regarding the shape and volume modification of the liver, without offering any information about the gallbladder. Ultrasonograpy of the liver allows a more detailed examination of the internal structure, including vascularization and the bile ducts. Ultrasonography is also useful in fine needle aspiration and biopsy, as a non-invasive method of diagnosis.
The goal of this study was of analysing the prevalence of liver and gallbladder pathologies arriving at the Faculty of Veterinary Medicine Iași, and their diverisity. A number of 177 pacients were examined between 2018 and 2020. All the dogs undergone the ultrasonographic exam. During the examination, 62 pacients were diagnosed with modifications at the level of the gallbladder while only 43 were diagnosed with modifications at the level of the hepatic parenchima.

Key words: Ultrasonography, liver and gallblader pathologies, prevalence

INTRODUCTION

The liver is the organ situated most cranially in the abdominal cavity, located in direct contact with the diaphragmatic wall. Its surface is in contact with the stomach, duodenum and pancreas. Anatomically, it is localized between the diaphragmatic wall, the stomach, the right kidney and the cranial portion of the duodenum.

The gallbladder is a pear-shaped like organ, with liquid content, situated at dogs between the medial hepatic lobe and the quadrate lobe. It stores the bile and it secrets it through the bile ducts into the duodenum.

The main imagistic methods of diagnosing liver and gallbladder pathologies are radiography and ultrasonography.

Radiography helps us determine volume changes that can appear at the liver. A method for objectively measuring the volume is by comparing the length of the liver to the thoracic vertebrae 11 (T11). The liver length is measured as the cranial border of the liver with the vena cava and the caudal border of the liver. In some breeds, like Pekinese or brachycephalic, the thoracic depth and width must also be taken in consideration. The normal gallbladder can't be evaluated on radiography.

Ultrasonography can evaluate the echogenicity of the liver parenchyma, the echostructure, the hepatic vessels, the gallbladder structure and the bile duct. The evaluation is made for diagnosing the normal liver, focal lesions, structure or architecture of the liver, vascular modification or the diameter of the bile duct.

MATERIALS AND METHODS

177 cases were examined during the interval 2018-2020 in the clinics of the Faculty of Veterinary Medicine from USV Iași. The main activity took part at the Radiology Laboratory and the Pathology Medical Service. During 30 september – 30 november 2019, the activity took part at the University "Federico II" from Naples, at the Radiology Laboratory. Ultrasonography was used as a golden standard in this study, while radiology was used at a small number of pacients.

The X-ray exam was made using the Intermedical Basic 4006 machine and the Examion X-CR SMART . The ultrasonographic exam was made using the GE Logiq V5 machine using a linear and a micro-convex probe.

RESULTS AND DISCUSIONS

From the total of 177 pacients examined using ultrasonography, 62 (35%) were diagnosed with pathologies of the gallbladder or biliary duct, 43 (25%) were diagnosed with liver pathologies this data being illustrated in figures 1 and 2. A correlation between biliary and hepatic pathologies couldn't be established, only 11% of the cases having both pathologies.

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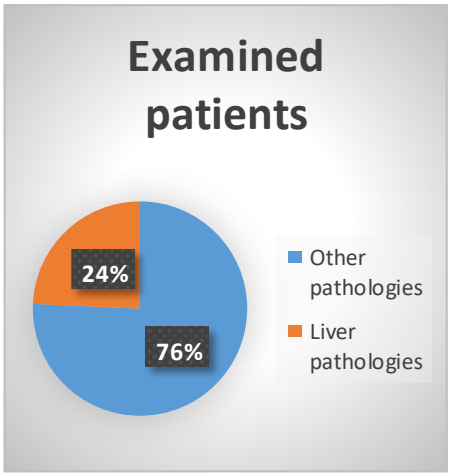

Figure 1. Clasification of pacients with liver pathologies

Figure 2. Clasification of pacients with gallbladder pathologies

There were a number of 26 (60%) females and 17 (40%) males with liver pathologies , while for gallbladder pathologies there were 33 (53%) males and 29 (47%) females . From this data we can observe that there is no correlation between liver and gallbladder pathologies and the sex of the animal.

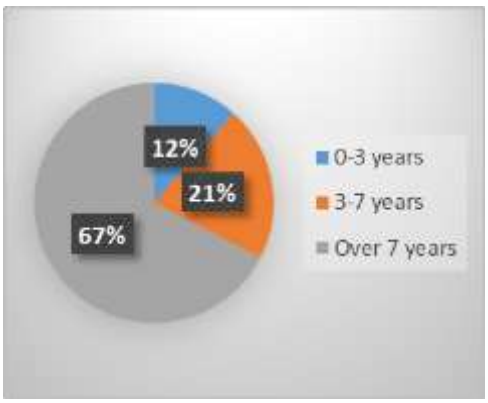

Figure 3. Age distribution of pacients with liver pathologies

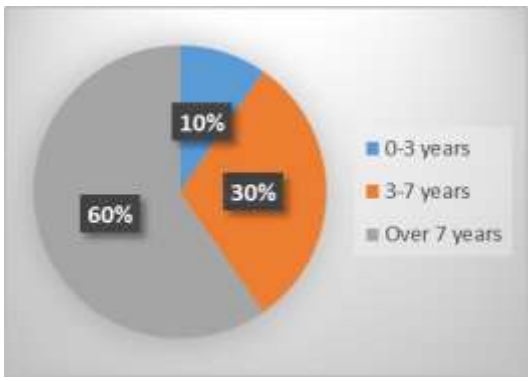

Figure 4. Age distribution of pacients with gallbladder pathologies

From figure 3 we can observe that geriatric pacients (over 7 years) are more predisposed to liver pathologies. This can be explained from the regeneration power of the liver and its functioning with a larger percentege of parenchima affected. Geriatric dogs have a slower metabolism and acumulate different lesions at the level of the parenchima during life. This two reasons can represente the explination of the liver pathologies at older dogs.

Pathologies between the age of 0-3 years are more rare, and they usually apear in case of genetic anomalies like porto-systemic shunts or different traumas.

From figure 4 we can observe the predisposition of gallbladder pathologies at the age category of over 7 years old. There were no genetic implications for the other age categories.

Mongrels in this study were represented by mix breeds that were under 20kg. We can observe from figure 5 that the biggest incidence of liver and gallbladder pathologies were at small breeds like bichon, caniche, pechinkez and some mongrels. This result can be explained by the bigger life expectancy of small breed races, meaning the higher chances of lesions to apear. Small breeds can have a life expectancy of 12-15 years while large breeds can reach 10 years.

The ultrasonographic modifications at the level o the liver were clasified into the following:

1. Dimension modifications such as hepatomegalia and microhepatia
2. Ecogenicity modifications such as hiperecogenicity in chornic hepatitis, fat liver, lymphoma or hipoecogenicity such as acute hepatitis.
3. Structural modifications that can be focal or diffuse
4. Vascular modifications such as vesel dillatation or porto-systemic shunts.

From figure 6 we can see that most of the modification were structural with a number of 20. This were represented by pathologies like: hepatic

nodules (figure 7), cysts and hepatic masses (figure 8).

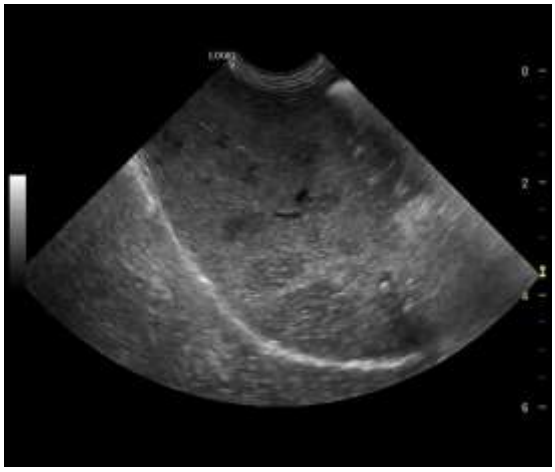

Figure 7. Multiple hyperechoic areas, difuse in the liver parenchim

Figure 8. Retrohepatic mass with mixed ecogenicity

Dimension modification were represented by microhepatia and hepatomegalia. For a certain diagnosis, RX came to complete the ultrasonography exam.

The modifications at the level of the gallbladder where clasified into the following:

1. Wall modifications such as colecystitis
2. Bile content modifications such as sluge or sediment

The main modifications of the bile content are represented by sludge, that was usually found incidentaly, without any clinical signs, billiary calculi (fig 10) and mucocele (fig 11).

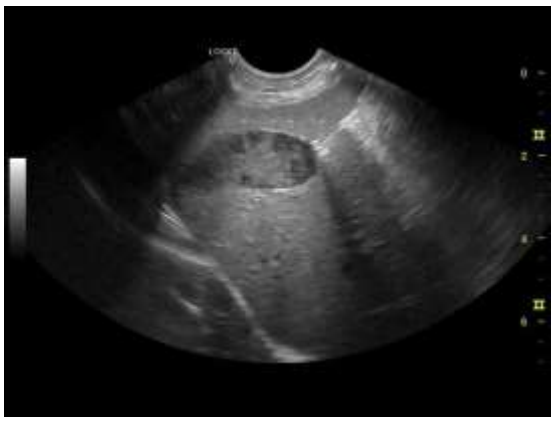

Fig 10. At the level of the gallbladder we can observe a high quantity of sediment shaped as a kiwi slice

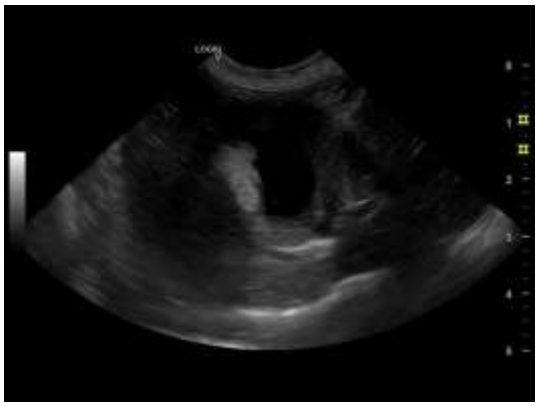

Fig 11. Hyperechoic sediment with acustic shadowing present

Modification of the biliary wall were repesented by colecystitis (fig 12) , angiocolystis and oedema (fig 13).

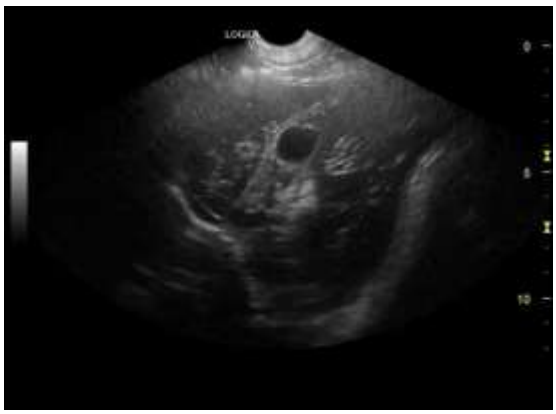

Fig 12. Thickening of the billiary walls and duct

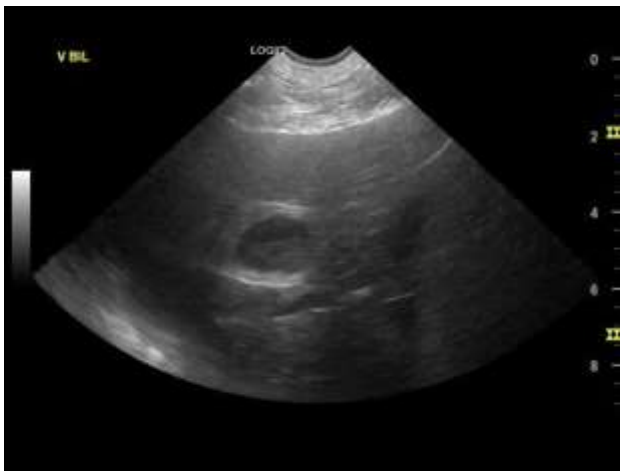

Fig 13. Thickening of the gallbladder wall with the apearence of 3 layers

CONCLUSIONS

In this study we have diagnosed using imagistics tehniques, completed in some cases by other paraclincal methods, liver pathologies like: liver masses, hepatic steatosis, hepatomegaly, microhepatia, distrofic changes at the level of the liver parenchima, porto-systemic shunts.

We can observe that the age that is more susceptible for liver pathologies is represented by the 3rd category (over 7 years) with a percentage of 67%, where the liver parenchima suffered different lesions during life and the regeneration power is reduced. In the category 0-3 years, we observed that the etiology is mostly genetic. There is no specificity for the sex of the animal.

We can also see that the prevalence of the liver pathologies is greater at the small breed dogs. An explination would be that their life expectance is higher.

In the case of gallbladder pathologies, we can observe that the dogs over 7 years (60%) had a higher incidence, followed by the pacients with the age between 3-7 years (30%) and lastly the pacients between 0-3 years (10%).

The small breed dogs were the most affected by this pathologies, the most representatives being Bichon.

Using the imagistic tehniques, mostly the ultrasonography , we have diagnosted the next pathologies of the gallbladder: billiary sludge, masses, colecistytis, angyocolitis, stones and wall oedema.

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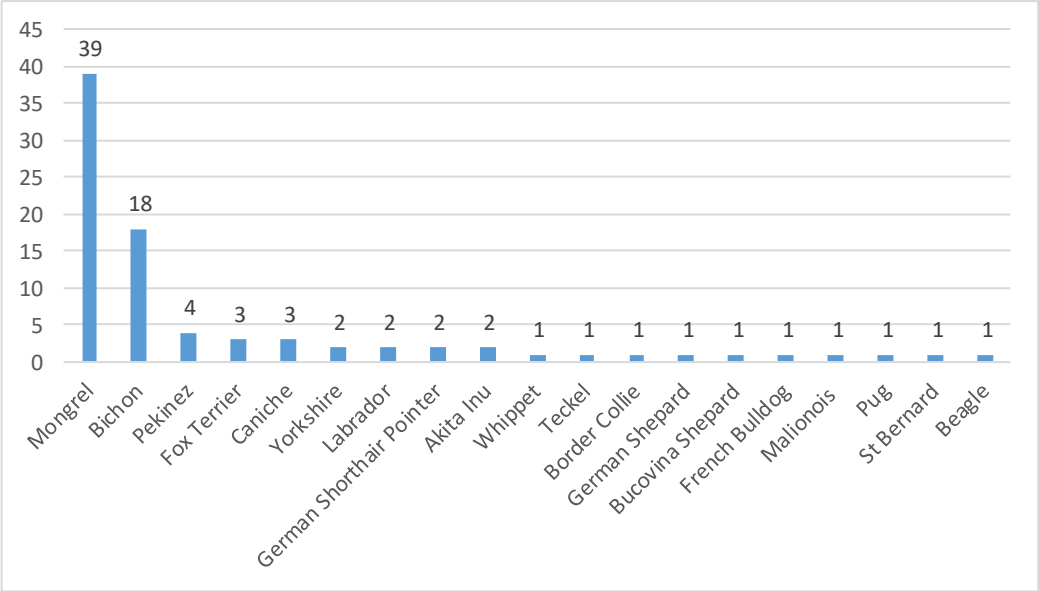

Figure 5. Distribution of breed in pacients with liver and gallbladder pathologies

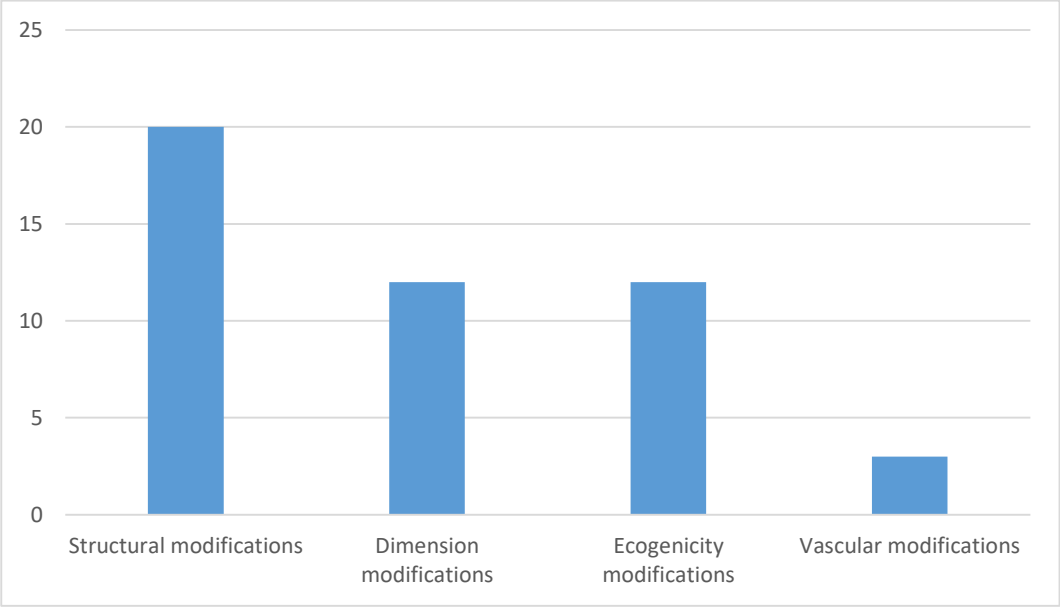

Figure 6. Ultrasonography modifications at the level of the liver parenchima

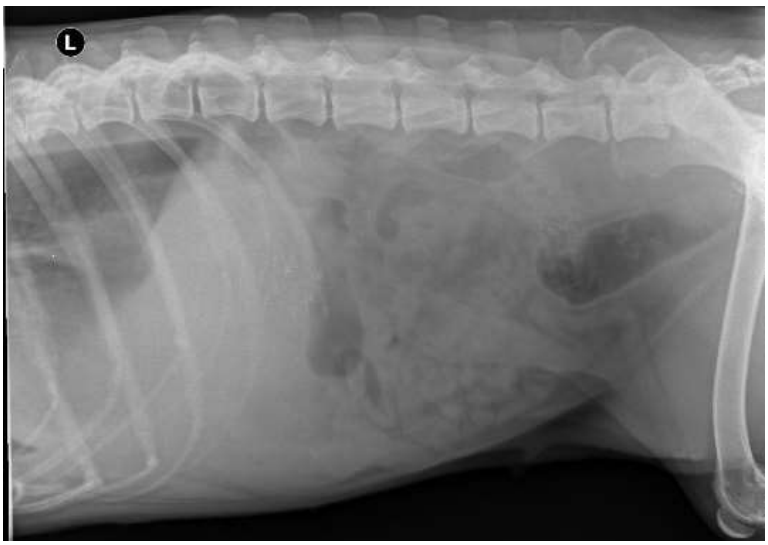

Figure 9. Hepatomegaly