

ULTRASOUND FINDINGS IN DOGS WITH SPLENIC HEMANGIOSARCOMA

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ABSTRACT

There were 21 ultrasonographic studies conducted on separate dogs with the average age being 9.6 ± 0.63 years with pathohistologically proven hemangiosarcoma of the spleen. The tumor lesions were with different sizes ranging from 0.5 to upwards of 7cm with irregular shape, uneven outlines and poor differentiation from the surrounding tissue. In the cases of bigger neoplastic formations heteroechogenity and internal cavities were easy to see and were caused by tissue breaking apart. In 23.8% of dogs with spleen hemangiosarcoma we found hemorrhagic peritoneal effusion. The combination of the tumor in the spleen with the presence of hemorrhagic peritoneal effusion is a strong indicator of future hemangiosarcoma.

Key words: ultrasound, spleen hemangiosarcoma dogs.

Introduction

Ultrasonography is a fast, cheap and reliable method for research that is widely used in the veterinary medicine. Abdominal ultrasound is the first choice of the figurative methods used to rate the abdominal organs (Forrest, 2007). Ultrasound is a highly sensitive method used to find focal lesions in the internal organs and according to some authors (Stamatiou et al., 2009; Crabtree et al., 2010) the accuracy can reach 80–95% which makes it comparable with computer tomography. Using ultrasound the characteristics of the focal process can be easily determined those being cyst or a tumor. Advancements of technology and usage of contrast ultrasonography allow for a highly accurate way to determine the characteristics of the tumor masses. (Troisi et al., 2015).

Ultrasonography is a flawless method for finding pleural or peritoneal effusions even when they are in minimal quantities. The availability of ultrasound guided biopsy or aspiration can be crucial for the diagnostic process (Glińska–Suchocka et al., 2013).

Hemangiosarcoma (HSA, malignant hemangioendothelioma or angiosarcoma) is an extremely aggressive malignant tumor derived from the endothelium of the blood vessels with high metastatic potential and poor prognosis (Karabağlı et al., 2011). This neoplasia is more common in dogs than any other species (Lana et al., 2007). Hemangiosarcoma is the most common spleen tumor in dogs. According to multiple studies this type of tumor takes up 50% of all spleen tumors when it comes to dog and around 70% of all malignant neoplasias of the spleen (Thamm, 2007).

Materials and methods

The studies were carried out with 21 dogs referred to the Small Animal Clinic of the Faculty of Veterinary Medicine, Trakia University, Stara Zagora, between 2007 and 2016. Seventeen of the dogs were from big and gigantic breeds. The average age of the dogs being 9.6 ± 0.63 years. In all dogs the type of tumor (hemangiosarcoma) was determined after a pathohistological examination.

The ultrasound examination of the patients was conducted using an ultrasound Mindray DC–6VET with a convex transducer and operating frequency of 5.0–8.0 MHz. During all the ultrasounds we used the highest frequency possible for each individual case. The dogs were positioned in dorsal recumbency. The fur on the was removed giving the option for an examination through the ventral

abdominal wall. In accordance with the standards for abdominal ultrasound all abdominal organs were scanned in B-mode and at least two planes: sagittal and transversal.

Results

In dogs with hemangiosarcoma the sonographic changes would be localized mainly in the spleen. The size of the spleen would vary from normal to extremely large.

The spleen capsule had uneven and irregular contours. Inside the organ, in all animals, one or more sections of varying sizes (from 0.5 to more than 7 cm in diameter), with irregular contours, with poorly differentiations from surrounding tissues, and with heterogeneous echogenicity were visualized (Fig. 1).



A



B

Figure 1: Splenic hemangiosarcoma. A. Small single tumor (0.83 sm); B. Massive tumor mass (>5.0 sm).

In the larger tumor lesions we observed the presence of anechogenic cavity formations with irregular shapes and varying sizes localized inside the neoplastic mass. (Figure 2).



Figure 2: Heteroechogenic tumor of the spleen with cavities.

In ten of the dogs (47.6%), we observed enlargement of the lymph nodes in the hilus area of the spleen. The responsive hilus lymph nodes were between 0.5 and 2.2 cm in size, smooth homogeneous and hypochoic, relative to the splenic parenchyma. In 23.8% of the animals (n=5) we found the presence of peritoneal effusion (Figure 3A), visualized as a different quantity anechogenic fluid.

In case of bleeding from the tumor mass in the eichogenic fluid, we observed multiple small highly mobile hyperechogenic entities usually occupying the far field of the screen.

In two of the dogs the ultrasonographics examination revealed hepatomegaly and the presence of different in size and shape hypo- and hetero-echogenic lesions in the liver parenchyma. (Fig. 3B)



A



B

Figure 3: A. Spleen hemangiosarcoma in dog with peritoneal effusion (arrow) and left kidney. B: Hemangiosarcoma of the spleen (thick arrow) and metastatic lesions in the liver (thin arrow). Legend: SP: spleen, LK: left kidney, L: liver.

Discussion

Abdominal ultrasound is an extremely reliable and accurate method for rating the size and the echostructure of the spleen (Feliciano et al., 2015). The possibility of finding even small (4–5mm) tumor formations including during screening examinations ensures early diagnosis of the neoplasms. Routine ultrasound examinations in 53 asymptomatic clinically healthy dogs revealed that 52.8% (n=28) of them had spleen lesions (Webb et al., 2012). The ultrasound findings can vary depending on the stage and histological type of the tumor.

The variations in the sizes of the tumors is related to the differences in their stage of development. The appearance of anechogenic cavities in the tumor mass is a common ultrasound finding in hemangiosarcomas (Webb et al., 2012). It is debatable whether the sonographic presentation of the tumor mass correlates with the pathohistological diagnosis. According to Maronezi et al. (2017) there is no such dependence. Other authors report high statistical significance of ultrasound-determined tumor sizes and their malignancy ($p=0.002$) (Lee et al., 2018). We think that large tumor lesions with uneven edges, with irregular contours and with poorly differentiations from surrounding tissues are likely to be malignant. We agree with the opinion of Ballegee et al. (2007) that small singular tumor lesions are likely to be benign, while the detection of multiple tumor lesions indicates their malignancy.

Ultrasonography is an extremely accurate method of finding even minimal peritoneal effusions (Glińska-Suchocka et al., 2013). Massive abdominal effusion is easy to detect. When the effusion is minimal quantity wise it visualized as anechogenic areas located in between the intestinal folds or around the hilus area of the spleen and liver.

In almost one quarter of dogs with hemangiosarcoma in addition to the focal changes in the spleen, the presence of abdominal fluid is visualized. Hemangiosarcomas are tumors that are rich in blood supply originating from the epithelium of the blood vessels and have a tendency to bleed. So often, including our studies, rather than a tumor ascites it is a chemoabdomen with its typical ultrasound pattern. When studying dogs with non-traumatic chemo abdomen Pintar et al. (2003) found that in 80% of cases this condition was due to malignant neoplasia with 70% of the animals having hemangiosarcoma in the spleen. This data indicates that the combination of tumor mass in the spleen with the presence of hemorrhagic peritoneal effusion is highly indicative of spleen hemangiosarcoma.

Conclusion

Abdominal ultrasound is a reliable and validated method for primary clinical diagnosis of neoplastic conditions of the spleen. Large tumor masses with mixed echogenicity accompanied by hemorrhagic peritoneal effusions are highly suspicious of being hemangiosarcoma

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