USG GUIDED BIOPSIES OF VISCERAL ORGANS IN DOGS

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The ultrasound guided core needle biopsy (USG-CNB) and ultrasound guided fine needle aspiration biopsy (USG-FNAB) for various abdominal organs on 10 clinical cases of dogs were carried out. The accuracy of the biopsy collection technique was appreciably high for collection of biopsy from liver, spleen and prostate but unsatisfactory for kidney tissue. Ultrasonography helped in characterization of echo texture thereby organal parenchymal change as well as determination of size. It was concluded that USG-CNB with (core needle biopsy instruments) using free hand technique was an easy, safe and accurate technique for obtaining sufficient and desired tissue for histopathological diagnosis in cases of hepatic, splenic and prostate affections in dogs.

Keywords: Fine needle aspiration biopsy, Kidney, Liver, Prostate, Ultrasound guided core needle biopsy (USG-CNB), Ultrasound guided fine needle aspiration biopsy (USG-FNAB).

The affection of visceral organ in dogs is common. The diagnosis of these visceral organ affections is mainly based on the history, clinical signs, physical examination, blood biochemistry and imaging studies. The clinical, radiological and hematobiological tests are usually inadequate for the establishment of an etiologic diagnosis, specific therapy and prognosis. Ultrasonography has the ability to differentiate various soft tissue densities, which makes it possible to locate organs and tissues not visible radiographically. For different oncological studies collection of biopsy and thereby evaluation is a gold standard for confirmatory diagnosis. But many times the biopsy collected grossly may become false negative. The ultrasound guided biopsy (USGB) can help to assess an organ function without surgical exploration to definitely diagnose the condition through histopathological/cytological examination. Several methods for obtaining biopsy samples of abdominal organs in small animals have been described including percutaneous biopsy (De Rycke et al., 1999), keyhole techniques (Haris et al., 2011) and biopsy during laparotomy or laparoscopy (Isaza et al., 2003). Ultrasound guided biopsy has become a well-recognized technique used by sonologist for histopathological characterization of biopsied tissue. The technique of USG-CNB and USG-FNAB is least expensive, rapid, and minimally invasive, hassle free and more accurate than blind punctures. The art of USG-CNB and USG-FNAB needs practice and reports are also scanty in animals. Therefore, present study was carried out to assess the efficacy and diagnostic value of ultrasound guided biopsy and ultrasound guided fine needle aspiration biopsy in cases of various organal affections in dogs.

Materials and Methods
The present study was conducted on 10 clinical cases of dogs of either sex, aged 8 months to 12 years weighing 10 to 36 kg presented in Department of Veterinary Surgery and Radiology, West Bengal University of Animal and Fishery Sciences, Kolkata-37, India, with varying symptoms of abdominal complaints. All the animals were subjected to systematic evaluation for diagnosis of diseases. Hematobiocchemical parameters including serum Alkaline Phosphatase (AKP), Serum Glutamic Pyruvic Transaminase (SGPT), Serum Glutamic Oxaloacetic Transaminase (SGOT), Blood Urea Nitrogen (BUN), creatinine (SC), Total leucocyte count (TLC), Differential Leucocyte count (DLC), Haemoglobin (Hb), total protein and albumin were estimated depending upon the case. Survey abdominal radiographs were taken. Two dimensional, B-mode ultrasonographic examination of whole abdomen was carried out. After thorough analysis of the results of all investigations the animals justified for USG...
guided biopsies were prepared in routine way. The ultrasound guided core-needle biopsy (USG-CNB) samples were collected in all 10 cases using a true-cut core disposable biopsy needle of size 16G X 11.25 cm and 14G x15cm in length from the suspected and target part of the organ. The length of sample notch was 2.0 cm and depth of the penetration was 22 mm. The USG-CNB was carried out in dorsal recumbency in all animals. In few cases local infiltration anesthesia was done where patients were non-cooperative during the procedure. The needle was pierced at an angle from ultrasound transducer through the skin, as the organ was being visualized on the monitor (Fig.1). Biopsy of organ was made in maximum one or two attempts and post biopsy scan was done to check the haemorrhage. Smears were made from tissue samples and processed for cytological evaluation. The tissue samples obtained were then stored in 10% buffered formalin for histopathological examination.

The ultrasound guided fine needle aspiration biopsy (USG-FNAB) was collecte

Table showing affection of the organs and type of biopsy collection technique

<table>
<thead>
<tr>
<th>Organ from which Biopsy was collected</th>
<th>Biopsy No</th>
<th>Technique of biopsy collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liver</td>
<td>4</td>
<td>USG-CNB: 3, USG-FNAB: 1</td>
</tr>
<tr>
<td>Spleen</td>
<td>2</td>
<td>USG-CNB: 2, USG-FNAB: 0</td>
</tr>
<tr>
<td>Kidney</td>
<td>2</td>
<td>USG-CNB: 2, USG-FNAB: 0</td>
</tr>
<tr>
<td>Prostate</td>
<td>2</td>
<td>USG-CNB: 1, USG-FNAB: 1</td>
</tr>
</tbody>
</table>

Liver: On the basis of haematobiochemical, clinical and radio-imaging studies one animal was suspected for hepatic cyst and thereby aspirate was collected under USG-FNAB. The clinical signs in that dog included vomiting, abdominal distension, reduced feed intake, and black colored loose faeces with elevated SGPT and AKP. Ultra sonogram at right paracostal area adjacent to xypoid showed presence of anechoic area surrounded by hyperechoic wall adhered with hepatic lobe. The anechogenicity in USG is suggestive of the evidence of any fluid pocket containing either blood, cystic fluid or any other fluid as happens in liver haematoma, cyst and abscess respectively.

Results and Discussion

The selected 10 clinical cases of dogs from the pool which were presented for various hepatic, spleenic, renal and prostate affections were included in the present study. All the dogs were subjected to clinico-physical, radiographic, ultrasonographic, and hematobiochemical studies before USG-CNB or USG-FNAB.

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The cytological changes of USG-FNAB in this cases evidenced degenerated and necrosed hepatocytes admixed with inflammatory cells (Fig. 2). Similar cytological findings were also reported by Bhadwal (2007). The increased level of SGOT may also be associated with leakage following altered membrane permeability as also reported by Rivera-Sanfeliz et al. (2005). The loose faeces in the liver disease could be due to cholestasis caused by endotoxins and increased resistance to portal blood flow, leading to congestion of intestinal vasculature, decreasing intestinal water resorption. Accurate radiographic evaluation of generalized and mild changes in hepatic size has been found to be difficult.
Spleen: The spleen of two dogs appeared to be enlarged in radiograph and the same dogs had ultrasonographcally spleeno-megaly where the edge of the spleen was found extended beyond the costal arch reaching mid ventral aspect of abdomen. The echogenicity decreases than a normal spleen parenchyma and at places there were presence of hyperechoic foci spreading the entire spleen with altered architecture of the organ. The clinical signs of diarrhea, vomiting, lack of appetite, abdominal pain, lethargy and reduced activity and elevated rectal temperature, heart rate and respiration rate were evidenced. Total platelet count, SGOT, SGPT and AKP values were elevated. The radiographic and ultrasonographic findings were indicative of alteration in size or structure of the splenic parenchyma. The USGB samples were taken from these animals for further study.

The histological observation revealed that the red pulp tended to be enlarged, while the white pulp tended to be reduced with increase in portal pressure and weight of the spleen. It also histologically revealed an increase in the splenic sinus-like structure, narrowing of the splenic cords, fibrosis due to reticular cell proliferation singly-scattered and clusters of foamy macrophages in the red pulp and fibrosis around the central artery in the white pulp as also recorded by Jankowski (2003) in a dog suggestive of spleeno-megaly (Fig.3).

Prostate: Two dogs, of more than 10 years age, were observed with constipation, blood stained urethral discharge, blood in the urine. The serum urea nitrogen, creatinine were elevated with eosinophilia. The radiographs of the abdomen showed enlarged prostate. On ultrasonography the prostatic parenchyma was observed moderately echogenic with a coarse but even texture. The prostate capsule looked to be thickened, hyperechoic and mass tissue pressing the intraprostatic urethra.

The histological findings in such prostate tissue collected under ultrasonography guided biopsy technique showed extensive acinar dilatation lined by prominent hypertrophied epithelial cells as also reported by Hoppe et al., (1986). Some residual islands of normal glandular hyperplasia were also seen in the periphery of the gland suggestive of benign prostatic hyperplasia (Fig. 4).

Kidney: Two dogs which had dysuurea, azotaemia, anaemia and ultrasonographically features of atrophied kidneys with loss of cortico-medullary junction thus suspected for chronic renal failure. The dogs were attempted for USG-CN of cortex but failed as the target tissues could not be collected as evidenced from the microscopic examination of the collected tissue after processing. In both cases the attempt to collect core biopsy with the help of both Tru-Cut biopsy needle and Bard Max core biopsy gun were unsuccessful. The kidneys are floating organ as a result of which biopsy needle could not strike the organ while attempted under USG guidance due to their mobility.

In the present study, ultrasonographic findings correlated with the hemato-biochemical parameters in all the ten dogs and by USG it was possible to identify alterations in int
Fig.3. Photomicrograph of spleen showing Spleeno-megaly. Note the presence of singly-scattered and clusters of foamy macrophages in the red pulp. In the absence of hyperplastic follicles patient (HE X100). Fig.4. Photomicrograph of prostate gland with increased stromal tissue and occasionally cystic change patient. (HE X100).

-ernal hepatic, prostate and spleen architecture and parenchyma. The cytological/histologic findings gave the confirmatory diagnosis which corroborated with the clinical, hematobiochemical and ultrasonographic findings. Radiography was not much helpful in the diagnosis of the diseased conditions of liver and spleen in most cases. However, spleenomegaly and hepatomegaly could be diagnosed on the lateral radiographs.

Conclusions
The techniques of USG-CNB and US-GFNAB were practically effective. The accuracy of the technique was 100% in case of collection of biopsy tissue from liver, spleen and prostate but not satisfactory for kidney. Ultrasonography helped in characterization of organal parenchyma for change in size and echo texture. It was concluded that USG-CNB using free hand technique was an easy, safe and accurate technique for obtaining sufficient and good quality tissue for histopathological diagnosis in cases of hepatic, splenic and prostate affections in dogs.

References


