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Prologue on DISEASES OF DOGS - for Practitioners

Mani Saravanan

1. Introduction

Pet animals play a vital role in the human society as a companion, stress buster, guarding, etc. Health-care management of such pet animals is very much essential. Hence the pet animal clinical practice is a challenge to relieve the suffering of the pet and to restore its normal routines. In recent years on par with human medicine, newer diagnostic technique and therapeutic protocols were followed to cure various diseases and condition of animals. Ascites, duodenal disorders, canine mastitis and re-emerging disease like Babesia are a timely needed topic in the day to day activities of pet animal clinical practices. This book provides the information on ascites, Babesia, duodenal disorders and mastitis of canines.

2. Ascites

Small animal clinicians are frequently presented with abdominal abnormalities. In many cases these abnormalities result from primary intra-abdominal disease, although the clinical signs may be an abdominal manifestation of extra-abdominal disease [1]. Ascites is usually accompanied with chronic hepatic damage, as a result of portal hypertension, hypoalbuminaemia and increased renal sodium and water retention. It also occurred in congestive heart failure, protein losing enteropathy, protein losing nephropathy, neoplasia, peritonitis, haemorrhage, and rupture of gall bladder or urinary bladder [2]. Ascites occurs when there is an alteration in Starling's forces, including increased venous or lymphatic hydrostatic pressure, vascular permeability, increased intraperitoneal oncotic pressure and decreased capillary oncotic pressure [3].

The diagnosis of liver disorders is often very vague and non-specific, especially in the early or mild stage of hepatobiliary diseases, because the clinical signs do not correlate with hepatic parenchyma damage. In the varied functional activities of liver, there was no single test that can accurately identify hepatic damage or its underlying cause; hence, a set of tests are necessary to assess ascites due hepatobiliary disorder. Liver dysfunction can be diagnosed and monitored by hepatic markers, hepatic blood flow estimation, prothrombin time, serum bilirubin, transaminases [4], serum alkaline phosphatase, γ -glutamyl transferase [5], glucose [6], total protein and albumin levels [7]. Complete blood counts, serum biochemical profile, urine analysis, faecal analysis and survey of abdominal radiography or ultrasonography [8] are being considered for screening value.

The gross appearance of the fluid may be helpful in determining the pathological process. Examination of ascitic fluid consists of colour, specific gravity, total protein, albumin, nucleated cell count and serum ascitic albumin gradient (SAAG). The actual cause of ascites is a greater difficulty to the clinicians [9].

Extensive literature has been published in various animals on ascites of hepatobiliary dysfunctions and their remedies. The main aim of the treatment protocol is to eliminate the causative factors by reducing hepatic inflammation, fibrosis and hepatic regeneration and curtail its complications. Low sodium diet and diuretics, namely, furosemide and spironolactone, are the most commonly used to reduce ascites. Certain animals failed to respond diuretics due to high serum aldosterone liver cirrhosis [10]. The consequence of ascites due to hepatobiliary disorders are refractory ascites and hepatorenal syndrome (HRS), which leads short survival of patient [11]. Abdominocentesis is performed if the ascites is life-threatening [12]. Other therapeutic management of ascites in humans are large volume paracentesis, intravenous albumin infusion, transjugular intrahepatic portosystemic shunt (TIPS), peritoneovenous shunt and liver transplantation [11, 13]. But these therapeutic measures are under experiment in animals, and each of the methods has its own disadvantage, that is, incomplete recovery from ascites and cost-ineffective.

3. Canine mastitis

Inflammation of the mammary gland is a common problem in bitches. It's caused by bacterial and fungal pathogens along with immunodeficiency [14, 15]. The clinical manifestation of mastitis is classified as acute, chronic, subclinical and gangrenous mastitis. Causes for the mastitis are poor hygienic, trauma and systemic infections. The most common route of infection is the ascending route followed by trauma and haematogenous route [16].

Complete physical examination of mammary glands should be done for their symmetry, temperature, size, consistency and colour. In the case of abnormal milk secretion, evaluate its colour, consistency and smell. Cytological examination of milk should be performed. In chronic mastitis a microbiological culture of the milk and antibiotic sensitivity should be performed to identify the pathogens and initiate the appropriate therapeutic protocols. The most common isolated pathogens are staphylococci, streptococci and *E. coli* in mastitis milk [16]. Mammary radiography and ultrasound examination are also recommended for such case to neoplasia and to exclude metastases to the lungs. Fine-needle biopsy is usually recommended if mammary neoplasia is suspected, though useful.

FNAC can precisely assess the degree of inflammation as well as detect abnormalities inside the mammary gland [17]. Acute phase proteins (CRP or SAA) in serum and milk samples seem to be the most accurate inflammatory biomarkers to diagnose canine mastitis, as their concentrations are significantly higher in bitches suffering from mastitis than in healthy bitches. Other inflammatory biomarkers like cyclooxygenases or interleukins seem to be promising both in diagnosis of mastitis and differentiation between mastitis and mammary tumours [18].

4. Babesiosis

Babesiosis is one among the deadly tick-borne haemaprotozoan infection in dogs. Causative agents of canine babesiosis are *Babesia canis*, *B. gibsoni* and *B. vogeli* [19]. Babesia infection could cause autoimmune disorder like immune-mediated haemolytic anaemia (IMHA) and immune-mediated thrombocytopenia (IMTP) in dogs, and it may occur individually or concurrently. If they occur together, they call it as Evans syndrome [20]. Evans syndrome with Babesia in canines leads to the destruction of RBCs and platelets, oxidative stress and endothelial injury [21, 22].

Flow cytometry method is considered to be more rapid, cost-effective, sensitive methods to diagnose IMHA and ITP in humans and animals [23, 24].

5. Duodenal disorders

Commonly recorded canine duodenal disorders are inflammatory bowel disease, lymphangiectasia, ulcer, foreign body, giardia, parasites, small intestinal bacterial overgrowth and neoplasia [25]. Duodenal disorders are difficult to identify clinically because of the non-specific symptoms. They may or may not be identifiable through routine radiographic, ultrasonographic or laboratory evaluation methods, because many diseases of duodenum primarily involve the mucosal surface. Thus diagnosis and treatment of the duodenal disorders are challenging for the canine practitioners [26]. Duodenoscopy is an efficient way of identifying the abnormalities of mucosal irregularities and obtaining mucosal biopsy and duodenal juice for routine histopathological and bacteriological studies [27–29].

6. Conclusions

- Newer therapeutic modalities may emerge to incorporate alternative medicine into an integrated medical approach with standard therapy against liver disorders.
- PCR is essential to rule out tick-borne infection in dogs, and flow cytometry is a sensitive method to diagnose IMHA and IMTP.
- Visualization of duodenal epithelium and obtaining intestinal mucosal biopsy by duodenoscopy are an ideal tool in the diagnosis of duodenal disorders.

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Author details

Mani Saravanan

Veterinary Clinical Complex, Veterinary College and Research Institute, Tamilnadu Veterinary and Animal Sciences University (TANUVAS), Thanjavur, India

*Address all correspondence to: sara82vet@yahoo.com

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