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Short Communication

SERUM HAEMATO-BIOCHEMICAL PROFILE IN ASCITIC DOGS

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SUMMARY

Sick dogs of different breeds and both sexes, aged between 3-5 years with clinical signs of distended abdomen and inappetance suggestive of ascites were examined. General clinical examination, haemato-biochemical examination, ultrasonography, abdominocentesis and peritoneal fluid examination were undertaken. Haematological findings in ascitic dogs were of anaemia of chronic disorder (mild normocytic, hypochromic and non-responsive). Results of the serum chemistry revealed decreased serum albumin, globulin and albumin/ globulin (A: G) ratio and significantly increased liver enzymes (aspartate transaminase and alanine transaminase) indicating severe liver damage. Ultrasonography examination revealed ground glass appearance of abdomen.

Key words: Ascites, dog, hemato-biochemical, serum

Ascites is the accumulation of fluid in the peritoneal cavity resulting either from normal functions or disease condition. The pathology of ascites is related to hepatic, renal and cardiovascular insufficiencies, hormonal and metabolic disorders, tumors and carcinomas of liver (Skardova, 1991). Most of the cases of ascites are due to congestive heart failure (CHF), followed by cirrhotic liver disease (CLD), chronic active hepatitis (CAH) and kidney damage, each of which is characterized by some specific serum chemistry and haematological abnormalities (Ihedioha *et al.*, 2011). Besides, depletion of plasma proteins associated with inappropriate loss of protein from renal or gastrointestinal disease resulting, obstruction of the vena cava or portal vein, lymphatic drainage due to neoplastic occlusion, overt neoplastic effusion, peritonitis, electrolyte imbalance especially hypernatremia, liver cirrhosis due to a decreased production of plasma proteins etc. are also reported to cause ascites (Ettinger and Fildman, 2005). Hormonal and metabolic disorders with an unfavourable prognosis are also frequently involved in the pathogenesis of ascites. Adult dogs are reported to be more susceptible compared to young and old ones (Saravanan *et al*., 2012).

The study was carried out on 10 dogs of different breeds and both sexes at the Clinical Complex of the College between October and December, 2012. Blood (5 ml.) was collected from each animal and serum was separated. The serum samples were stored at -20°C until further evaluation. The activities of liver specific enzymes mainly aspartate transaminase (AST) and alanine transaminase (ALT) were assessed by DNPH colorimetric method using commercial kits (Span Diagnostics Ltd., Surat). Levels of total serum protein were assayed by Biuret method, albumin by BCG method, blood urea nitrogen (BUN) by Berthelot method, creatinine by Modified Jaffe's Reaction method and glucose by GOD-POD method using commercial kits (Span Diagnostics Ltd., Surat). Haemoglobin was estimated using Sahli's hemoglobinometer method. Total leucocyte count (TLC) and total erythrocyte count (TEC) were estimated using Neaubaeur's counting chamber method. The ultrasonography was performed on all the affected dogs.

The affected dogs had gradual symmetrical enlargement of the abdominal volume and palpational undulation of ascitic fluid. There was pronounced costal breathing, anaemia of mucous membranes, cardiac insufficiency, oedema of distal parts of limbs and rigid movement. Ascitic fluid (transudate) is generally present in cirrhosis hepatitis, nephrosis and heart diseases, whereas exudate is frequent in peritonitis, tumors, liver and spleen ruptures (Skardova, 1991).

The haemogram exhibited marked decrease in Hb

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concentration in ascitic dogs with concomitant noticeable decrease in erythrocyte count (Table 1). These results showed that ascitic dogs had normocytic, hypochromic, non-regenerative type of anaemia. However, the TLC showed higher values resulting to neutrophilia, lymphopenia, eosinophilic and monocytic granulopenia. Ihedioha *et al.* (2011) reported the similar trend of hypochromic anaemia with leucocytosis in dogs with ascitic abdominal distension which may be due to infectious, inflammatory and neoplastic conditions (Parker, 2002).

Table1
Haemato-biochemical parameters in ascitic dogs

Serum parameter	Values (Mean ±S.E.) in ascitic dogs	Normal values*
Total proteins (gm/dl)	4.39±0.07	5.4-7.5
Albumin (gm/dl)	1.05±0.09	2.3-3.1
Globulin (gm/dl)	2.73±0.11	2.4-4.4
Albumin / Globulin Ratio	0.66±0.05	0.8-2.0
AST (IU/L)	104.5±5.82	15-43
ALT (IU/L)	89.5±0.01	19-70
Glucose (mg/dl)	94.5±3.74	76-119
Creatinine (mg/dl)	0.72±0.08	0.5-1.7
BUN (mg/dl)	19.87±1.13	8-28
Hb (gm %)	10.31±0.23	12-19
RBC ($x10^6/\mu L$)	5.04±0.11	5.0-7.9
TLC ($x10^3/\mu L$)	9.15±0.92	5-14.1

*Obtained from "The Merck Veterinary Manual".

The biochemical analysis of affected dogs reflected considerable decrease in albumin, globulin and total protein concentrations (Table 1). Differential diagnosis for abdominal distension with a palpable fluid wave included effusions resulting usually from septic and nonseptic transudates, secondary to decreased colloid oncotic pressure. Albumin is responsible for about 80% of colloid oncotic pressure. The A:G ratio of 0.66 denoted acute hypoalbuminic ascitis in these dogs. Hypoalbuminemia results from albumin loss, decreased production, or inflammatory conditions (Center, 1989; Parker, 2002). Proteinuria was not observed in the affected dogs which ruled out the cause of altered glomerular filtration. However, the activities of both the enzymes were significantly higher in the affected dogs as compared to the normal values indicating alterations in liver function and suggested etiology for the ascitic condition. Glucose, BUN and creatinine concentrations were found in the physiological range.

Ultrasonography examination revealed ground glass appearance of abdomen and masking of abdominal cavity details. Sonographic features in cases of ascites vary from multiple hepatic nodules, decreased liver lobe size to diffuse hyperechoic (bright) but small liver with distended gall bladder, irregular contour and mottled appearance of liver (Kumar *et al*., 2012). Dogs with spontaneous ascites were found to have hepatic vein distension and a tortuous vena cava on abdominal ultrasound. In right lateral recumbency, the caudal vena cava crossed the diaphragm and became kinked before entering into the right atrium. Sometimes caudal vena cava kinking can be the result and not the cause of the peritoneal effusion (Pelosi *et al.*, 2012).

The biochemical analysis of the ascitic dogs revealed that the dogs were suffering from chronic hepatic damage with hypoalbuminemia and decreased A:G ratio. Also, the activities of both transaminases were higher in the affected dogs. Absence of proteinuria and concentrations of BUN, creatinine and glucose within their normal range ruled out any damage in glomerular filtration.

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