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Hemato-biochemical changes in transmissible venereal tumours (TVT) affected dogs

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Abstract

The objective of the present study was to evaluate and compare the hemato-biochemical parameters of the dogs suffering with TVT with the hemato biochemical parameters of the apparently healthy dogs. Dogs which were presented to the Veterinary Clinical Complex were screened for the presence of tumors. They were subjected to various diagnostic tests to confirm the tumor types. Upon confirmation of tumor their hemato-biochemical parameters were studied. The dogs which were presented at the hospital for regular checkups and vaccination were randomly selected and their hemato biochemical parameters were obtained which were grouped as apparently healthy dogs. The hematobiochemical parameters of dogs which were diagnosed for TVT were compared with the parameters of the apparently healthy dogs.

Keywords: dogs, hematology, TVT, serum biochemistry

Introduction

Cancer is one of the major causes of death in human beings and dogs. Neoplasms are of two types benign and malignant. Leukemias and lymphoma which account for approximately 8% of malignancies arise from the blood forming cells and from cells of the immune system. Despite the availability of wide range of diagnostic modalities for cancer no single modality is full proof for identification of cancer. Laboratory assessment for cancer with fine needle aspiration, histopathology etc is the main source of reliable diagnosis. Ultrasonography, radiography hemato biochemistry etc may be used for further confirmation of cancer and metastatic growths in the body [3,6].

Materials and Methods

The dogs presented to clinic and those referred from various hospitals in and around Hyderabad to Teaching Veterinary Clinical Complex, Bhoiguda formed the basis for the present study. Whole blood and serum samples of all the selected dogs formed the clinical material for laboratory examination. Clinical samples for hematology and biochemistry i.e., blood and sera samples were collected from all the dogs with malignancy for laboratory examination. In dogs with malignancy, blood and sera samples were collected before therapy. Blood and serum were also collected from apparently healthy dogs to establish normal values. Two ml of whole blood was withdrawn from cephalic or saphenous vein in vacutainer with K-EDTA for estimation of hematological parameters. For separation of serum, 5ml of blood was collected in a vacutainer containing clot accelerator. Serum was separated immediately after clotting by centrifugation at 3000 rpm for 5 minutes and collected in ependorff tubes. Care was taken during collection and processing of blood samples to avoid haemolysis. Serum samples were collected for the estimation of biochemical parameters. Estimation of all the hematological and biochemical parameters was carried out on the same day of collection. However, blood was also collected from apparently healthy dogs to establish normal values.

Hematology

Hematological parameters such as Hb, PCV, TEC, TLC and DLC were estimated as per the standard procedures. Hemoglobin was estimated by Sahli's comparator method and the concentration was expressed as g/dl. Packed cell volume was estimated by micro hematocrit method and values were expressed as per cent. Total erythrocyte count was examined by haemocytometer and the results were expressed as number of erythrocytes x 10⁶ per microliter of blood. Total leucocyte count was examined by haemocytometer and the results were expressed as number of leucocytes x 10³ per microliter of blood.

Blood smears were prepared on a clean grease free slide and stained by Leishman's stain for DLC. Cells were counted by battlement method and expressed as percentage.

Serum biochemistry

All the serum biochemical parameters were estimated by semi auto analyzer (Star 21 plus, supplied by M/s Rapid Diagnostics, New Delhi) employing the kits supplied by Span diagnostics Pvt. Ltd.

Alanine aminotransferase (ALT)

Serum ALT was estimated by kinetic assay method and the values were expressed as IU/L.

Aspartate Aminotransferase (AST)

Serum AST was estimated by kinetic assay method and the values were expressed as IU/L.

Alkaline phosphatase (ALP)

Serum ALP was estimated by kinetic assay method and the values were expressed as IU/L.

Total Protein

Total Protein was estimated by end point method (Modified Biuret) and the values were expressed as g/dl.

BUN

BUN was estimated by initial rate assay (NED-dye) and the values were expressed in mg/dl.

Creatinine

Creatinine was estimated by initial rate assay (Modified Jaffe's reaction) and the values were expressed in mg/dl.

Results

Dogs that were suspected to be suffering from certain tumors were subjected to detailed evaluation, clinical examination and other special examination to confirm the type of tumor. However, dogs that were apparently healthy and presented for general check up, deworming and vaccination were also considered to establish normal values.

Hematological examination of apparently healthy dogs and TVT affected dogs was depicted in Table No.1. In TVT affected cases the mean hemoglobin was 12.63±0.04g/dl which was non significantly reduced when compared to that of apparently healthy dogs (13.75±0.51g/dl). Similarly an insignificantly reduced PCV (38.15±0.99 percent), and TEC (6.25±0.44X10⁶/dl) were also noticed in the affected dogs when compared to that of apparently healthy dogs (41.60 ±0.91 percent and 6.63 ±0.3X10⁶/dl). The mean total leukocyte count and differential leukocyte count of apparently healthy and dogs affected with TVT of the present investigation are mentioned in Table No.1. The total leukocyte count among the dogs of TVT (18.99±0.65X10³/μl) were significantly high (P<0.01) when compared to that of Group apparently healthy dogs (13.30± 0.86X10³/μl). Similarly, evaluation of DLC also revealed significantly increased neutrophils (79.39±0.77%) (P<0.01), significantly decreased lymphocytes (16.60±0.28%) (P<0.01) but with no variation in the mean monocytes (2.02± 0.22%) and eosinophils (1.99±0.65%) in TVT affected dogs when compared with apparently healthy ones (72.0± 0.32%, 24.0 ±0.14%, 2.0±0.36% and 2.0±0.80 percent) respectively. Further platelets in TVT suffering dogs (2.67± 0.32 X10⁵/dl) showed a significant decrease (P<0.05) when compared to

that of apparently healthy ones (3.06±0.24X10⁵/dl).

Table 1: Mean haematological values of Apparently Healthy dogs and TVT affected dogs

S. No.	Parameter	Apparently Healthy dogs (n=10)	Dogs affected with TVT (n=40)
1.	Haemoglobin (g/dl)	13.75±0.51	12.63±0.04
2.	PCV %	41.60±0.91	38.15±0.99
3	TEC (x 10 ⁶ /μl)	6.63±0.3	6.25±0.44
4	TLC (x 10 ³ /μl)	13.30±0.86	18.99±0.65**
5.	DLC (%)		
	Neutrophils (%)	72.0±0.32	79.39±0.77**
	Lymphocytes (%)	24.0±0.14	16.60±0.28**
	Monocytes (%)	2.00±0.36	2.02±0.22
	Eosinophils (%)	2.00±0.80	1.99±0.65
6	Platelets (x 10 ⁵ /dl)	3.06±0.24	2.67±0.32*

** Significant at P < 0.01 when compared to apparently healthy dogs;

*: Significant at P < 0.05 when compared to apparently healthy dogs

##: Significant at P < 0.01 when compared to before therapy;

#: Significant at P < 0.05 when compared to before therapy

The mean serum biochemistry parameters of apparently healthy dogs and dogs with TVT tumors were given in Table No.2. In the present study the mean BUN (18.81±1.24 mg/dl) and serum Creatinine (0.86±0.26 mg/dl) were found to be non-significantly different to Group of apparently healthy dogs (16.29±0.44mg/dl and 0.95±0.62 mg/dl); but ALT (40.40±1.28 iu/l), AST (42.37±0.26 iu/l) and ALP (48.51±1.44 iu/l) levels were significantly high (P<0.01) among dogs of TVT when compared to that of apparently healthy cases (30.47±0.98 iu/l, 39.86±0.36 iu/l and 42.90±0.80 iu/l). Further, a significantly decreased (P<0.05) serum protein (5.99±0.36 g/dl), was also recorded in affected dogs when compared with apparently healthy dogs (6.70± 0.14g/dl.).

Table 2: Mean serum biochemistry values of Apparently Healthy dogs and TVT affected dogs

S. No.	Parameter	Apparently Healthy dogs(n=10)	Dogs affected with TVT(n=40)
1	BUN(mg/dl)	16.29± 0.44	18.81±1.24
2	Creatinine(mg/dl)	0.95± 0.62	0.86±0.26
3	ALT(IU/L)	30.47 ± 0.98	40.40±1.28**
4	AST(IU/L)	39.86±0.36	42.37±0.26**
5	ALP(IU/L)	42.90±0.80	48.51±1.44**
6	Total Protein(g/dl)	6.70±0.14	5.99±0.36*

**: Significant at P<0.01 when compared to apparently healthy dogs;

*: Significant at P < 0.05 when compared to apparently healthy dogs

##: Significant at P < 0.01 when compared to before therapy

#: Significant at P < 0.05 when compared to before therapy

Discussion

The mean hemoglobin of TVT affected cases taken up for detailed study (n=40) was 12.63±0.04g/dl which was insignificantly reduced when compared to that of apparently healthy dogs (13.75±0.51g/dl). Similarly an insignificantly reduced PCV (38.15±0.99 percent), and TEC (6.25±0.44X10⁶/dl) was also noticed in dogs when compared to that of apparently healthy dogs (41.60 ±0.91 percent and 6.63 ±0.3X10⁶/dl). These findings were in agreement with the findings of Kabuusu *et al.* [7] who reported mild anemia and Cizmeci *et al.* [4] who reported anemia in dogs affected with TVT because of continuous bleeding. On the contrary Behera *et al.* [2] reported that hematological parameters in TVT revealed normal hemoglobin, hematocrit and total erythrocyte

count. The total leukocyte count among the dogs of TVT ($18.99 \pm 0.65 \times 10^3/\mu\text{l}$) were significantly high ($P < 0.01$) when compared to that of apparently healthy dogs ($13.3 \pm 0.86 \times 10^3/\mu\text{l}$). This leucocytosis in TVT dogs was explained to be because of tumoural bleeding and lower urinary system infection as reported by Cizmeci *et al.* [4] Behera *et al.* [2] and Girmabirhan *et al.* [5] also reported that there was increase in total leucocytes count in TVT dogs which was in concurrence with our present findings. DLC revealed significantly increased neutrophils ($P < 0.01$), significantly decreased lymphocytes ($P < 0.01$) but with similar values of monocytes and eosinophils in TVT affected dogs when compared with apparently healthy ones which were in agreement with that of Kabuusu *et al.* [7]. Further platelets in TVT suffering dogs showed significant decrease ($P < 0.05$) when compared to that of apparently healthy ones. These findings were in agreement with the findings of Behera *et al.* [2] and Girmabirhan *et al.* [5]. In the present study the mean BUN, serum Creatinine, were found to be insignificantly increased compared to apparently healthy dogs. But ALT, AST and ALP levels were significantly high ($P < 0.01$) among dogs of TVT when compared to that of apparently healthy dogs. Further, a significantly decreased ($P < 0.05$) serum protein, was also recorded in affected dogs when compared with apparently healthy dogs. These were in agreement with the findings of Behera *et al.* [2] and Girma Birhan *et al.* [5]. While Albanese *et al.* [1] reported normal levels of total protein, BUN and Serum creatinine in TVT dogs.

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