HAEMATOLOGICAL EFFECTS OF SKIN AND SUBCUTANEOUS TISSUE NEOPLASMS IN CANINES

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ABSTRACT

The present study was undertaken in 25 cases of skin and subcutaneous neoplasms with the objective to evaluate the changes in the haematological and serum biochemical parameters due to skin and subcutaneous tissue neoplasms in canines.

Key words: Haematological, biochemical, neoplasms, canine

Introduction

Skin of canines is most common seat for tumours. Skin tumours in the dog are more likely to be benign than malignant (Wilcock, 1993). Jain (1996) stated that normochromic anaemia was seen in malignancies in the dogs. Of all species, dog develops neoplasms twice as frequently as humans, with incidence of skin and mammary tumours being the highest. Fayolle *et al.* (1987) studied the routine haematology in canine mammary tumours and found non-significant changes in haematological parameters. Stockhaus *et al.* (1999) also found non-significant haematological observations in cases of mammary tumour in female dogs.

Materials and Methods

A total of 750 cases were presented during the period from October 2010 to September 2011 and out of these 40 dogs were affected with skin and subcutaneous neoplastic growths at various body parts. Twenty five clinical cases of skin and subcutaneous tumours in dogs of different age groups and breeds were selected for the present study. The animals were divided into three groups. All the dogs of Group I, II and III premedicated with atropine sulphate @ 0.65 mg (total dose) i/m followed by xylazine sedation @ 1 mg/kg body weight or medetomidine @ 20 µg/kg, i/m and general anaesthesia was achieved by using ketamine @ 5 mg/kg or propofol @ 5 mg/kg body weight i/m. After proper premedication and anaesthesia, in group I, fifteen dogs which were affected with benign tumours were treated surgically. In group II, five dogs which were affected with malignant tumours were treated surgically while remaining five dogs of group III which were affected with malignant tumours were treated by lumpectomy plus antineoplastic therapy (i.e. Vincristine sulphate @ 0.025 mg/kg body weight i/v followed one week later by Methotrexate @ 0.3 mg/kg body weight) intravenously at weekly interval under fluid therapy. Blood samples were collected from the dogs before surgery and at 60, 120, and 180 minutes during and post surgical interventions.

The venous blood (approximately 3 ml) was collected by vein puncture either from cephalic or saphenous vein in the vials containing ethylene diamine tetra acetic acid (EDTA). Before mixing the EDTA, slides were immediately prepared for DLC. The estimation of haematological parameters were done by automated haematology blood cell counter, Sussi. The blood samples (3 ml) from the dog were collected before surgery, post surgery and after application of antineoplastic drugs to estimate the biochemical parameters. These parameters were estimated by standard methods using semi-automated analyzer (Logotech-Techo-168). The haematological parameters evaluated were haemoglobin (Hb), packed cell volume (PCV), total leucocyte count (TLC) and differential leucocyte count (DLC) (Table 1).

Results and Discussion

Haemoglobin showed a non-significant decrease after lumpectomy alone in group I and II at various intervals. These values ranged between 10.12±0.83 g/dl to 13.65±0.2 g/dl. In animals of group III, there was a non-significant increase in the haemoglobin level between 60 to 120 minutes followed by decrease at 180 minutes. These values ranged between 10.16 ± 0.34 g/dl to 11.96±0.23 g/dl. The packed cell volume showed a non-significant decrease between 60 to 120 minutes which returned to normalcy by 180 minutes in all the treatment groups at various intervals. The PCV values ranged from 33.50±1.65 % to 36.92±1.78 % in different groups of animals at various intervals. There was increased TLC count at 0 hour interval before surgery. The TLC decreased significantly ($P<0.01$) from 60 minutes up to 180 minutes post surgery. The values ranged between 9.20±0.16 to 17.81±0.12 before and after surgery. The haematological parameters revealed significant reduction in total erythrocyte count (TEC), total leucocyte count (TLC) and total platelet count (TPC) in both the groups.

Differential Leucocyte Count (DLC)

A non-significant increase in neutrophils (%) observed between 60 to 120 minutes in all the three groups during post-surgical treatment. The increased values ranged from 64.67 ± 0.71 per cent to 71.0±0.71 per cent. The values returned towards normalcy by 180 minutes post surgery. Combination chemotherapy might cause decrease in the neutrophils (Walter and Biller, 2006). A non-significant decrease in lymphocytes (%) was observed between 60 to 120 minutes followed by an increase in lymphocytes at 180 minutes after surgical treatment

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Table 1: Haematological observations before and after treatment in dogs affected with skin and subcutaneous neoplasm

Parameters	Groups (n=15 in I and n=5 in II,III)	0 minute	Post operative time interval (minutes)		
			60 minutes	120 minutes	180 minutes
Hb (gm/dl)	I	13.65±0.2^{a}	12.92±0.22^{a}	12.43±0.18^{a}	12.84±0.15^{a}
	II	12.28±0.24^{b}	11.12±0.40^{b}	10.12±0.83^{b}	11.72 ± 0.25^{b}
	III	11.16±0.34^{c}	11.48±0.23^{b}	11.96±0.23^{b}	10.28 ± 0.22^{b}
PCV (%)	I	35.98±1.66^{a}	35.62±1.59^{a}	35.57±1.52^{a}	35.15±1.46^{a}
	II	36.92±1.78^{b}	36.88±1.48^{b}	36.84±1.39^{b}	36.90±1.84^{b}
	III	33.88±1.10^{c}	33.84±1.80^{c}	33.80±1.39^{b}	33.50±1.65^{b}
TLC (x 10^{3}cu mm^{-1})	I	17.20±0.13^{b}	12.51±0.09^{a**}	9.61±0.08^{b**}	9.23±0.12^{a**}
	II	17.81±0.12^{a}	13.81±0.08^{a**}	9.91±0.08^{a**}	9.20±0.16^{a**}
	III	16.41±0.12^{a}	12.81±0.08^{a**}	9.91±0.06^{a**}	9.20±0.16^{a**}
DLC Neutrophils (%)	I	64.67±0.71^{a}	64.93±0.75^{a}	66.07±0.82^{a}	65.0±0.45^{a}
	II	70.00±0.63^{b}	70.80±0.97^{b}	71.0±0.71^{a}	70.2±1.05^{a}
	III	68.20±0.37^{b}	68.60±1.44^{b}	66.80±1.02^{a}	66.4±0.81^{c}
Lymphocytes (%)	I	30.73±0.53^{a}	30.47±0.62^{a}	30.13±0.86^{a}	30.50±0.43^{b}
	II	25.40±0.24^{b}	24.60±0.98^{b}	23.80±0.49^{a}	24.80±1.08^{c}
	III	26.20±0.49^{b}	25.80±1.24^{b}	25.40±1.33^{a}	26.00±0.58^{a}
Monocytes (%)	I	3.13±0.17^{b}	3.20±0.17^{a}	3.53±0.17^{a}	3.73±0.15^{a}
	II	3.20±0.20^{ab}	3.80±0.37^{a}	3.40±0.24^{b}	3.60±0.40^{a}
	III	4.00±0.45^{a}	3.20±0.20^{a}	4.00±0.63^{a}	4.20±0.51^{a}
Eosinophils (%)	I	1.20±0.24^{a}	1.20±0.24^{a}	1.40±0.25^{a}	1.47±0.17^{a}
	II	1.20±0.37^{a}	1.40±0.51^{a}	1.20±0.49^{a}	1.00±0.32^{a}
	III	1.40±0.40^{a}	1.60±0.51^{a}	1.50±0.37^{a}	1.30±0.51^{a}
Basophils (%)	I	0.20±0.11^{a}	0.13±0.09^{a}	0.13±0.09^{a}	0.27±0.12^{ab}
	II	0.20±0.20^{a}	0.20±0.20^{a}	0.20±0.20^{a}	0.00±0.00^{b}
	III	0.20±0.10^{a}	0.60±0.14^{a}	0.00±0.00^{a}	0.40±0.02^{a}

**P<0.01= Significant at 1% level

in all the groups of animals. The decreased values ranged between 23.80±0.49 per cent to 30.73±0.53 per cent. In neutropenia as a compensatory mechanism lymphocyte count increases in the blood or due to change in neutrophil lymphocyte ratio (Jacobs, 2008). The monocyte count fluctuated non-significantly at different time intervals after various treatments. These values ranged from 3.13±0.17 per cent to 4.20±0.51 per cent in all the groups of animals at various intervals. The eosinophil count fluctuated non-significantly at various intervals after different treatment and the values ranged from 1.00±0.32 per cent to 1.60±0.51 per cent in all the groups of animals at various intervals. There were non-significant changes in basophils in all the groups of animals at various intervals post treatment and the values ranged between 0.00±0.00 per cent to 0.60±0.02 per cent.

Based on these observations it can be inferred that alterations in haematological values due to skin and subcutaneous neoplasms, probably depend upon immune status, hormonal changes, diet and the relative number in different geographical areas.

References

Fayolle, P. *et al.* (1987) *Vet. Clinic. Pathol.* **16** (3): 73-75.

Jain, N.C. (1996) *Haematological Techniques In: Schalm's Veterinary Haematology*, 4th ed. Lea and Febinger, Philadelphia, pp. 20-86.

Jacob, R.M. (2008) *J. Amer. Assoc.* **24** (2): pp. 263- 267.

Stockhaus, C. *et al.* (1999) *J. Small Ani. Pract.* **40**(7): 326-331.

Wilcock, B. P. (1993) *Jubb, K. F. Pathology of domestic animals*. Academic press. INC, California. Pp. 706-733.

Walter, C.U. and Biller, B.J. (2006) *J. Vet. Int. Med.***20**:919-938.