

Original Research Article

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Study of Liver Function Enzymes i.e. Alanine Amino Transferase, Alkaline Phosphatase in Pre and Post-treated Dogs on Chemotherapy with Doxorubicin and Vincristine in Venereal Granuloma

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ABSTRACT

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The present study was carried out in TVCC, Hisar on twenty-four dogs affected with venereal granuloma. Affected dogs were divided equally into three groups viz. vincristine therapy (Group I) with 7 day cycle and doxorubicin therapy consisting two groups i.e. Group II with 14 day cycle and group III with 21 day cycle. Blood sample collection was done at weekly interval and before administration of drug i.e. Day 0, 7, 14 in Group I, Day 0, 7, 14, 21, 28 in Group II and Day 0, 7, 14, 21, 28, 35, 42 in Group III. Biochemical parameters viz. Alanine Amino Transferase, Alkaline Phosphatase was undertaken for study. Significant rise in serum ALP activity recorded in Group I, II, III. Distinct rise in serum ALT observed in Group I and non-significant increasing pattern recorded in Groups II and III.

Introduction

Venereal Granuloma also known as Canine transmissible venereal tumor (TVT) is a contagious, naturally occurring, horizontally transmitted venereal round cell tumor (Murgia *et al.*, 2006). Transmission of TVT occurs normally by direct contact through coitus by viable tumor cells through injured mucosa and

tumour cells are seeded onto mucous membrane but may be transmitted through licking, biting, and sniffing tumor affected areas (Bloom, 1954 and Dass, 1986, Das and Das, 2000). In enzootic areas, where there are high numbers of free-roaming sexually active dogs, TVT is the most common canine tumor (Das and Das, 2000; Ganguly *et al.*, 2016). The lesions of TVT are usually confined to the

mucous membranes of the external genitalia of dogs of both sexes of any breeds (Amaral *et al.*, 2004). TVT lesion usually remain localized, but metastasis to the adjacent oral, ocular, nasal, skin and conjunctiva mucosae and inguinal lymph nodes was reported in many cases Chemotherapy with vincristine sulfate is the most frequently used drug and venereal granuloma responds well (Calvet *et al.*, 1982; Cohen, 1985; Johnson, 1994). Other chemotherapeutic agents like cyclophosphamide, vinblastine and methotrexate have also been used alone or in combination (Richardson, 1981; Johnston, 1991; Brown *et al.*, 1981; Yang *et al.*, 1991). Resistant cases can be treated with doxorubicin (Richardson., 1981; Souza *et al.*, 1998). Variation in biochemical parameters viz. ALP, ALT values show increase (due to cytotoxic effect of chemotherapy on liver metabolism).

Materials and Methods

Twenty four dogs (male and female) with history of bleeding from genital organs were selected. Blood samples were collected from the distal *cephalic vein or saphenous vein* of male and female dogs from all three groups. Blood samples were collected at weekly interval till 3rd cycle of chemotherapeutic treatment in each group and before administration of drug on the day of treatment. Site of blood collection was shaved and cleaned with antiseptic and 5 ml blood was collected by using 20 and 22 or 24 gauge scalp vein by using 20 and 22 or 24 gauge scalp vein set in plastic centrifugal tube, for serum separation.

Centrifugal tube was kept in slanting position at 4°C for 3 hrs and thereafter it was centrifuged at 3000 rpm for ten minutes for serum separation. Thereafter, serum was stored at -20 °C until analysed for Liver Function enzymes analysis. Alanine Amino

Transferase (UV kinetic (IFCC) method) and Alkaline Phosphatase (P nitrophenyl phosphate (PNPP)).

Results and Discussion

Serum alkaline phosphatase (ALP)

Significant rise in serum ALP activity after vincristine therapy (Group I) and distinct increase following doxorubicin regimens (Group II and III) concurs with the reported increase in serum ALP activity following cytotoxic drugs therapy in canine TVT (Kadam *et al.*, 2000 and Cizmeci, 2012).

Recorded increase in ALP activity in TVT dogs evidenced cytotoxic effect of chemotherapy on liver metabolism (Camacho and Laus, 1989; Behera *et al.*, 2012).

Serum alanine amino transferase (ALT)

Distinct rise in serum ALT on Day 7 post-treatment was followed by marginal increase on Day 14 post-treatment in vincristine treated dogs (Group I). However, serum ALT values during post-treatment period were within the normal range. Present observation in vincristine treated dogs concurs with the reported serum ALT pattern in TVT dogs (Daleck *et al.*, 1987; Camacho and Laus, 1989 and Dinesh *et al.*, 1993).

Serum ALT showed non-significant increasing pattern with marginal drop during the course of doxorubicin therapy in TVT dogs (Groups II and III). Non-significant serum ALT changes following doxorubicin were also reported by Todorova *et al.*, (2005). However, significant high serum ALT activity after doxorubicin therapy was recorded in TVT dogs (Gadmade, 2006). Elevated ALT values following chemotherapy are consequential to hepatic damage (Behera *et al.*, 2012).

Table.1 Serum ALP and ALT (Mean±SE) in TVT affected dogs during pre and post treatment of vincristine [Group I (n=8)]

Parameter	DAY0 (1 st dose)	DAY7 (2 nd dose)	DAY14 ((3 rd dose)
ALP (IU/L)	121.57±0.21 ^a	122.76±0.33 ^b	122.83±0.49 ^b
ALT (IU/L)	40.73±0.24	42.57±0.81	42.71±0.93

Day 0-pre-treatment; Days 7 and 14-post treatment

Means with different superscripts (a, b) within a row differ significantly (p<0.05)

Table.2 Serum ALP and ALT (Mean±SE) of TVT affected dogs during pre and post treatment of doxorubicin [Group II (n=8)]

Parameters	DAY0 (1 st dose)	DAY7	DAY 14 (2 nd dose)	DAY21	DAY28 (3 rd dose)
ALP (IU/L)	93.56±16.35	94.90±16.76	94.20±16.48	94.92±16.64	94.43±16.60
ALT (IU/L)	31.15±0.38	32.76±0.70	31.74±0.53	32.41±0.43	31.81±0.86

Day 0 – Pre-treatment; Days 7, 14, 21, 28- Post -treatment

Means with different superscripts (a, b) in a row differ significantly (p<0.05)

Table.3 Serum ALP and ALT (Mean±SE) of TVT affected dogs during pre and post treatment of doxorubicin [Group III (n=8)]

Parameters	DAY0 (1 st dose)	DAY7	DAY14	DAY21 (2 nd dose)	DAY28	DAY35	DAY42 (3 rd dose)
ALP (IU/L)	119.43±0.93	119.58±0.90	119.01±0.95	119.54±0.84	119.80±0.88	119.79±1.01	120.42±0.94
ALT (IU/L)	31.85±0.67	32.90±0.73	33.05±0.62	33.23±0.63	33.42±0.71	33.83±0.90	33.71±0.80

Figure.1 Histogram showing ALP and ALT (Mean±S.E.) in TVT affected dogs (Group I)

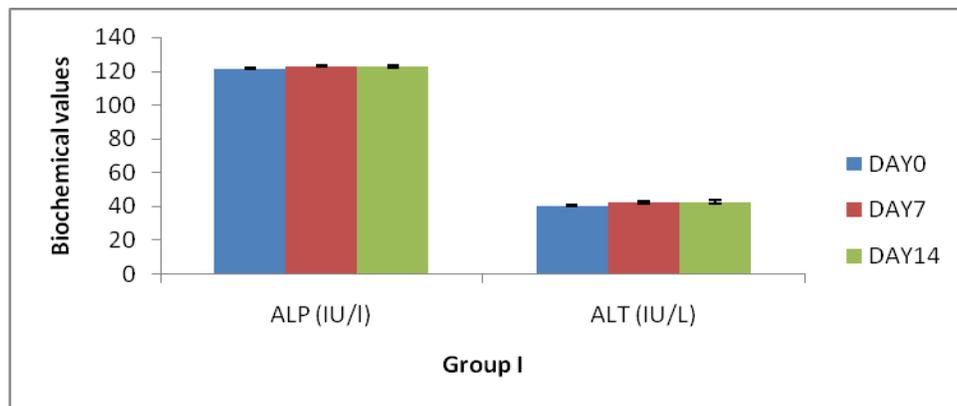


Figure.2 Histogram showing ALP and ALT (Mean±S.E.) of TVT affected dogs during pre- and post-treatment of Doxorubicin (Group II)

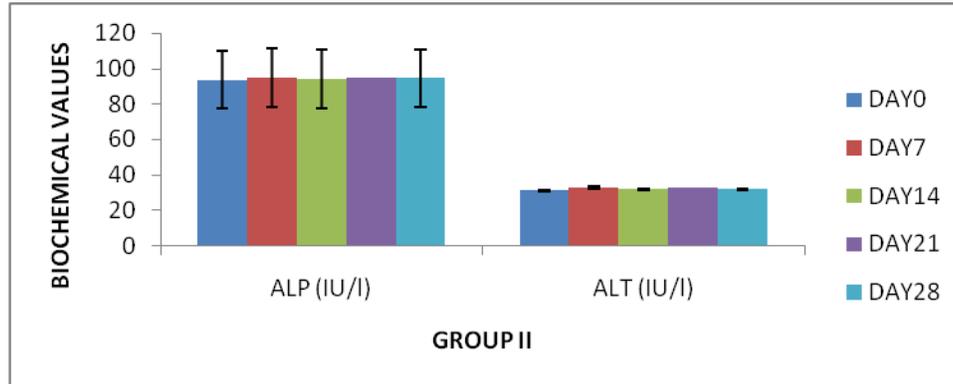
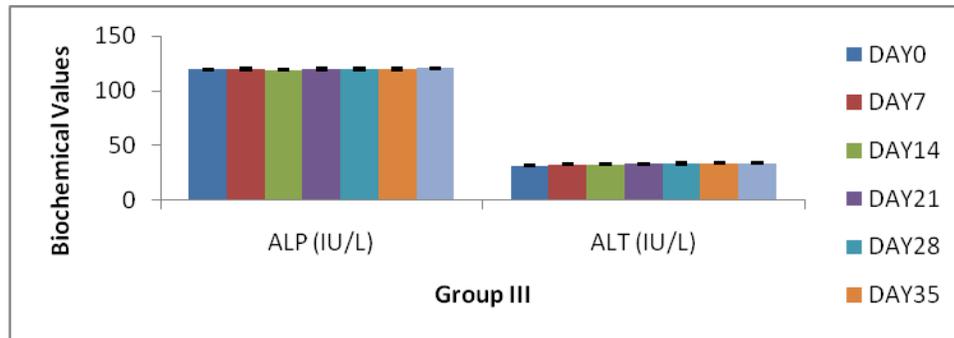


Figure.3 Histogram showing ALP and ALT (Mean±S.E.) of TVT affected dogs during pre- and post-treatment of Doxorubicin (Group III)



In conclusion, venereal granuloma is a tumour of canines that invariably affects susceptible dogs of both sexes. It is mainly transmitted from infected dog to a susceptible one through coitus. Exact cause of tumour is obscure. There is no specific breed or age relationship with the disease. Although clinical signs and symptoms of disease are indicative of its diagnosis but general elevation of Liver function enzymes viz. ALP and ALT is observed following chemotherapy due to cytotoxic effect of drugs affecting liver metabolism.

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