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SURGICO-CHEMOTHERAPEUTIC MANAGEMENT OF MAMMARY TUMOUR IN CANINE

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Abstract: The present investigation was undertaken to ascertain the efficacy of Surgico-chemotherapeutic treatment for the management of Mammary Tumour in Bitches. The study was conducted on 18 clinical cases of different breeds irrespective of age divided in to 3 groups. Depending upon the size of mammary tumor these case were subjected to either partial mammectomy, chemotherapy with doxorubicin or mammectomy along with sequential chemotherapy at the dose rate of 10 mg/M^2 on 0, 10 and 20 days. Histopathological examination revealed more cases of carcinoma like adenocarcinoma. Blood samples were estimated after each course of chemotherapy to monitor the changes in some principal haematological and biochemical parameters. Surgical intervention combined with sequential regimen of doxorubicin effectively suppressed the development of new neoplasm and metastases but in few cases it was accompanied with general adverse reactions such as lethargy, anorexia, vomiting, hair loss, fever and anaemia.

Keywords: Dog, mammary tumor, surgical excision and doxorubicin.

Introduction

Mammary gland tumours are the most common neoplasm in bitches. The incidence of canine mammary neoplasm varies from 0.7 to 53.3 percent (Boldizsar *et al*., 1992). It also occurs in male dogs, but the prevalence is only 1%. The average age of occurrence of this ailment is 10−11 years, but in dogs less than 4 years of age were also reported (Rutterman *et al.,* 2000). Breeds like Spaniels, Scottish, Terriers, Fox terriers, Poodles, Dachshunds, Alsatians and Labradors are at higher risk for mammary tumour development whereas the incidence in other breeds (Boxer, Chi-huahua) is minimal. About 65 % of mammary gland tumours affect the caudal mammary complexes (Cohen *et al.,*1974).

The therapeutic modalities in tumour management are radiotherapy, chemotherapy, hyperthermia, cryosurgery, hormonal therapy, immunotherapy, gene therapy and biological response modifiers (Riley and Riley, 1982).

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Excision of tumour, as a method of cancer treatment is being carried out for long ago but tumour metastasis is one of the most important clinical aspect of neoplastic disease (Hunter *et al*., 2001) and can be the cause of surgical failure (Brodey, 1975). In such condition, instead of repeated surgical intervention, a small size mammary tumor less than 3cms size could be treated with chemotherapeutic drugs without much alteration in haemogram and biochemical parameters.

In both medical and veterinary oncotherapy, number of drugs had been launched recently with variable results. Doxorubicin is the most common anthracycline and one of the single active agent used in breast cancer treatment. The recent analysis of randomized clinical studies of adjuvant chemotherapy in breast cancer demonstrated that anthracycline therapy produced a greater reduction of recurrence and mortality rates. Doxorubicin has antibiotic effect as well as it is having cytotoxic property. The cytotoxic action is due to its characteristic binding to DNA and inhibition of synthesis of nucleic acid. Doxorubicin produces regression in a variety of disseminated malignancies.

Thus, present investigation aimed to monitor efficacy of a chemotherapy protocol with doxorubicin combined with operative treatment for malignant mammary tumours in bitches.

Materials and methods

The present study was conducted on 18 clinical cases of bitches with mammary neoplasm divided into 3 groups. These cases were subjected to simple mammectomy under general anaesthesia in group A. Sequential chemotherapy of doxorubicin 10 mg/ m^2 I/V was alone given in group B while in group C surgico-chemotherapeutic regimen was carried out. For histopathological studies, sample of mammary tumors were collected before commencement of treatment from each case. Haematological study of total red blood cell counts, total white blood cell count, differential leucocyte counts, haemoglobin (Hb, g/l) and platelate. Biochemical estimation of aspartate aminotransferase (AST U/I), alanine aminotransferase (ALT,U/l), blood urea nitrogen (mmol/l) and serum creatinine (µmol/l) was carried out on the respective day of treatment.

Result and Discussion

Clinical status of patients like body temperature was within normal range and respiration rate does not differed statistically. However, rise in respiration rate could be attributed due to stress of toxicity of drugs. Similar observation reported by Schalm *et al.* (1997) and Ravi Kumar *et al.* (2000).

Following table shows no recurrence of mammary tumors in the treatment group of surgical excision + chemotherapeutic agent. Whereas recurrence of mammary tumor was seen in two cases in group of surgical excision and three cases in the group of chemotherapeutic treatment. Nausea, vomition, anorexia, alopecia, anemia and abdominal colic were seen in the animals of group II and III respectively.

Table: Result of Treatment in different groups

Animal No.	**Surgical Excision**	**Chemotherapeutic agent (Doxorubisin)**		**Chemotherapeutic agent + Surgical Excision**	
1	+++	+++	I, V	+++	A, V
2	+++	++	I, V	+++	A, I
3	+++	+++	A, I, V	+++	V
4	++	+++	A, l, V	+++	V, I
5	+	+	A, I, V, Al	+++	V
6	+++	+	V	+++	I, V

+ = indicates minimum recurrence of Tumour,
++ = Indicates moderate recurrence of Tumour,
+++= Indicates no recurrence of Tumour
V = Vomition; A = Anemia; I = Inappetance ; Al = Alopecia

Thus it shows that, chemotherapy prevents the tumour dissemination by controlling the early metastases accompanied by few side effects that stop both owners and veterinarians to use it in cancer therapy. The boundary between efficacy and toxicity in chemotherapy is very narrow as it has a marked haematological, gastrointestinal toxicity, cardiotoxicity, and nephrotoxocity (Cotter *et al.,* 1985 and Susaneck *et al.,* 1983). Vomiting and anorexia could be due to damage of the gastrointestinal epithelium or CNS effects.

Haematological and biochemical parameters were recorded on 0^{th}, 10^{th}, 20^{th} and 30^{th} postoperatively. A significant decrease in haematological parameters viz. TLC, TEC, Hb, PCV, Platelet count, neutrophils and eosinophils due to a total suppression of the bone marrow activity, accidental infection and allergic reaction , where as significant increase in lymphocyte and monocytes were observed in all the groups. Biochemical study revealed non-significant changes in AST, ALT, BUN and serum creatinine in group I, whereas significant increase was observed in groups II and III but these values were within physiological limits.

Histological examination of 18 cases of mammary tumors was undertaken. Out of these cases, 16 (88.89%) tumors appeared to be malignant while 2 (11.11%) tumors were found benign. The histological features of different tumors observed were as follows;

Section of solid carcinoma (Fig.1): In five cases (27.78%) tumor cells arranged in sieve like pattern with central necrosis, the necrotic masses were basophilic. The myoepithelial proliferation was also observed.

Adeno squamous cell carcinoma (Fig.2): In six cases (33.33%) tumors showed classical picture of squamous cell carcinoma was observed with sheets and cords. The central part consists of lamellate necrotic cells. The peripheral areas of tumor contain adenomatous tissue in all the section of tumors.

Complex carcinoma (Fig.3): In one case (5.55%) section showed epithelium arranged in tubular manner with abundant mitotic figures appeared to be solid mass. Some of the cells were spindle shaped and look like myoepithelium and hence designated as complex carcinoma.

Fibro sarcoma (Fig.4): In four cases (22.22%) it was found that fibrous tissue arranged in haphazard manner. The mitotic figures were abundant with necrotic masses infiltrated with leucocytes.

Fibro- adenoma (Fig.5): In two cases (11.11 %) mixture of luminal epithelial cells and fibroblastic stroma cell with scanty mitotic figure was observed in the section giving impression of fibro adenoma.

In the present study, percentage of malignancy was 88.89% as compared to benign tumour i.e. 11.11%. The present study is corroborated with the findings of Madhubala (2005), Raghatwan (2006). They also found maximum percentage of malignancy in canine mammary tumour.

Conclusion

It can be concluded that the surgical intervention combined with sequential regimen of doxorubicin at the dose rate 10 mg/M^2 effectively suppressed the development of new neoplasm and metastases. Haematological study revealed erythroocytopenia, leucocytopenia, neutropenia, eosinopenia with lymphocytosis, and monocytosis in bitches treated with doxorubicin. Biochemical study revealed non-significant changes in group I, whereas significant increase was observed in groups II and III but these values were within physiological limits. Histopathological examination revealed more cases of carcinoma like adenocarcinoma.

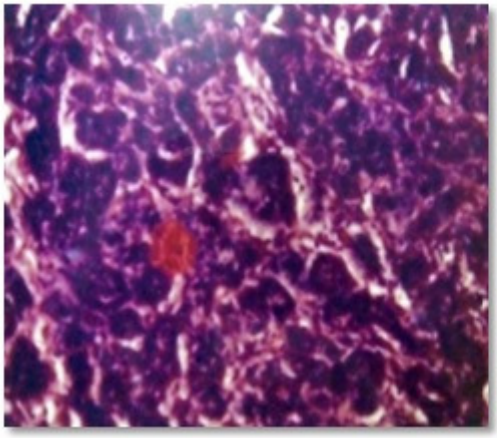

Figure 1: Solid carcinoma

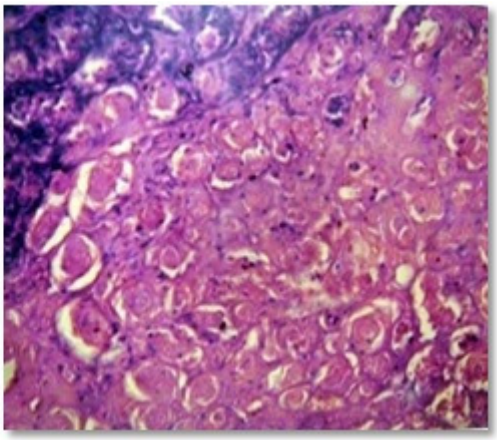

Figure 2: Adeno squamous cell carcinoma

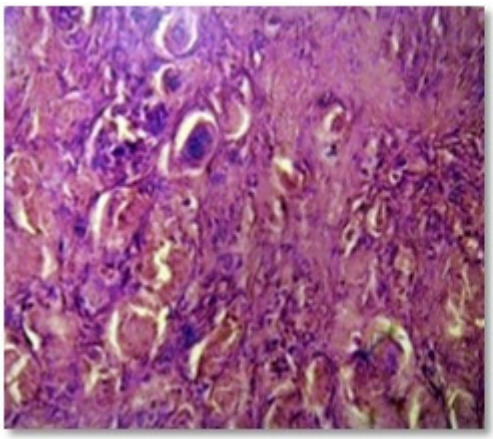

Figure 3: Complex carcinoma

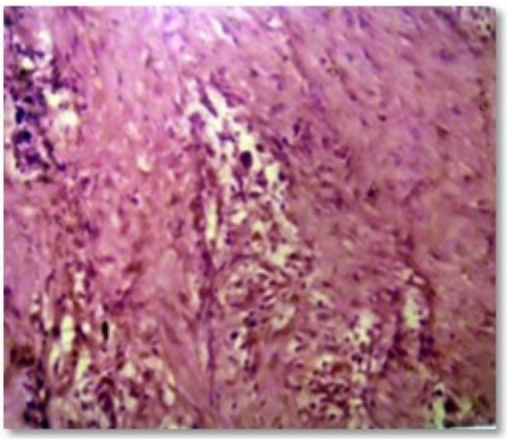

Figure 4: Fibro-sarcoma

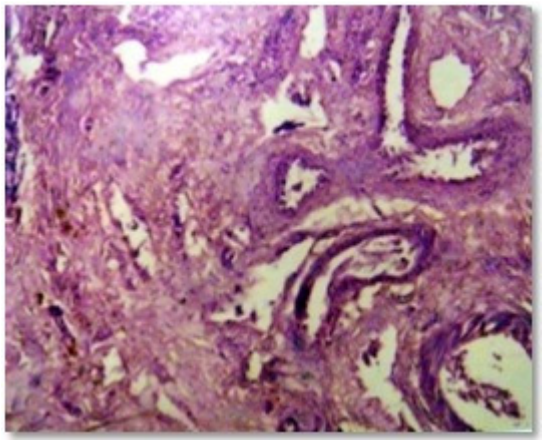

Figure 5: Fibro-ademona

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