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Prognostic Significance of Mitotic Index in Canine Cutaneous Tumours*

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Abstract

The present work was undertaken to apply mitotic index as an indicator in the prognosis of cutaneous tumours in dogs. Out of the 103 samples collected from the Madras Veterinary College, Teaching Hospital, Chennai, mitotic index was analyzed by light microscopy on formalin fixed paraffin embedded section of selected 53 canine cutaneous tumours. Mitosis was noticed in all the type of tumours. But the mitotic figures were more in all the malignant tumours when compared to the benign tumours. Among the malignant tumours, metastasis and death rate was higher.

Key Words: Dogs, Cutaneous tumours, Mitotic count, Prognosis.

The clinical behaviour of tumours continues to be unpredictable and improved prognostic aids are needed to identify patients at high risk of the disease recurrence and death (Preziosi, 2004). For many years, the traditional histological diagnostic criteria including tumour size, enlargement of the nuclei, variation in the nuclear shape, and change in chromatin pattern, nucleolar abnormalities and mitotic rate have been well recognized as prognostic indicators or as indicator of malignant potential in numerous human and animal tumours (Koestner, 1985; Gopal, 2007). Sarli *et al.* (2002) demonstrated that mitotic index (MI) was a strong predictor of the outcome for a soft-tissuse sarcoma and malignant mammary tumours respectively. Carrying out the present work was driven by the increasingly frequent finding of these neoplasms, which had a population incidence of as high as 1.39 per cent (Gopal, *loc cit*). The observation of the present study was to evaluate the prognostic value of mitotic index in canine cutaneous tumours.

Materials and Methods

The present work was conducted at the Department of Veterinary Pathology, Madras Veterinary College, Tamil Nadu Veterinary and Animal Sciences University, Chennai. Tissue samples from the dogs were collected from cases of skin tumours which attended the Small Animal Clinics of the Madras Veterinary College Teaching Hospital, Chennai. Samples were also collected from the necropsied cases at the Department of Veterinary Pathology, Madras Veterinary College, Chennai. Particulars of animals like the breed, age and sex were recorded. Specific data such as history, clinical manifestations, location, size, shape, weight and the cut surface of the skin tumours were also collected. Smears prepared from FNAB or imprints from the cutaneous tumours were either air dried or wet fixed in absolute isopropanol for 30 minutes and stained by Leishman–Geimsa (LG) and Haematoxylin and Eosin (H&E) stains. Tissue samples fixed in 10% neutral buffered formalin were processed and stained with H&E. Mitotic figures were counted in the histopathological sections and expressed as average number per 10 high power fields (HPF).

Results and Discussion

The mean mitotic counts recorded in various cutaneous tumours under 10 HPF are presented in the Table I. Among the squamous cell carcinomas, when compared with the mean mitotic count of 8.86, the metastasizing tumours showed higher value (9.2) and highest in the metastatic neoplasm terminating in death (12.33). These findings indicated the highly proliferative potential of the metastatic tumours

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Table I. Mitotic counts in the cutaneous tumours in dogs

Type of tumour	No.	Case No.	Mitotic count	Clinical feature	Post Survival periods
Squamous cell Carcinoma	1	112773	6.5	-	Alive
	2	110030	7.4	-	Alive
	3	108783	9.2	Metastasis	Alive
	4	115485	12.33	Metastasis/Death	41 days
Basal cell Carcinoma	1	117724	2.3	-	Alive
	2	112125	3.9	-	Alive
	3	111397	4.6	-	Alive
Perianal adenoma	1	115237	4.3	-	Alive
	2	113354	4.6	-	Alive
Parianal adenocarcinoma	1	112031	5.1	-	Alive
	2	118950	5.0	-	Alive
	3	109551	7.9	Multiple	Alive
	4	112848	8.1	Recurrence	77 days
Sweat gland adenocarcinoma	1	111244	3.3	-	Alive
	2	127348	4.5	-	Alive
	3	111065	7.1	Metastasis	Alive
Fibroma	1	114558	2.2	-	Alive
	2	111488	2.3	-	Alive
Fibrosarcoma	1	114010	8	-	Alive
Liposarcoma	1	111304	3.1	-	Alive
	2	126888	6	-	Alive
Mast cell tumour	1	115836	5.4	-	
	2	114608	6.9	-	
	3	112745	8	Recurrence	108 days
	4	115004	12	Death	63 days
Histiocytoma	1	117868	5.5	-	Alive
	2	114027	6.7	-	Alive
	3	120400	7.8	Recurrence	85 days

when compared to the non-metastatic tumours. Though all the tumours were well differentiated type, mitotic count was higher in metastasizing tumours. In the basal cell carcinoma, the mean mitotic counts were 3.6. The solid type showed highest mitotic count. Both the cases of perianal adenoma showed similar mitotic counts while perianal adenocarcinoma showed a higher mean value of 6.53 compared to the adenoma and multiple and recurrence cases showed the highest mitotic counts. The mean mitotic count of sweat gland adenocarcinoma was 4.45 and metastatic tumour showed highest mitotic count (7.1). The mean mitotic count in fibromas was 2.25 while that of fibrosarcoma was 8 nearly three times more than that of fibroma. Liposarcomas showed mean mitotic count of 4.55 and one of the case which had higher mitotic count (6) showed higher malignant features like anisokaryosis and multinucleated cells. The mast cell tumours showed the mean mitotic count of 8.25. Though all the tumours were intermediate type Grade II. The recurrent case showed mitotic count higher (8) than other two cases and count

was 33 per cent more in case of death (12). In histiocytoma the mean mitotic count was 6.67. The recurrent case showed highest mitotic count of, 7.8. From the above it can be concluded that malignant tumours had higher mitotic count compared to the benign tumours. The metastasizing tumours showed higher mitotic count and the count were still higher in cases of mortality. These indicated that metastasis and death cases had more proliferating activity. Hence, mitotic counts can be used in judging the grade of tumours and probable survivability of affected cases. These finding agreed with Sarli *et al.* (*loc cit*).

Summary

The dogs bearing cutaneous tumours showing higher count died within two months (Squamous cell carcinoma 41 days and Mast cell tumour 63 days) and recurrent cases died within 4 months (Perianal adenocarcinoma 72 days, histocytoma 85 days mast cell tumour 108 days). Besides, those tumours which showed high count showed higher malignant features than their counterparts. Thus, the study showed that there was prognostic significance in assessing tumour growth by evaluating the mitotic index in canine cutaneous tumours.

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Influence of Genetic and Non-Genetic Factors on Fortnightly Test-Day Milk Yields and First Lactation 305-Day Milk Yield in Murrah Buffaloes

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Abstract

The present investigation was carried out using data on 18871 fortnightly test-day (TD) milk yield records during first lactation of 961 Murrah buffaloes. Least squares maximum likelihood programme was used to estimate genetic and non-genetic parameters. The least squares means for first lactation 305-day milk yield (FL305DY) was found to be 1853.49±15.88 Kg. Effect of period, season and AFC groups was found to be highly significant ($P<0.01$), significant ($P<0.05$) and non-significant on FL305DY, respectively. The h^2 estimate of FL305DY was 0.25±0.09. The estimates of genetic and phenotypic correlations between FL305DY and fortnightly TD milk yields ranged from 0.19 to 0.99 and from 0.52 to 0.83, respectively

Key Words: Test and 305-day milk yields, non-genetic, genetic factors, Murrah

Test-day milk yield records have advantages over daily milk yield recording, which is a costly and time consuming proposition under field conditions, like lesser generation interval, better adjustment for non-genetic factors influencing the milk yield leading to more

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