นิพนธ์ต้นฉบับ

NEOPLASMS OF DOGS IN BANGKOK

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Abstract

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NEOPLASMS OF DOGS IN BANGKOK

2,425 neoplasms from dogs in Bangkok were submitted to the Department of Pathology, Chulalongkorn University, from January 1982 to December 2000 (a 19-year period) and were retrospectively studied to survey the prevalence of the different types of tumours. Histopathological diagnosis was based on the World Health Organization (WHO, 1974) classification of tumours in domestic animals. The prevalence of canine tumours was categorized into skin and soft tissue tumours, 55.05% (1,335 cases); mammary tumours, 28.29% (686 cases); reproductive tumours, 9.69% (235 cases); musculoskeletal tumours, 1.86% (45 cases); digestive tumours, 2.68% (65 cases); hematopoietic and lymphatic tumours, 1.94% (47 cases) and urinary tumours, 0.50% (12 cases). The most common skin and soft tissue tumours were mast cell tumours (22.13%, mean dog age 7.96 yrs), whereas the others were basal cell tumours (9.44%, mean age 7.66 yrs), perianal gland adenomas (8.76%, mean age 11.31 yrs), melanomas (7.10%, mean age 8.96 yrs), squamous cell carcinomas (6.19%, mean age 8.79 yrs), sebaceous gland adenomas (5.27%, mean age 8.59 yrs), canine cutaneous histiocytomas (3.47%, mean age 5.13 yrs), dermatofibromas (3.32%, mean age 7.54 yrs), lipomas (3.17%, mean age 8.60 yrs) and fibrosarcomas (2.79%, mean age 8.35 yrs). The types of 686 mammary tumours were adenocarcinomas (59.91%, mean age 9.14 yrs), benign mixed mammary tumours (23.18%, mean age 9.05 yrs) and adenomas (14.58%, mean age 8.95 yrs). There was no marked differences between sex, breed and the predilection sites of the tumours. The study indicated that canine tumours, especially tumours of skin, soft tissue and mammary gland, are common problems in dogs in Bangkok.

Keywords : Bangkok, canine, neoplasm

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***ผู้เขียนรับผิดชอบบทความ**

บทคัดย่อ

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เนื้องอกของสุนัขในเขตกรุงเทพมหานคร

จุดประสงค์ของการศึกษาย้อนหลังเพื่อศึกษา อายุ เพศ พันธุ์ ตำแหน่ง และประเภทของก้อนเนื้องอกต่างๆ ของสุนัข ทำการสำรวจอุบัติการณ์เนื้องอกของสุนัขจำนวน 2,425 ราย ในเขตกรุงเทพมหานคร โดยใช้ข้อมูลจาก ภาควิชาพยาธิวิทยา คณะสัตวแพทยศาสตร์ จุฬาลงกรณมหาวิทยาลัย ในช่วง 19 ปี ตั้งแต่เดือนมกราคม 2525 จนถึงเดือนธันวาคม 2543 การวินิจฉัยทางจุลพยาธิวิทยาใช้หลักเกณฑ์ขององค์การอนามัยโลก (WHO) ในการวินิจฉัยเนื้องอกในสัตว์เลี้ยง อุบัติการณ์ของเนื้องอกในสุนัขจำนวน 2,425 ราย แบ่งได้ดังนี้ คือ เนื้องอกของผิวหนังและเนื้อเยื่ออ่อน ร้อยละ 55.05 (1335 ราย) เนื้องอกของเต้านม ร้อยละ 28.29 (686 ราย) เนื้องอกของระบบสืบพันธุ์ ร้อยละ 9.69 (235 ราย) เนื้องอกของระบบกล้ามเนื้อและโครงร่าง ร้อยละ 1.86 (45 ราย) เนื้องอกของระบบทางเดินอาหาร ร้อยละ 2.68 (65 ราย) เนื้องอกของระบบสร้างเม็ดเลือดและน้ำเหลือง ร้อยละ 1.94 (47 ราย) และเนื้องอกของระบบขับถ่ายปัสสาวะ ร้อยละ 0.50 (12 ราย) เนื้องอกที่พบได้มากที่สุดของผิวหนังและเนื้อเยื่ออ่อน คือ mast cell tumours (ร้อยละ 22.13 อายุเฉลี่ย 7.96 ปี) เนื้องอกชนิดอื่นๆที่พบ คือ basal cell tumours (ร้อยละ 9.44 อายุเฉลี่ย 7.66 ปี) perianal gland adenomas (ร้อยละ 8.76 อายุเฉลี่ย 11.31 ปี) melanoma (ร้อยละ 7.10 อายุเฉลี่ย 8.96 ปี) squamous cell carcinomas (ร้อยละ 6.19 อายุเฉลี่ย 8.79 ปี) sebaceous gland adenomas (ร้อยละ 5.27 อายุเฉลี่ย 8.59 ปี) canine cutaneous histiocytomas (ร้อยละ 3.47 อายุเฉลี่ย 5.13 ปี) dermatofibromas (ร้อยละ 3.32 อายุเฉลี่ย 7.54 ปี) lipomas (ร้อยละ 3.17 อายุเฉลี่ย 8.60 ปี) และ fibrosarcomas (ร้อยละ 2.79 อายุเฉลี่ย 8.35 ปี) เนื้องอกที่พบได้มากของเต้านมจำนวน 686 ราย คือ adenocarcinomas (ร้อยละ 59.91 อายุเฉลี่ย 9.14 ปี) benign mixed mammary tumours (ร้อยละ 23.18 อายุเฉลี่ย 9.05 ปี) และ adenomas (ร้อยละ 14.58 อายุเฉลี่ย 8.95 ปี) เพศ พันธุ์ และตำแหน่งของก้อนเนื้องอกไม่มีความแตกต่างกัน ผลการศึกษาสามารถบ่งชี้ถึงความสำคัญทางการสัตวแพทย์ของเนื้องอกในสุนัข โดยเฉพาะเนื้องอกของผิวหนังและเนื้อเยื่ออ่อน และเนื้องอกของเต้านม

คำสำคัญ : กรุงเทพมหานคร สุนัข เนื้องอก

Introduction

Naturally occurring tumours in dogs and cats, develop twice as frequently as in humans, have histopathological features and a biological behaviour similar to tumours in man and progress a more rapid rate than in man. Studies of the prevalence of different tumours in dogs, based on histological examination, were performed in the USA (Brodey, 1970; Vail and Withrow, 1996), the UK (Bobstock, 1986) and in Australia (Rothwell et al., 1987; Er and Sutton, 1989). However information on the influence of age, sex or breed on the prevalence of these neoplasms or on the predilection sites, has not previously been available for the population of Thai dogs. The purpose of this study was to determine the prevalence of canine tumours during a 19-year period from January, 1982 to December, 2000 and to detect any age, breed, sex or site predilections for the more common neoplasms.

Materials and Methods

All tumours specimens were obtained from 2,425 dogs and were studied at the Department of Pathology, Faculty of Veterinary Science, Chulalongkorn University, Bangkok between January 1st, 1982 and December 31st, 2000.

The specimens were fixed in 10% neutral buffered formalin, embedded in paraffin, sectioned and stained

with hematoxylin and eosin. Other histologic stains (mainly Periodic acid Schiff, Masson's trichrome and toluidine blue) were also used for particular cases. Histopathological diagnosis was done by pathologists, according to the World Health Organization Histopathological classification of the tumours in domestic animals (WHO, 1974).

Results

The prevalence of the several types of canine neoplasms identified in this study is presented in Table 1. Skin and soft tissue tumours accounted for 55.05% of all neoplasms, making them the most common sites for canine tumours presented to our laboratory. Other tumours consisted of 28.29% mammary tumours, 9.69% reproductive tumours, 1.86% musculoskeletal tumours, 2.68% digestive tumours, 1.94% hematopoietic and lymphatic tumours, and 0.50% urinary tumours. Sex distribution, age and breed of affected dogs are summarized for each tumour in Table 1. Most types of tumours were not apparently sex related except for a high prevalence of perianal gland adeoma in male dogs (Table 2).

The type of skin and subcutaneous tumours were studied and categorized into mast cell tumours 22.13%, basal cell tumours 9.44%, perianal gland adenomas 8.76%, melanomas 7.10%, squamous cell carcinomas 6.19%, sebaceous gland adenomas 5.27%, cutaneous histiocytomas 3.47%, fibromas 3.32%, lipomas 3.17% and papillomas 2.94% (Table 2). Mast cell tumours were the most common skin and soft tissue neoplasms. The trunk was the most common site of this tumour followed by the limbs and the head. The age of the dogs ranged from 5 months to 25 years (mean, 7.68 years). Basal cell tumours were the second most commonly found tumour on the skin. The head was the most common site followed by the trunk and the limbs. Perianal gland adenomas accounted for 8.76% of the cases and were confined to the perineum, the tail and the prepuce.

Out of 686 cases of mammary tumours, 61.81% were malignant neoplasms, 23.18% were benign mixed mammary tumours, 14.72% was benign neoplasms and

Table 1 Prevalence of tumour types from 2,425 dogs (during 1982-2000)

Types of neoplasms	Percentage; % (number)	Breed (M:P ratio)	Sex (M:F ratio)	Average age (mean, years)
1. Skin and soft tissue tumours *	55.05(1,335)	1.67	1.37	8.30(1m-25)
2. Mammary tumours**	28.29(686)	1.33	686 Female	9.01(1-20)
3. Reproductive tumours	9.69(235)	1.84	1.70	8.11(5ms-16
Male	(87)	1.54	87 Male	9.34(2-16)
Female	(60)	1.23	60 Female	9.98(2-16)
Venereal granuloma	(88)	3.27	1.52	4.94(5ms-13)
4. Musculoskeletal tumours	1.86(45)	0.95	1.35	7.64(10ms-18)
5. Digestive tumours	2.68(65)	2.00	1.12	8.12(1-17)
6. Hematopoietic and lymphatic tumours	1.94(47)	1.53	1.72	7.10(1.5-17)
7. Urinary tumours	0.50(12)	1.75	1.4	9.55(2-14)
Total	2,425			

*Location: head: trunk: limb = 0.67:1:0.45, ** Location: focal diffuse ratio = 3.08

M: P ratio: Mongrel: Pure breed ratio, M: F ratio: Male: Female ratio

Table 2 Types of neoplasms, numbers and percentage, breed, sex, age and location in 1,335 dogs affected by skin and soft tissue tumours

Types of neoplasms	Percentage;% (number)	Breed (M:P ratio)*	Sex (M:F ratio)**	Average age (mean, years)	Location (Head: Trunk: Limb ratio)
1. Mast cell tumour	22.13(293)	2.23	0.88	7.69(.5-25)	0.20: 1: 0.47
2. Basal cell tumour	9.44(125)	1.76	1.22	7.66(.5-15)	1: 0.50: 0.38
3. Perianal gland adenoma	8.76(116)	2.89	11.10	11.31(6-20)	116 Trunk
4. Melanoma	7.10(94)	1.58	2.14	8.96(1-20)	1:0.28:0.23
5. Squamous cell carcinoma	6.19(82)	2.08	1.41	8.79(8ms-20)	1: 0.82: 0.24
6. Sebaceous gland adenoma	5.27(65)	1.19	1.86	8.59(1-16)	1:0.61:0.26
7. Canine cutaneous histocytoma	3.47(46)	1.24	2.00	5.13(.25-15)	0.94:1:0.65
8. Fibroma	3.32(44)	1.79	0.83	7.54(1-15)	0.80:1:0.80
9. Lipoma	3.17(42)	1.44	0.62	8.60(2-16)	0.03:1:0.03
10. Papilloma	2.94(39)	0.83	1.77	5.74(3ms-14)	1: 0.26:0.30
11. Fibrosarcoma	2.79(37)	2.18	1.27	8.35(.5-17)	0.69:1:0.92
12. Hemangioma	2.72(36)	1.06	1.54	7.33(2-14)	0.17:1:0.25
13. Sebaceous epithelioma	2.64(35)	0.40	0.07	9.78(4-15)	1:0.16:0.68
14. Hemangiopericytoma	2.34(31)	5.00	0.58	11.61(7-14)	0.19:0.75:1
15. Neurofibroma	2.04(27)	1.75	2.00	8.29(3-14)	1:1::0.4
16. Apocrine adenocarcinoma	1.88(25)	1.88	0.67	9.48(5-14)	0.75: 1: 0.33
17. Sebaceous gland hyperplasia	1.59(21)	1.00	1.00	3.92(1m-11)	1: 0.06:0
18. Apocrine adenoma	1.50(20)	1.44	5.33	7(1-11)	1:0.90:0.50
19. Perinal gland adenocarcinoma	0.90(12)	3.00	9.00	9.67(8-14)	0:12:0
20. Neurofibrosarcoma	0.83(11)	4.00	3.00	8.75(3-14)	1:0.50:1
21. Hemangiosarcoma	0.83(11)	0.83	1.75	8.73(3-14)	0.50:1:0.33
22 Liposarcoma	0.76(10)	8.00	0.25	5.17(1-9)	0:1:0.67
23. Malignant fibrous histiocytoma	0.68(9)	1.25	1.25	8.67(3-14)	0.75:0.50:1
24. Malignant histiocytoma	0.60(8)	0.75	6.00	7.67(3-12)	0.5:1:1
25. Sebaceous adenocarcinoma	0.45(6)	1.00	1.50	10.67(9-12)	3:0.33:0
26. Leiomyoma	0.15(2)	2 Mongrel	1.00	10(8-12)	0:2:0
27. Myxoma	0.15(2)	2 Mongrel	2 Female	10	0:2:0
28. Leiomyosarcoma	0.07(1)	1 Mongrel		10	0:0:1
29. Myoblastoma	0.07(1)	1 Mongrel	1 Male	3	1:0:1
30. Malignant giant cell tumour	0.07(1)	1 Pure	1 Female	8	1:0:0
31. Non neoplastic lesions	6.27(83)				
Follicular cyst & keratosis	(37)	0.80	0.50	6.62(1-11)	0.14:1:0.29
Epidermal cyst	(22)	0.50	1.50	6.18(1-12)	0.21:1:0.29
Calcinosis cutis	(9)	1.67	1.00	2.36(0.42-7)	0:1:0.33
Intracutaneous cornifying Epithelioma	(4)	1.00	0.33	5.33(1-9)	0:0.14:1
Others	(11)	0.75	0.80	7(1-13)	0.17:1:0.50
Total	**1,335**	**1.67(754:453)**	**1.37(712:519)**	**8.30(1m-25) (373:556:248)**	**0.67:1:0.45**

*M:P ratio: mongrel : pure breed ratio, **M:F ratio : male: female ratio

Table 3 Types of neoplasms, numbers and percentage, breed, mean age and location in 686 dogs affected with mammary tumours

Types of neoplasms	Percentage;% (number)	Breed (M:P ratio)*	Average age (mean, years)	Location (Focal : Diffuse)
1. Non neoplastic lesions				
Nodular glandular hyperplasia	0.30(2)	2 Mongrel	12(10-14)	2 Focal
2. Benign	14.58(100)			
Adenosis	(4)	4 Mongrel	12.67(11-14)	3 Focal
Adenoma				
Simple tubular adenoma	(26)	0.97	8.18(1.3-15)	7.00
Complex adenoma	(22)		10.19(6-16)	7.00
Fibroadenoma	(20)			
Simple papillary adenoma	(15)			
Cystic adenoma	(11)			
Intraductal papilloma	(2)			
3. Benign mixed mammary tumour	23.18(159)	1.40	9.04(2-20)	2.77
4. Malignant mixed mammary tumour	1.90(13)	1.60	10.2(8-13)	7.00
5. Myoepithelioma	0.15(1)			
6. Malignant tumour	59.91(411)			
Simple tubular adenocarcinoma	86.37(355)	1.57	9.16(1-15)	2.60
Simple papillary adenocarcinoma	2.92(12)	1.50	6.70(3-10)	1.50
Complex adenocarcinoma	6.08(25)	1.09	9.17(4-13)	2.00
Solid carcinoma	4.14(17)	1.13	9.14(5-15)	4.50
Mucinous carcinoma	0.24(1)	1 Pure	12	
Anaplastic carcinoma	0.24(1)	1 Pure	12	
Total	**686(Female)**	**1.33(238:179)**	**9.01(1-20)**	**3.08**

*M:P ratio: mongrel: pure breed ratio

Table 4 Types of neoplasms, numbers and percentage, breed and mean age in 235 dogs affected with reproductive tumours

Types of neoplasms	Percentage;% (number)	Breed (M:P ratio)*	Sex (M:F ratio)	Average age (mean, years)
1. Venereal granuloma	37.45(88)	3.27	1.52	4.94(5ms-13)
2. Female reproductive organs	25.53(60)	1.23	60 Female	9.98(2-16)
Fibroma	11.91(28)	0.86	28	10.27(2-14)
Leiomyoma	6.81(16)	1.80	16	8.83(6-13)
Hemangiopericytoma	0.85(2)	2 Mongrel	2	10(8-12)
Lipoma	0.42(1)	1 Pure	1	11
Neurofibroma	0.42(1)	1 Mongrel	1	11
Papillary cystadenoma of ovary	0.42(1)	1 Mongrel	1	13
Papillary cystic adenocarcinoma of ovary	0.85(2)	1.0	2	13.5
Granulosa cell tumour	2.55(6)	1.5	6	11.4(3-16)
Uterine gland adenocarcioma	1.28(3)	1.0	3	8.14(3-13)
3. Male reproductive organs	37.02(87)	1.54	87 Male	9.34(2-16)
Seminoma	22.13(52)	2.13	52	9.48(2-16)
Sertoli cell tumour	13.62(32)	0.94	32	9(2-15)
Leydig cell tumour	0.85(2)	1.00	2	10.5(8-13)
Papillary adenoma of prostate gland	0.42(1)	1 Mongrel	1	11
Total	**235**	**1.84(142:77)**	**1.47(134:91)**	**10.18(5m-16)**

* Location; extragenital: genital area = 1:0.63

Table 5 Types of neoplasms, numbers and percentage, breed, sex and mean age in 168 dogs affected with other tumours

Types of neoplasms	Percentage;% (number)	Breed (M:P ratio)*	Sex (M:F ratio)	Average age (mean, years)
1. Urinary tumours	(12)	1.75	1.40	9.55(2-14)
Transitional cell carcinoma of urinary bladder	58.33(7)			
Renal cell carcinoma	16.67(2)			
Renal adenoma	8.33(1)			
Neurofibroma of kidney	8.33(1)			
Leiomyosarcoma of urinary bladder	8.33(1)			
2. Digestive tumours	(65)	2.00	1.12	8.12(1-17)
Acanthomatous epulis	69.23(45)	1.53	1.05	7.8(1-17)
Ameloblastoma	1.54(1)			
Granular cell tumour	1.54(1)			
Salivary adenocarcinoma	1.54(1)			
Mesothelioma	6.15(4)	4 Mongrel	4 Female	8.5(5-12)
Cholangiocellular carcinoma	6.15(4)	3.00	4 Male	10.75(8-14)
Hepatocellular carcinoma	4.62(3)	3 Mongrel	2.00	9(8-10)
Pancreatic adenocarcinoma	3.08(2)			
Rectal adenocarcinoma	3.08(2)			
Leiomyoma of intestine	1.54(1)			
Leiomyosarcoma of intestine	1.54(1)			
3. Hematopoietic & lymphatic tumours	(47)	1.53	1.72	7.10(1.5-17)
Lymphoma	76.60(36)	1.62	2.25	6.34(1.5-13)
Hemangioma of spleen	12.77(6)	0.67	0.50	10.4(8-17)
Hemangiosarcoma of spleen	10.64(5)	3.00	1.00	8.25(8-11)
4. Musculoskeletal tumours	(45)	0.95	1.35	7.64(10ms-18)
Osteosarcoma	75(33)	1.55	2.00	8.13(10ms-18)
Chondrosarcoma	9.09(4)	0.17	1.00	5.5(3-10)
Osteoma	4.55(2)			
Chondroma	6.82(4)	2 Pure	3 Female	7.5(5-10)
Bony exostosis	5.88(2)	1.00	1.00	88

0.30% were hyperplastic lesions. There were several histologic types of malignant and benign tumours as shown in Table 3. with an average age range from 1 to 20 years (mean, 9.01 years). A location of mammary tumours in female dogs, appeared in a higher proportion of focal sites than in diffuse sites.

Out of 235 cases of reproductive tumours, 37.45% were venereal granulomas, 37.02% were in male reproductive organs, and 25.53% were in female reproductive organs (Table 4). The mean age of the dogs with venereal granulomas was 4.94 years (ranging from 5 months to 13 years). This type of tumour was found both in male and female dogs and the commonest sites of venereal granulomas were the genital and the extragenital areas (skin, nose or eye). Seminoma, the most common type of testicular tumour, was present in 22.13%, while Sertoli cell tumours were less frequent in testes (13.62% of the cases). Both of them were usually recorded as

cryptorchid' testes in affected dogs. The commonest tumours of the female genital tract were fibromas (11.91%) and leiomyomas (6.81%). Granulosa cell tumours were the most common ovarian tumours in 2.55% of the cases.

The histological classification for the different types of tumours of urinary, digestive, hematopoietic and lymphatic and musculoskeletal systems are shown in Table 5. Acanthomatous epulis was most commonly presented and made up 69.23% of the digestive tumours. Lymphoma was the most common hematopoietic and lymphatic tumour occuring in 76.60% of the cases. Osteosarcomas accounted for 75% of musculoskeletal tumours.

Discussion

Two thousand four hundred and twenty five cases of tumours in this report consisted of 58.97% (1,430 cases) benign and 40.03% (995) malignant neoplasms which were very similar in prevalence. The prevalence rate of the most common tumour mass was for skin and soft tissue tumours, (55.05%) and the second most common neoplasm was the mammary tumour. Skin and subcutaneous tissue tumours have been cited as the most common in other recent surveys, in the UK (Bostock, 1986), Australia (Finnie and Bostock, 1979; Rothwell et al., 1987; Er and Sutton, 1989) and the USA (Brodey, 1970; Miller et al., 1991; Vail and Withrow, 1996), although the prevalence of each type varied in the studies. Though the high prevalence of mammary tumours in bitches balanced the high numbers of perianal gland tumours in males, the overall prevalence was still greater in female dogs than in males. In agreement with other surveys (Rothwell, 1987), there is no establish sex predilection in the frequency for common canine tumours except for a high tendency of perianal gland tumours in male dogs. The mean age of affected dogs (Table 1) ranged from 4.94 to 9.98 years which falls within the common range for most neoplasms in the dog (Schneider et al., 1969). The influence of breed on each type of tumour in this survey could not be determined, because the population of pure breed dogs was rather small.

The main features of skin and soft tissue tumours in our study, were the large group of mast cell tumours, basal cell tumours, perianal gland adenomas, melanomas, and squamous cell carcinomas and are similar to other reports (Bostock 1986; Rothwell et al., 1987; Er and Sutton, 1989). Cutaneous neoplasia is more frequent in old dogs than in young dogs. The head region is the site of predilection for many skin tumours, while the distribution of mast cell tumours is diffuse occuring on the body trunk, head and limbs. Our data indicated a high risk of mast cell tumours, basal cell tumours and perianal gland tumours for dogs in Bangkok.

Mammary tumours (28.07%) were the second most common neoplasm as is also found in a report (McEwen and Withrow, 1996) stating that mammary tumours were estimated to occur in 0.2% of female dogs at risk. A high incidence of adenocarcinomas was recorded in this report, followed by benign, mixed mammary tumours and adenomas. Dogs are considered to have a high risk of developing malignant, mammary tumours (Cohen et al., 1974).

Venereal granulomas were commonly found in Bangkok dogs. Dogs of both sexes and with a wide age range were affected. The mean age was lower than for other reproductive tumours and the youngest dog was only 5-months old. These might be due to sexual transmission of tumours among mature dogs and the high population of stray dogs in Bangkok.

There are interesting discrepancies between our data and other reports in the incidence of tumour types. The variation of the incidence of tumours types in each survey depended on the individual cases of sickness in those animals and may not accurately reflect the total population of dogs. In summary, our survey indicated that skin and soft tissue tumours and mammary tumours were an important veterinary medical problems for dogs. Neoplasms occurred mainly in old dogs, and sex and breed predilection were not evident in this study.

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