Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2019; 7(6): 442-445

Received: 25-09-2019
Accepted: 27-10-2019

Satuti Sharma
Division of Veterinary Pathology FVSc& AH, SKUAST-J R. S. Pura, Jammu, Jammu and Kashmir, India

Shafiqur Rahman
Division of Veterinary Pathology FVSc& AH, SKUAST-J R. S. Pura, Jammu, Jammu and Kashmir, India

Nawab Nashiruddullah
Division of Veterinary Pathology FVSc& AH, SKUAST-J R. S. Pura, Jammu, Jammu and Kashmir, India

Shilpa Sood
Division of Veterinary Pathology FVSc& AH, SKUAST-J R. S. Pura, Jammu, Jammu and Kashmir, India

Riya Abrol
Division of Veterinary Pathology FVSc& AH, SKUAST-J R. S. Pura, Jammu, Jammu and Kashmir, India

Deepshikha
Division of Veterinary Microbiology FVSc& AH, SKUAST-J R. S. Pura, Jammu, Jammu and Kashmir, India

Corresponding Author:
Satuti Sharma
Division of Veterinary Pathology FVSc& AH, SKUAST-J R. S. Pura, Jammu, Jammu and Kashmir, India

Prevalence of spontaneously occurring animals neoplasms in Jammu

Satuti Sharma, Shafiqur Rahman, Nawab Nashiruddullah, Shilpa Sood, Riya Abrol and Deepshikha

Abstract
A total of 55 samples of growth were recorded in domestic animals (bovines and canines) during one year period from January, 2016 to January, 2017 from Jammu. Out of theses, 44 samples were positive for tumorous growth and remaining were non tumourous condition. Out of 26 samples collected from bovines (cattle and buffalo), 21 were positive for neoplasms (80.76%; 21/26). Out of 29 samples collected from canines, 23 were positive for neoplasms (79.31%; 23/29). In bovines and canines, occurrence and also malignancy of neoplastic conditions was more in female than male animals. More tumour conditions were observed at 0-3 years of age in bovines and 10-12 years of age in canines. In bovines, skin and soft tissues showed highest occurrence (52.38%; 11/21) followed by eye (33.33%; 7/21), mammary gland (9.52%; 2/21) and the tumour of alimentary system (4.77%; 1/21). In canines, tumour of skin and soft tissues showed highest occurrence (56.52%; 13/23) followed by mammary gland (26.08%; 6/23), genital system (8.70%; 2/23), bone (4.35%; 1/23) and lymphoid organ (4.35%; 1/23).

Keywords: Bovine, canine, Jammu, neoplasms, prevalence

Introduction
Cancer being a silent killer is a life threatening ailment and has gained much importance and awareness of people towards animal pain and suffering [1]. The increased use of antibiotics and vaccines in domestic animals led to decrease in mortality due to infectious disease in the last two decades. Because of the short life span of most of the animals, it is an important concern for veterinary practitioners, diagnosticians, and researchers [2]. Cancer is uncontrolled cell growth and proliferation results from an accumulation of mutation in genes that control cell division, inhibit or promote cell division and survival [3]. There are many causes involved in tumour genesis but genetic and environmental factors like air and water pollution, infectious agents, and ionizing and non ionizing radiation and more specifically hormones and medications have major effects on occurrence of neoplasia [4].
There are several surveillance systems established in various countries for neoplasm study. But in India, such system does not exist. This unclear scenario of cancer incidences in India is due to lack of systemic study at national level and absence of Animal Cancer Registry. Therefore, the present study is undertaken to investigate the pathoepidemiology of various spontaneously occurring neoplasms in animals in Jammu.

Materials and Methods
The present study was conducted on 55 growth samples collected from animals (male and female) of different species, age and sex presented for treatment in Teaching Veterinary Clinical Complex (TVCC), F.V.Sc & AH., SKUAST-J, R.S. Pura (48) and Central Veterinary Health (CVH), Talab Tillo, Jammu (07) during a period of 12 months i.e., from January, 2016 to January, 2017. Out of these 55 tumour samples, 26 samples were collected from bovines and 29 from canines which were diagnosed on the basis of histopathological examinations. The occurrence was studied according to age, sex and system wise. Any abnormal mass detected was examined in detail. After collection, the tissue was preserved in 10% formalin processed routinely, and embedded in paraffin wax. Sections were cut at 5 μm and stained with hematoxylin and eosin (H&E) and subjected to routine histopathological studies [5]. Detailed data was collected in each case and the age, sex, and system wise occurrence of various tumours in animals was also recorded.

Results and Discussion

Out of collected 55 tumour samples, 26 samples belonged to bovines in which 21 were positive for neoplasms and remaining were non neoplastic conditions while in canines out of 29 collected samples, 23 were positive for neoplasms while remaining were non tumorous conditions which were diagnosed on histopathological examinations. Now the occurrence was studied according to age wise, sex wise and system wise both in bovines and canines.

Age and Sex wise prevalence in bovines

Age wise - Highest risk of development was observed at the age group of 0-3 years and lowest at above 15 years of age (Table 1). Kimura *et al.* (2012) observed 20% cases in bovines below 1 year of age, 40% in between 1-5 years of age, 40% in 6-10 years of age group animals [6] whereas Jakhar *et al*. (2006) recorded more occurrence of tumours in animals of 3-5 years age group [7]. The occurrence of bovine tumours at the early age might be due to the fact that cattle residing in industrial areas of Jammu shorten the age boundary of the occurrence of commonest tumour diseases. Partial development of immune system in growing animals might be another cause for occurrence of tumours in early age [4].

Sex wise - In the present study, occurrence of neoplastic conditions was more in female 95.24% (20/21) than male 4.76% (1/21) animals (Table 1). Higher frequency of occurrence of neoplasm in female was also reported [7]. A higher frequency of occurrence for all tumors nearly twice in females than that of males have been reported by earlier workers [8]. Kimura *et al*. (2012) also reported 47% tumours in females and 20% in male cattle and remaining 33% of cases did not revealed any information [6]. Bovine females being reared by cattle owners for production purposes as a source of income caught more care and attention towards their health and treatment than males.

Table 1: Age and sex wise occurrence (%) of different neoplasms in bovines (N=21)

Age group (Years)	Male			Female			Over all Total	Percentage
	Benign (%)	Malignant (%)	Total	Benign (%)	Malignant (%)	Total		
0-3	1 (100)	0	1	4 (66.66)	2 (33.33)	6	7	33.33
4-6	0	0	0	1 (25)	3 (75)	4	4	19.05
7-9	0	0	0	0	3 (100)	3	3	14.29
10-12	0	0	0	0	3 (100)	3	3	14.29
13-15	0	0	0	2 (66.66)	1 (33.33)	3	3	14.29
> 15	0	0	0	0	1	1	1	4.75
Total (%)	1 (100)	0	1 (4.76)	7 (35)	13 (65)	20 (95.24)	21 (100)	

Age and Sex wise occurrence of neoplasms in canines

Age wise- Highest risk of development was observed at the age group of 10-12 years and lowest at 0-3 years in both sexes (Table 2). Dorn *et al*. (1968) reported the peak incidence of canine neoplasms between 6-14 years of age [10]. Similar observations were also reported by Das and Parhi (2003) [11]. Occurrence of neoplasia in old age might be due to the accumulation of somatic mutations over a period of time which was needed for the development of tumour, moreover latent period is also an important factor for tumour development. Besides, decline in immune competence that accompanies aging could also be a contributing factor in tumor development [4].

Sex wise - The occurrence of neoplastic condition was found more in female 87% (14/23) than male 39.13% (9/23) animals (Table 2). Similar findings with more neoplastic cases in female dogs were also reported by many earlier workers [3, 9-12]. Out of 60 tumour bearing animals 35 (58%) were females and 25 (42%) were males [13]. Kimura *et al*. (2012) also reported 51% tumours in females and 43% in male dogs [6]. Hormonal imbalance in females was being high, which could lead to the occurrence of more neoplasms in females than males [4]. The increased risk of females for all tumors in the canine species may be due to the high relative frequency of occurrence of mammary tumors in dogs [8].

Table 2: Age and sex wise occurrence (%) of different neoplasms in canines (N=23)

Age group (Years)	Male			Female			Over all Total	Percentage
	Benign (%)	Malignant (%)	Total	Benign (%)	Malignant (%)	Total		
0-3	0	1 (100)	1	0	1 (100)	1	2	8.69
4-6	1 (50)	1 (50)	2	0	2 (100)	2	4	17.39
7-9	1 (50)	1 (50)	2	1 (50)	1 (50)	2	4	17.39
10-12	1 (33.33)	2 (66.66)	3	2 (28.57)	5 (71.42)	7	10	43.48
13-15	0	1 (100)	1	2 (100)	0	2	3	13.05
Total (%)	3 (33.33)	6 (66.67)	9 (39.13)	5 (35.71)	9 (64.29)	14 (60.87)	23 (100)	

System wise prevalence in bovines

In cattle, 21 cases were reported, skin and soft tissues showed highest occurrence (52.38%; 11/21) followed by eye (33.33%; 7/21), mammary gland (9.52%; 2/21) and the tumour of alimentary system (4.77%; 1/21) (Table 3). Higher occurrence of tumours of skin, eye, and mammary gland were also reported by earlier workers [14-16]. Madewell (1981) also reported that the tumours of skin and soft tissues as the most frequently recognisable neoplastic disorder in cattle [17]. Among skin and soft tissues, fibroma, fibrosarcoma and cutaneous squamous cell carcinoma each were showing the higher frequency of occurrence (27.27%; 3/11) followed by myxoma and papilloma (9.09%; 1/11). Misdorp (1967) and Nobel *et al*. (1979) reported maximum cases of skin tumours, fibromas and fibrosarcomas [14, 18, 19]. Higher occurrence of fibroma in both species might be due to either continuous irritation of skin [20] or ultraviolet radiations causing skin cancer [4]. In the present study, 7 cases of eyes were recorded

and all were malignant in nature i.e. ocular squamous cell carcinoma in tumours of eye. Squamous cell carcinoma of the eye was the single tumour common encountered in cattle in India [21]. Out of 447 tumours, 96 cases were of squamous cell carcinoma of the eye as reported by Plummer (1956) [22]. The etiology of eye tumour is multifactorial involving heritability, sunlight, nutrition, eyelid pigmentation, and perhaps viral involvement playing roles [23]. Two cases of ductal adenoma and 1 case of epulis were reported in mammary gland and tumours of alimentary system. Single case of epulis in cattle was also earlier reported [24, 25].

Table 3: System wise occurrence (%) of different neoplasms in bovines (N=21)

Tissue/Organ affected	No. of cases collected	Occurrence (%)
Tumour of skin & soft tissue	11	52.38
Tumour of alimentary system	1	4.77
Tumour of mammary gland	2	9.52
Tumour of eye	7	33.33
Total	21	100

System wise occurrence of neoplasms in canine

Out of total 23 cases which were positive for neoplasms, tumour of skin and soft tissues showed highest occurrence (56.52%; 13/23) followed by mammary gland (26.08%; 6/23), genital system (8.70%; 2/23), bone (4.35%; 1/23) and lymphoid organ (4.35%;1/23) (Table 4). Among skin and soft tissues, skin tumours were the most common tumour in dogs, accounting for approximately one third of all tumours [23]. Hamid *et al*. (2014) also reported the higher incidence of tumour of skin, mammary gland and genital organs in canines [3]. The reason behind the occurrence of more skin and soft tissues was that tumour over the skin was identified more easily and also because of constant exposure on the skin to the external environment [17]. Among skin and soft tissues, fibroma showed the highest frequency (53.85%; 7/13) followed by hepatoid gland adenocarcinoma (23.08%; 3/13), anaplastic mastocytoma (15.38%; 2/13) and cutaneous squamous cell carcinoma (7.69%; 1/13). Reddy *et al.* (2009) reported 5 cases of fibroma, 3 of mast cell tumours and 5 of squamous cell carcinoma from the total 58 cases of skin tumours in canines [1]. Gupta and Tiwari (2009) also observed maximum cases of fibroma [2]. Babu *et al*. (2012) revealed that out of total 20 tumour samples in canines, 6 of fibroma, 2 each of hepatoid gland adenoma and adenocarcinoma were observed [13]. Higher occurrence of fibroma in both species might be due to either continuous irritation of skin [20] or ultraviolet radiations causing skin cancer [4]. In mammary gland, four cases of papillary adenocarcinoma (66.67%; 4/6) and 2 cases of lipid rich carcinoma (33.33%; 2/6) were recorded. Mammary gland tumour as the most common occurring tumours of female dogs was also reported by many earlier workers [26, 27]. Among genital system, 1 each case of tumour of male genial organ i.e. Sertoli cell tumour and female genital organ i.e. Ovarian adenocarcinoma was observed. Babu *et al*. (2012) and Baioni *et al*. (2017) also reported 2 cases of Sertoli cell tumour [13, 28]. Patnaik and Greenlee (1987) also observed 48% cases of ovarian adenocarcinoma [29]. In the present study, 1 case of splenic lymphoma was observed in lymphoid organ. Earlier many workers also reported the cases of splenic tumour in dogs [3, 30, 31]. In bones, 1 case of osteosarcoma was observed. Babu *et al*. (2012) also reported 1 case of osteosarcoma out of total 61 cases [13]. The occurrence of osteosarcoma might be due to increase body weight or the age factor or either radiation induced osteosarcoma [32].

Table 4: System wise occurrence (%) of different neoplasms in canines (N=23)

Tumour	Number of cases	Percentage
Tumour of skin & soft tissue	13	56.52
Tumour of bone	1	4.35
Tumour of lymphoid organ	1	4.35
Tumour of genital system	2	8.70
Tumour of mammary gland	6	26.08
Total	23	100

Conclusion

The occurrence of neoplasm in bovines and canines was found to be 80.76% (21/26) and 79.31% (23/ 29) respectively. Occurrence of neoplasm was more in females than males both in canines and bovines. Risk of development of tumour was more at older age in canines and at younger age in bovines. In bovines, tumours of skin and soft tissues and tumours of eye were most common. In skin and soft tissues, fibroma, fibrosarcoma and cutaneous squamous cell carcinoma were showing the same prevalence. In eye, ocular squamous cell carcinoma was the most common tumour. In canines, tumours of skin and soft tissues, mammary gland and genital system were the most common. In skin and soft tissues, fibroma was most common occurring, and cutaneous squamous cell carcinoma was least common. In mammary gland tumour, papillary adenocarcinoma showed highest prevalence. In genital system, Sertoli cell tumour and ovarian adenocarcinoma was common tumour.

References

1. Reddy GBM, Kumar R, Kumar P, Sharma AK, Singh ND. Canine Skin tumours: Occurrence and histopathology. Indian Journal of Veterinary Pathology. 2009; 33(2):200-203.
2. Gupta N, Tiwari SK. Studies on incidence, histopathological features and surgical management of neoplasms in canine. Veterinary World. 2009; 2(10):392-395.
3. Hamid A, Azmi S, Rahman S, Sharma M. Prevalence of spontaneously occurring neoplasms amongst canines in Jammu. Indian Journal of Canine Practice. 2014; 6(1):87-90.
4. Moulton JE. Tumours in Domestic Animals. Edn 2, University of California Press Berkeley and Los Angeles, California, USA, 1990.
5. Bancroft JD, Gamble M. Theory and Practice of Histological Techniques. Edn 5, Churchill Livingstone, USA, 2002.
6. Kimura KC, Garate AN, Dagli MLZ. Retrospective study of neoplasms in domestic animals: A survey between 1993 and 2002 of the service of Animal Pathology, Department of Pathology, School of Veterinary Medicine and Animal Science, University of Sao Paulo, Southeast Brazil. Brazilian Journal of Veterinary Pathology. 2012; 5(2):60-69.
7. Jakhar KK, Singh P, Dev K. Occurrence of tumours in domestic animals. Haryana Veterinary Journal. 2006; 45:79-81.
8. Priester WA, Mantel N. Occurrence of tumours in domestic animals. Data from 12 United States and

Canadian Colleges of Veterinary Medicine. Journal of the National Cancer Institute. 1971; 47(6):1333-1344.
9. Dorn CR, Taylor DN, Frye FL, Hibbard HH. Survey of animal neoplasms in Alameda and Contra Costa Countries, California I. Methodology and description of cases. Journal of National Cancer Institute. 1968; 40:295-305.
10. Das BC, Parhi NK. Incidence of canine tumours in Orissa (2000-2002). National Symposium on Basic Pathology and Animal Diseases and XX Annual Conference of IAVP. 2003, 135
11. Schafer KA, Kelly G, Schrader R, Griffith WC, Muggenburg BA, Tierney LA *et al*. A canine model of familial mammary gland neoplasia. Veterinary Pathology. 1998; 35:168-177.
12. Merlo DF, Rossi L, Pellegrino C, Ceppi M, Cardellino U, Capurro C *et al*. Cancer incidence in pet dogs: Findings of the Animal Tumour Registry of Genoa, Italy. Journal of Veterinary International Medicine. 2008; 2:976-984.
13. Babu P, Abraham MJ, Lalithakunjamma CR, Vijayan N, Narayanan MK. An epidemiological study of canine neoplasms. Indian Journal of Veterinary Research. 2012; 46(2):196-198.
14. Misdorp W. Tumours in large domestic animals in the Netherlands. Journal of Comparative Pathology. 1967; 77:211-216.
15. Dukes TW, Bundza A, Corner AH. Bovine neoplasms encountered in Canadian slaughterhouses: A summary. Canadian Veterinary Journal. 1982; 23:28-30.
16. Naghshineh R, Hagdoost IS, Dezfuli MRM. A retrospective study of the incidence of bovine neoplasms in Iran. Journal of Comparative Pathology. 1991; 105:235-239.
17. Madewell BR. Neoplasms in domestic animals: A review of experimental and spontaneous carcinogenesis. The Yale Journal of Biology and Medicine. 1981; 54:111-125.
18. Nobel TA, Klopfer U, Perl S, Nyska A. Neoplasms of domestic mammals in Israel 1969-1979. Refuah Veterindrith: Quarterly of the Israel Veterinary Medical Association. 1979; 36:23-26.
19. Bastianello SS. A survey on neoplasia in domestic species over a 40 year period from 1935 to 1974 in the republic of South Africa. 1. Tumours occurring in cattle. Onderstepoort Journal of Veterinary Research. 1982; 49:154-204.
20. Gurram K, Rajapantula M, Chennamraju PK. Fibroma in buffaloes - A report of 2 cases. International Journal of Livestock Research. 2017; 7(3):189-192.
21. Chandrasekharan NKP, Sastry GA. A survey of animal neoplasms in the Madras state. Indian Veterinary Journal. 1954; 30:325-333.
22. Plummer PJG. A survey of six hundred and thirty six tumours from domesticated animals. Canadian Journal of Comparative Medicine. 1956; 20(7):239-251.
23. Rajmani RS, Mishra M, Singh PK, Sahoo AP, Tiwari AK, Doley J *et al*. Common neoplasms in animals- An overview. Journal of Animal Research. 2012; 2(2):127-137.
24. Nowak M, Madej JA, Ciaputa MR, Poradowski D. Manifestation of tumours in domestic animals in lower Silesia in 2005- 2008. Bulletin of the Veterinary Journal in Pulawy. 2010; 54:229-236.
25. Jakhar KK, Kumar S, Singh P, Lather D, Sharma V, Jangir BL. A rare case of fibromatous epulis in a buffalo. Haryana Veterinarian. 2015; 54(1):91-92.
26. Withrow SJ, MacEwen E. Small Animal Clinical Oncology. Edn 3, Elseveier Saunders, Philadelphia, 2001.
27. Dhami MA, Tank PH, Karle AS, Vedpathak HS, Bhatia AS. Epidemiology of canine mammary gland tumours in Gujarat. Veterinary World. 2010; 3(6):282- 285.
28. Baioni E, Scanziani E, Vincenti MC, Leschiera M, Bozzetta E, Pezzolato M *et al*. Estimating canine cancer incidence: findings from a population–based tumour registry in North Western Italy. BMC Veterinary Research. 2017; 13:203.
29. Patnaik AK, Greenlee PG. Canine ovarian neoplasms: A clinicopathologic study of 71 cases, including histology of 12 Granulosa cell tumours. Veterinary Pathology. 1987; 24:509-514.
30. Christensen NI, Canfield PJ, Martin PA, Krockenberger MB, Spielman DS, Bosward KL. Cytopathological and histopathological diagnosis of canine splenic disorders. Australian Veterinary Journal. 2009; 87(5):175-181.
31. Patnaik TK, Parvathamma PS, Samantara S, Panda SK, Kumar S. Splenic tumor in a German Shepherd Dog. Indian Journal of Veterinary Surgery. 2009; 30(2):135.
32. Leonardi L, Roperto F, Franciosini MP, Mandara MT. An unsual case report of primitive jejuneal canine osteosarcoma. International Journal of Veterinary Science. 2012; 1(2):69-71.