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PREVALENCE OF TUMOURS IN DOMESTIC ANIMALS IN THE LOWER SILESIA (POLAND) IN 2009-2011

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Abstract

The study aimed at the analysis of prevalence frequency and localisation of tumours in domestic animals. The research material comprised 4,212 tumours developed in dogs, cats, horses, and exotic animals, isolated during surgery, autopsy or biopsy, performed for the purpose of histopathological diagnosis. The most numerous group involved canine tumours, including 3,585 cases (85.1%), followed by tumours in cats (532 cases, 12.6%), ferrets (34 cases, 0.81%), rats (19 cases, 0.45%), horses (15 cases, 0.36%), and rabbits (14 cases, 0.33%). A significant increase in incidence of tumours was noted, as compared to studies performed in the same region of Poland in 1957-1995 and 2000-2004 or in 2005-2008. This was particularly evident in exotic animals, in which 80 cases (1.9%) were detected in 2009-2011 but only 20 cases (1.2%) in 2005-2008. The most frequent localisation of neoplasia involved the skin, subcutaneous tissue, and mammary gland.

Key words: domestic animals, tumours, Lower Silesia, Poland.

The numerous studies on neoplasia were associated with various definitions of a tumour. In 1872, Julius F. Cohnheim wrote that tumours represent „delineated, atypical tissue formations, originating from a matrix of an excessive or aberrant deposit of embryonal elements" (11). Currently, tumours are known to be capable of deriving only from a tissue, in which cells maintain their ability to divide. It should be noted that cell division, particularly in malignant tumours, manifests polymorphism or heterogeneity, which means that no two identical tumour cells can be encountered (3, 9). Persistent clonal selection leads to tumour traits, such as progressive growth, infiltration, and ability of metastasis. This involves a multi-stage process of several years, including phases of initiation, promotion, and progression, and, as a rule, it can be detected when the tumour cell number reaches 10^9, or the tumour weight reaches one gram. Duration of the latent tumour development varies from a few months to more than ten years in humans and the terminal stage of the development involves the clinical phase (12). Therefore, the earlier the tumour is detected, the higher is the chance of the recovery. Neoplastic diseases were found to be a cause of death of as many as 50% cats and dogs and, thus, it can be assumed that over every other patient visiting a veterinary doctor suffers, has suffered, or will suffer from a tumour (11).

The study represents a continuation of investigations on frequency of tumour development in the region of Lower Silesia. Such studies provide several significant data on, *i.e.* an increase or a decrease in incidence of specific tumours in the population of animals, as related to their age, gender, species, or breed (4, 6-8).

Material and Methods

The research material included 4,212 tumours, originating from dogs, cats, horses and exotic animals of Lower Silesia, sampled during surgery, autopsy, or biopsy and referred for a histopathological diagnosis to the Department. Tumour samples were fixed in 7% buffered formalin, dehydrated, and embedded in paraffin blocks. The sections were routinely stained with haematoxylin and eosin (HE), van Giesson's and Masson's techniques, and toluidine blue. In certain cases immunohistochemical techniques were also used.

The tumours were subdivided into the following histological types: embryonal, organ primordia, epithelial, nervous and chromogenic tissue, mesenchymal, mesodermal, and complex.

Results

Within three years (2009–2011) 4,212 cases of tumours were diagnosed in animals of Lower Silesia, which gives on the average 1,404 tumour cases per year. In the same region, the average number of 33 tumours per year was diagnosed in 1957-1967 (4) and only 23 cases of tumours in 1976-1995 (6). The previously published analysis of tumour incidence in the same

region in 2000-2004 demonstrated the mean of 192 neoplastic cases per year, while in 2005-2008, Nowak *et al*. (7, 8) documented mean incidence of neoplasia at the level of 488 cases per year. The results pointed at an evident increase in tumour incidence in animals of Lower Silesia. Such results reflect also an increasing awareness of the significance of histopathological diagnosis prior to selection of appropriate therapy and for prognosis in a neoplastic disease among veterinarians and, indirectly, among owners of animals, particularly owners of dogs and cats.

The most numerous group involved tumours of dogs - 3,585 (85.1%) cases, followed by tumours of cats - 532 (12.6%) cases, ferrets - 34 (0.81%) cases, rats - 19 (0.45%) cases, horses - 15 (0.36%) cases, and rabbits - 14 (0.33%) cases. The remaining animal species were represented by individual animals, including, *i.e.* corn snake, European souslik, varanus exanthematicus.

Out of 3,585 cases of tumours detected in dogs, 61.5% (2,204 cases) involved malignant forms and 38.5% (1,381 cases) were benign. Mesodermal and mesenchymal forms were most frequent (1,771 cases, 49.5%) in dogs. Tumours of epithelial origin were diagnosed in 1,639 cases (45.7%). The third most numerous group of tumours were complex tumours (93 cases, 2.6%). The remaining groups of tumours included around 1.5% or even lower proportion of cases (Fig. 1).

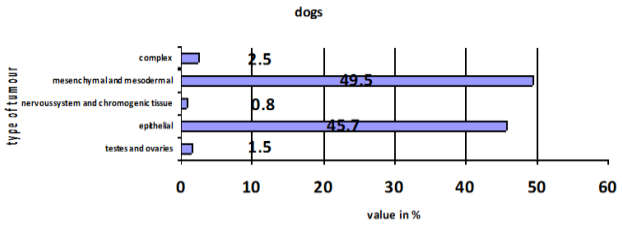


Fig. 1. Shares of individual tumour groups in dogs

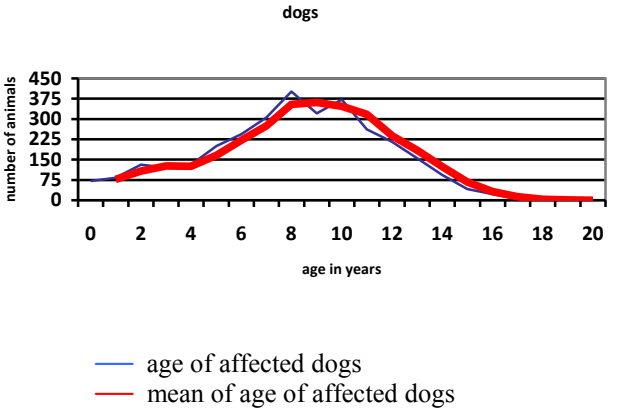


Fig. 2. Manifestation of tumours in dogs related to age

The tumours affected males and females with a similar frequency (1,743 cases or 48.6% *vs* 1,842 cases or 51.4%, respectively). Incidence of tumours in dogs of various age is presented in Fig. 2. In both sexes, an evident increase in tumour incidence was noted following the second year of life with the peak between 7th and 11th year of life. In the studies conducted at the threshold of the 1950s and 1960s, the authors demonstrated peak incidence of tumours in dogs aged 10 to 12 years (4), while in our studies conducted in 2000-2004 (7) and in 2005-2008 (8), the highest incidence of neoplasia was demonstrated to affect 8- to 9-year-old dogs. In the studies performed in the Lower Silesia region in 1957– 1967 tumours in dogs in the age group until 2-year-old were detected in 4.3% individuals (4), while in 1976-1995 in 4.8% dogs (6), and in 2000-2004 the proportion of affected dogs did not exceed 4.3% (7). In our studies conducted in 2005-2008, a two-fold increase was noted in young dogs affected by neoplastic disease (they accounted for 8.2% of the population) while the current investigations demonstrate that the proportion persists.

The highest incidence of tumours (1,085) was noted in mixed breeds, comprising 30.1% of all examined dogs. Among pure breed dogs, the highest number of tumour cases (285, 8.0%) was noted in German Shepherds, followed by small bulldogs (279, 7.8%), dachshunds (192, 5.4%), Labrador retrievers (176, 5%), amstaffs (120, 3.3%), golden retrievers (110, 3.1%), Yorkshire terriers (109, 3%), miniature schnauzers (88, 2.5%), cocker spaniels (77, 2.1%), Dobermans (75, 2.1%), beagles (55, 1.5%), Siberian husky (54, 1.5%), Bernese mountain dogs and west highland white terriers (46 each, 1.3% each), and Irish setters (44, 1.2%). In the remaining breeds, the incidence of tumours did not exceed 1% of the total number of examined animals (Table 1).

The most frequent group was formed by tumours of skin and subcutaneous tissue (1,803 cases or 50.3% of all canine tumours), followed by tumours of the mammary gland (705 cases or 19.7% of all canine tumours), tumours located in the lymphoid system (328 cases or 9.1% of all canine tumours), and tumours of the alimentary system (209 cases or 5.8% of all canine tumours). The remaining locations did not exceed 4%.

Among tumours located within the skin and subcutaneous tissue, tumours deriving from histiocytes formed a definite majority of 279 cases (15.5%) followed by tumours deriving from mastocytes (200 cases, 11.1%), lipomas (197 cases, 10.9%), adenomas (149 cases, 8.3%), non-keratinising squamous carcinomas (138 cases, 7.7%), keratinising squamous carcinomas (119 cases, 6.6%), adenocarcinomas (114 cases, 6.3%), fibrosarcomas (108 cases, 6%), basal cell carcinomas (65 cases, 3.6%), papillomas (59 cases, 3.3%), fibromas (59 cases, 3.3%), poikilocytotic sarcomas (57 cases, 3.2%), malignant melanomas (47 cases, 2.6%), simple angiomas (45 cases, 2.5%), and dermal lymphomas (40 cases, 2.2%). Frequency of manifestation of other tumours did not exceed 2%.

The next tumours in terms of their frequency of occurrence in dogs were found in the mammary gland. In this organ, the most frequent tumour was adenocarcinoma (390 cases, 59.6% of all tumours in the gland). Less frequent were adenomas (127 cases, 18.4%), mixed tumours (77 cases, 10.9%), carcinomas of various type (24 cases, 3.4%), fibrosarcoma (12 cases, 1.7%), lipoma (11 cases, 1.6%), and fibroma (eight cases, 1.1%). Manifestation frequency of the other tumours did not exceed 1%.

Table 1
Manifestation of tumours in individual breeds of dog

BREED	Number of animals (%)	BREED	Number of animals (%)	BREED	Number of animals (%)
Mixed breed	1,085 (30.1)	Chinese crested dog	10 (0.2)	Chichuachua	2 (0.05)
German sheep dog	285 (8.0)	Maltanese	9 (0.2)	Griffon bruxellois	2 (0.05)
Small bulldog	279 (7.8)	Scottish setter	9 (0.2)	Neapolitanian mastiff	2 (0.05)
Dachshund	192 (5.4)	Staffordshire bull terrier	8 (0.2)	Polish bloodhound	2 (0.05)
Labrador retriever	176 (5.0)	Cane corso	8 (0.2)	Swiss sheep dog	2 (0.05)
Amstaff	120 (3.3)	Briard	7 (0.2)	Middle pintscher	2 (0.05)
Golden retriever	110 (3.1)	Caucasus sheep hound	7 (0.2)	Shiba inu	2 (0.05)
Yorkshire terrier	109 (3.0)	Newfounland	7 (0.2)	Springer spaniel	2 (0.05)
Caniche moyen	88 (2.5)	Podhale sheep dog	7 (0.2)	German spitz	2 (0.05)
Cocker spaniel	77 (2.1)	Polish lowland sheepdog	7 (0.2)	Tosa inu	2 (0.05)
Doberman	75 (2.1)	English buldog	6 (0.2)	Irish wolfhound	2 (0.05)
Beagle	55 (1.5)	Chow chow	6 (0.1)	American akita	1 (0.02)
Siberian husky	54 (1.5)	Dog de bordeaux	6 (0.1)	German shorthaired pointer	1 (0.02)
Bernese mountain dog	46 (1.3)	Jack russel terrier	6 (0.1)	Australian cattle dog	1 (0.02)
West highland white terrier	46 (1.2)	Belgian sheepdog	6 (0.1)	Basset	1 (0.02)
Irish seter	44 (1.2)	Bullmastiff	5 (0.1)	Bichon	1(0.02)
Foxterrier	34 (0.9)	Argentinian dog	5 (0.1)	Polish greyhound	1(0.02)
Bavarian bloodhound	32 (0.9)	Tibetanian mastiff	5 (0.1)	Fila brasileiro	1 (0.02)
French bulldog	31 (0.9)	Mops	5 (0.1)	Gordon setter	1 (0.02)
Middle schnauzer	31 (0.9)	Scottish terrier	5 (0.1)	Japan chin	1 (0.02)
Rottweiler	31 (0.8)	Polish hound	4 (0.1)	Karelian bear dog	1 (0.02)
German mastiff	29 (0.8)	Shetland sheep dog	4 (0.1)	Kerry blue terrier	1 (0.02)
Shih tzu	27 (0.7)	Middle Asia sheep dog	4 (0.1)	mastín del Pirineo	1 (0.02)
Giant schnauzer	25 (0.7)	American pitbullterrier	4 (0.1)	English mastiff	1 (0.02)
Shar-pei	21 (0.6)	Miniature poodle	4 (0.1)	Moscow guarding dog	1 (0.02)
Bullterrier	20 (0.5)	Irish terrier	4 (0.1)	Naked Peruvian dog	1 (0.02)
Weimar pointer	20 (0.5)	Border collie	3 (0.08)	Norwich elkhound	1 (0.02)
Miniature schnauzer	17 (0.4)	Beauceron	3 (0.08)	Parson russel terrier	1 (0.02)
Miniature pintscher	17 (0.4)	Bloodhound	3 (0.08)	Ca de Bou	1 (0.02)
Bernardine	16 (0.4)	Bouvier des flandres	3 (0.08)	Wachtelhund	1 (0.02)
Russian terrier	16 (0.4)	Cavalier king charles spaniel	3 (0.08)	English setter	1 (0.02)
German pointer	16 (0.4)	Hovawart	3 (0.08)	Silky terrier	1 (0.02)
Scottish sheepdog	15 (0.4)	Jagdterrier	3 (0.08)	Wolfspitz	1 (0.02)
Airedale terrier	14 (0.4)	Leonberger	3 (0.08)	Swiss sheepdog	1 (0.02)
Rhodesian ridgeback	14 (0.4)	Samoyed	3 (0.08)	Tibetanian terrier	1 (0.02)
Alaskan malamute	13 (0.3)	Hungarian pointer	3 (0.08)	Welsch corgi	1 (0.02)
Dalmatian	12 (0.3)	Akita inu	2 (0.05)	Whippet	1 (0.02)
Welsh terrier	12 (0.3)	Bobtail	2 (0.05)	Czech pointer	1 (0.02)
Pekingese	11 (0.3)	Bolognese	2 (0.05)	Italian pointer	1 (0.02)
Flat coated retriever	10 (0.2)				

The subsequent site of canine tumour location involved the lymphoid system. The highest numbers of tumours were detected in lymph nodes (253 cases, 77.1% of all lymphoid system tumours, of which 97% represented lymphomas. The spleen provided locus for 75 cases of tumours (22.9%) and also in this site the dominant type of hyperplasia was lymphoma (42.7%), followed by angiosarcoma (14 cases, 18.7%), cavernous angioma (nine cases, 12%), and simple angioma and fibrosarcoma (8% each). Poikilomorphic sarcomas accounted for 5.3% of the cases while the remaining tumours showed prevalence of up to 4%.

In canines the subsequent site of most frequent tumour development involved the alimentary tract with the liver. Most numerous tumours were developing within mouth cavity (178 cases, 85.2%). This site was affected most frequently by development of fibrous epulis (53 cases, 29.8%), papilloma (28 cases, 15.7%), non-keratinising squamocellular carcinoma (23 cases, 11.2%), fibrosarcoma (15 cases, 8.4%), melanoma (10 cases, 5.6%), fibroma (nine cases, 5.1%), and plasmocytoma and carcinogenic epulis (each of 2.8%). The incidence of remaining tumours never exceeded 2.5%. In the intestines, 26 cases of tumours were detected. They comprised 12.4% of all tumours detected in the alimentary tract. The most numerous group was formed by adenomas (30.8%), followed by adenocarcinomas (26.9%), and lymphomas (23.1%). The remaining tumours failed to exceed the threshold of 15%. The stomach provided the location for around 3% of tumours of the alimentary tract; such as smooth muscle myoma, adenoma, lymphoma, or mucinous carcinoma. In the liver, also around 3% of alimentary tract tumours were disclosed, of which the most frequent proved to be adenocarcinomas (33.3%), carcinomas (33.3%), angiosarcomas, and fibrosarcomas (each 16.7%).

Within male genital system, 119 cases of tumours were detected, which comprised 3.3% of all canine tumours and 6.8% of tumours in male dogs. The principal location of the neoplasia involved testes in which 6% of tumours were located in male dogs. The most frequent testicular tumour was seminoma (42.4%) followed by leydigioma (34%), tumour of Sertoli cells (22.6%), and simple angioma (1%). Prostate tumours accounted for just 0.6% of all tumours in male dogs or 9.2% of tumours in the male genital system.

Within female genital system, 57 cases of tumours were detected, which comprised 1.6% of all canine tumours and 3.1% of tumours in bitches. Most of the tumours were located in the vagina (1.5% of tumours in bitches). The tumours were dominated by fibromas (18.5%), mast cell tumours (14.8%), smooth muscle cell myomas, and keratinising squamocellular carcinomas (each of 11.1%) while simple angiomas and fibrosarcomas comprised each 7.4% of cases. The next female organ in order of tumour manifestation frequency involved the ovaries (1%), with prevalence of granuloma cell tumour (57.9%). Other tumour type located in the ovary was adenoma (10.5% cases) while detection frequency of the remaining tumours did not exceed 5.3%. The uterus provided location of 0.6% tumours in bitches. Smooth muscle myomas (45.4%) were predominant among these tumours, while detection frequency of the other tumours did not exceed 10%.

Perirectal glands provided location site for 90 tumours. In the location, the most frequent tumours were adenocarcinomas (47.7%), followed by adenomas (45.5%) while carcinomas and tumours of mast cells comprised each 2.2% of the tumours. The remaining tumour types accounted each for less than 1.5% of the tumours.

Osseous system was the site of 58 or 1.6% neoplasia cases diagnosed in dogs. The most frequent was osteosarcoma (34.4% cases), followed by osteoma and fibrosarcoma (each accounting for 11.1% of tumours), chondroosteoma (8.6%), chondroma (6.8%), chondrosarcoma (3.7%), and osteochondrofibroma (1.7).

Within the urinary system, 41 (1.1%) cases of neoplasia were noted among all tumour cases detected in dogs. Most tumours (73.1%) were located in the urinary bladder and the most frequent tumour type was carcinoma of the urinary bladder (60%). In the site, myomas, fibromas, fibrosarcomas, angiosarcomas, and papillomas carcinoma originating from transitional epithelium were also noted. Renal tumours accounted for 22%. Tumours in the urinary tract included lymphoma, adenocarcinoma, carcinoma, adenoma, fibrosarcoma, and angiosarcoma. In the urethra, one case of carcinoma and one case of mucosarcoma were found.

In the respiratory system, 19 cases of neoplasia were detected, which accounted for 0.5% all tumours diagnosed in dogs. The most frequently affected site was the nasal cavity (42%) and the following tumours were found: adenocarcinoma, adenoma, carcinoma, keratinising squamocellular carcinoma, and fibrosarcoma. In the lungs, neoplasia was usually manifested in the form of adenocarcinoma, osteosarcoma, angiosarcoma, and bronchial carcinoma.

Tumours of thyroid gland were relatively rare (0.4%) and included adenocarcinomas, adenomas, and carcinomas. Within the auditory canal, tumours were also encountered on rare occasions (0.4%), encompassing adenomas, adenocarcinomas, papillomas, and non-keratinising squamocellular carcinomas. In muscular tissues, just 0.1% tumours were located (neuromyoma, fibrosarcoma, lipoma, and poikilocytotic sarcoma). The least affected sites of neoplasia included eyeballs (0.05%, sarcoma and fibrosarcoma), nervous system (0.02%, in the form of sarcomatoid meningioma), and bone marrow (0.02%; myeloid leukaemia).

Separate group involved pathology diagnosed upon examination of aspirates from abdominal cavity, chest cavity, pericardial sac, or histopathological examination of tumours located in body cavities. In dogs, such cases comprised 1.6% of all neoplasia cases. On the basis of cytological analysis of liquids sampled from body cavities, adenocarcinoma, carcinoma, and adenoma were diagnosed most frequently, and in the pericardial sac - angiosarcoma and endothelioma.

In cats, tumours accounted for 12.6% of all diagnosed animal tumours, pointing at almost a six-fold

increase in prevalence of neoplastic disease in this species, as compared to the 1960s, when tumours accounted for 2.1% of all diagnosed animal tumours (4). An increase by 1/3 was observed as compared to prevalence of 9% noted in 2000-2004 (7), and a slight increase as compared to results noted in 2005-2008 (8).

Out of 532 cases of tumours detected in cats, 69.5% (372 cases) constituted malignant forms and 30.5% (160 cases) represented non-malignant forms. In cats the highest number of diagnosed cases - 290 (54.5%) comprised epithelial tumours. Mesenchymal and mesodermal tumours were noted in 218 (40.9%) cases. The third in the sequence of most numerous groups was formed by complex tumours (22 cases, 4.1%). Two (0.5%) tumours originating from chromatogenous tissue were also diagnosed (Fig. 3).

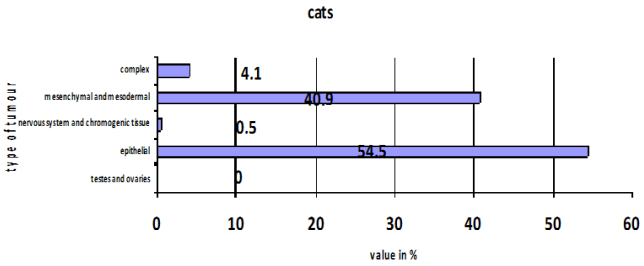


Fig. 3. Shares manifested by individual tumour groups in cats

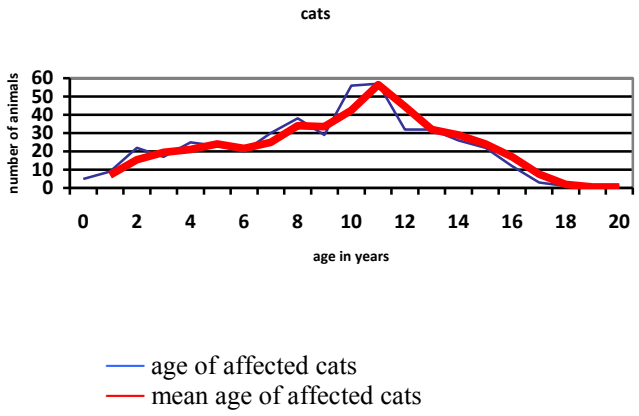


Fig. 4. Manifestation of tumours in cats of different age

As compared to dogs, in cats tumours were found more frequently in females (333 cases, 62.6%), than in males (199 cases, 37.4%). Prevalence of tumours in cats of different age is presented in Fig. 4. An increase in tumour incidence was noted in cats between 7th and 11th year of age and its peak was detected between 10th and 11th year of age. The fraction of young cats aged up to 2 years did not exceed 10% of the examined animals.

The highest number (441) of tumours was detected in European cats, which comprised 82.9% of all examined cats. Among pure breed animals, the highest number of neoplastic disease was disclosed in Persian cats (32 tumours, 6.0%), followed by Maine coon cats (20 tumours, 3.8%), Siberian and Siamese cats (eight tumours in each of them, 1.5%), and British cats (five tumours, 0.9%). In the remaining breeds, at most 0.5% cats were affected. Similarly to dogs, also in cats, the extensive prevalence of tumours diagnosed in mixed breed animals reflected the marked prevalence of mixed breed over pure breed individuals in the entire population cultured in Poland. Tumours of skin and subcutaneous tissue formed the most numerous group (231 cases, 43.4% of all tumours in cats), followed by tumours of the mammary gland (167 tumours, 31.4%), alimentary tract and liver (61 tumours, 11.4%), and tumours of the lymphoid system (19 tumours, 3.5%). The remaining tumour locations did not exceed 2% of cases.

Fibrosarcomas (72 cases, 31.1%), followed by squamocellular non-keratinising carcinomas (24 cases, 10.3%), adenomas (18 cases, 7.8%), lipomas and poikilocytotic sarcomas (16 cases or 6.9% each), adenocarcinomas (15 cases, 6.5%), basocellular carcinomas (11 cases, 4.7%) were the most frequently diagnosed tumours of skin and subcutaneous tissue. Manifestation of other tumours did not exceed 4%. In cats, the next most frequent site of neoplastic development was the mammary gland and the most frequently encountered tumour was adenocarcinoma (104 cases, 62.3%). In the site, adenomas accounted for 22.2%, fibrosarcomas for 4.1%, and adenofibromas for 3.5% of cases. The remaining tumour types were encountered very rarely.

The alimentary tract was the subsequent most frequent site of tumour manifestation in cats. Similarly to dogs, most of the tumours were located in oral cavity (46 cases, 75.4%). The dominating type of hyperplasia involved fibrous epulis (12 cases, 26%), while non-keratinising squamocellular carcinomas (11 cases, 23.9%), fibrosarcomas (four cases, 8.7%) accounted for lower proportions of oral cavity tumours. In the intestines, five cases of lymphoma were detected and one of each among smooth muscle myoma, poikilocytotic sarcoma, and fibrosarcoma. In the liver, a single case of adenocarcinoma and in the stomach, a single case of lymphoma was noted.

The lymphoid system contained 19 cases of neoplastic lesions. In the lymph nodes, only lymphoma type lesions were detected; in the thymus, a single case of thymoma.

In the osseous system, neoplastic lesions were manifested by presence of singular cases of osteoma, osteosarcoma, fibrosarcoma, and chondroosteosarcoma. Few cases of tumours were noted in the remaining organs and systems.

In horses, 15 neoplastic tumours were detected (0.4% of the total diagnosed neoplastic lesions in domestic animals). In the study, six (40%) cases represented malignant forms and nine (60%) cases non-malignant forms. The highest group of tumours diagnosed in horses were epithelial tumours (seven cases, 46.7%), followed by tumours of mesenchymatic/mesodermal origin (five cases, 33.3%), and tumours of chromatogenic tissue (two cases, 13.3%). The remaining 6.7% of cases involved complex tumours. In 53.3% of cases, the tumours were diagnosed

in males, and in 46.7% - in mares. Independently of sex, the highest prevalence of tumours was detected in animals at the age of 7 to 12 years.

Most tumours (66.6%) in horses were located in skin and subcutaneous tissue. The prevailing type of tumour proved to be fibroma and papilloma (three cases of each) followed by fibrosarcoma and malignant melanoma (two cases of each). In the uterus, two cases of adenoma and one case of adenofibroma were detected. The remaining neoplastic lesions affected kidneys (carcinoma) and penis (squamocellular non-keratinising carcinoma).

The final group of animals under the analysis involved exotic animals among which 66 tumours were diagnosed, which constitutes 1.6% of all examined neoplastic lesions in household animals. The group contained 34 (51.5%) ferrets, 19 (28.8%) rats, 14 (21.2%) miniature rabbits, and five (7.6%) guinea pigs. The remaining animal species formed less than 5% of the group.

In ferrets, the most numerous (14, 41.2%) neoplastic lesions were observed within skin and subcutaneous tissue. They included mainly adenoma and adenocarcinoma, tumours of histiocytic cells, single cases of fibroma, fibrosarcoma, carcinoma, chondroma, and osteoma. The animals also developed tumours in the lymphoid system (29.4%); the lymphomas were located in the spleen and lymph nodes. In the adrenal glands, three cases of adenocarcinomas and a single case of simple angioma were diagnosed. In rats, tumours affecting the mammary gland and skin prevailed. In miniature rabbits, dermal tumours were the most frequent. Comparing the data from 2000-2004 (7) and 2005–2008 (8), a growing interest is noted in exotic animals, which may indicate that it is „fashionable" to keep such animals at home and veterinarian care over exotic animals, has improved.

Discussion

Following analysis of all histopathological results obtained in the Department, in 2009-2011, it can certainly be concluded that among the examined cases, tumours of skin and subcutaneous tissue prevailed. The highest fraction (15.5%) was formed by tumours originating from histiocytes. Comparing present results with those obtained in 2005-2008, an increase in the number of tumours of histiocytic origin was noted, which accounted for 12.9% of tumours (8). Thus, an increase by almost 2.5% was revealed. In the study, an increase in the number of skin tumours originating from mastocytes was noted (11.1% skin tumours, as compared to just 6.2% in the earlier studies) (8). The attention also should be given to lipomas and adenomas, the proportion of which was 10.9% and 8.3%, respectively, which is higher in comparison to the results obtained in 2005-2008 (4% and 5.4%, respectively) (8).

Tumours of the mammary gland occupied the second most frequent site in dogs and in 2009-2011, the most frequent type of the tumour was adenocarcinoma (390 cases, 59.6%). The data corresponded to statistics from previous years (7). Mammary gland tumours in bitches are manifested more frequently than in women, comprising 30% and 20% of tumours, respectively (2). Nevertheless, as compared to the results from previous years (7, 8) and the presented data, Pietraszka and Perfieniuk (9) as well as Adamu (1) detected a similar prevalence of neoplasia cases within the mammary gland and skin tumours. The number of the lymphoid system tumours in dogs was almost two-fold higher (9%) than in humans (5%) (2). As compared to 2004-2008, an increase in the prevalence was noted (7).

Pulmonary tumours in dogs are rare (around 1% of tumours). This was confirmed by statistical data from the years 2005-2008 (8), as well as 2009-2011, whereas in humans they comprise as many as 16% of all malignant tumours, mainly induced by tobacco smoking (2). In experimental animal models attempts to induce bronchial carcinoma with tobacco smoke failed (10). It cannot be reliably concluded yet what effect on tumour development in the respiratory system in animals is exerted by the environment and factors altering the environment in a direct or indirect way. However, the preferable site for spread of metastases in carcinoma of the mammary gland is known to involve just the lungs, which was clinically confirmed on several occasions. Unfortunately, due to the inability to control patient history, it was impossible to demonstrate the share of pulmonary metastases following a diagnosis of malignancy in the mammary gland.

In recent years, detection of tumours in exotic animals significantly increased. In our department, 80 cases of neoplasia were found among the animals, which is 1.9% of all examined lesions. In 2005-2008, 20 (1.2%) cases of neoplasia were detected in exotic animals of all examined cases (8), and in 2000-2004 no such case was detected (7). This probably reflected and increased interest in rearing and „fashion" of keeping such animals at home. The frequently inappropriate conditions of maintenance, improper diet, as well as inbred rearing promote appearance of neoplastic lesions.

Prevalence of tumours in mixed breeds was consistent with results of other authors, according to whom mixed breeds account for 35.7% of dogs with neoplastic process (6), according to Malicka, they account for 27% of dogs with tumours (5), according to our data from 2000-2004, they accounted for 36% (7), and in 2005-2008 they comprised 31.7% of dogs with neoplasia (8).

In oncology, a particular role is played by prophylaxis, including primary prophylaxis, involving elimination of tumour risk factors and secondary prophylaxis, or screening examinations. The latter allow detecting pre-neoplastic lesions or cases of early neoplasia, which are easier to cure in humans and animals.

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