MULTIPLE PRIMARY TUMOURS A IN DOG. A CASE REPORT

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Received for publication April 04, 2008

Abstract

The work reports a rare case of canine two primary malignant tumours concurrent with one benign tumour occurring within a single organism. Soft palate malignant melanoma with metastases to the regional lymph nodes and internal organs was classified as the index tumour, while thyroid carcinoma was defined as incidentaloma. The third tumour recognised was a large lipoma located in the abdominal cavity. The presented case proves that in the animal organism affected with a malignant tumour, other tumours may develop.

Key words: dog, multiple primary tumours, diagnosis.

The multiple primary tumours (MPT) have been reported in humans for over 100 years. According to the MPT definition worked out by the International Agency for Research on Cancer in 1991 (cit. after 4), multiple primary tumours meet three specific conditions:
1) the neoplasm must clearly be proven histologically to be a malignant tumour,
2) each tumour must be topographically distinct and separate,
3) the possibility of the second primary being a metastasis from the primary tumour must be considered and excluded as possibility.

The MPT may be classified as synchronous or metachronous. It is assumed that if some tumours are diagnosed at the same time as the primary neoplasm - the index tumour is the one producing more intensive clinical signs and being the main reason for patient’s disorder. However, the histological structure and clinical stage have a crucial effect on the prognosis (3, 16).

The paper describes the MPT case in a dog with two primary tumours recognised: one malignant and the other benign. The subsequent post mortem examination revealed the presence of the second malignant tumour.

Case report

A male dog, 14-year-old, mongrel, weighing 11 kg was presented for the radiological examination of pharynx, chest, and abdominal cavity at the Laboratory of Radiology and Ultrasonography. The history of this dog revealed the progressive dyspnoea at rest, loss of appetite persisting for about a week, sporadic vomits, temporal anxiety, and abdominal cavity enlargement observed for the past several years. The clinical examinations showed the presence of a black ulcerated formation on the soft palate, while in the abdominal cavity - a large painless tumour. The results of the haematological and biochemical examinations were within the physiological range, apart from mild leukocytosis.

The X-ray screening of the dog’s chest and abdominal cavity was performed in the lateral and dorsoventral (DV) view, while the head and neck at lateral positioning. The radiographic evaluation showed the presence of multiple metastases of varied size in the lungs. The abdominal radiograph revealed a large mass that occupied almost the entire peritoneal cavity and displaced the intestines cranially and dorsally (Fig. 1).

Its radiodensity was compatible with fat. Within the mentioned mass, five well-demarcated nodular lesions were detected. Besides, the radiographic examination showed the right kidney enlarged, while the left one was displaced medially and cranially. The liver and spleen appeared to be small. The shape and margin of the liver were soft and regular, while the spleen margin rounded and the organ itself closely adhered to the largest fat-dense mass.

The ultrasound examination of the abdomen was performed on the dog in a standing position. This evaluation has also revealed that five well-demarcated nodular lesions were detected. Besides, the radiographic examination showed the right kidney enlarged, while the left one was displaced medially and cranially. The liver and spleen appeared to be small. The shape and margin of the liver were soft and regular, while the spleen margin rounded and the organ itself closely adhered to the largest fat-dense mass.

The ultrasound examination of the abdomen was performed on the dog in a standing position. This evaluation has also revealed that the largest mass showed the properties of the adipose tissue. The parenchymal nodular lesions were shown to be hypoechoic of non-homogenous echotexture, with single areas of markedly reduced echo. In the bigger lesions, the connective tissue septa were noted. The poor physical status of the dog and the large lipoma-like mass causing the intestine compression, disallowed the sonographic examination of the parenchymal organs. Only the left kidney was evaluated and the examination findings were normal. The lateral radiogram of the dog head and neck revealed the mass occupying almost the entire pharynx lumen.
To recognise a nature of the mass in the oral cavity, a specimen was excised for histopathological evaluation. The microscopic view confirmed the presence of neoplastic proliferation, which was recognised as a malignant melanoma (5).

Based on the studies performed, the diagnosis of the advanced neoplastic disease was established. The owner elected euthanasia and permitted a necropsy. At the necropsy, an oval creamy white mass of 25 cm in diameter and 3000 g of weight fused to the omentum was found (Fig. 2).

On the mass cross-section area, there appeared several cavernous spaces filled with gelatinous blood secretion. Cranially, under the capsule, there was seen a formation of a rhomboidal shape recognised as an extra spleen.

The post-mortem examination revealed a mass in the oral cavity arising from the soft palate and almost blocking lumen of the pharyngeal isthmus. Besides, the enlargement of the retropharyngeal lymph nodes was detected as well as the presence of a 1 cm tumour in the right thyroid lobe. In the lungs, liver, and the right kidney there appeared nodular infiltrates of a metastatic nature. The neoplasms detected at the necropsy and affected organs were excised for the histopathological examination. The specimens were fixed in 10% neutral formalin, embedded in paraffin blocks, and the obtained histological preparations were stained with haematoxylin and eosin. Besides, the additional immunohistochemical staining was conducted to determine the histogenesis of the analysed metastatic foci. The LSAB⁺ - HRP (DAKO) kit and the following
antibodies: cytokeratin AE1/AE3 diluted at 1:100 ratio, vimentin clone V9 1:50, and melan A 1:200 were used. The colour reaction was developed after incubation with DAB (4-hydrochloride-3,3-diaminobenzidine). The microscopic view of the abdominal tumour exhibited the structure characteristic of lipoma. The cavernous spaces visualised in the ultrasonographic and radiographic evaluation and at necropsy were described as the blood extravasation into the neoplasm parenchyma at the organisation stage. The thyroid neoplasm was recognised as solid-follicular carcinoma (8). The histopathological examination supported the diagnosis of oral cavity malignant melanoma established before (Fig. 3) and showed the presence of this malignancy metastatic spread to the lungs and lymph nodes. Cells in the metastatic foci in the lymph nodes and lungs contained high amount of melanin, while in the liver and kidney there was detected only scarce quantity of this pigment that occurred focally in single cells.

Besides, in these organs a markedly higher cellular pleomorphism was observed. Therefore, to determine neoplastic cell histogenesis in the mentioned organs explicitly, there was additional immunohistochemical staining conducted. All the neoplastic cells developed a positive, differentiated as regards its intensity, reaction with the antibody identifying vimentin and melan A (Fig. 4), and a cytokeratin-negative reaction, that ultimately confirmed the presence of malignant melanoma metastases in the liver and kidney as well.

Discussion

The problem of more than one primary tumour diagnosed in one single patient was given concern in medicine as late as in the past 30 years. The review of literature implies that some malignant neoplasms can often coexist, e.g. urinary bladder carcinoma with prostate adenocarcinoma or meningioma with kidney carcinoma (2, 14). Unlike the large-scale studies conducted on MPT in humans, the veterinary research reports concerning this issue are quite rare (1, 4, 10). According to the present authors’ knowledge, the presented phenomenon of the coexistence of soft palate melanoma with thyroid carcinoma and additional peritoneal cavity lipoma in one single patient has not been described so far.

In the reported case, malignant melanoma of the palate should be regarded as the index tumour. It is known to be one of the most common oral malignant neoplasms, beside squamous cell carcinoma. It is largely a disease of the advanced age individuals and its most common locations are the gingiva, mouth or cheek mucosa, tongue, and hard palate (12, 13). In dogs, in only approximately 4% cases it develops in the soft palate (11). The prognosis is poor due to fast progressing infiltration and a high metastatic rate. It is estimated that 20% of the affected patients have evidence of the tumour with metastases at the time of diagnosis. Regional lymph node and pulmonary metastases occur most frequently, yet they can also localise in the abdominal lymph nodes, liver, adrenal glands, and skeletal system (12, 13). Alike, in the present case beside the melanoma metastasis to the retropharyngeal lymph nodes and lungs, there were detected single metastases to the liver and right kidney.

The other primary tumour – thyroid solid-follicular carcinoma was detected at necropsy. It was not palpable at the clinical examination. No metastatic foci of this neoplasm were recorded in the regional lymph nodes or internal organs. Therefore, it should be considered an “incidentaloma”, i.e. a lesion that does not induce any clinical symptoms (17). The medical reviews inform that the past decade has been marked with an increasing concern about thyroid neoplasms detected as an incidental finding. It has been confirmed that people, who had a malignant primary tumour in their history have a higher risk of developing a thyroid neoplasm. Incidentalomas exhibit the malignant properties more often as compared to tumours recognised in a conventional way (17). As for animals, thyroid tumours are mostly detected when an owner notices a big lump round the dog’s throat or some behavioural changes (6). To the present authors’ knowledge, the available literature does not provide any description of thyroid incidentaloma in animals, just like no phenomenon of peritoneal cavity lipoma coexisting with malignant neoplasm has been reported. The history data revealed that a lipoma had been developing for several years in the presented dog, yet its gradual abdominal enlargement did not worry the owner. It is believed, that occurrence of the clinical signs induced by the abdominal neoplasm depends on the adjacent organs, which are likely to be compressed by the lipoma developing in the body cavity (7). Although lipomas are occasionally found within the body cavity, they are promptly recognised owing to the characteristics in the anamnesis, the results of clinical, radiologic, and ultrasonographical examinations. They present a uniform parenchyma structure in both, radiographic and ultrasonographic evaluation (7, 9, 15). In the reported case; however, the image was not characteristic. The atypical lesions inside the lipoma visible at the histological examination appeared to be haematomas. The ultrasonographical image of a haematoma is subject to its organisation stage. A several-day-old haematoma image is hypeochogenic. It may contain the anechoic areas inside. Haematomas exhibit some sonographic characteristics related to time progression, like hyperechogenic septa and fibrous walls. Then resorption of the fluid content proceeds followed by the cicatrisation process, which depends on the haematoma size (9). The authors could not find any description of a large haematoma visualised in a sonographic image that was situated in a lipoma located within the body cavity. The lipomas described were shown to contain solely the pigment that occurred focally in single cells.

The reasons for the development of more than one tumour in a single individual have not been explained in full so far. Most often these are genetic factors, exposure to endogenic cancerogens or exogenic factors as well as impairment of the patient’s immunity.
The reported case implies that in both, animals and humans, different types of tumours can develop synchronically.

References