DIAGNOSTIC AND THERAPEUTIC PROTOCOL FOR MAMMARY TUMOURS IN CANINES AND FELINES

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Abstract

Mammary tumors are a common pathology among female cats and dogs, and less common in males of these species. Intact and older females are more susceptible to this condition. A mammary tumor is typically suspected when a lump is discovered during a physical examination of the abdominal area, along the mammary chains. Although surgical treatment is the therapy of choice in most cases, sometimes chemotherapy may be also required. Establishing a correct diagnosis is the foundation for individual optimisation of treatment, as well as the possibility to predict the course of the pathology and prognosis. Diagnosis is based on obtaining an accurate history, clinical, paraclinical and imaging examination of the patient. All this will allow a tumor staging, which will guide therapy and prognosis. This article presents a diagnostic and therapeutic algorithm developed after centralizing the latest data published in the literature, providing a guide in the management of mammary tumors in canids and felines.

Key words: mammary tumors, canine, feline, protocol

Mammary gland tumours are commonly seen in veterinary pathology, representing the most common neoplasms in unspayed bitches, while in cats they rank third in incidence after skin cancer and lymphoma (Withrow et al., 2012). Their development is based on an abnormal accumulation of cells due to excessive proliferation, insufficient apoptosis, and disturbances in cell differentiation (Hanahan & Weinberg, 2000; Tavasoly et al., 2013).

Despite having such a high frequency in veterinary medical practice, similar to pathology in human medicine, this neoplastic condition is still not fully elucidated being an open topic for study and analysis (Akram et al., 2017). Therefore, in the literature are encountered many publications, sometimes contradictory, which complicates the clinical approach to this disease. This study aimed to develop a protocol for diagnosis and therapy in mammary tumors, elaborated after centralizing the latest data published in the literature, which will facilitate the approach of this condition by the veterinarian in the clinic.

MATERIAL AND METHOD

The study was conducted by consulting PubMed, Google Scholar, ResearchGate, Scopus databases using keywords such as tumors, neoplasia, mammary gland, canine and feline.

RESULTS AND DISCUSSIONS

The results of this study were stated in the form of 2 diagrams, one for diagnosis and one for therapy *(Figure 1 and Figure 2)*.

Most of the time in canids and felines, the definitive diagnosis of mammary tumors is made after surgery (post-excision) by histopathological confirmation, which is why tumor staging is an extremely important step in the approach of patients (Goldschmidt et al., 2011; Rasotto et al., 2017). Staging actually involves finding out how far this pathology has progressed, and identifying the stage it has reached (Kaszak et al., 2022).

As shown in *Figure 1*, the diagnosis is based on obtaining an accurate history, clinical examination of the patient, as well as performing paraclinical examinations (fine needle aspiration, chest X-rays, biochemical and haematological examination, histopathological examination) whose result will allow the clinician to select the therapy.

The clinical examination includes a general evaluation of the patient and a specific assessment of the mammary glands. Each mammary gland will be examined and palpated individually in order to identify differences in consistency, as mammary tumours in canids often have a raised consistency and a nodular appearance. The number of mammary glands affected is identified, as well as

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adherence to underlying tissues (Sleeckx et al., 2011).

The tumour formation will be measured, given the fact that its size is also an important factor in staging. Regional lymph nodes will also be assessed, as both axillary and superficial inguinal lymph nodes can be identified on palpation if they are enlarged. The existence of metastases usually coincides with the observation of non-specific clinical signs such as weight loss, fatigue, lethargy, dyspnoea, cough, which is why the evaluation of the general condition is also important.

Fine needle aspiration of mammary gland tumours, although controversial due to the structural heterogeneity of the mammary gland, allows differentiation from other pathologies that require a different approach than mammary gland tumours, and therefore should also be performed (Dobson & Lascelles, 2011; Raskin & Meyer, 2016).

The definitive diagnosis, however, will only be made on the basis of histopathological examination (Bulman-Fleming, 2020).
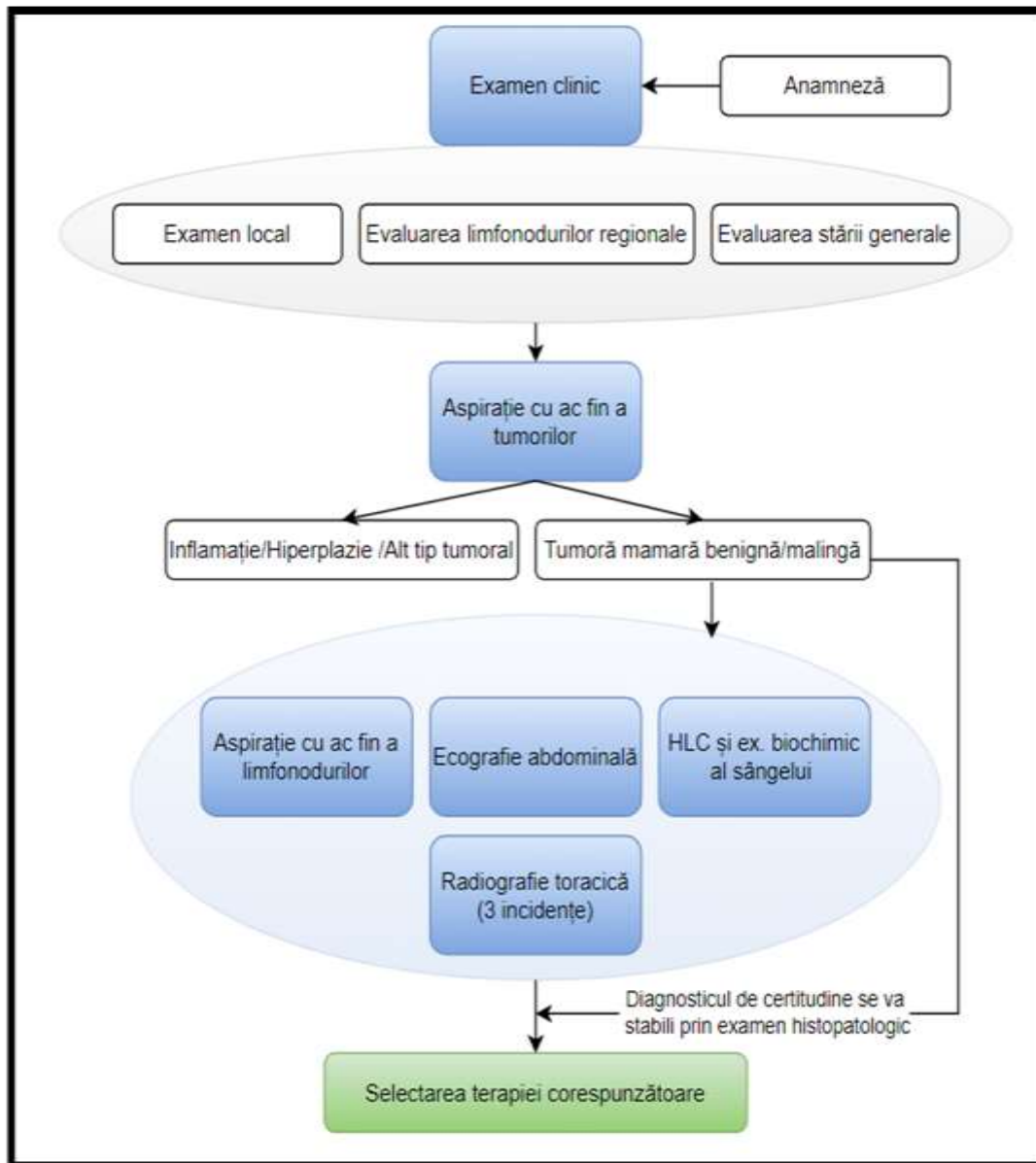

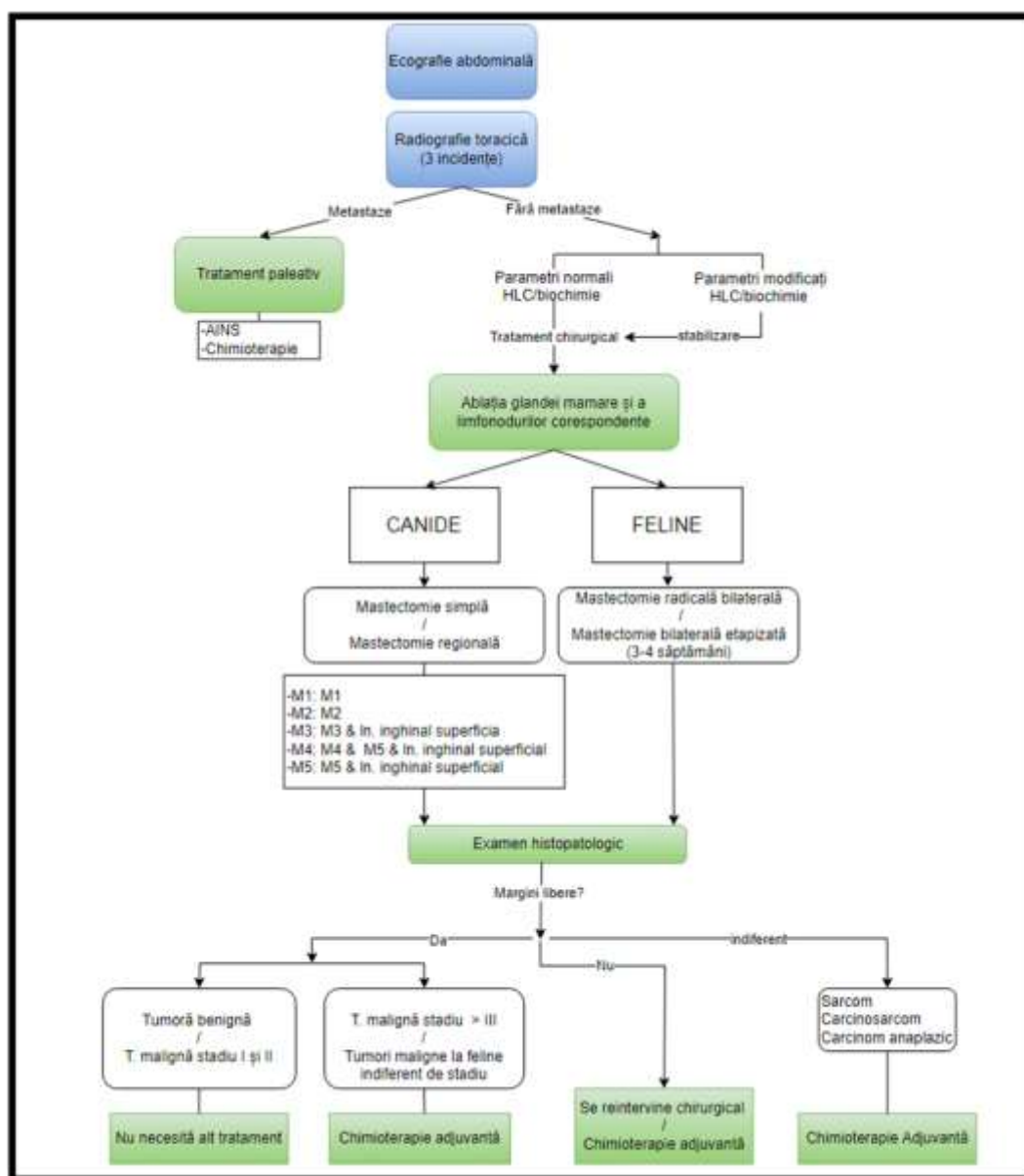Figure 1 **Diagnostic protocol in mammary tumors**

Figure 2 **Therapeutic approach to mammary tumours**

Fine needle aspiration of lymph nodes allows us to assess the extent of the tumour process. This will only be done if the lymph nodes are reactive, i.e. they are enlarged in volume and can be identified on palpation.

It is important to note that if no tumour cells are identified during this examination, a false-negative result cannot be excluded, however, their detection confirms the existence of metastases in the lymph nodes.

Radiological examination of the chest, in 3 views, is performed with the aim of identifying lung metastases. Computed tomography provides details that allow better identification of lung metastases, but due to high costs, low accessibility and the fact that it can only be performed under general anaesthesia, it is rarely used in diagnosis (Bulman-Fleming, 2020).

Abdominal ultrasound is also recommended to assess medial iliac and superficial inguinal lymph nodes in order to identify metastases earlier (Soler et al., 2016).

Biochemical and haematological profiling does not provide specific results for breast neoplasia, but is of preoperative importance by identifying concurrent geriatric conditions and paraneoplastic syndromes (Sleeckx et al., 2011).

By connecting the results obtained from all these investigations, tumor staging will be established and it will be possible to select the appropriate therapy (Withrow et al., 2012).

The first step in therapy will be determined by the outcome of the radiological and ultrasound examination. If metastases are found to be present, then surgery will not be pursued but palliative treatment will be initiated (Andrew Novosad, 2003; Valdivia et al., 2021).

However, if the patient does not have metastases, the treatment of choice is surgery, performing mammary gland ablation (Hörnfeldt & Mortensen, 2023; Tran et al., 2016).

It should be noted that the therapeutic approach to this pathology is very different in canids compared to felines. This is based on the much more aggressive phenotype found in felines, as well as the particularities of lymphatic drainage. About 80-90% of feline mammary tumours are malignant and with high metastatic potential, so their approach is also different (Cassali et al., 2018). In canids, about 50% of tumours are benign and malignant tumours have low metastatic potential, so a simple mastectomy is recommended, sometimes regional depending on the tumour location (as shown in the diagram).

In both species, however, the histopathological findings will guide the follow-up therapy, so that depending on the result obtained, it will be decided whether further surgery is necessary (when the excised margin was not large enough and neoplastic cells remained in the tissue), adjuvant chemotherapy (in the case of particular types of tumours, malignant tumours with stage greater than 3, or in any type of malignant tumour in cats), or no further treatment in the case of benign or incipient malignant tumours. There are several protocols described in the literature. In general, substances such as Doxorubicin, Cyclophosphamide and Carboplatin are used (Dobson & Lascelles, 2011; Withrow et al., 2012).

In terms of the chemotherapeutics used, there is no standard protocol yet. They are still being studied, including in women's breast cancer. Metronomic therapy is also frequently used and is based on the administration of low doses of cytostatics, having an antiangiogenic and immunomodulatory role, potentiated by the addition of non-steroids. It is therefore not a targeted therapy on tumour cells, but aims to decrease neoformation vessels (Mutsaers, 2009; Rossi et al., 2018).

Discussion with the owner is a key point when initiating chemotherapy treatment. It is very important to communicate to the owner that this chemotherapy will not cure the patient, but will slow down metastasis.

Periodic evaluation of the patient will be necessary, because before each administration of chemotherapy HLC and blood biochemistry will be mandatory, with special attention to lymphocytes, liver and kidney profile. Depending on these values the next step will be approached accordingly. The main adverse reactions that occur are of a digestive nature that can be treated like any normal gastroenteritis.

CONCLUSIONS

Establishing a correct diagnosis is the basis for individual optimisation of treatment, as well as the possibility to predict the course of the pathology and prognosis.

In cats, early diagnosis and aggressive surgery is the first-line treatment associated with a better prognosis.

Breast tumors in canids have a lower metastatic potential, so surgery is generally curative, but the outcome of the histopathological examination will indicate the need for further treatment.

Chemotherapy is used to slow the progression of the disease, not to cure the patient, an aspect that should be highlighted from the beginning to the owners.

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