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CASE REPORT
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Metastatic Intranasal Mastocytoma in a Dog

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ABSTRACT

***Background*:** Mast cell tumors (MCTs) are neoplasms originating from mast cells, which can be well or poorly differentiated. They are considered the most commonly diagnosed malignant cutaneous neoplasm in dogs; however, intranasal forms are still little reported. Thus, this study seeks to report a case of unilateral intranasal MCT exhibiting submandibular lymph node metastasis.

***Case*:** A 11-year-old-and-4-month-old dog of undefined breed (UB), weighing 41 kg, was referred to the Veterinary Medical Teaching Hospital of the University of Passo Fundo (UPF), in the state of Rio Grande do Sul, Brazil. Presenting a clinical history of bilateral purulent nasal secretion, accompanied by sneezing in the two months prior to admission, in addition to vomiting and diarrhea. Auxiliary tests were requested, including skull X-ray, cytology of the nasal cavity with a swab, and collection of material from the submandibular lymph node directly through cytology with a needle. Cytological findings from the right nasal cavity were consistent with mast cell tumors (MCTs). Cytological analysis of the left nasal cavity was compatible with dysplasia/cellular reactivity. A heterogeneous population of cells was detected on cytology of the right submandibular lymph node. These findings were consistent with MCT lymph node metastasis. Skull radiography showed an increase in both opacity and soft tissue extension, surpassing the palate, from the canine tooth through the caudal region of the maxillary sinuses to the last molar, without bone destruction. The dog was then admitted for an abdominal ultrasound, which showed no changes in the spleen or liver. The leukocyte count showed mild lymphopenia and the presence of reactive lymphocytes. Through the buffy coat, the presence of rare round cells, compatible with circulating mast cells, was detected. Due to the biological behavior of the neoplasm and its anatomical location, the established therapy was based on the use of vinblastine and prednisolone. The patient did not show any clinical improvements. In a joint decision with the patient's guardian, the dog was euthanized.

***Discussion*:** Intranasal MCTs commonly present progressive and intermittent unilateral epitaxis, mucopurulent nasal discharge, dyspnea, and ocular discharge. Several anatomical sites were associated with more aggressive neoplastic phenotypes; those with an unfavorable prognosis were mainly those present in the oral and intranasal mucosa. Cytopathological examination is considered a highly sensitive method for the diagnosis of MCTs. Metastases are present in more than 90% of mucosal MCTs, usually affecting regional lymph nodes and associated with a poor prognosis. Radiography is considered a useful test in determining the size and location of tumors in the nasal cavity. Chemotherapy plays an important role in the treatment, especially in cases like the one described in this report, in which surgical excision is not possible due to the anatomical location of the neoplasm. Intranasal MCTs are uncommon in dogs. In this case, he presented aggressive, metastatic behavior and a poor response to antineoplastic therapy. Furthermore, due to the location of these tumors, they may be clinically similar to a number of other upper respiratory tract diseases, posing a diagnostic challenge. Therefore, it is essential that the search for differential diagnoses be carried out through auxiliary tests, such as cytology and imaging.

Keywords: neoplasm, cytology, diagnosis, chemotherapy.

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INTRODUCTION

Mastocytomas (MCTs) represent the third most commonly diagnosed neoplasm in dogs and usually present cutaneous or subcutaneous [1]. Extra cutaneous locations, such as intranasal, were associated with more aggressive phenotypes and considered unfavorable prognosis [8]. Another important factor for determining prognosis is the presence of lymph node metastases, generating negative impacts on the therapeutic direction [19]. With regard to diagnosis, the use of cytology is a fast, low invasive and highly sensitive method for the confirmation of neoplasia [18]. Although surgery remains the most efficient method of treatment, the use of chemotherapy protocols needs to be considered in neoplasms at high risk of developing metastases or in truly unresectable ones, such as intranasal localized ones [1, 18].

Thus, this study seeks to report a case of unilateral intranasal MCT exhibiting submandibular lymph node metastasis, with emphasis on its anatomical location and diagnostic aspects.

CASE

A 11-year-old-and-4-month-old dog of undefined breed (UB), weighing 41 kg, was referred to the Veterinary Medical Teaching Hospital of the University of Passo Fundo (UPF), in the state of Rio Grande do Sul, Brazil. Presenting a clinical history of bilateral purulent nasal secretion, accompanied by sneezing in the 2 months prior to admission, in addition to vomiting and diarrhea. Based on this, auxiliary exams were requested, including skull radiography, which showed an increase in soft tissue opacity in the ventrodorsal view of the open mouth from the palate to the fourth premolar region, without loss of turbinate structure. In addition to cytology of the nasal cavity using a swab, and collection of material from the right submandibular lymph node through cytology with a 25 mm x 0.70 mm needle.

Little differentiated and individualized round cells were observed in the right nasal cavity. They presented marked anisocytosis, clear cytoplasm with a discrete number of evenly distributed metachromatic granules, variable nucleus:cytoplasm ratio, round and eccentric nuclei with moderate to intense anisokaryosis, coarse chromatin and evident nucleoli (n=1 to 4), with moderate anisonucleosis (Figure 1). Occasional mitotic figures and moderate presence of inflammatory infiltrate, in addition to free granules at the bottom of the slide, were also observed. Cytological findings were consistent with mast cell tumors (MCTs). Cytological analysis of the left nasal cavity was compatible with dysplasia/cellular reactivity. A heterogeneous population of cells was detected on cytology of the right submandibular lymph node. This population consisted of 39% of poorly differentiated mast cells similar to those in the right nasal cavity (Figure 2); 24% small lymphocytes; 21% eosinophils, 15% segmented neutrophils; 1% macrophages. These findings were consistent with MCT lymph node metastasis.

A follow-up skull radiography (Figures 3 A & B) showed an increase in both the opacity and the extension of the soft tissue, surpassing the palate, from the canine tooth through the region of the caudal maxillary sinuses up to the last molar, without bone destruction. The dog was then admitted for an abdominal ultrasound, which showed no alterations in the spleen or live. The other organs also presented no significant alterations. Red blood cell count, platelet count, and total plasma protein test were all within the reference range for the species. The leukocyte count showed mild lymphopenia and the presence of reactive lymphocytes. Through the buffy coat, the presence of rare round cells was detected, compatible with circulating mast cells (Figure 4).

From these findings, a chemotherapy protocol was established, including chemotherapy[1] [Vinblastine - 2 mg/m^2/week] with corticosteroid[2] [Prednisolone® - 2 mg/kg/week] as an adjuvant drug. Chemotherapy sessions did not result in a good clinical response, as the patient began to have epistaxis, intensified inspiratory dyspnea and purulent ocular secretion in the right eye. Along with selective appetite, which can sometimes be characterized as anorexia associated with the occurrence of vomiting. Evolving to generalized weakness and inability to support your own weight. Given the malignancy of the neoplasm, its location and rapid infiltration, in addition to the presence of regional lymph node metastasis, we discussed the prognostic perspectives with the dog's owner, and it was decided that the patient's euthanasia should be performed.

DISCUSSION

Regarding the presence of intranasal mast cell tumors, the most commonly observed clinical signs include progressive and intermittent unilateral epista-

xis, mucopurulent nasal discharge, sneezing, dyspnea and ocular discharge [4,5,11,12]. Several anatomic sites were associated with more aggressive neoplasm phenotypes; those with an unfavorable prognosis were mainly extracutaneous neoplasms present in the oral and intranasal mucosa [8,17]. When compared to other extracutaneous MCTs, the intranasal location leads to a shorter survival period and may be associated with complications in the brain or with optic involvement, advanced stage of the disease due to the late onset of clinical signs, and complex regional anatomy preventing surgical resection [9].

Radiography is considered a useful test in determining the size and location of nasal cavity tumors in dogs and is usually capable of showing increased soft tissue radiopacity, aggressive bone invasion, and loss of nasal turbinate details [12,15]. Despite the absence of bone lysis, the changes in the patient's radiographic findings reveal rapid development of the neoplasm in a short period, indicating aggressive biological behavior and unfavorable prognosis. Cytopathological examination is considered a highly sensitive method for diagnosing MCTs, and the observation of a high degree of cellular pleomorphism can suggest neo-

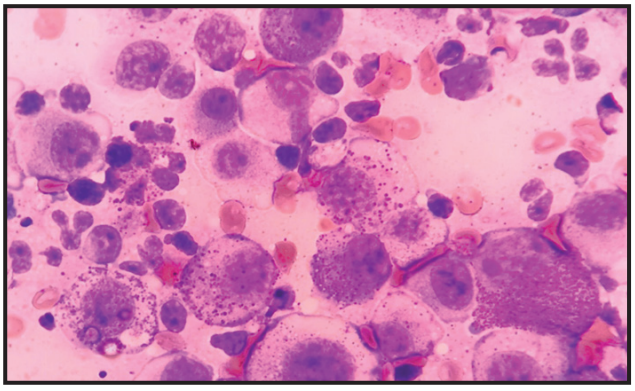

Figure 1. Cytology of the right intranasal cavity through swab showing poorly differentiated and individualized round cells with marked cellular pleomorphism, compatible with mast cell tumors. [Fast panoptic staining; 1000x].

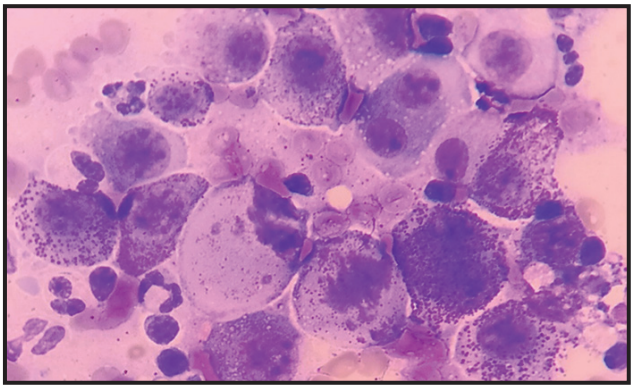

Figure 2. Submandibular lymph node fine needle cytology with the presence of binucleated neoplastic mast cells and variable presence of metachromatic granules compatible with mast cell metastasis. [Fast panoptic staining; 1000x].

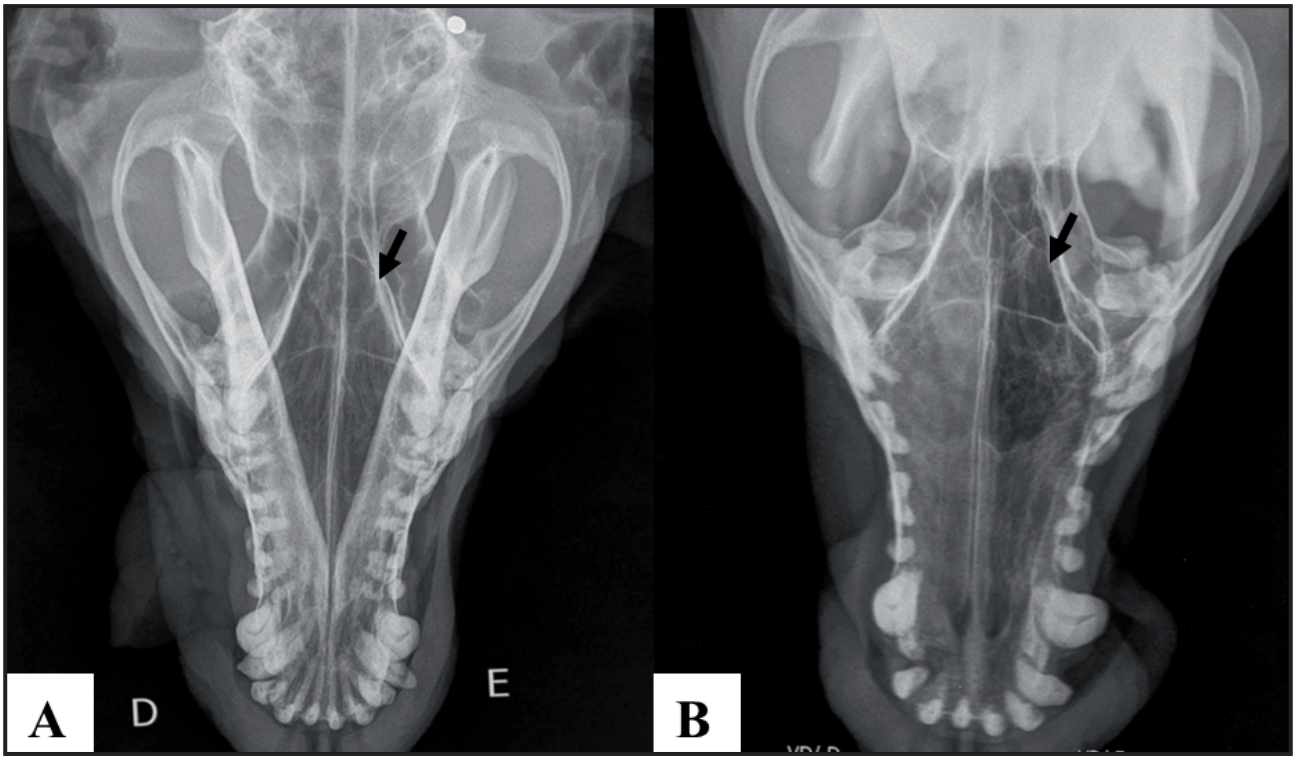

Figure 3. Ventrodorsal open mouth radiograph of a dog. A- Showing increased soft tissue opacity (arrow) from the palate to the fourth premolar, indicative of a neoplastic mass. B- Progression of the case of a dog diagnosed with intranasal mast cell tumor with increased opacity and soft tissue extension (arrow) in the intranasal region.

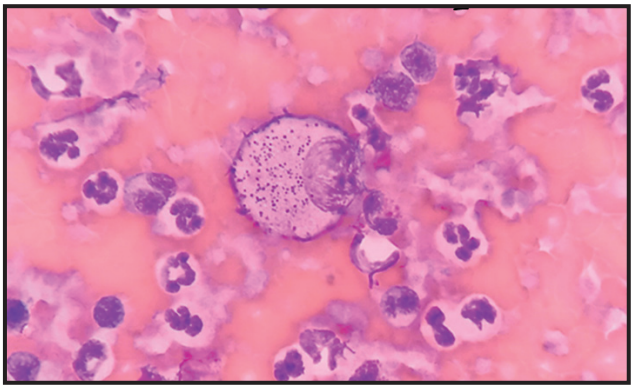

Figure 4. Presence of round cells compatible with mast cells (arrow) in the buffy coat of a canine with intranasal mast cell tumor. [Fast panoptic staining; 1000x].

plasm with more aggressive behavior [14]. However, it is known that histological review is considered the gold standard for tumor classification purposes. In this particular case, a histopathological examination was not carried out due to the difficulty of performing a biopsy at the anatomical location in question and the general condition of the patient.

Biological behavior can be unpredictable, and metastases are present in more than 90% of mucosal MCTs, usually affecting regional lymph nodes and associated with poor prognosis [20]. Authors observed metastatic lymph node involvements in two of the four dogs with intranasal MCT [9]. Lymph nodes with more than 3% of their population consisting of mast cells should be considered metastatic [3], which is in line with what was observed in the patient's lymph node cytology. As the case progressed, the patient began to present clinical signs of the gastrointestinal tract and facial edema resulting from mast cell degranulation and extravasation of histamine, heparin, and chemotactic factor for eosinophils and proteolytic enzymes. The increase in these substances can result in gastroduodenal ulcerations since, with the increased histamine blood levels, a stimulus of H2 receptors in the parietal cells occurs, increasing the production of gastric acid and, consequently, gastric motility, which accounts for the manifestation of acute vomiting and diarrhea in the patient [9]. The facial edema can also be explained as a result of the release of vasoactive substances that cause this clinical change due to increased tissue permeability [18].

As for the white blood cell count, the occurrence of lymphopenia can be explained as a result of a stress-induced response since the patient was experiencing pain and respiratory discomfort [16]. The visualization of mast cells in the buffy coat represents an important finding since these cells are rarely found in blood circulation and are more frequently related to cases of cutaneous or extracutaneous metastatic MCTs. Patients with MCTs may exhibit peripheral blood and bone marrow involvement [6]. The detection of neoplastic mast cells visualized in the buffy coat mear in the present case may be related to the initial spread of the neoplasm, which would negatively alter the prognosis [2].

Due to the similarities of the clinical signs and laboratory findings of intranasal MCTs with other diseases that affect the nasal cavity, different diagnoses such as mycotic, bacterial, and parasitic rhinitis, as well as nasal foreign bodies, nasal polyps, and other neoplasms should be considered during clinical consultation [7,14]. Furthermore, concerning the intranasal neoplasms, adenocarcinomas and squamous cell carcinomas are more commonly diagnosed, followed by chondrosarcomas; in contrast, hemangiosarcomas, transmissible venereal tumors, melanoma, and MCTs are diagnosed less frequently [5,11,13]. Chemotherapy plays an important role in the treatment, especially in cases like the one described in this report, in which surgical excision is not possible due to the anatomical location of the neoplasm. The main drugs used in these cases are vinblastine, which acts by interrupting the polymerization of microtubules, consequently preventing cell metaphase and mitosis, along with prednisolone, which acts on specific receptors and sensitive cells, inhibiting cell division [10].

Despite the choice of the most effective chemotherapy protocol and hospital care, clinical signs persisted and epistaxis control proved very challenging, as was anorexia. After the sixth cycle of chemotherapy, it became clear that the neoplasm persisted in its aggressive nature, causing a significant loss in the patient's quality of life, which led to the decision to perform euthanasia. Intranasal MCTs in dogs are uncommon and have a poor prognosis, with low life expectancy, ranging from 24 to 134 days [9]. In this case, he presented aggressive, metastatic behavior and poor response to antineoplastic therapy. Moreover, due to the location of these tumors, they may be clinically similar to a range of other upper respiratory tract disorders, representing a diagnostic challenge. Therefore, it is essential that the search for differential diagnoses be performed through auxiliary tests, such as cytology and imaging.

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Declaration of interest. The authors declare no conflicts of interest. The authors are the only responsible for the content and writing of this article.

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