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Xanthogranulomatous mastitis in a female dog

Mastite xantogranulomatosa em fêmea canina

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ABSTRACT: Xanthogranulomatous mastitis (MXG) is a rare chronic inflammatory condition of the breast. In women, it raises concern and requires a biopsy due to the clinical-radiological similarity with breast neoplasia. The definitive diagnosis is given through histopathological examination. In canine females, chronic benign non-neoplastic lesions in the mammary glands are not frequently described, such as MXG. The objective of this work is to describe the clinicopathological findings of a case of xanthogranulomatous mastitis in a female canine. The case occurred in a female Pinscher breed, 8 years old, not castrated, who presented irregular heat, in addition to a history of galactorrhea and treatment with antigalactogenic drugs. The physical examination revealed the presence of a nodule in the left mammary chain, affecting the caudal thoracic mammary gland (M2E). Due to the fear that it was a malignant neoplasm, the treatment was a radical mastectomy of the left mammary chain, followed by an anatomopathological examination of all glands. Histologically, the M2E nodule was made up of cracks and cholesterol crystals associated with the presence of numerous lipid-laden macrophages and multinucleated giant cells, characterizing it as xanthogranulomatous mastitis.

KEYWORDS: chronic mastitis; mammary gland; inflammation; female canine.

RESUMO: A mastite xantogranulomatosa (MXG) é uma rara condição inflamatória crônica da mama. Em mulheres inspira preocupação e exige biópsia devido a semelhança clínico-radiológica com neoplasia mamária. O diagnóstico definitivo é dado por meio do exame histopatológico. Em fêmeas caninas, lesões benignas não neoplásicas crônicas nas glândulas mamárias não são descritas com frequência, a exemplo da MXG. O objetivo deste trabalho é descrever os achados clínico-patológicos de um caso de mastite xantogranulomatosa em uma fêmea canina. O caso ocorreu em uma fêmea canina, raça Pinscher, 8 anos de idade, não castrada, que apresentava cio irregular, além de histórico de galactorreia e de tratamento com antigalactogênico. No exame físico foi constatada presença de nódulo na cadeia mamária esquerda, acometendo a glândula mamária torácica caudal (M2E). Pelo receio de tratar-se de neoplasma maligno, o tratamento instituído foi a mastectomia radical da cadeia mamária esquerda, seguido de exame anatomopatológico de todas as glândulas. Histologicamente, o nódulo da M2E era constituído de fendas e cristais de colesterol associados à presença de numerosos macrófagos carregados de lipídios e de células gigantes multinucleadas, caracterizando tratar-se de uma mastite xantogranulomatosa.

PALAVRAS-CHAVE: mastite crônica; glândula mamária; inflamação; cadela.

INTRODUCTION

Xanthogranulomatous mastitis (MXG) is a rare chronic inflammatory disease of the breast (Koo; Jung, 2009). It is a benign, non-neoplastic pathological condition with unknown etiopathogenesis, although it is admitted that obstruction, hemorrhage, inflammation, and hypoxia in the ducts can cause it (Bamanikar *et al.*, 2018; Lee; Lee; Peng, 2022). The condition affects young women, with a history of recent lactation and manifests itself with an increase in the volume of firm consistency and high sensitivity of the breast (Zarami *et al.*, 2022). In most cases in women, this lesion is evidenced during mammography examination with subsequent recommendation of biopsy due to its firm consistency during palpation examination and its radiological similarity to breast cancer (Miszkiel *et al.*, 2000; Oliveira *et al.*, 2017; Zahid; Kummarapurugu; Alrefai, 2021). There are still few cases reported in humans, and to date, there is no description of cases in female dogs. Thus, this work aims to describe a case

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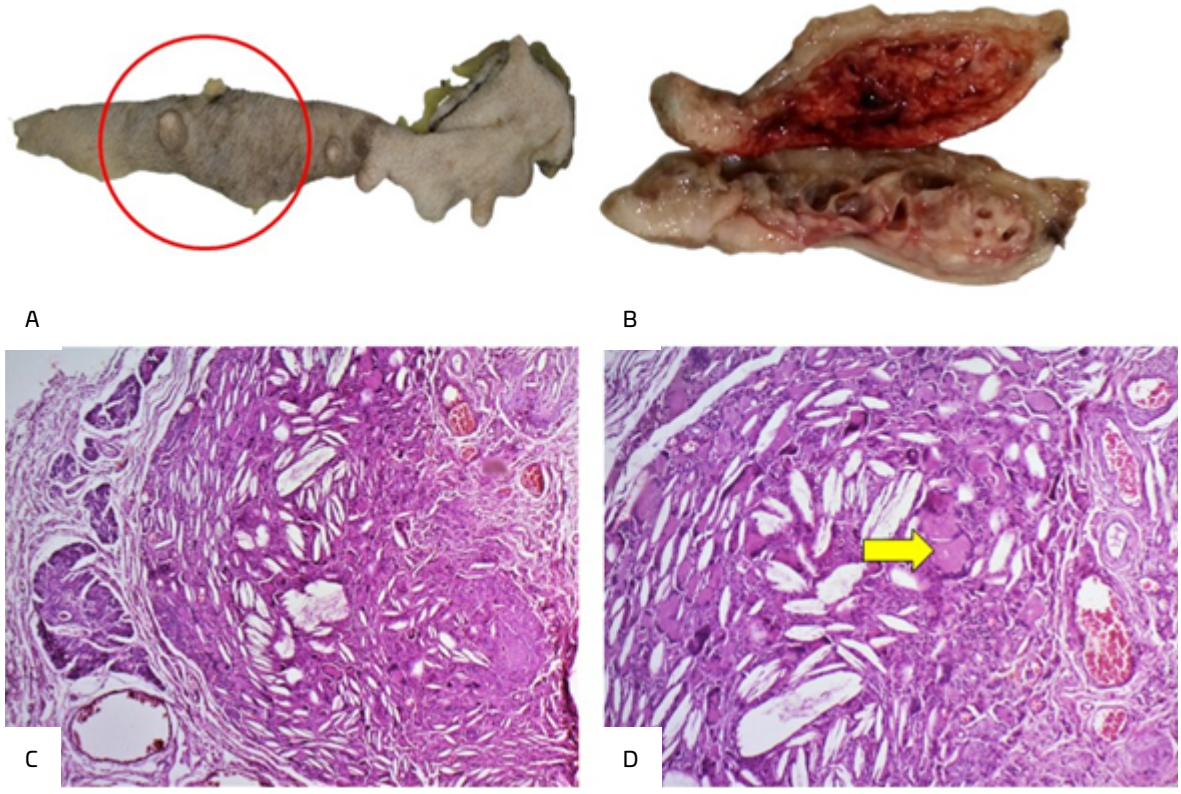
of xanthogranulomatous mastitis in a female dog, characterizing its clinicopathological aspects.

CASE REPORT

The case occurred in a female dog, Pinscher, 8 years old, 4.2 kg, not castrated, who presented irregular heat, in addition to a history of galactorrhea and treatment with antigalactogen. The physical examination revealed the presence of a nodule in the left mammary chain, affecting the caudal thoracic mammary gland (M2E). A cytopathological examination was carried out, but the sample was inadequate due to low cellularity, so collection and histopathological analysis were suggested. The treatment instituted was radical mastectomy of the left mammary chain and excision of the left axillary lymph node, with subsequent referral of samples for pathological examination.

On macroscopy, the segment of the left mammary chain measured 20x4.5x1.5 cm and had a surface covered by brown skin, rough texture and hair, in addition to five papillae referring to the cranial thoracic (M1E) and caudal thoracic (M2E) mammary glands.), cranial abdominal (M3E), caudal abdominal (M4E) and inguinal (M5E). M2E had a surface showing a nodule covered by intact skin and measuring 7.5x5.5x1 cm (Figure 1 A). The sections showed an abundant presence of adipose tissue and the nodule exhibited multiple cystic cavitations filled with brown liquid content (Figure 1 B). The other mammary glands and the left axillary lymph node did not show macroscopic changes. The samples were fixed in 10% formalin and processed by conventional histochemical methods to obtain permanent histological preparations stained with hematoxylin and eosin.

Histologically, the M2E nodule was made up of cracks and cholesterol crystals associated with the presence of numerous lipid-laden macrophages (also called xanthoma cells or foamy histiocytes) and multinucleated giant cells, characterizing xanthogranulomatous mastitis, sometimes compressing the parenchyma. (Figure 1 C-D). In the breast tissue, numerous markedly dilated ducts were also observed with traces of suppurative inflammatory content in the lumen (cystic ectasia), in addition to focal atypical lobular hyperplasia, moderate multifocal ductal epithelial hyperplasia, and moderate multifocal ductal ectasia. For differential diagnosis, Ziehl Neelsen staining was performed, but no Alcohol-Acid Resistant Bacilli (AFB) were detected. Regarding the analysis of the other mammary glands, epithelial hyperplasia of the ductal type and adenosis type was observed, in addition to ductal ectasia. The left axillary lymph node showed only moderate multifocal reactional lymphoid hyperplasia.



Source: Author, 2023.

Figure 1. Xanthogranulomatous mastitis in a female dog. (A) Left caudal thoracic mammary gland (M2E) showing a nodule covered by intact skin, measuring 7.5x5.5x1 cm (circle). (B) The cuts contain abundant adipose tissue and the nodule displays multiple cystic cavitations filled with brown liquid content. (C) Nodule consisting of cracks and cholesterol crystals associated with the presence of numerous lipid-laden macrophages (xanthoma cells or foamy histiocytes) and multinucleated giant cells. HE, 50x. (D) Multiple cholesterol clefts are associated with the presence of numerous xanthoma cells (foamy histiocytes) and multinucleated giant cells (arrow). HE, 100x

DISCUSSION

The term xanthogranuloma originates from the union of xanthoma, that is, the accumulation of lipids within macrophages, and granuloma, a lesion characterized by chronic inflammation rich in macrophages and giant cells. Thus, xanthogranuloma consists of chronic inflammation in tissue rich in adipocytes (Cozzutto; Carbone, 1988), as is the case of the mammary glands. As observed in the case we are reporting, in breast lesions of women, MXG, a rare chronic inflammation, is characterized by clusters of macrophages (histiocytes) with a foamy appearance, immersed in and/or phagocytosing lipid content, in addition to the presence of cells of the Touton type, which are multinucleated giant cells with abundant lipid content (Jyoti *et al.*, 2013; Koo; Jung, 2009; Zahid; Kummarapurugu; Alrefai, 2021; Zarami *et al.*, 2022).

The causes for the development of MXG are poorly understood and there is a need for more studies to better understand it. However, it is known that its occurrence occurs, above all, in tissues rich in lipids after episodes of trauma and/or tissue necrosis. Furthermore, it is related to risk factors such as ductal obstruction, hemorrhage, inflammation, hypoxia, defective lipid transport, and autoimmune and allergic diseases (Bamanikar *et al.*, 2018; Koo; Jung, 2009; Zarami *et al.*, 2022). In women, the clinical presentation of MXG is variable, however, the majority of patients present with breast nodules that can mimic benign or malignant breast neoplasia (Zarami *et al.*, 2022). MXG may be related to the history of the female dog in question, which presented irregular heat and, therefore, repeated hormonal influence on the mammary glands, in addition to the occurrence of galactorrhea with consequent episodes of mastitis.

In women, even in the early stages, imaging tests are very important to check the presence and appearance of possible breast lesions, benign or malignant. Complementary exams such as anatomopathological analysis are essential to obtain a definitive diagnosis (Clemente *et al.*, 2019; Kapoor *et al.*, 2021; Şeker, 2021; Tang *et al.*, 2021). As in the present case, the histopathological examination reveals that the change is not a neoplasia but a chronic inflammatory process (Bamanikar *et al.*, 2018; Hussain *et al.*, 2012; Jyoti *et al.*, 2013).

In canine females, the use of imaging exams for the evaluation and diagnosis of mammary nodules is uncommon, with radiography being widely used in the search for metastases. For changes in the mammary glands, the usual practice in veterinary medicine is a clinical and physical examination, including palpation of the mammary glands of the right and left chain, cytological examination and when there are nodules, the recommended treatment is surgical removal of the gland(s). affected breast(s), the entire chain or both breast chains (Cassali; Nakagaki, 2023).

In veterinary medicine, it is still necessary to raise awareness among owners about the importance of routine consultations and exams for companion animals, especially concerning the early diagnosis of pathologies, such as mammary neoplasms. In women, breast nodules have a differential diagnosis of diseases that cause inflammation in the breast such as MXG, as well as granular cell tumor, histiocytoid carcinoma, invasive carcinoma, and lipid-rich breast cancer (Zarami *et al.*, 2022).

Thus, it is noteworthy that in canine females, MXG is a benign, non-neoplastic, chronic inflammatory lesion, also rare and of little-known origin, which mimics mammary neoplasia in both women and canine females. As a result, the diagnosis must combine clinical aspects, imaging, cytopathological examinations, and mammary incisional biopsy, with the aim of a more assertive and less invasive therapeutic approach, since in malignant neoplasms in canine females the treatment consists of radical mastectomy. Furthermore, the anatomopathological analysis of surgical specimens is also essential for diagnostic conclusion.

CONCLUSION

The anatomopathological analysis was essential to establish that the breast lump noticed on clinical-physical examination and surgically removed, due to the fear that it was a malignant neoplasm, was a chronic inflammatory lesion. The occurrence and description of cases of this nature are extremely relevant as they are exceptional in female canine breasts.

REFERENCES

BAMANIKAR, S. A. *et al*. A rare case of xanthogranulomatous mastitis with intraductal papilloma. **Medical Journal of Dr. DY Patil University**, v. 11, n. 4, p. 348-351, 2018.

CASSALI, G. D.; NAKAGAKI, K. Y. R. **Patologia Mamária Canina e Felina do Diagnóstico ao Tratamento.** 2. ed. São Paulo, SP: Medvet. 2023. 548p.

CLEMENTE, L. C. *et al*. Suspicious microcalcifications associated to Xanthogranulomatous Mastitis. **Virchows Archiv**, v. 475, n. 1, p. 244-244, 2019.

COZZUTTO, C.; CARBONE, A. The xanthogranulomatous process: xanthogranulomatous inflammation. **Pathology-Research and Practice**, v. 183, n. 4, p. 395-402, 1988.

HUSSAIN, T. *et al*. Xanthogranulomatous inflammation involving latissimus dorsi donor site and implant breast reconstruction: case report and literature review. **World Journal of Surgical Oncology**, v. 10, p. 1-4, 2012.

JYOTI, K. *et al*. Comparison of fine needle aspiration cytology of non-neoplastic lesions of breast with histopathology. **Scholars Journal of Applied Medical Sciences**, v. 1, n. 6, p. 804-813, 2013.

KAPOOR, H. *et al*. Xantho-granulomatous mastitis preceded by cysts on ultrasound: Two cases with review of literature. **Clinical Imaging**, v. 78, p. 64-68, 2021.

KOO, J. S.; JUNG, W. Xanthogranulomatous mastitis: clinicopathology and pathological implications. **Pathology international**, v. 59, n. 4, p. 234-240, 2009.

LEE, S. D.; LEE, H. S.; PENG, N. J. Mastite xantogranulomatosa mimetizando como câncer de mama em F-18 FDG PET/CT. **Journal of Nuclear Medicine and Molecular Imaging**, v. 35, n. 1, p. 24-27, 2022.

MISZKIEL, K. A. *et al*. Radiological and clinicopathological features of orbital xanthogranuloma. **British journal of ophthalmology**, v. 84, n. 3, p. 251-258, 2000.

OLIVEIRA, I. *et al*. Xanthogranulomatous mastitis mimicking locally advanced breast cancer. **The Breast Journal**, v. 23, n. 2, p. 227-229, 2017.

ŞEKER, N. S. Idiopatic granulomatous lobular mastitis. **Research & Reviews in Health Sciences**, v. 1, n. 1, p. 165-174, 2021.

TANG, E. L. S. *et al*. The therapeutic dilemma of idiopathic granulomatous mastitis. **Annals of the Academy of Medicine, Singapore**, v. 50, n. 8, p. 598-605, 2021.

ZAHID, I. G.; KUMMARAPURUGU, S.; ALREFAI, S. Xanthogranulomatous breast mass: an unusual presentation. **Cureus**, v. 13, n. 9, 2021.

ZARAMI, A. B. *et al*. Xanthogranulomatous Mastitis: Report of a rare case and review of literature. **Borno Medical Journal**, v. 19, n. 1, p. 77-81, 2022.