

Surgical management of mammary gland fibroma in a two-year old Boerboel bitch- a case report

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ABSTRACT

Accurate diagnosis and prompt treatment of canine mammary tumours are crucial for achieving a positive outcome. A two-year and two months old Boerboel bitch weighing 40 kg was presented to the Veterinary teaching hospital (VTH) of the Michael Okpara University of Agriculture, Umudike with a primary complaint of enlarged mammary gland. Physical examination showed that the caudal mammary gland was enlarged and firm, measuring approximately 12 cm x 8.5 cm but with no evidence of pain on palpation. The physiological parameters which included heart rate (110 beats/minute), pulse rate (110 beats/minute), rectal temperature (39.9°C), and Respiratory rate (15 cycles/minute) were within the normal ranges for dogs. The capillary refill time was less than 2seconds and the mucous membrane was normal. Fine needle cytology showed neoplastic fibroblasts while preoperative radiograph revealed no pulmonary metastasis. The patient was evaluated for surgical fitness and a simple mastectomy was performed under general anaesthesia. Xylazine-Ketamine anaesthetic protocol was used following a standard procedure. Histopathology of the excised tissue revealed severe proliferation of fibrous connective tissue that had disrupted the normal histologic architecture of the mammary gland which confirmed mammary gland fibroma. The patient made an uneventful recovery from anaesthesia and was given post-surgical treatment and care. One year post-surgery the bitch whelped successfully and there was no reoccurrence. It is obvious from this report that careful surgical excision of mammary gland fibromas using wide margins and ensuring complete elimination of the entire tumour not only cures the condition, but also ensures there would be no reoccurrence.

Keywords: Bitch, Boerboel, fibroma, mammary gland, mastectomy

INTRODUCTION

Mammary tumours are the most common type of tumours in bitches (Fasseha, 2020) with higher incidence in intact females than spayed ones (Kamble *et al.*, 2016). Bitches spayed before their first heat have 0.5% of the risk of developing mammary gland tumor while those spayed after just one heat cycle have 8% (Klopfleisch *et al.*, 2010). The exact causes for canine mammary tumours are not fully understood but the most important factors influencing its incidence and development include breed, hormones, diet, age, genetic predisposition, and cyclooxygenase-2 expression (Sleekx *et al.*, 2011). Canine mammary gland tumours can occur in any breed, but more cases were reported in Cocker Spaniels, Poodles, Dachshunds, German Shepherds, and Labrador Retrievers (Salas-Araujo *et al.*, 2016). The median age of affected dogs is between 8-10 years (Pastor *et al.*,

2018). It has also been demonstrated that obesity and consumption of red meat are associated with an increased risk of mammary gland tumours in both intact and ovariectomized bitches (Joshi *et al.*, 2012). Mammary gland tumors can be malignant or benign, and arise from the different types of tissues including epithelial or glandular tissues, and mesenchymal or connective tissues in the mammary gland. Benign connective tissue tumours are also known as fibromas, and are mostly encountered around the trunk, eye and neck but may grow in any organ (Heenan, 2016).

Treatment of canine mammary tumours includes surgery, radiotherapy, hormonal therapy and chemotherapy (Fossum, 2013). However, surgery remains the preferred option for many of the mammary tumours and is especially reliable in patients with benign or early stage tumours (Sorenmo, 2011).

The goal of surgery is to remove all tumour tissues thereby preventing the development of new tumours in the mammary glands (Sorenmo, 2011). Different surgical techniques can be used including lumpectomy, regional mastectomy, simple mastectomy, and unilateral/bilateral mastectomy (Sleekx *et al.*, 2011). This case report presents a case of a mammary gland fibroma treated by simple mastectomy.

CASE PRESENTATION

Case history

A 2-years and two months old Boerboel bitch of 40 kg was presented to the Veterinary teaching hospital (VTH) of Michael Okpara University of Agriculture, Umudike with an enlarged mammary gland. The mammary growth was first noticed two months earlier and had regressed and reoccurred once within that period. The last parturition was 8 months prior to presentation while the last heat was about 2 months before presentation at the VTH.

Patient evaluation

The bitch was in good body condition. The left caudal (5th) mammary gland was enlarged, firm (solid), measuring approximately 12 cm x 8.5 cm (Fig IA), with no evidence of pain on palpation. The heart rate (110 beats/minute), pulse rate (110 beats/minute), rectal temperature (39.9°C) and respiratory rate (15 cycles/minute) were all within the normal range of values for dogs. The capillary refill time was <2 seconds and the mucous membrane was normal. The PCV (45%) and other red cell indices as well as the white cell indices of the patient were within the normal ranges for dogs, an indication that the patient was fit for surgery, while fine needle cytological examination confirmed the growth to be neoplastic. Preoperative radiographs of the thoracic region showed no pulmonary metastasis.

SURGICAL PROCEDURE

PREOPERATIVE PREPARATION AND ANAESTHESIA

The area around the base of the left caudal mammary gland was clipped extensively and prepared for aseptic surgery. The bitch was placed on IV fluid therapy (0.9% normal saline at 25 mL/kg/hr intraoperatively) and was premedicated with Atropine sulphate (JiangouHuayang Pharmaceutical Co. Ltd., China) at 0.025 mg/kg IM and Xylazine HCl (VMD, Arendonk, Belgium) at 1.5 mg/kg IM 5 minutes later. Induction of anaesthesia was achieved with Ketamine (Swiss Parenteral Ltd, India) at 10 mg/kg IM 10 minutes after administration of Xylazine. Anaesthesia was maintained with Ketamine (Swiss Parenteral Ltd, India) at 5 mg/kg IM.

SURGICAL TECHNIQUE

An elliptical skin incision was made around the affected mammary gland, about 2 cm from the base. The subcutaneous tissue was incised to expose the underlying abdominal fascia. The edge of incised tissue was elevated and the subcutaneous

tissue was then separated from the fascia by sliding a sharp scissors through the abdominal fascia. The dissection was continued carefully to minimize incisions on the mammary tissue. Haemorrhage from small bleeders was controlled with thermocautery and haemostats. The major blood vessels (caudal superficial epigastric vessels) supplying the gland were carefully isolated and double ligated using size 2-0 chromic catgut (Fig IB). The dissection was continued deep into the rectus fascia until the mammary gland was completely excised (Fig IC). The excised mass was fixed in 10% phosphate-buffered formal saline (Sigma-Aldrich Laborchemikallen GMBH, Germany) and sent to the histopathology lab for examination. The surgical wound was flushed with normal saline and the subcutaneous tissue sutured using size 2-0 chromic catgut in a subcuticular suture pattern (Fig ID) to pull the wound edges closer and reduce tension. The skin was apposed and sutured with size 2 nylon suture material using horizontal mattress suture pattern.

Post-operatively, the wound was cleaned and properly dressed. Diclofenac sodium (JiangouHuayang Pharmaceutical Co. Ltd., China) 1 mg/kg IM was administered for 5 days, oxytetracycline 20% (HebeiKexing Pharmaceutical Co. Ltd., China) 20 mg/kg IM was given and repeated after 72h and Vincristine sulfate 0.5 mg/m² IV, was given as a single dose. Elizabethan collar was placed on the bitch to prevent self traumatization. The skin sutures were removed on day 14 post-surgery.

DISCUSSION

Mammary gland fibromas are benign tumours of the connective tissues which may be asymptomatic but have the potential, due to its location to ulcerate as a result of repeated trauma caused by constant contact with hard rough surfaces leading to superficial bleeding and infection. Majority of mammary neoplasms (as seen in this case) occur mainly in the caudal glands, probably due to their greater amount of glandular tissue (Sorenmo 2011). The median age of affected bitches ranges between 8 and 10 years (Pastor *et al.*, 2018). The bitch in this case was 2 years and 2 months old. As observed with the history, the bitch whelped six months before the growth was first observed and the tumour was observed during the oestrous cycle. This implies that the present case was possibly hormonally induced as stated by Torres *et al.* (2021). The diagnosis of fibroma was confirmed by histopathology which revealed severe proliferation of fibrous connective tissue which had disrupted the normal histologic architecture of the mammary gland (Figure IIA). The proliferating fibrous connective tissue displaced the glandular and adipose tissues of the mamma (Figure IIB). According to Sorenmo (2011), surgery remains the mainstay of treatment for canine mammary tumours. Surgical excision is the most effective treatment for regional tumour control and conducting histological evaluation, ultimately leads to



Figure I: A, Mammary tumour (black arrow). B, Ligation of Blood vessels. C, Excision of the mammary gland. D, Closure of the subcutaneous tissue with subcuticular suture pattern.

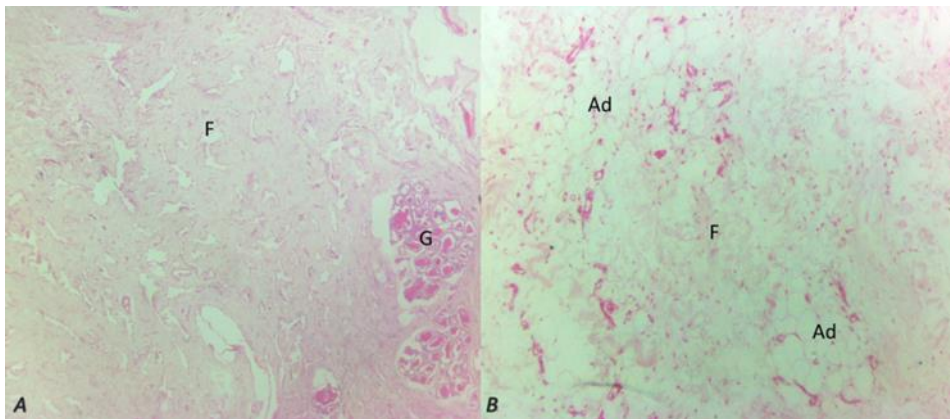


Figure II: Photo micrograph of mammary gland fibroma disrupting the normal histologic architecture of the mammae. (A); the proliferating fibrous tissue “F” surrounded and displaced the mammary glandular tissue “G”; as well as the adipose tissues (Ad) of the mamma (B).

improved overall survival rates (Nosalova *et al.*, 2024). The pre-operative chest radiograph was taken to check for metastasis. Metastasis of fibromas to the thoracic cavity has been commonly reported in bitches (Sorenmo 2011). The choice of surgical removal of mammary gland fibromas is based on certain criteria which include tumour size and location, possible extension to regional lymph nodes,

adherence and fixation of tumour to tissue, and total number of lesions (Papazoglou, 2012). Thus, a simple mastectomy, which is the removal of the entire affected gland rather than a lumpectomy was carried out as the lesion was contiguous with the mammary gland. The simple mastectomy was performed with wide margins to ensure that the entire tumour was

excised to prevent a recurrence as suggested by Fasseha (2020).

The patient made an uneventful recovery from anaesthesia and was promptly discharged. Vincristine chemotherapy was administered as an adjunctive treatment pending the outcome of the histopathology. Studies have reported a high incidence of high-grade pre-neoplastic lesions occurring adjacent to malignant lesions (Antuofermo *et al.*, 2007). Diclofenac sodium and Oxytetracycline were administered for pain relief and to combat secondary bacterial infections respectively. The client was advised to promptly report any abnormalities observed. About one year post-surgery, the bitch was reported to have whelped, littering 5 with no recurrence of the tumour. In conclusion, this case report has shown that with accurate diagnosis and timely intervention, a simple mastectomy can be curative when a fibroma is localized in one of the mammary glands.

REFERENCES

- Antuofermo, E., Miller, M., Pirino, S., Xie, J., Badve, S. & Mohammed, S.I. (2007). Spontaneous mammary intraepithelial lesions in dogs - a model of breast cancer. *Cancer Epidemiology Biomarkers & Prevention*, 16, 2247–2257.
- Fasseha, H. (2020). Mammary Tumours in Dogs and its Treatment Option- A Review. *Biomedical Journal of Scientific & Technical Research*, 30 (4), 23552-23561.
- Fossum, T. W. (2013). *Small Animal Surgery*. (4thed.). St. Louis, Missouri: Elsevier Mosby, 809-815.
- Heenan, P.J. (2016). Tumors of fibrous tissue involving the skin. In: Elder DE, editor. *Lever's Histopathology of the Skin*. 9th ed. Philadelphia, USA: Lipincott Williams and Wilkins, 996-997.
- Joshi, S., Bhadauria, R. S., Gunjan, J. & Diwaker, A. K. (2012). Introduction to neoplasm: 'tumor classification' a review article. *International Journal of Advanced Research in Pharmaceutical & Bio Sciences*, 1(3), 227-264.
- Kamble, M., Dhakate, M. S., Upadhye, S. V. & Akhare, S. B. (2016). Surgical management of mammary tumor in a dog. *Intas Polivet*, 17(1), 196-197.
- Klopfleisch, R., von Euler, H., Sarli, G., Pinho, S. S., Gartner, F & Gruber, A. D. (2010). Molecular Carcinogenesis of Canine Mammary Tumor; News from an Old Disease. *Veterinary Pathology*, 48(1), 98-116.
- Nosalova, N., Huniadi, M., Horňáková, L., Valenčáková, A., Horňák, S., Nagoos, K., Vozar, J., & Cizkova, D. (2024). Canine Mammary Tumors: Classification, Biomarkers, Traditional and Personalized Therapies. *International Journal of Molecular Sciences*, 25, no. 5: 2891.
- Papazoglou, L. (2012). Current Surgical Options for Mammary Tumor Removal in Dogs. *International Journal of Veterinary Science and Medicine*, 1, 6.
- Pastor, N., Caballé, N. C., Santella, M., Ezquerro, L. J., Tarazona, R., Duran, E. (2018). Epidemiological study of canine mammary tumors: Age, breed, size and malignancy. *Australian Journal of Veterinary Sciences*, 50, 143–147.
- Salas-Araujo, Y.J., Aburto, E., Alonso, R., Márquez-Alvarado, A.A., Corona-Monjaras, H., Romero-Romero, L. (2016). Association of Histological Features with Potential Risk Factors and Survival in Canine Mammary Tumors. *Veterinaria México OA*;3:1.
- Sleeckx, N., de Rooster, H., VeldhuisKroeze, E.J.B., Van Ginneken, C., Van Brantegem, L. (2011). Canine Mammary Tumours, an Overview. *Reproduction in Domestic Animals Zuchthygiene*, 46, 1112–1131.
- Sorenmo, K. U. (2011). Canine Mammary Tumors: Treatment, Prognostic Factors and Outcome. World Small Animal Veterinary Association World Congress Proceedings, 2011.
<https://www.vin.com/doc/?id=5124312>
- Torres, C. G., Iturriaga, M. P., Cruz, P. (2021). Hormonal Carcinogenesis in Canine Mammary Cancer: Molecular Mechanisms of Estradiol Involved in Malignant Progression. *Animals*, 11(3), 608.