

Case Study**SURGICAL MANAGEMENT OF MAMMARY GLAND TUMOR IN CANINE: A CASE STUDY ON 9-YEAR-OLD JAPANESE SPITZ****Sabina lamsal^{1*}, Bikas Giri²**¹Agriculture and Forestry University, Chitwan²Central Referral Veterinary Hospital, Kathmandu

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Abstract

A 9-year-old intact female Japanese spitz with body weight 11kg was presented in Central Veterinary Hospital (CVH), Tripureshwor, Kathmandu on Poush 25, 2075 from Balkot, Bhaktapur with a complain of sudden enlargement of hardy mass along ventral abdomen for 5 days. Abdominal radiograph (lateral view) revealed that a cutaneous nodular mass protruding out, not deeply embedded into muscles while a ventro-dorsal view with no sign of metastasis. Needle aspiration with aseptic technique was employed to differentiate it with cyst, hematoma and abscess and was confirmed as a mammary gland tumor. For surgical correction, animal was induced with 2ml solution of Xylazine-HCl (2mg/kg) Ketamine-HCl (5mg/kg) at 1:2 ratio through slow intravenous route. The clipping and scrubbing around the abdominal region from xyphoid to pubis was done using Savlon® (Chlorhexidine and Cetrimide followed by Rectified Spirit and Povidone iodine) along with administration of preemptive analgesic and prophylactic antibiotics i.e. Ceftriaxone (30mg/kg body wt.) and Meloxicam (0.5mg/kg body wt.) intravenously. Simple mastectomy was performed. Closure of muscles, sub cutaneous fascia was accomplished using absorbable sutures (Vicryl 2-0) in simple continuous fashion. Skin edges were undermined and skin closure was achieved by placement of tension relieving horizontal mattress sutures using monofilament Prolene polypropylene suture (size 2-0). Follow-up was advised after 6 days and similar antibiotic and analgesic were administered postoperatively. No postoperative surgical infection and other complications regarding wound dehiscence was noticed with the proper healing of wound.

Keywords: Radiograph, Needle aspiration, Anesthesia, Healing.**Introduction**

A mammary tumor is a neoplasm originating from the mammary gland and its associated lymph nodes. Canine mammary tumors (CMTs) are the most common neoplasms in intact female dogs; predominantly in older ages. In general, more than 40% of tumors in female dogs are CMTs (Dorn et al. 1968). The mammary glands in dogs and cats are associated with their nipples and extend from the underside of the chest to the groin on both sides of the midline. The dog is by far the most frequently affected domestic species as such 50% of all tumors in the bitch are mammary tumors. Approximately 45% of mammary tumors are malignant in dogs. Pure Breeds like Poodles, Cocker Spaniels, German Shepherds, Dachshunds, Spitz seem to have an increased risk of developing a mammary tumor (Schneider 1970; Dorn and Schneider 1976). The

tumors can be multiple and may vary in histology within or among the different tumor sites.

Case history

A 9-year-old intact female Japanese spitz with body weight 11kg was presented in Central Veterinary Hospital (CVH), Tripureshwor, Kathmandu on Poush 25, 2075 by her owner Saraswati Khadka from Balkot, Bhaktapur with a complain of sudden enlargement of hardy mass along ventral abdomen for 5 days. According to owner, the small firm, protuberance was noticed 2-3 months ago and Aela was brought to CVH thereafter. The dog had normal appetite and was regularly vaccinated.

Clinical findings and Observations

On physical examination, dog was bright, alert and responsive with normal visible mucus membrane. Rectal temperature, heart rate and respiratory rate were found to be 102.2⁰F, 128 beats/min, 31/min, respectively. Capillary refill time (CRT) was about <2 seconds and a fine body condition score (BCS) of 3. *On palpation*, a hard, dense tumor like mass felt on mammary region. *Palpation* of regional lymph nodes denotes the enlarged nodes with the extent of spread. *Auscultation* revealed normal heart and lungs sound. *Ocular examination* revealed a corneal opacity in both the eyes and known that attempt had been made to treat for cataract in past.–Blood test (CBC count and Serum biochemistry) was suggested before performing surgery and report revealed that all the parameters were in normal range allowing the dog for surgical intervention.

Lateral abdominal radiograph revealed that a cutaneous nodular mass protruding out, not deeply embedded into muscles (Fig 1) while a ventro-dorsal view revealed no sign of pulmonary metastasis (Fig 2). Needle aspiration with aseptic technique was employed to differentiate it with cyst, hematoma and abscess (Fig 3).



Fig 1: Right Lateral view; showing tumorous



Fig 2: Antero-posterior view of chest cavity mass underneath the abdominal region



Fig 3: Fine-needle aspiration for



Fig 4: preservation of tumor sample differentiation of tumors from cyst and hematoma.



Fig 5: Preparation of surgical site



Fig 6: Skin closure with Prolene



Fig 7: Post-operative healing of wound (20 days after surgery)

Treatment

Patient preparations and anesthesia used

Animal was induced with 2ml of Xylazine (2mg/kg) and ketamine (5mg/kg) at 1:2 ratios through slow intravenous route. The clipping and scrubbing around the abdominal region from xyphoid to pubis was done using Savlon® (Chlorhexidine and Cetrimide) followed by Rectified Spirit and Povidone iodine (Fig 5).

Animal was kept in dorsal recumbency and was provided with slow infusion of constant intra-venous fluid therapy using Ringer's lactate (RL). As a prophylactic antibiotic and preemptive analgesic, Ceftriaxone (30mg/kg body wt.) and Meloxicam (0.5mg/kg body wt.) was administered intravenously 30 minutes before initiation of surgery. The maintenance volume was 0.5 ml of aforementioned anaesthetic agents was infused following the ratio of 1:2 when necessary. A total of 3.5ml of maintenance dose was administered during the entire surgical procedure. The heart rate and respiratory rate was monitored in every 5 minutes interval as shown in Fig A. Similarly, palpebral reflex and jaw tone was monitored to assess the level of anesthesia.

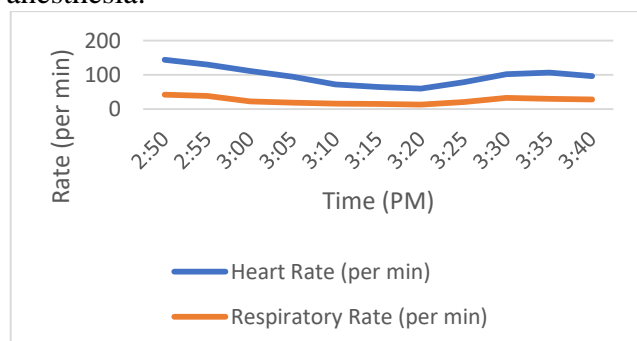


Fig A: Showing Heart rate and Respiratory rate of dog throughout the operative procedure

Surgical procedure

An elliptical incision of the skin and subcutaneous tissue was made around the mammary glands involved, with 1-2cm margins of healthy tissue, down to the pectoral musculature, abdominal oblique or rectus fascia. Blunt dissection was performed to separate the affected mammary gland from the underlying tissue. The cranial portion of the skin was elevated and gentle traction was applied caudally. Hemorrhage is controlled by using hemostatic forceps. Major vessels that were ligated as encountered including the cranial superficial epigastric, internal thoracic vessels, the caudal superficial epigastric vessels and the external pudendal vessels using catgut (size 1-0). Before closing the wound, area was flushed with warm saline. Closure of muscles, sub cutaneous fascia was accomplished using absorbable sutures (Vicryl 2-0) in regular simple continuous fashion. Skin edges were undermined and skin closure was achieved by placement of tension relieving horizontal mattress sutures using monofilament Prolene polypropylene suture (size 2-0) (Fig 6). Bandaging was done around the surgical area with Leukoband®.

Total duration of Surgery: 2:52pm (starting time) to 3:40 pm (ending time) i.e. 48 minutes

[Samples from excised tumorous mass were preserved in 10% buffered formalin solution for histopathology. (Fig 4)]

Since, the final temperature was sub-normal 93.8°F. In order to recover the animal from hypothermia, warmth was maintained using hot water bags and with warm cloths. After a while, Aela regained her consciousness recovering from the dose of anesthesia. Follow-up was advised after 6 days and advised to intake post-operative medications as per as prescription: Ceftriaxone-500mg/vial (@30mg/kg bd. wt), slow I/V daily for 7 days to check for any secondary bacterial infection and Meloxicam (@0.2mg/kg bd. wt.) S/C daily for 3 days to clinical management of pain was administered. Elizabeth collar was applied to prevent loss of bandage and self-trauma from scratching.

The dog was brought to CVH on 6th day of surgery and bandage was removed. No postoperative surgical infection and other complications regarding wound dehiscence was noticed with the proper healing of wound (Fig 7).

Case discussion

Dogs have 5 pairs of mammary glands which are numbered 1 through 5 from front to back. Although any gland can be affected, the majority (greater than 65%) of mammary tumors develop in the fourth and fifth mammary glands. In dogs, one single nucleotide polymorphism (SNP) in exon 9 of BRCA1 and one SNP in exon 24 of BRCA2 were found to be significantly associated with canine mammary tumors. Mammary tumors are more common in female dogs that are either intact or were spayed after 2 years of age. The risk of a dog developing a mammary tumor is 0.5% if spayed before their first heat (approximately 6 months of age), 8% after their first heat, and 26% after their second heat (Schneider et al. 1969). Spaying does not provide a protective effect against mammary tumor development after 2 years of age (Sleeckx et al. 2011).

Hormones play an important role in the hyperplasia and neoplasia of mammary tissue, but the exact mechanism is unknown. Estrogen or progesterone receptors (or both) have been reported on mammary tumor cells in animals; these may influence the pathogenesis of hormone-induced mammary neoplasia as well as the response to hormone therapy. It is supposed that estrogens promote ductal growth, whereas progestins are able to induce a lobulo-alveolar development of the mammary glands with hyperplasia of secretory and myoepithelial cells. During the long luteal phase of the canine estrous cycle, the mammary gland is exposed to a high concentration of progesterone (Schaefers-Okkens et al. 2005) which may lead to an up regulation of growth hormone (GH) production within the mammary gland (Mol et al. 1996; Queiroga et al. 2008). It is speculated that GH stimulates the proliferation of mammary stem cells as a first step in the process of mammary carcinogenesis. (Mol et al. 1996; van Garderen et al. 1999).

Conclusion

Surgical resection is the current gold standard therapy for mammary gland tumors in dogs and considered to be the single most effective method to attain local tumor control. The survivability can vary significantly depending on different tumor and host characteristics including age, tumor size, tumor stage, tumor histopathological type, tumor grade, clinical behavior

of the tumor, lymph node involvement, hormonal expressions (Papazoglou, 2012). Study had shown that radiation therapy or chemotherapy might be followed as an adjuvant to surgery with incompletely resected tumors and in metastatic cases (Chakrabarti, 2007). Ovari(ohyster)ectomy at an early age (after 3 months of age), as a preventive measure, can significantly reduce the risk of developing CMTs (Hellmén, 2005). Other factors that may reduce the incidence of mammary tumors include feeding a well-balanced diet and avoiding obesity and the administration of hormones (particularly progesterone or mixed estrogen-progesterone drugs).

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