Introduction

Adenocarcinoma refers to the neoplasia of epithelial cells that originate from glandular tissue or possess glandular characteristics themselves (Kutzler, 2021). The exact causes of this type of carcinoma in dogs are not quite distinguishable. It could be that exposure to certain growth promoting hormones to mammary gland such as progesterone could be responsible for it (Trabert et al., 2019). Mammary adenocarcinoma could also be caused due to certain other neoplasms such as osteosarcoma (Stoewen and Pinard, 2021).

Incidence of this condition can be associated to whether a dog has been subject to ovariohysterectomy. It has been studied that dogs spayed before they experience their first heat has 0.5% risk of developing this condition while in dogs spayed after first or second heat increases the risk to 8% and 26% respectively (Mammary Tumors, 2021). This condition can also be age and breed specific as well since after 7 years of age a dog is more susceptible to it (Stoewen and Pinard, 2021) and certain breeds like Chihuahuas, Poodles, Dachshunds, Yorkshire Terriers, Cocker Spaniels, Brittany Spaniels, English Setters, Boxer Dogs, and Doberman Pinchers are more susceptible to it (Stoewen and Pinard, 2021).

In this clinical report, the detailed procedure of the diagnosis, surgical intervention followed by excision and short-term follow-up of a mammary adenocarcinoma in a 3 year old female dog will be discussed which will be helpful for small animal practitioners.

Materials and methods:

Case history: A 3-year-old, female, street dog with signs of weakness, lethargy and inappetence was presented to the S. A. Q. Teaching Veterinary Hospital of the Faculty of Veterinary Medicine, Chattogram Veterinary and Animal Sciences University. It was a rescued dog with available clinical history of 3 months. The owner claimed the presence of the overgrown portion at the mid inguinal region expanding from the mid inguinal region upto the last pair of teats towards the end of the pre-pubic area. There was no available information on the vaccination or deworming of the dog.

Clinical examination and diagnostic procedures: Clinical examination revealed normal temperature and other physical parameters within their normal range. During palpation of the overgrown region pain was revealed. Blood sample was collected and routine examination was performed as well. To collect the blood sample, the patient was restrained in lateral recumbency and the mouth was tied with the help of a gauze. The area of collection was cleaned with alcohol and blood was collected with help of a syringe and a butterfly needle. Routine examination of blood revealed parameters within their normal range.

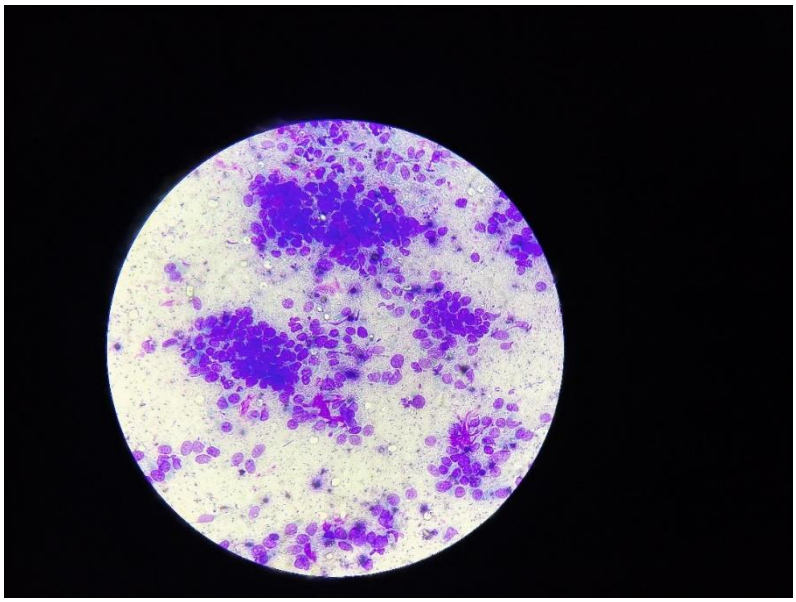

Figure 1: Cytological examination of the affected tissue

Cytological examination: Fine needle aspiration cytology (FNAC) was performed on the affected tissue. To perform it, the animal was psychologically restrained by the owner and physically restrained at lateral recumbancy. The designated area of aspiration was cleaned by applying 70% alcohol on the surface followed by insertion of the needle and aspiration of the tissue was done. After the aspiration, the contents of the needle was sprayed on a glass slide and smeared. A combination of Giemsa staining and Leishman staining was done on the smeared tissue. Equal volume of Giemsa and Leishman stain was mixed to maintain a 1:1 ration. The air dried smears were flooded with the stains and left for one minute. An equal volume of distilled water was added and left for six minutes. The slides were washed in tap water, dried, cleared and mounted. Once the staining was completed, the slide was observed under microscope.

Surgical Procedure

General considerations

1. This condition could be hereditary and age or breed specific.
2. Patients suffering from neoplasia may respond differently to anaesthetics.
3. During exploratory surgery, major blood vessels might be at risk.

Figure 2: Surgical procedure of removal of the neoplasm

Materials required: Syringe, 25 gauze needle, vicryl (2-0), Catgut (2-0), Ketamine, Xylazine, normal saline set, sterile surgical blade, BP handle/needle holder, dissecting scissors, forceps, towel, towel clamps.

Pre-surgical procedure: The animal was fasted for 12 hours prior to surgery. During this time no food or water was provided to the animal.

Shaving was done carefully at the surgical site with a blade until hair was removed completely from the site of operation.

Restraint and anaesthesia: The animal was restrained with a dog muzzle and kept at a dorso-ventral position. The surgical area was cleaned repeatedly with alcohol and povidone iodine.

Once shaving was done, the animal was pre-anaesthetized with Xylazine HCl injection (0.2mg/kg body weight) (Xylazin®, Indian Immunologicals LTD.) followed by anaesthesia with Ketamine (6mg/kg body weight) (Ketalar®, Popular pharmaceuticals) administered intravenously.

The animal was positioned dorso-ventrally on the operation table and normal saline was given via a catheter continuously throughout the surgery.

Surgical technique:

Skin incision: An incision was done on the ventral mid-inguinal region along the length of the neoplasm.

Surgical procedure: The skin was separated from the underlying tissue with a combination of incision with scalpel blade and blunt dissection with the scissors. After the initial incision the skin separation was initiated with scalpel. Blunt dissections were made with scissors to avoid cutting any major arteries or veins. The aim was to remove the entire skin of the affected area. The entire skin that covered the affected area was separated with small incisions followed by more blunt dissections. With this procedure, the stalk of the neoplasm was reached gradually. Ligation on the stalk was performed with Polygactin 910 (Vicryl®, Ethicon). Multiple ligations were given to avoid any chances of excessive bleeding. Ligation was completed which was followed by excision of the tumor mass with the scalpel. Following the excision, some excess skin was removed followed by suturing the remaining skin.

Closure: The muscles were sutured with a combination of ford interlocking and simple continuous suture. The subcutaneous tissue was sutured with subcuticular suture followed by cross mattress suture on the skin.

Post-operative management: Post-operative care was taken by administering Ceftriaxone (50mg/Kg body weight) (Ceftron®, Square pharmaceuticals), Meloxicam (0.2mg/Kg body weight) (Melocam®, Renata Pharmaceuticals Ltd.), Pheniramine maleate (1mg/Kg body weight) (Astavet®, ACME Laboratories Ltd.).

The owners were advised to apply a preparation of neomycin sulphate powder (Nebanol®, Square pharmaceuticals) to apply on the affected wound twice daily to prevent any infection. They were also advised not to let the patient jump or do any excessive playing until the wound is completely healed.

Result

The cytological examination revealed the presence of anisocytosis, poikilocytosis and binucleated cells. The presence of binucleated cells along with the other two indicated towards adenocarcinoma since binucleated cells are more frequently found in cancer cells (Shi and King, 2005).

The animal showed normal vital signs after regaining consciousness. Within 12-16 hours normal eating and drinking routine continued. Further follow-up was done for 1 month. No recurrence of any of the previous clinical signs were observed during that period of time. The suture on the ventral side of the pubic region took about 14 days to heal. After which the suture material on the skin was removed with the help of stich cutters. Though the surgery was successful, the prognosis of the patient is still unfavorable since the neoplasm can recur at any time. In the above mentioned treatment, the animal recovered smoothly and none of the previous symptoms were seen during the follow-up period.

Discussion

Mammary tumors account for more than 54% of total tumors in female dogs where malignant tumors occurred more frequently (70%) than their benign counterparts (30%) (Vascellari et al., 2016). It is also less frequent for dogs aging less than 6 years and increases at a higher rate (approximately 60%) for dogs between dogs of 8 and 13 years of age (Vascellari et al., 2016). In one study, it was observed that the annual incidence rate of mammary tumor was 16.8%, 47.5% of which was malignant in nature (Salas et al., 2015). While it is evident that survivability after metastasis of the neoplastic cells is very low, the recurrence rate of the metastasis cannot be ignored either. Even so, considering the invasive nature of the neoplastic cells in this case, it was decided that surgery had to be done in order to limit the future risks and to remove the affected tissue.

Following the surgery, possible risks include discomfort and pain associated with stress along with subcutaneous edema and infection at the incision site as well (Horta et al., 2015). This may result from aggressive surgical techniques and inconsiderate surgical approach. During the follow-up of our current case, great care was taken during the surgical intervention and post-operative care was well taken care of as well. No such signs of post-operative complications were observed during the follow-up except for mild discomfort at the incision site.

It was observed in a study that after the initial surgery where mastectomy was carried on, 58% of the dogs developed new tumors on the ipsilateral side of the mammary chain and 77% had to undergo repeat surgery (Stratmann et al., 2008). And so the prognosis of the patient still remains unfavorable and there is a possibility of recurrence of the neoplasm.

Conclusion:

Mammary adenocarcinoma/ mammary tumor (MT) is quite a common occurrence in female dogs of any breed. Common signs include lethargy, loss of appetite and loss of weight along with palpable neoplastic mass beneath the skin of the animal. Surgical removal of the neoplastic mass is recommended in patients with a palpable neoplastic mass that is in danger of becoming metastatic.

Limitation:

Due to lack of some advanced diagnostic tools such as CT (Computed Tomography) Scan further diagnostic examinations were not done. Also, lack of proper instruments and experienced technicians kept us from performing histopathological examinations too. Even so, the available diagnostic tools were used appropriately to reach the conclusion as far as possible.

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