

Excision of tumor by electrocauterization method in a Pigeon:
A Case study



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Statement of Author

I, Md. Abu Younus Shajid, hereby declare that I have successfully completed all of the tasks listed in this report. The information was acquired from books, national and international periodicals, and other sources. All references used in this work have been given due credit. As a result, I am exclusively responsible for gathering, processing, maintaining, and disseminating all the data assembled in this report.

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The Author

Abstract

Tumor in lower eyelid is very common in pigeon. Treatment consists of surgical correction by electrocauterization method with the addition of antibiotics in selected cases. The aim of this report was to describe a surgical procedure to remove a tumor from the lower eyelid position of left eye in a pigeon. A four years old pigeon was presented to Shahedul Alam Quadery Teaching Veterinary Hospital (SAQTVH), Chattogram Veterinary and Animal Science university (CVASU) with complain of swollen mass in the left eye since last three to four months. Clinical findings upon physical examination recorded tumor in the left lower eyelid. Following the diagnostic process, electrocauterization was chosen based on the findings of the clinical evaluation. Typically, general anesthesia was used during the electrocauterization, along with intraoperative systemic analgesia. The decision of electrocautery was taken to ensure that it would not damage any vital eye structures. Antibiotics were continually administered to prevent a secondary bacterial infection and a gauze was applied soaked in an antiseptic solution. No complication was recorded and the surgical side was healed within 10 days.

Keywords-Lower eyelid tumor, pigeon, General anesthesia, electrocauterization, recovery, post operative care

Chapter 1: Introduction

Pigeons have served various useful purposes throughout history of human civilization and continue to do so in modern times. Pigeons are used as messenger, meat and egg purpose, sports, pest control, fertilizer production, companionship and education. In the past, humans have valued pigeons as food, pets, sacred animals, and messengers. Pigeons have been employed to deliver communications due to their homing skills, particularly during the world wars. Despite this, city pigeons are now viewed as pets and poultry. Pigeons are now regarded as a significant component of veterinary practice, and a proper approach requires understanding of bird's disease diagnosis. Pigeons as pet and poultry are susceptible to systemic sickness, just like other animals.

According to Agricultural Sample Survey, Bangladesh had a population of 10.8 million pigeons of which 11% were kept in commercial farms (Kabir et al., 2014). Over 2,000 pigeon breeders are located in the city of Dhaka, and over 20,000 more farms are located all over the country, particularly in Chittagong, Dinajpur, and Barisal. The Tongi, Kaptan, and Jinjira Bazaar pigeon haats are three closes to Dhaka (Islam et al., 2020).

Due to their distinct physiology, anatomy, and metabolic activity, owners' management system of rearing may have a significant impact on the health of their animals. Because of the large number of caged birds, this is fairly complicated.

It's possible that birds don't exhibit any clinical symptoms like other animals. Many of the cage birds like pigeon suffer from many diseases for false management system and genetical issues. Sometimes the reasons behind this may be genetical, environmental, bacterial and viral causes, diet, age and hormonal. These types of factors cause tumor in pigeon.

Genetical causes are very important for benign tumor in many animals. Sometimes gene mutations from their parents that make them more likely to develop tumor. Certain types of tumors may be more likely to develop as a result of these alterations. Tumor suppression gene, oncogene and mismatch repair gene are sometime responsible for tumor. The health of the pigeons may suffer if feed contains dangerous contaminants such mycotoxins (toxins made by mold), heavy metals, insecticides, or other chemicals, hormones and growth promoter, additives and preservatives (Dalvi et al., 1986). GMOs also responsible for benign neoplasia in pigeon. In some instances, growth promoters or hormones may be added to poultry feed to speed up growth. Long-term

exposure to certain drugs, particularly if not carefully controlled, may have an impact on the growth of tumors. To guarantee the safety of the food supply, several nations have rigorous regulations regarding the use of hormones and growth boosters in poultry feed. While some mutations are inherited, others happen on exposure to radiation, specific chemicals. Critical genes that control cell development and division may be affected by these alterations. Tumors can occur as a result of these genes' mutations, which can cause cells to proliferate and expand uncontrollably. Imbalance nutrition triggers weaken immune system and cellular stress. It also influences lack of antioxidants and weakened tissues. Specific nutrient deficiencies, such as particular vitamins or minerals, can make it more difficult for the body to repair DNA damage or control cell proliferation. For instance, a B-vitamin called folate deficiency has been linked to a higher risk of developing specific cancers. Antioxidants are necessary for defending cells against free radical damage, and proper nutrition supplies them. Unstable chemicals called free radicals can harm DNA and cause harm to cells. Without enough antioxidants, cells may be more prone to mutations that might cause tumor development.

There have been reports of both primary and metastatic benign and malignant neoplasia affecting the eye, such as medulloepitheliomas (Schmidt et al., 1986), lymphoreticular tumors (Paul-Morphy et al., 1985), melanocytic tumors (Fournier et al., 1983) and rhabdomyosarcomas (Hvenegaar et al., 2009). A retrobulbar adenocarcinoma, a glioma, a liposarcoma, and two mast cell tumors are among the other retrobulbar and eyelid malignancies that have been documented (Dukes et al., 1983).

Among them most of the common neoplasia is benign lower eyelid tumor. Birds have three eyelids. They are upper, lower and the nictitating membrane. In benign eyelid tumors there are – (a) papillomas: these are generally benign tumors caused by a virus. They often appear as small, fleshy growths and are usually harmless; (b) lipomas: these are soft, fatty tumors that can occur under the skin, including the eyelids and are usually slow-growing and benign; (c) fibromas: these are tumors of fibrous tissue and are typically benign and can occur on various parts of the body, including the eyelids.

The cell cycle, a regulatory mechanism found in healthy cells, maintains controlled growth and division. This regulation may be disturbed by mutations, which could result in uncontrolled proliferation of cells. Blood is necessary for tumor growth. To assure a supply of nutrition and

oxygen, tumorous cells trigger angiogenesis, the growth of new blood vessels and emit signals that encourage the development of blood vessels inside the tumor. Tumor cells may develop resistance against immune system identification. They may create proteins that block immunological reactions or pass as regular cells to evade immune attacks (Wu et al., 2007).

The signs of benign tumor affected pigeon are abnormal growth surrounding the eyelid and there is a noticeable lump or swelling on the eyelid. Signs are not appeared suddenly but they are shown gradually. Normally it takes three to four months to become an appear able shape and size. The color of the eyelid or the region around the eye changes. It might seem darker than usual, redder, or inflamed. Excessive or abnormal discharge from the eye can be a sign of an underlying issue. When the eye is uncomfortable or painful, birds may squint or blink excessively. Extra tears or moist eyes may be a sign of discomfort. Changes in behavior in birds could include becoming more lethargic, avoiding light, or displaying symptoms of pain. Pigeon will face vision problems, running into things, or moving slowly. Loss of appetite is also most common sign.

A four years old pigeon was presented at the Shahedul Alam Quadery Teaching Veterinary Hospital (SAQTVH), Chattogram Veterinary and Animal Science University (CVASU) with complain of swollen mass in the left eye since last three to four months. Thus, the current study was carried out with the following objectives.

Objectives:

1. Describe the history, clinical findings, procedure of excision of the tumor.
2. Record the post operative care and complications.

Chapter 2: Case presentation

A four years old male pigeon of 350 gm body weight was brought to Shahedul Alam Qaderi Teaching Veterinary Hospital (SAQTVH), Khulshi, Chattogram, Bangladesh with a history of swollen mass in left eye (Figure-1.1) and unusual gait. Excessive or abnormal discharge from left eye was monitored. Pigeon became lethargic and was avoiding light. It was showing pain symptoms.

The tumor was developing for 3-4 months. The respective doctor examined the pigeon. On clinical examination, the pigeon's temperature was 109.1°F. Its heart rate was 175 beat per minute. The pigeon was found to be dull and somewhat lower weight (Figure -1.1). Left eye movement was difficult and the pupil was nearly closed. So, the respective Veterinarian decided several ophthalmic examinations for diagnosis of the problem.



Figure 1.1- Lower eyelid tumor in pigeon

2.1: Ophthalmic Examination

Anamnesis function and morphologic assessment were included in this extensive eye examination. Direct and indirect ophthalmoscopy, electroretinography, menace reflex, corneal reflex, palpebral reflex, Schirmer tear test, tonometry, Fluorescein and Rose Bengal staining tests, cytology and culture and many other tests can be performed for the diagnosis. Only the available tests from SAQTVH, CVASU were performed by the respective Veterinarian which are described below.

2.1.1: Ocular Reflex

One of the most vital examinations to evaluate a bird's vision is the examination of the ocular reflex. The palpebral reflex was examined by touching the skin at the lateral and medial edge of the eyelid, and the corneal reflex was evaluated by symmetrically stroking the cornea in both eyes with moist cotton. Although the right eye showed a positive response but the left eye was swollen and couldn't move easily.

When a fast-moving object was quickly brought up to the eye of that pigeon, the reflex was examined. A positive reaction was noted with a normal right eye blink, but the left eye blink was difficult to move.

The enlarged mass was first considered to be a tumor based on the pigeon's past medical conditions and clinical indicators. The attending physician made the decision to remove the tumor surgically.

2.2: Preoperative care and advice to the owner

The veterinarian advised the owner not to withhold water from the pigeon as hydration is crucial for avian patients. In preoperative stage, cage preparation is most important. Ensuring of the bird's cage remaining clean, dry, and warm was very crucial. To relieve stress, Doctor suggested the owner to give the cage some familiar perches and objects to keep the bird warm before surgery as anesthesia might cause a decrease in body temperature. The Veterinarian advised the owner to monitor her bird closely for any signs or symptoms of sickness, such as changes in droppings, behavior or appetite and also suggested for any health concern issues. Doctor told to pick a secure,

well-ventilated container for the journey to the hospital and not to make too much noise while going to the outside. Doctor also advised a complete set of all relevant documents and test results in the day of surgery.

2.3: Before Surgery

The pigeon's respiratory system was checked by the Veterinarian. The patient's abdomen and crop, eye side was checked and palpated. The pigeon suddenly started shivering. The surgeon boiled some water in an electric heater. Then he covered the heater with a towel. After that, the assistant surgeon wrapped the whole pigeon in that warm towel for 10 minutes. Then the shivering was stopped.



Figure 1.2-Heating of water in electric heater



Figure 1.3- Wrapping of towel to the pigeon for warming

2.4: Restraining and Anesthesia

The pigeon was controlled through both chemical and physical restraining. The weight was again measured. To reduce excessive struggling and wing flapping, the bird was loosely wrapped in a towel. The surgeon took it on the surgery table.

Anesthesia dose was Ketamin 10mg/kg and diazepam 0.2 mg/kg. The trade name of ketamin was Inj. Ketalar (Ketamine Hydrochloride BP equivalent to 500 mg ketamine) and the trade name of diazepam was Inj.Sedil (each 2 ml ampule contain diazepam BP 10 mg). At the breast muscle, both were injected intramuscularly. Local anesthesia was given by lidocaine. Surgeon diluted lidocaine with saline. He diluted saline and lidocaine at the same amount and administered it intramuscularly.

Inj. ketalar was injected 0.07 ml and Inj. Sedil was injected 0.014 ml intramuscularly. After 5 minutes when there was still a movement, then Inj. Ketalar (ketamin) injected 0.035 ml and inj. Sedil (Diazepam) injected 0.01 ml. So, total amount of ketamin was 15mg/kg.



Figure 1.4- Anesthesia (Lidocaine) is administered locally to the eye site



Figure 1.5-Inj.Ketalar (Ketamin) administered intramuscularly



Figure 1.6-Inj.Sedil (Diazepam) administered intramuscularly

2.5: Monitoring the effect of anesthesia

In avian surgery, anesthetic monitoring is critical. Vital signs were monitored while the level of anesthesia was manually evaluated:

Heart rate: The heart rate was frequently observed. Surgeon performed auscultation frequently.

Reflex: In surgical levels of anesthesia, the corneal and pedal reflexes slowed but persisted. When the anesthetic plane grew deeper, the palpebral response swiftly disappeared.

Respiratory rate: The breathing became shallow as the anesthetic plane deepened. It took the pigeon at least three to eight seconds to breathe.

2.6: Surgical technique

The method of the surgery was electrocauterization system. Electrocauterization is the process of damaging tissue by using chemical corrosive elements or extreme heat by electricity. In electrocautery, the tissue is cauterized—burned or destroyed—by passing an electric current through a tiny probe. In order to burn away undesirable or dangerous tissue, electrocautery is a safe surgical technique that is frequently employed. By "burning" the bleeding blood vessels, it can also be used to effectively reduce or stop bleeding.

The surgeon ensured all supplies and equipment that would be used for the surgery were sterile, easily accessible, and completely functional before administering anesthesia. At first the pigeon was properly restrained. After the anesthesia and shaving around the tumor region, an antiseptic solution povidone-iodine was used to disinfect it. The surgeon started surgery by an electrocautery device, which was consisted of a probe adjusted with an electrical generator. On the affected tissue, the electrocautery device was applied. The electrical current was passed through the probe and produced more heat. The surgeon controlled the intensity and duration of that electrical current. electrocautery was also used to seal the targeted blood vessels. The surgeon continued electrocautery device to remove the tumorous tissue as necessary. The surgical team kept checking on the patient's vital signs to make sure the pigeon calm. After removal of targeted tumor tissue, the surgeon closed the bleeding using cotton. The assistant surgeon sequentially pressured on the region and the bleeding was stopped. Povidone-iodine solution was used to wash the surrounding area. Surgeon advised to apply povidone-iodine in that way for the following five days to make sure full healing.



Figure 1.7-Shaving of surgical site



Figure 1.8- Heat is given by electrocauterization method



Figure 1.9 -Excision of tumor



Figure 1.10- Bleeding is being stopped by cotton



Figure 1.11-Picture of tumor



Figure 1.12-After surgery, recovery from tumor

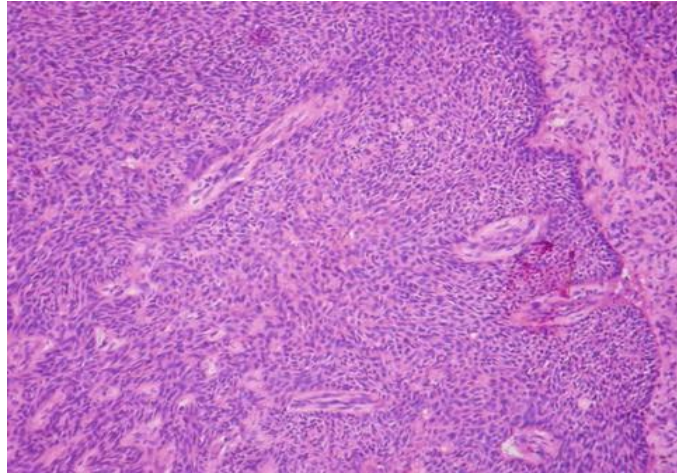


Figure1.13-A microscopic figure of lower eyelid tumor in a pigeon (Adenis et al., 1998)

2.7: Recovery

The pigeon regained consciousness thirty minutes after the surgery. The bird was covered with a towel to prevent damage from flapping its wings or moving too much, as well as to keep its body temperature normal. It was kept under constant observation until it was able to perch, and head motions were recorded. It was also monitored for bleeding and regurgitation.

2.8: Post operative care

Antibiotics, vitamins, and antiseptic cream were given for post-surgery in order to minimize infection and promote quicker healing. Antibiotic cefixime trihydrate (Drop. Ceftid 25mg/ml-25 ml bottle, Oponin Pharma limited) was advised to given orally 1 drop sequentially 12 hours for 5 days for preventing secondary bacterial infection. Antibiotic moxifloxacin (Drop. Eyemox 0.5%, 5 ml, ACME Laboratories limited) was advised to pour on left eye sequentially one drop daily two times for seven days to stop the secondary bacterial infection on eye. The doctor also suggested to administer ice around the surgical site for healing and pain removal. It was suggested that the patient come for a check-up after 15 days. The owner was advised to include certain foods high in vitamin A, such as carrots, sweet potatoes, mangoes, papayas, and dark green leafy vegetables, to its diet instead of only eating seeds. After 15 days no abnormalities were found and the bird had a healthy recovery.

Chapter 3: Discussion

Tumor in avian species is increasing day by day for many factors. Genetical factors are very important. Normal genes have a chance to become oncogenes when they undergo a mutation, which encourages cell division and growth. Uncontrolled cell proliferation is a characteristic of tumor. Tumor suppressor genes control cell division and stop tumor development. These genes can become malfunctioning due to mutations, which permits uncontrollably dividing cells to grow into tumors. Amplifications, deletions, and translocations are examples of large-scale chromosomal changes that can impair gene activity and cause tumor (Marusyk et al., 2010). Diets deficient in vital nutrients, particularly in antioxidants such as vitamins A, C, and E might impair immunity and increase pigeon's susceptibility to tumors. Free radicals are dangerous molecules that have the ability to damage cells (Bilal et al., 2021).

Hormones and growth enhancers are sometimes given to birds to help them grow faster. Long-term exposure to these compounds could result in abnormal cell proliferation (Sahin et al., 2004). In birds, injuries that cause prolonged irritation or inflammation can occasionally promote tumor development. There are many types of tumors in pigeon. Comparison among histopathological and gross appearance of tumor, we can compare and identify them. Basal cell carcinoma originates from primitive, pluripotent basal cells of the epidermis and it is an undifferentiated epithelial tumor of the skin (Kern et al., 1996). Another type of tumor fibrosarcoma found in syrinx, small intestine, liver, cloaca, air sacs, spleen, and lungs (Schmidt et al., 2015). Our reported pigeon's tumor was xanthoma type. Multinucleated giant cells and masses of foamy macrophages might cause thicker, dimpled skin that colored yellow to orange (Reavil et al., 2004). Local pigeons and Amazon parrots are mostly affected. It can also be found in thigh, leg, abdomen and thorax region (Reavil et al., 2004). In this particular case, the tumor was identified with an eye examination using and several ocular reflexes. There are currently plenty of additional diagnostic test techniques available. The diagnosis may be established through evaluating the structures in the brain and eyes, using a number of imaging methods. Among these tests Xray, ultrasonography, MRI and CT scan are majorly used. The fluorescein staining test is required before applying any topical medication to the eye and is used to confirm the presence of ulcers (Abrams et al., 2002).

In this surgery case, anesthesia dose was ketamine 10 mg/kg and diazepam 0.2 mg/kg. Xylazine is an alpha-2 adrenergic receptor agonist. Sympathetic nervous system has a type of receptor called

an adrenal receptor, which reacts to the neurotransmitter norepinephrine. Xylazine decreases the release of norepinephrine and other neurotransmitters by activating these receptors, which has a variety of results. Xylazine firstly affect in central nervous system. The release of excitatory neurotransmitters is impeded in the central nervous system (CNS) after activation of alpha-2 adrenergic receptors. This depression results in sedation, analgesia (pain relief) and muscle relaxation by work on CNS. By suppressing the brain's and spinal cord's ability to feel pain, xylazine reduces discomfort. Acetylcholine, a neurotransmitter that promotes muscular contraction, is inhibited by xylazine, which results in muscle relaxation. The principal mechanism of action of ketamine is as a non-competitive antagonist of the glutamate receptor known as N-methyl-D-aspartate (NMDA). Ketamine works by attaching itself to NMDA receptors to block the release of glutamate, a neurotransmitter important for pain perception and synaptic transmission. Ketamine has sedative and anesthetic effects by changing glutamate levels, which in turn modifies excitatory impulses in the brain. The dose of xylazine and ketamine is supported by previous studies (Azizpour et al., 2012). In order to reduce central sensitization, local anesthetics can be given preoperatively to block the location of tissue manipulation and inhibit the transmission of pain signals (Doneley, 2018). The dose of lidocaine 2 mg/kg diluted with saline was also advised previously (Lierz et al., 2012).

When compared to normal tissue, tumors frequently exhibit increased cellularity, or more cells concentrated in one region. Nuclear abnormalities include larger nuclei (anisokaryosis), irregular form (pleomorphism), and prominent nucleoli (nucleolar prominence) can all be seen in tumor cells. Tumors have increased mitotic activity. Tumor tissue may include inflammatory cells like lymphocytes and macrophages as a result of an immune response related to the tumor (Reavil et al., 2004). In the present study, no post operative complications were observed and resolution of the affected tissue was recorded. Therefore, it can be concluded that the surgical procedure followed to treat the clinical condition was appropriate.

Chapter 4: Conclusion

A tumor is an abnormal growth of cell that can make a pigeon feel unwell. The major consequences that a tumor can cause can be avoided with surgery. Surgery in pigeon is a stressful experience. Every step-in surgery should have a positive outcome: Previous history, physical examination, preoperative care, fasting, anesthesia, surgical technique and another important part post operative care. All physical examination were taken properly including corneal reflex, palpebral reflex. Suggestions for pre-operative care including warm environment, feeding had been advised also. Anesthetic dose, procedures and monitoring steps all were maintained in proper scientific way. Respective surgeon performed electrocauterization method in a hygienic way. The owner then completed post operative care in home. Electrocauterization was necessary, which resulted in reduced pain and a quicker recovery after surgery.

Limitation

- Proper lab test and correct diagnostic facilities like MRI, CT scan were not properly found,
- Limitation of time.

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BIOGRAPHY

I am Md. Abu Younus Shajid, son of Md. Muslim Uddin and Badrunnahar Rina. I passed the Secondary School Certificate examination in 2014 (G.P. A-5.00) followed by Higher Secondary Certificate examination in 2016 (G.PA-5.00). Now I am an intern veterinarian under the Faculty of Veterinary Medicine in Chattogram Veterinary and Animal Sciences University. In the future, I would like to engage in research on clinical animal diseases in Bangladesh and work as a veterinarian.