ADDIS ABABA UNIVERSITY
COLLEGE OF VETERINARY MEDICINE AND AGRICULTURE
DEPARTMENT OF CLINICAL STUDIES

COMPILED CASE REPORTS OF SURGICAL PROCEDURES AND THEIR OUTCOME ON DIFFERENT DOMESTIC ANIMAL SPECIESES IN AND AROUND BISHOFTU TOWN, OROMIA, ETHIOPIA

MVSc THESIS

By

WENGELU WELAMO WELDEYES

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COMPILED CASE REPORTS OF SURGICAL PROCEDURES AND THEIR OUTCOME ON DIFFERENT DOMESTIC ANIMAL SPECIESES IN AND AROUND BISHOFTU TOWN, OROMIA, ETHIOPIA

A Thesis Submitted To the College of Veterinary Medicine and Agriculture of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master of Veterinary Science in Veterinary Surgery

BY

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DEPARTMENT OF CLINICAL STUDIES

MVSc IN VETERINARY SURGERY

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APPROVAL SHEET

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As MVSc research advisor, I hereby certify that I have read and evaluated this Thesis prepared under my guidance by Wengelu Welamo entitled **"COMPILED CASE REPORTS OF SURGICAL PROCEDURES AND THEIR OUTCOME ON DIFFERENT DOMESTIC ANIMAL SPECIESES IN AND AROUND BISHOFTU TOWN, OROMIA, ETHIOPIA We approved for submission to dissertation assessment committee.**

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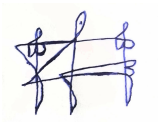
Signature:  Date: 07/06/2024 G.C.

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First of all, I declare that this thesis is my original work, with proper attribution given to all sources of information used. This thesis, which is deposited at the university/college library and will be accessible to borrowers in accordance with library policies, has been submitted in partial fulfillment of the requirements for an advanced Master of Veterinary Surgery (MVSc) degree at Addis Ababa University, College of Veterinary Medicine and Agriculture. I hereby affirm that this thesis is not being submitted for consideration for any academic degree, diploma, or certificate to any other university anywhere.

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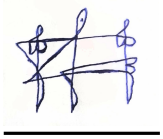
Name: Wengelu Welamo Weldeyes Signature: 

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LIST OF ABBREVIATIONS AND ACRONYMS

AAU	Addis Ababa University
ACTH	Adrenocorticotropic hormone
CACC	Central Agricultural Census Commission
CRT	Capillary Refill Time
CS	Caesarean Section
CSA	Central Statistical Authority
CVMA	College of Veterinary Medicine and Agriculture
DSVC	Donkey Sanctuary Veterinary Clinic
GDP	Gross Domestic Product
ILRI	International Livestock Research Institute
MoA	Ministry of Agriculture
MOARD	Ministry of Agriculture and Rural Development
NMSA	National Metriology Service Agency
OHE	Ovariohysterectomy
PGA	Polyglycolic Acid
PPF	Procaine Penicillin Fortified
RVF	Rectovaginal fistula
SPANA	Society for Animal protection Abroad
TRP	Traumatic reticuloperitonitis
VTH	Veterinary Teaching Hospital

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ABSTRACT

Ethiopia has the largest livestock population in Africa which can generate income to the country and farmers' livelihood. However, various surgical disorders requiring surgical interventions are one of the the major causes of direct and indirect loss in this sector. The current study was conducted to to record, document and compile various surgical treatments and corrections with their outcome in different domestic animals in the form of case reports in the study areas and period. The study was conducted at different veterinary service centers, namely: Addis Ababa University Veterinary Teaching Hospital, Donkey Sanctuary, SPANA, and Dire veterinary Clinic, farms and open fields. For each and every case, the owners were asked about animals, the animals were assessed for clinical findings, recorded and compiled followed by surgical judgement for elective or emergency surgical operations. Besides, all animals undergoing the surgical treatments were followed up at regular interval and their outcomes were recorded. During the study period, a total of 28 different domestic animals were undergone various forms of surgical treatments and corrections. From the total animal species, Canine 8(28.6%), Swine 5(17.9%), Ovine 4(14.3%), Equine 4(14.3%), Bovine 3(10.7%), Feline 2(7%), while Caprine 1(3.6%), and Camelus 1(3.6%). From these, 92.8% (26/28) animals were completely recovered wile 3.6% (1/28) patient was died after month, and 1(3.6%) was slaughtered on 56 days after surgical intervention after the animal gain body weight. The study indicated that ailments deem surgical managements and corrections by experienced veterinarians under strict asepsis to reduce direct and indirect loss of animals and consequently save life of animals.

Key words: *Anesthetics, Case report, Domestic animals, Outcomes, Surgical management*

1. INTRODUCTION

Ethiopia is home to a diverse array of livestock species and is well-suited for livestock production, boasting the largest livestock population in Africa, with 65 million cattle, 40 million sheep, 51 million goats, 8 million camels and 49 million chickens in 2020 (CSA, 2020a), and also 2.1 million horses, 0.4 million mules and 7.88 million donkeys representing 45% of agricultural output/GDP in Ethiopia (CSA, 2016). Moreover, the livestock sector plays a crucial role in generating income for farmers, creating employment opportunities, ensuring food security, providing essential services, and contributing to social, cultural, and environmental values, thereby sustaining livelihoods (MoA and ILRI, 2013). Livestock is a major source of animal protein, power for crop cultivation, means of transportation, export commodities, manure for farmland and household energy, security in times of crop failure, and means of wealth accumulation. The sector accounted for up to 40% of the agricultural Gross Domestic Product (GDP), nearly 20% of the total GDP, and 20% of the national foreign exchange earnings in 2017 (World Bank, 2017).

Despite Ethiopia's high livestock population and favorable environmental conditions, the country exhibits the lowest off-take rate and per capita consumption of livestock products globally (Solomon & Dagim, 2019). This is primarily attributed to the prevalence of various animal diseases, limited coverage, and the inaccessibility of veterinary and extension services, as well as other essential infrastructure (Gobena, 2017). Moreover, Even though livestock is very important, until recently, individual sick animals received less care since Ethiopian policy and human resources were mostly focused on preventive medicine. This shift has impacted veterinary practices, including veterinary surgery and medical research on domestic animals (MOARD, 2010).

Despite having a long history, veterinary surgery is a relatively new scientific field that emerged with the development of medical imaging technology. Since the majority of early human surgery dealt with trauma, war and other calamities served as the greatest stimulus for its advancement. Veterinary surgery mostly involved castration, dentistry, spaying, and treating severe wounds until the 1920s. It was

believed that surgical invasion of the peritoneum and joint cavities, for example, was too dangerous to be performed in routine practice (Bullock, 1929). Veterinarian surgery has advanced to a level of sophistication comparable to that of medical surgery in most respects in recent years. In actuality, veterinary surgeons are developing many of the surgical innovations that are utilised in human surgery because of the growing significance of veterinarians in basic medical research (Woods, 2018).

Although evidence-based medicine is a well-established concept in human medicine, the discipline of veterinary medicine is still in new and lacks development (Grindlay *et al*., 2012). Animal deaths resulting from surgical disorders are most common if they are not addressed promptly. They pose a serious threat to the economy, and if surgical intervention fails, there are no further options available to save the animal, which could result in culling or the eventual loss of a valuable or productive animal (Berge and Westhues, 1986). Moreover, surgical disorders may impair an animal's ability to develop, function, and have a high economic value (Arju *et al*., 2014). Nonetheless, Ethiopian veterinary literature currently lacks sufficient descriptions of both minor and major surgical procedures and techniques pertaining to both small and large domestic animals. Furthermore, there are few compiled veterinary surgical case reports that are published in various acceptable scientific publications and thus difficult for veterinarians and young vet surgeons to use as a frame of reference.

Therefore, the objectives of this thesis were:

- To perform various surgical treatments and corrections in different animal species.
- To develop comprehensive surgical skills and gain diverse experiences with a variety of surgical patients.
- To document and compile various surgical cases, correction procedures and their outcomes.

2. MATERIALS AND METHODS

2.1. Study Area

This study was carried out from October, 2023 to June, 2024 G.C. in and around Bishoftu town's veterinary service centres particularly: the University of Addis Ababa Veterinary Teaching Hospital, Donkey Sanctuary, SPANA, Dire veterinary clinic, Farms and open Fields on surgical procedures, techniques, and their outcome in various domestic animal species. The town is located in the South East of Addis Ababa in East Shewa Zone Oromia Region, about 47.9 km from the capital city, Addis Ababa. It is located at 9^0 N latitude and 40^0 E longitude. The altitude is about 1880 meters above sea level. The average annual rainfall is 866 mm with a bimodal distribution. The long rainy season extends from June to September (of which 84% of the rain is expected) followed by a dry season from October to February. The short rainy season lasts from March to May. The mean annual minimum and maximum temperatures are 14ºC and 26ºC, respectively. The humidity of the study area is 66% in summer and 56% in winter (NMSA, 2019). In Ada`a Liben district where Bishoftu is the center, there are about 160, 697cattles, 22,181sheep, 37, 510 goats, 5, 660 horses, 38, 726 donkeys, 268, Mules, 191, 380 poultry and 3, 274 beehives (CACC, 2003).

2.2. Study Animals and Study Design

Descriptive study was conducted on various surgical patients with variable age groups, species and origins on the study areas requiring different forms of surgical management and corrections within the specified time frame. During the study a total of 28 animals with distinct surgical requirements were handled: comprising 8 canines (2 males and 6 females), 5 male swine, 4 ovine (1 male and 3 females), 4 equines (1 male and 3 females), 3 bovines (2 males and 1 female), 2 female felines, 1 male caprine, and 1 male camelid. The majority of cases were managed within the premises of the veterinary teaching hospital, with additional cases handled at the Donkey Sanctuary, dire veterinary clinics, and through farm visits.

2.3. Study Methods

During the study, each and every surgical patient admitted for the study was recorded in case recording sheet (Annex 1). Furthermore,

Preoperative evaluation: Each domestic animal presented to veterinary facilities underwent a comprehensive medical assessment, which included the following: Patient Signalment: Origin, sex, breed, age, species, and general body condition status; History: Owner's chief complaints, duration and progression of the disease, animal management system, and presence of previous medication; Physical and Clinical Examination: A thorough investigation of the affected organ or system and vital parameters, including body temperature, heart rate, respiratory rate, tissue perfusion status (capillary refill time and color of mucous membrane), body condition, hydration status, ruminal motility (for ruminants), overall health status, and prognosis.

Diagnosis and assessment of surgical conditions in small animals and small ruminants were conducted as follow: Dystocia cases were diagnosed through palpation, complemented by historical information and visual inspection. The viability of the fetus was determined through trans-abdominal palpation in these species. Surgical conditions characterized by swelling or distension of body parts or cavities required additional diagnostic procedures such as exploratory puncture or fine-needle aspiration. Physical palpation was utilized to evaluate the consistency, pain, reducibility, and size of swollen areas and draining lymph nodes. Percussion of distended abdomens aided in determining their consistency, while rectal examinations provided insight into the bladder status in adult large animals experiencing urinary issues.

Most animals presented were stabilized before planned surgical interventions, while those admitted with emergency conditions such as dystocia, urinary rupture, omental evisceration, perineal lacerations, and broken horn and bleeding wounds were promptly addressed. Elective cases were scheduled based on surgical urgency and the fasting status of the animal. Some animals fasted prior to surgical intervention, depending on the procedure type, age, and species. Weight measurement facilitated safe and precise administration of fluids, drugs, and anesthetic agents, with small animals, small ruminants and young large animals weighed using balances, while

adult large animals' weights were estimated. Surgical interventions were predominantly performed following condition confirmation, with a few cases undergoing exploratory surgery.

Preparation for Surgery: Subsequent to evaluation, owners were requested to sign a written consent (Annex 2) before surgery proceeds then patients were meticulously appraised for anesthesia (Annex 3) suitability and surgical risks, with tailored anesthesia protocols devised in accordance with individual patient profiles and procedural requirements to ensure optimal safety. The animals were evaluated with care preoperative and during operation for every change and also anesthesia(Annex 5).

Surgical Intervention: Surgical procedures were executed under sterile conditions, with techniques and management strategies adapted to the unique exigencies of each case, thereby optimizing procedural efficacy and patient outcomes.

Post-Operative care and follow-up: Vigilant care post-surgery involved immediate and subsequent monitoring to detect and address discomfort or complications, utilizing telephonic and in-person assessments to ensure a smooth recovery and promptly address any emerging concerns or complications.

Data Compilation and Reporting: Relevant data pertaining to surgical cases were methodically compiled and documented in comprehensive surgical reports based on system involved, delineating the procedural nuances, patient responses after operation (Annex 4), and any observed outcomes or complications.

2.4. Ethical Considerations

Prior to commencing the research, a formal request detailing the study's objectives and the proposed measures for mitigating animal pain and distress during surgical treatment was submitted to the Animal Research Ethics and Review Committee of Addis Ababa University's College of Veterinary Medicine and Agriculture. They conducted a thorough examination of the proposal, assessing it within the framework of research ethics and determined that there were no ethical issues pertaining to the objectives and methodology outlined in the proposal. However, the animals were examined, diagnosed according to case type and surgically treated by being based on the consent letter translated to language the owners can easily understand(Annex 2).

3. COMPILED CASE REPORTS OF SURGICAL PROCEDURES AND THEIR OUTCOME ON DIFFERENT DOMESTIC ANIMAL SPECIESES

3.1. Surgery of Reproductive System

3.1.1. Open castration in dogs

Abstract

Surgical castration, which involves removing the testes (testicles), is a frequent technique of contraception that is additionally utilized to change unwanted behaviour and avoid disorders of the reproductive system. Cases of two male dogs were presented to the Addis Ababa University, Veterinary Teaching Hospital, for surgical sterilization and performed open castration with different forms under general anaesthesia and both dogs were completely recovered from operation.

Key words: *Dogs, Open castration, Scrotal ablation, Scrotal approach*

Introduction

Surgical castration, which involves removing the testes (testicles), is a frequent technique of contraception that is additionally utilized to change unwanted behaviour and avoid disorders of the reproductive system (Diesel *et al*., 2010). It is one of the most commonly performed procedures in veterinary clinical practice, and is considered as one of the dog population management as well as preventing diseases of reproductive system, like benign prostatic hyperplasia and to change undesirable behavior, such as urine marking, between-male aggression, and mounting of other dogs (El-Wahed *et al*., 2014).

In the male, complete castration (removal of the testicles) eliminates the incidence of testicular tumors, decreases the incidence of benign prostatic hypertrophy, prostatitis and injuries associated with roaming (Bushby, 2012). Neutering involves removing the hormone source that regulates reproduction and establishes secondary sexual traits. In dogs and cats, this is most commonly accomplished by removal of the testes or ovaries, though there are a variety of surgical techniques as well as non-surgical

methods of contraception to prevent reproduction without removing the source of gonadal hormones (McKenzie, 2010).

Patients are given general anaesthesia for the castration of dogs and cats. Various techniques for injectable induction and maintenance with inhalant agents were utilized (Fossum, 2007; Tobias, 2010). Anesthetic induction, maintenance, and recovery may be altered in excited animals. Minimize handling of puppies or kittens before anesthesia (Kustritz, 2002). Surgical castration can result in post-operative problems such as bleeding, edema or excessive swelling, infection, and inadequate wound healing. The aim of this case report was to describe the surgical management of testis in dogs through open castration by different approaches.

Description of the Cases

Case history and clinical findings: A three (Case 1) and five (case 2) years-old, local breed dogs were admitted with different clinical presentations to the Addis Ababa University, Veterinary Teaching Hospital. The case 1 was presented for elective surgical sterilization to prevent breeding and improve its behavior while the case 2 was presented with a history of mechanical injury at tip of left scrotum before one week and the dog has been licking it since then. Thorough clinical examination revealed a necrotized left testicular tip (Figure 1A) and was found to be firm upon palpation while right one was found normal. Besides, the vital clinical parameters like heart rate, respiration rate and temperature of the animals were assessed and found within physiological limits. Based on history and clinical examinations, the case two was diagnosed as mechanical wound and finally, dogs were admitted for an elective surgeries by scrotal ablation (case 2) and open castration through scrotal incision approach (case 1) under general anesthesia.

Pre operative preparations, anesthesia and animal control: The dogs were brought to VTH on the days of their preset appointment and withheld from feed and water overnight. Before surgery, the patients received (Pen &Strep® Norbrook UK) penicillin (24 mg/kg) and dihydrostreptomycin sulphate (30 mg/kg). The dogs were positioned on a surgical table in dorsal recumbency after being sedated by ketamine (Ketamine Hydrochloride, Germany) at a dose of 10 mg/kg IM. Then, the area between the os-penis and surrounding the base of the scrotum was washed with soap

and water, shaved and cleaned with an antiseptic solution, diluted chlorhexidine solution (savlone). The operative site was lastly scrubbed with a weak iodine solution.

Thence, the dogs were taken to operation room and put on surgical table followed by induction with Ketamine @5 mg/kg and Diazepam @0.5 mg/kg IV. Besides intravenous fluid using lactated ringers solution @10 ml/kg/hr at calculated rate of 1drop/second was administered using 18G IV cannula through cephalic vein. Using a syringe, ketamine and diazepam were combined and injected at the same interval. Sterile drapes were put and sterile surgical instruments were used during surgery. Sterile surgical gloves were also worn and standard aseptic principle was followed in all surgical steps, including surgical scrubbing of hands with iodine-based scrub solution and aseptic handling of instruments.

Surgical procedure and techniques: In both cases, different forms of open castration were used as a means of treatment. A 5 cm incision was made in the scrotal region (case 1) and subcutaneous tissues following aseptic preparation and patient control. While cutting through partially incised subcutaneous tissue and fascia, the left testicle was forced up to the incision by applying pressure below it, allowing to protrude through the incision line. Next, the scrotal ligament, which joins the scrotum to the testicle's caudal pole was broken and the testicle was pulled and grabbed using a gauze sponge. But for case 2, the skin around the base of the scrotum was incised (Figure 1B) and the cords were found by blunt dissection.

In both cases, the cords were clamped using three haemostats (Figure 1C) and double ligated with polyglycolic acid 910 (vicryl) 2-0. One circumferential ligation was placed below the distal haemostat far from the testicle, and a transfixation ligature was applied at the groove created by the middle haemostat. The spermatic cord was then severed between the middle haemostat and the haemostat closest to the testis and removed. After verifying the cut stump for bleeding, the haemostats on the cord were released. This procedure was repeated for the second testicle.

Following the removal of both testes, effective hemostasis was confirmed, and the incision was closed in two layers: skin and subcutaneous tissue. The subcutaneous layer was sutured with a simple continuous suture pattern, thoroughly obliterating the dead space (Figure 1D) using absorbable suture material (vicryl) 2-0. The skin was

closed with a buried continuous horizontal subcuticular pattern using absorbable suture material 3-0 polyglycolic acid 910 (vicryl) in case 2 (Figure 1E), and a simple interrupted pattern using silk 2-0 in case 1 (Figure 1F). Finally, the incision was inspected for gaps, oozing, or any other issues, and iodine tincture solution was applied to the area.

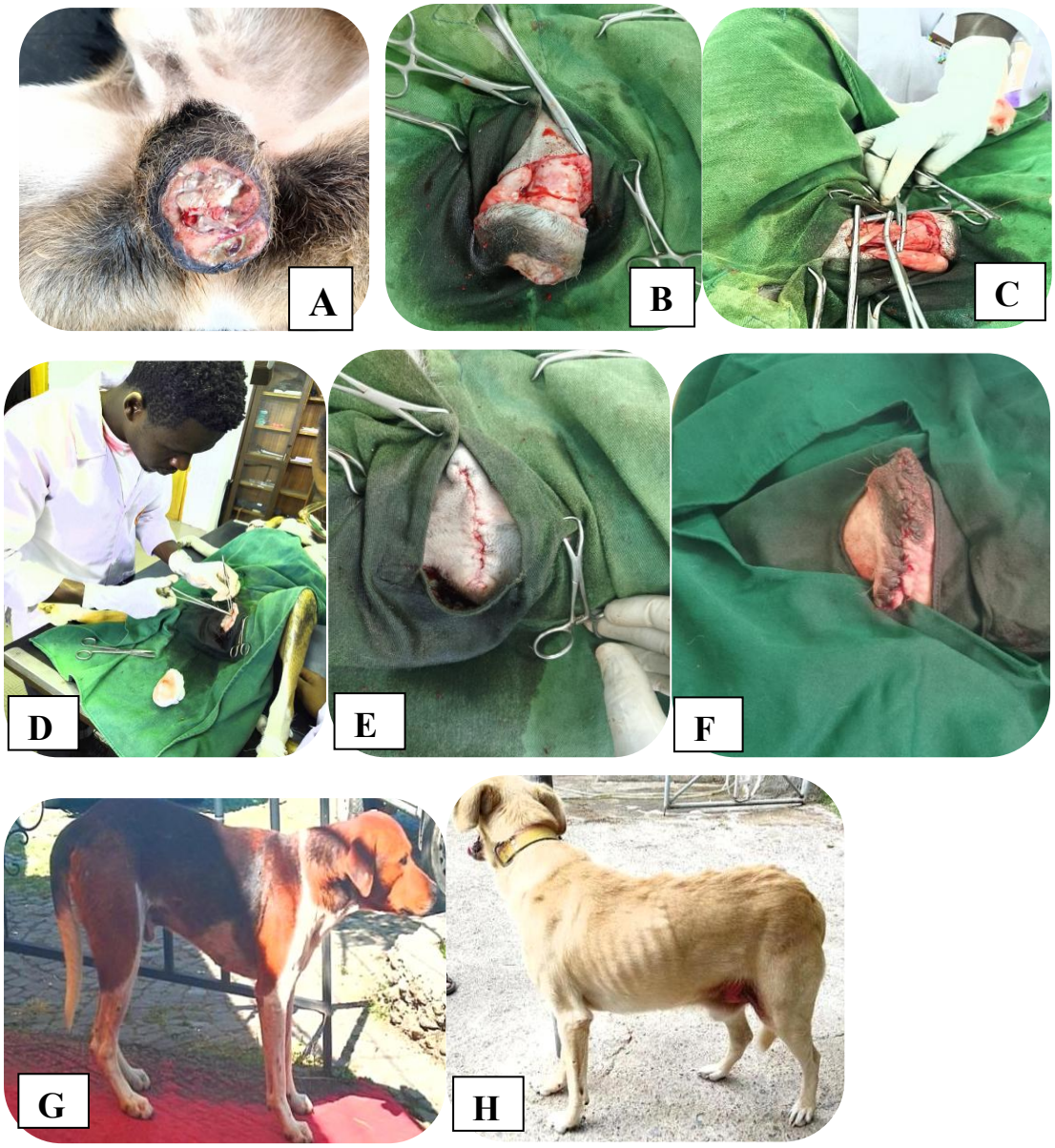

Figure 1: Open castration and its surgical progression in dogs

(A) Gross appearance before the operation (B) Scrotal ablation (C) The clamped spermatic cord using three hemostats (D) The closure of the incision (E) The closed skin with a buried subcuticular pattern by 3-0 vicryl in (case 2) (F) The closed skin by simple interrupted pattern using silk 2-0 (case 1) (G&H) Case 1 & Case 2 respectively after one month of follow up

Post operative care and outcome: After successful surgical management, the wounds were dressed and disinfected with iodine at frequent interval and (Pen &Strep® Norbrook UK) penicillin (24 mg/kg) and dihydrostreptomycin sulphate (30 mg/kg). intramuscular (IM) was given as postoperative antibiotics for five days for both cases. Besides, the wounds were inspected for any post operative complications upon regular follow up during the time they brought to hospital. The owners were asked by the phone communication on daily basis about the status of animals including health, food and water interest for appetite. The owners were also advised to restrict exercise for few days, and use modified collars postoperative to avoid self mutilation. In addition, the owners were advised to follow their dogs for any signs of discomfort during urination. Accordingly, the complications were occurred in both of them due to owner's failure to take care of the collars use, following which the dogs licked the sites and untied about half suture notes on the second and third day in case 1 and case 2 respectively and sutured again. But, it was untied again on 7^{th} day in case 2 that became refreshed and restitched again. Finally the suture material for case 1 was removed on 12^{th} and 17^{th} day for case 2 and the dogs were completely recovered from operation without any additional complication and upon on follow up of one month (Figure 1G&H), the body condition of the dogs were improved and seen alert.

Discussion

This case study detailed the effective implementation of open castration in dogs, undertaken to address problematic behaviors, manage pet overpopulation (Case 1), and mitigate the risk of reproductive system ailments (Case 2). Surgical sterilization of pet animals is a method of rendering animals completely sterile and performed as an alternative method of contraception which can be used in dog population management besides preventing diseases of the reproductive system. In addition to these benefits, castration can modify undesirable behaviors such as urine marking, sexual behavior, aggression towards people, inter-male aggression, and mounting of other dogs (Adin and Scansen, 2011). Castration of dogs and cats is considered one of the strategies to address these undesirable behaviors (Endenburg, 2015).

The open castration with ablation of scrotum had been recorded in equids (Misk and Seleim, 1987) and in ruminants (Misk, 1982). This technique offers primary closure

of the wound, no drainage, minimal swelling and quicker return to activity (Bassert, 2017). But the present case report (Case 2), described the successful management of open castration by the scrotal ablation in dog. For many years, the prescrotal technique has been taught as the most acceptable method for canine castration (Hamilton *et al*., 2014). However, scrotal castration has gained popularity in recent years as a safe alternative to the prescrotal technique (McKenzie, 2010). Like wise, the management approach used for the open castration of the dog in the current case (Case 1) was the scrotal approach.

In summary, the techniques reported here were associated with minimal complications and provide quick, safe and reliable methods for removing descended testicles from dogs through total scrotal ablation and through scrotal approach followed by primary closure of subcutaneous tissue and the skin.

3.1.2. Surgical management of hydrocele in ram

Abstract

A hydrocele is defined as the pathological accumulation of serous fluid between the visceral and parietal layers of the vaginal tunic. A two-year-old intact ram presented to the Veterinary Teaching Hospital (VTH) with a unilateral testicular swelling that had been present for two weeks. The animal exhibited marked discomfort upon manipulation of the affected testicle. Despite a week-long course of antibiotics and anti-inflammatory drugs, the condition did not improve. Clinical examination revealed that the left testicle was significantly enlarged compared to the right, and the animal displayed increased aggression when the left testicle was palpated. The ram was diagnosed with a hydrocele and subsequently underwent open castration. The procedure was successful, and the ram recovered uneventfully.

Key words: *Hydrocele, Open castration*, *Ram, Scrotal ablation*

Introduction

A hydrocele is a pathologic accumulation of serous fluid between the visceral and parietal layers of the vaginal tunic (Henry *et al*., 2000). The vaginal tunic is secretor, and fluid produced by the vaginal tunic is resorbed through the veins and lymphatic

vessels of the spermatic cord. Hydrocele results when production of fluid by the vaginal tunic is increased or resorption is decreased. Hydroceles may accompany testicular neoplasia or scrotal trauma or they may be idiopathic (Schumacher, and Varner, 2007).

Castration is one of the most common surgical sterilization procedures for male animals, which can be performed using either open or closed techniques (Schumacher *et al*., 2012). Castration of cattle, sheep, and goats has traditionally been a routine part of livestock husbandry to improve meat quality by increasing the distribution of fat, improving tenderness (cattle and sheep) (Field, 1971; Sales, 2014), avoiding undesirable odours and flavour (rams and goats) (Misock *et al*., 1976; Zamiri *et al*., 2012)), and reducing the occurrence of dark-firm-dry meat (cattle) (Warriss, 1990).

The procedure can be performed by using local anaesthetics like 2% lidocaine HCl either intra testicularly or into the scrotal sac to reduce pain (Sutherland, 2009). The present case report described the surgical management of hydrocele in ram by open castration through scrotal ablation.

Description of the Case

Case history and clinical findings: A two years old intact ram was presented to the VTH with unilateral swelling of the testicle and increased in size since two weeks and was resentful upon manipulation of the testicle. The animal was treated by VTH staff with antibiotics and anti-inflammatory drugs for a week: Pencillin-streptomycin combination @1ml/10kg, IM, and dexamethasone sodium @0.2mg/kg, IM, once a day for three days. Upon clinical examination, the left testicle was considerably larger (Figure 2A) than the right one and the scrotal sac and associated structures were filled with fluid and were painful upon touching. All vital signs were also assessed and found within in normal physiological limit. Depending on history and thorough clinical examinations the case was tentatively diagnosed as hydrocele and admitted for surgical treatment by open castration through scrotal ablation.

Pre operative preparation, anesthesia and animal control: The ram was restrained in dorso-lateral recumbence on surgical site preparation table and aseptically prepared on the base of the scrotum through shaving, washing with water and savlone before

scrubbed by diluted iodine solution. The scrotal skin around both spermatic cords was infiltrated with 2% lidocaine solution. Then the ram was taken to operation room and restrained on surgical table (Figure 2B).

Surgical procedure and technique: Following aseptic preparation of the surgical site and patient stabilization, a skin incision was made around the base of the scrotum. Hemostasis was achieved by crushing the bleeding vessels on the lateral aspect of the scrotum. The subcutaneous tissues and scrotal skin were then separated using Metzenbaum scissors. Subsequently, the scrotal fascias were incised to allow the testicle to be exteriorized. The testicle was pushed through the incision, and the spermatic cord was clamped using three hemostats (Figure 2C). The cord was then ligated with 2-0 vicryl at the groove created by the second hemostat. The spermatic cord was transected 1 cm caudal to the ligature, between the ligature and the hemostat closest to the testis, and the stump was inspected for bleeding. The opposite testicle was removed using the same technique. The subcutaneous tissue was closed with a simple continuous suture pattern, and the skin was closed with an interrupted suture pattern using catgut 2-0 (Figure 2D) with some portion of the scrotum left open to allow fluid licking. Finally, the surgical site was scrubbed with iodine solution.

Post operative care and outcome: Post operatively, the antibiotics (Penstrep), @ 1ml/10kg IM was administered for three days. Daily dressing of the surgical wound using 2% povidone iodine was taken place. The owner was advised to clean the place where the ram lives on daily basis and attend if there is any deviation of animal from its normal status. The suture material was removed on the scrotal skin by the 10th day after complete healing without any apparent complication (Figure 2E).

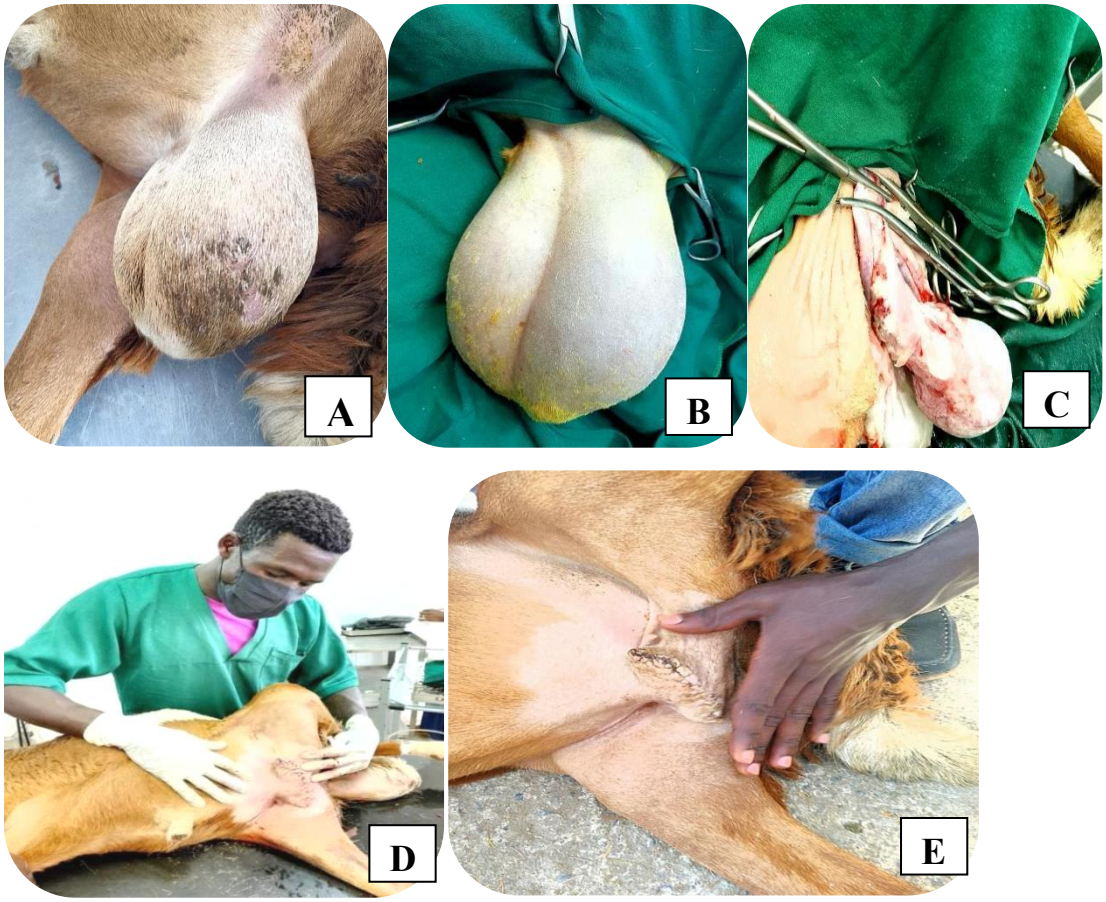

Figure 2: Open castration in Ram by scrotal ablation

(A) The enlarged testicle (B) Aseptically prepared and draped surgical area (C) The clamped spermatic cord using three hemostats (D) The closed scrotal skin in an interrupted pattern using catgut 2-0 (E) The completely healed status of surgical wound after suture material was removed by the 10th day after operation

Discussion

Castration stands as the foremost surgical intervention frequently sought by farmers aiming to enhance their income, primarily due to its significant contribution to improving meat quality, a trait highly sought after in local markets, and its facilitation of easier management practices (Khandoker *et al*., 2011; Al Noman *et al*., 2018). However, the procedure's inherent pain induction may precipitate enduring neurophysiological alterations, encompassing allodynia, hyperesthesia, hyperalgesia, paresthesia, and conceivably, peripheral and/or central sensitization, thereby potentially impeding weight gain. Such adverse effects can be mitigated through the administration of local anesthetics (Prunier *et al*., 2006). In line with this approach,

the current case was managed utilizing the local anesthetic agent lidocaine HCL to effectively control pain.

Testicular ablation is recommended in collaborating hydrocele because it can result in hernias or it causes distress as time advances (Ahmed Ali *et al*., 2019). This was consistent with the current case report. The spermatic cord was transected 1 cm distal to the ligature after being clamped using three hemostats and ligated. This case report was consistent in terms of spermatic cord severing site but not in its use with the study conducted by Aswad et al. (1976) who concluded that cutting the spermatic cord at its lowermost part after its ligature helps to reduce the space. Thereafter, transfixion of the stump and the tunics with the fascia by simple sutures prevents retraction of the cord and reduces the gap left by the removed testicles.

A hydrocele appears as a painless, fluid-filled scrotal enlargement that is often misinterpreted by owners as testicular enlargement. It may occur bilaterally or unilaterally and may develop acutely or insidiously. If development is chronic, the testis within the affected tunic is usually smaller than normal as a result of atrophy. Diagnosis can be verified with aseptic aspiration of a serous, amber-colored transudate from the vaginal cavity (Brinsko *et al*., 2010). In contrast, the hydrocele described in this case report was painful, serous, amber-colored, and linked to the left testicle unilaterally beneath the scrotum and had its own sac. The discomfort it caused could have been attributed to its size and swelling.

In conclusion, castration of ram is one of the routine and common surgical procedures in veterinary clinical practice. In this particular case report, the ram was assessed for health status, restrained and aseptically prepared before incision. Then skin incision was made around the base of the scrotum through which both testes were removed after adequate ligation. Finally, open castration of hydrocele in ram by scrotal ablation was successfully performed without complication.

3.1.3. Surgical sterilization of male piglets

Abstract

Piglets are castrated to reduce their aggression against other pigs and care takers and to avoid boar taint, which is caused by the buildup of skatole and androstenone in the

meat of sexually mature male pigs. In the current case management, elective open castration was performed on five two months aged piglets at the farm premises by infiltrating 2% lidocaine HCL subcutaneously along the length of both testicles for two piglets and intra- testicularly for three piglets. Upon regular follow up, barrows were successfully recovered without any significant complications except in two piglets with temporary mild depression and appetite loss.

Key words: *Open castration, Piglets, Testicles*

Introduction

Ethiopia is a home to approximately 28,000 pigs, constituting 0.1% of the African swine population, according to FAO (2005). These pigs are entirely composed of exotic breeds and have not been thoroughly characterized. Additionally, the local community has shown a lack of attention to the domestic pig (Yeshambel and Bimerew, 2014.) Despite the underdeveloped state of the swine sector in African countries, such as Ethiopia, there is significant potential for it to contribute to food security and generate employment opportunities, particularly within impoverished farming communities (Goraga *et al*., 2016).

Castration of piglets serve the purpose of preventing boar taint in the meat of sexually mature male pigs, as well as minimizing aggression towards other pigs and caretakers. Besides, boar taint is one of the factors which can decrease the market values is the due to the accumulation of two key compounds, skatole and androstenone, in the meat of intact males resulting undesirable smell and taste when the pork is heat treated (Claus *et al*., 1994; AVMA, 2018). Due to the lipophilic nature of these compounds, they tend to build up in the adipose tissue of growing animals in correlation with pubertal development. In carcasses where the concentration of these compounds exceeds an individual's sensitivity threshold, consumers may detect an unpleasant cooking odor or flavor in the meat (Font-I-Furnols *et al*., 2003).

The pig castration can be conducted by using local anesthetics like lidocaine which can be administered either intratesticularly or into the scrotal sac effectively reduce pain (Sutherland, 2009). This case report provides a detailed account of the pre, intra,

and post-operative procedures of piglet open castration conducted at the farm premises.

Description of the Case

Case history and clinical findings: The farm owner has requested open castration in five two months aged male piglets, to curb aggressive behavior in the piglets and avoid boar taint. Upon physical examination, all vital signs were within the normal range, and the piglets were observed to be in good overall health and body condition. Consequently, the piglets were approved for elective complete bilateral orchidectomy.

Pre-operative preparations, anesthesia and animal control: The piglets were physically restrained by lifting their hind limbs, positioning them upside down, and allowing them to stand on their forelimbs with their heads down, with the help of assisting personnel. The hair around the perineum and scrotum was then clipped using scissors and shaved with a scalpel blade, followed by cleaning the area with a diluted iodine tincture solution. Then, 2% lidocaine HCL, was administered subcutaneously along the length of both testicles for two piglets and intratesticularly for three piglets, with a waiting period of 10-15 minutes for the anesthetic to take effect.

Surgical procedure and techniques: After aseptic preparation and control, open castration was performed with single vertical incision, on each testicle approximately 1 cm in length, was made with a surgical blade on the scrotum, parallel to the median raphe, and extended based on the size of the testicle. Subsequently, the testicles were delicately pulled out through the incision (Figure 3A**)** after cutting through the skin, facial layer, and tunica vaginalis. Following the gentle exteriorization of the testicle, the spermatic cord was ligated by vicryl 3-0 (Figure 3B**)**. Distal to the ligation, the spermatic cord was severed, and the testicle was removed (Figure 3C**)** for all piglets. This process was repeated for the removal of the other testicle, leaving the incisions open to be healed without closure (Figure 3D**)**. Finally, the area was cleansed with a diluted iodine tincture solution (Figure 3E).

Post operative care and outcome: The barrows were administered with antibiotics penstrep intramuscularly for three consecutive days. The wound was dressed with 2% povidone solution for three days. Post-operative complication like mild depression

and loss of appetite was encountered in two of them but was not series. Later, all were recovered uneventfully.

Figure 3: Open castration in Piglets

(A) The exteriorized testicle through the incision, (B) Ligation of the spermatic cord, (C) The removed testicles from a piglet, (D&E) Incisions scrubed with iodine and left open to be healed without closure

Discussion

Even though castration in domestic animals can be conducted, by physical, chemical, and hormonal methods open castration is the predominant approach in piglets (Ting *et al*., 2003). This case report illustrated the utilization of surgical open castration as a resolution for a pig farmer's issue. Various methods can be employed to restrain piglets during castration, such as suspending them by the hind legs using a castration stand or assistance from another person, placing them in a V-trough, or holding them manually between an individual's legs (Rault *et al*., 2011). In this case report, the piglets were physically restrained by lifting their hind limbs, positioning them upside down, and allowing them to stand on their forelimbs with their heads down, with the help of assisting personnel.

Piglet castration, as indicated by Hay et al. (2003), is commonly performed without anesthesia or analgesia during the initial seven days of life. However, after this period, guidelines, as outlined by Hegerová and Juhás (2021), recommend that castration should only occur under the supervision of a veterinarian, involving anesthesia and long-term analgesia. This agreed with the open castration procedure described in the current case report, in which the patient's case was managed by a qualified veterinarian to ensure a safe and effective outcome using the local anesthesia to control pain and keep the welfare of the piglets. Sutherland (2009) also supported this stance, emphasizing that piglets older than one week should undergo castration with anesthesia administered by a veterinarian, accompanied by extended analgesic measures.

To alleviate pain during castration, Prunier et al. (2002) have demonstrated the effectiveness of lidocaine when administered intratesticularly or into the scrotal sac. This approach was further supported by Haga and Ranheim (2005), who observed reduced pain responses, as indicated by cardiovascular and ECG measures, compared to castration performed without anesthesia. The current case paper aligned with this perspective and, accordingly, employed 2% lidocaine HCL local anesthesia. This was subcutaneously administered along the length of both testicles into the scrotal sac for two piglets and intratesticularly for three piglets, aiming to manage pain in the piglets undergoing the castration procedure. Then the piglets were managed under both intra-testicular and subcutanous local anesthesia administration and these ways were all found helpful to make castration safe and successful.

For open castration of piglets, a single vertical incisions parallel to median raphae was performed on each testes's scrotum which is similar with Pérez-Pedraza et al. (2018). Notably, all piglets that underwent this castration procedure successfully recuperated with minimal complications.

3.1.4. Surgical management of recto-vaginal fistula in jenny

Abstract

Rectovaginal fistula (RVF) is an opening between the rectum and the vagina which results in chronic contamination of the vagina with fecal material. A jenny with recto-

vaginal lacerations was presented to Dire Clinic after foaling before four days ago. Clinical examination revealed the third-degree perineal laceration. As a result , the surgical repair was performed by a six-bite vertical suture pattern with modified Goetz(one-stage operation) after the injection of 2% lidocaine hydrochloride between the first and second intra-coccygeal spaces. After one month, the jenny was entirely recovered and could readily urinate through separate natural orifices and was seen alert.

Key words: *Jenny, Modified Goetz*, *Perineal laceration, Rectovaginal fistula*

Introduction

Perineal laceration is the term for lacerations that occurs at the perineal area which is usually caused by the birth of offspring. Depending on the quantity and severity of tissue damage, it is divided into three severities: the first, second, and third degrees (Faez *et al*., 2014). In domestic animals, it usually happens after parturition and affects the perineum's structures mostly because of dystocia brought on by either foetal or maternal causes (Blood *et al*., 2007).

One of the reasons of dystocia is foetal malpresentation, in which the foetus is not in the typical anterior longitudinal presentation, position, and posture, with dorso-sacral position and extended head and extremities or the neck flexed (Purohit *et al.*, 2012). The foal's legs also places excessive pressure on the lateral and dorsal walls of the birth canal due to strong expulsive efforts and the rotation of the equine foetus during parturition from a dorso-ventral to a dorso-sacral position (Purohit, 2011). This increases the risk of laceration. The foal's foot is forced into the vestibule's ceiling by the abdominal compression during foaling, and the foal's hooves grab the dorsal transverse fold of the vestibulo-vaginal junction (Woodie, 2006).

First-degree perineal lacerations are defined as those that solely affect the skin and mucosa of the vestibula or vagina. Second-degree perineal lacerations do not impact the rectal mucosa, but rather the vestibular mucosa and submucosa, the skin of the vulva's dorsal commeasure, and the perineal body musculature, including the constrictor vulva (Adams and Fessler, 2000). Third-degree perineal lacerations occurs when the recto-vestibular septum, rectum and vestibule musculature, and the perineal

body are torn (Hendrickson, 2007; Kazemi *et al*., 2010). Thus, a third degree perineal laceration, results an opening between the rectum and the vagina (Recto vaginal fistula) resulting in chronic contamination of the vagina with fecal material. Consequently, the ensuing vaginitis, cervicitis, and endometritis contribute to the high rate of infertility found in mares and jennies with RVF (Gunther, 1976; Hilbert, 1981). The fistula occurs most frequently in primiparous mares as a result of a foaling injury, when the foal's foot or nose is forced through the roof of the vagina, creating a communication into the rectum (Aanes, 1988).

Description of the Case

Case history and clinical findings: A local breed jenny with a successful history of one previous delivery was brought to the Dire Clinic in Bishoftu Town, East Shoa Zone, with a recto-vaginal laceration sustained after the delivery of her second foetus (Figure 4A). It was occurred four days ago during foaling while the owner attempting to remove the foetus without adjusting the natural posture, position, or presentation of the foetus. The fetus's hooves were lodged in the delivery canal and cut the vagina and the rectum. Examination of the perineal region revealed extensive, foul smelling vulva with tear which extends from ventral aspect of anus to the dorsum of the vulva and vagina resulting common pass ways for defecation and urination. Finally, based on clinical findings and history the case was diagnosed as a third-degree perineal laceration and decided to be managed by surgical repair by using modified Goetz (Figure 4B).

Pre-operative preparations, anesthesia and animal control: Before commencing the operation, fortified procaine penicillin at 4,000,000IU was administered IM. Then the jenny was gently controlled and positioned lying on lateral recumbence and administered 2ml 2% lidocaine hydrochloride between the first and second inter-coccygeal spaces epidurally @1ml/100kg (Brinsko *et al*., 2011). In order to avoid interference during a surgical procedure, the tail hair was held in a side to back orientation. After the fecal material was manually removed from the rectum, the perineal region and vaginal vault were cleaned with water, savlone and repeated flushing with a mild povidone iodine solution and were thoroughly dried.

Surgical procedure and treatment: Modified Goetz (one-stage operation) was used for closure. The operative area was exposed by holding skin with Allis tissue forceps near the muco-cutaneous margin on each side of the disrupted dorsal commissure of the vulva and an incision was made along the tissue which allowed exposure of the three clear tissue planes: the rectal mucosa, the perineal body and the vaginal mucosa. Then closure of recto- vestibular shelf was accomplished by a six-bite vertical suture pattern by modified Goetz (one-stage operation) as mentioned by (Anwar and Purohit, 2013; Pooniya *et al*., 2019) with No. 2 Polyglactin (Vicryl, Ethicon, USA) suture material, placed starting just cranial to the defect and was terminated at the dorsal commissure of vulva. The operation was completed by reconstruction of the perineum with four bite interrupted vertical suture pattern using Vicryl No. 2 commencing cranially and terminated caudally (Figure 4C). At ventral commissure of vulva, enough room, almost 4cm (Figure 4D), was left for urination and lastly, 2% povidone iodine was applied on it (Figure 4E) and flunixin meglumin (Banamine®) at 2.2mg/kg intramuscular was administered. After operation, the animal could readily urinate through her natural orifice.

Post operative care and outcome: Postoperatively, the suture line was cleaned daily with povidone iodine solution, flunixin meglumin and antibiotics fortified procaine penicillin was administered IM for two additional days. In order to prevent complications following surgery, such as atony of the rectum, discomfort, and tenesmus during defecation, which could lead to suture dehiscence, the owner was recommended to give jenny a little amount of green alfalfa hay every day during the postoperative period and to confine the jenny for the first week after surgery. After one month of follow up, the jenny was entirely recovered uneventfully and could readily urinate through her natural orifice and was seen alert (Figure 4F).

Figure 4: Recto-vaginal fistula repair in Jenny

(A) Recto-vaginal laceration (B) Common passageways for defecation and urination (C) Reconstruction of the perineum (D) Enough room left for urination (E) Povidone iodine was applied on the site (F) Jenny could readily urinate through her natural orifice.

Discussion

Rectovagianl fistula is one of the challenging surgical cases in equines due to less optimal operative visibility, continued rectal peristalsis and bacterial contamination (Singh & Saharan, 2017). It also poses threat to breeding soundness. During surgical repair, it is advisable to apreciate the involvement of cervix (Turner, 1989). Although there are other alternative methods than the Goetz method (one stage repair) for surgical repair of perineal lacerations in jennies, different groups of veterinarians and authors have slightly different approaches (Pooniya *et al*., 2019). However, the goal of all procedures is to rebuild the wall of tissue between the rectum and the vestibule and consequently, restore the structural integrity of the perineal body. The present report agreed with (Anwar and Purohit, 2013), and so the Goetz technique, a one-

stage procedure outlined for mares and cattle was effectively used to repair RVF in a jenny during the current study and it offered fast healing and conformational soundness in the perineal area. This study also agreed with (Kazemi *et al*., 2010) and therefore, RVF was repaired successfully by Goetz method, and dehiscence of the suture line and fistula formation did not occur after surgery.

To sum up, a variety of surgical methods and technique adjustments can be applied to effectively repair RVF, but the present study's result suggested that the surgical outcome for the single-stage surgical repair of a recto vaginal fistula was good and successful.

3.1.5. Second degree perineal laceration repair in jenny

Abstract

A local breed female donkey with her first parity was brought to AAU, Donkey Sanctuary Veterinary due to dystocia that began 13 hours ago. During helping the jenny by pulling the fetus through natural orifice by stitch, the perineum of the jenny was lacerated extending from ventral aspect of anus to the dorsum of the vulva and vagina but did not extended to rectal wall and diagnosed as a second degree perineal laceration. Thence it was reconstructed in 2 layers: Firstly, internal musculature was sutured using simple continuous sutures pattern and skin was closed by simple interrupted sutures pattern with 1-0 size vicryl starting from the distal and caudal anus to the cranial vaginal vulva. The animal was kept at hospital for three days and sent home on fourth day after it showed hopeful progression. Finally, the wound was completely healed without complication.

Key words: *Dystocia, Jenny, Perineal laceration*

Description of the Case

Case history and clinical findings: A local breed jenny with her first parity was brought to AAU, Donkey Sanctuary Veterinary with a history of difficult in giving birth. The case began before 10 hours and the animal traveled about additional 3 hours to reach the Hospital. The owner also said that the amniotic sac has been seen 10 hrs ago after which the jenny tried to deliver the fetus repeatedly by standing and

lying down but could not give birth to fetus. During examination, there was dirty amniotic sac (Figure 5A) hanging from the vagina of jenny, vital parameters were within normal range with slight increment in rectal temperature as it came from far area. When the amniotic sac inspected and palpated, there were fore legs feet and fetal muzzle hanged within it.

After washing the area with water and savelone, the case was managed by manually pulling the fetus gently through the birth canal but it was not easy to do this. Then stitch was applied on the feet and mouth part of the fetus and pulled again forcibly leading to the expulsion of the dead fetus (figure 5B) but the perineum of the jenny was lacerated extending from ventral aspect of anus to the dorsum of the vulva and vagina (Figure 5C) but did not extended to rectal wall. This laceration was therefore diagnosed as a second degree perineal laceration due to dystocia caused by oversized male fetus and decided to be managed through surgical repair.

Pre-operative preparations, anesthesia and animal control: The operation was conducted while the animals was restrained by the owner in standing position. When once the area was washed with mild antiseptics (chlorhexidine solution) and ready for surgical correction, the local anesthesia, 2% lidocaine hydrochloride was infiltrated around the laceration. The tail of animal was also held away from the median by team assistant to minimize contamination and tail twitching during surgical procedure.

Surgical procedure: The animal was held in standing position during the procedure in a correct position. Lacerated tissues were reconstructed in 2 layers starting from the distal and caudal anus to the cranial vaginal vulva on the area of the laceration (Figure 5D). Firstly, the layer covering the internal musculature was sutured using simple continuous sutures pattern and then skin sutures using simple interrupted sutures pattern with 1-0 size vicryl to prevent wound dehiscence. The area was scrubbed with a diluted iodine solution (Figure 5E). Finally, fortified procaine penicillin(H-PPF VET) at 4,000,000IU and flunixin meglumin (Banamine®) at 2.2mg/kg were administered intramuscular. Then the animal was kept at hospital in the donkey sanctuary care premises and was followed for 3 days and sent home on 4^{th} day.

Post operative care and outcome: During the animal was in hospital after the operation, flunixin meglumin and fortified procaine penicillin was given IM for one

and two additional days respectively. The suture line was cleaned daily with 2% povidone iodine solution. The jenny was maintained on green grass to pass loose faeces to avoid any straining and tension on sutures. On post operative time, depression on first day, the straining for two days was observed which was stopped afterwards. The healing status was going in successful manner and the jenny was being alert day to day, it also had normal appetite except first day until 4th day post-operation when it was in hospital during follow up (Figure 5F). The jenny was sent home on fourth day and the owner was advised to inspect and monitor the urination as well as defecation status and any discomfort felt on jenny. Finally, the wound of jenny was completely healed and no complication was reported till 2 months of follow up.

Figure 5: Second degree perineal laceration repair in Jenny

(A) Amniotic sac suspended at vagina (B) Expelled dead fetus (C) Perineal laceration before closure (D) Reconstruction of laceration (E) The closed perineal laceration (F) The alert and active animal on 4th post operative day of followup

Discussion

The current case report described the surgical repair of second degree perineal laceration which was occurred due to dystocia during parturition. There are many causes of perineal lacerations which are commonly associated with calving process. One of them is the occurrence of dystocia due to fetal abnormalities which include malpresentation of the fetus, oversized fetus and also male-calf deliveries. Male calf is usually heavier than female calf and often causes more dystocia and damage to the birth canal (Farhoodi *et al*., 2000). Similarly, in the current case report, the delivered foal was a male foetus and was a contributing factor to the emergence of dystocia and a second-degree perineal laceration in a female donkey that was in good physical condition.

Perineal laceration can also be caused by trauma during breeding which is most probably due to the aggressiveness of the bull. Other than that, perineal or perivaginal abscesses and congenital abnormalities such as stenosis of the vagina could occlude the genital passage and thus interfere with the calving process (Purohit *et al*., 2011). The current case report however, disagreed with the finding stated above but concurs with Kazemi et al. (2010) in terms of the animal's primiparity. As a result, the jenny was primiparous in the case under consideration and sustained a second-degree perineal laceration as a result of the forced extraction used to treat dystocia brought on by the oversized foetus.

In the present case management, the laceration resulting from the forceful expulsion of a dead fetus through the vaginal canal was surgically corrected immediately, without waiting for the formation of granulation tissue and epithelialization of the wound. This approach differs from some surgical treatment protocols (Abdullah *et al*., 2014), which recommend performing reconstruction only after the inflammation has subsided and granulation tissue has appeared at the injury site. Despite this deviation, the immediate reconstruction in the present case achieved good apposition of the wound edges without causing any unsightly appearance.

Reconstruction of the perineal body was completed by using a modified episioplasty technique. During closing the perineal body, the left and right vestibular mucosa were apposed from cranial to caudal with simple interrupted or horizontal mattress sutures

(Vicryl 2–0). The perineal skin was apposed with simple interrupted sutures (Frietman *et al*., 2019). In the present case report, lacerated perineal tissues were reconstructed in 2 layers starting from the caudal anus to the cranial vaginal vulva on the area of the laceration. Firstly, the layer covering the internal musculature was sutured using simple continuous suture pattern and then skin was closed using simple interrupted sutures pattern with 1-0 size vicryl to prevent wound dehiscence.

After repair the mares are again maintained on full course of antibiotics, anti-histamines, anti-inflammatory, vitamin- C & B-complex. The repaired perineal area should be dressed daily with light povidone-iodine solution followed by maggicidal spray. The mares should also be maintained on green grass only to pass loose faeces and to avoid any straining (Singh and Saharan, 2017). This was in agreement with current case study in which the jenny was dressed with 2% povidone iodine solution, maintained on antibiotics, anti-inflammatory drugs and on green grass to pass loose faeces to avoid tension on suture as there was straining. Therefore, in conclusion, this present study was strongly recommending the cases of perineal laceration to be managed early by using absorbable suture materials with antibiotic and anti-inflammatory drugs.

3.1.6. Ovariohysterectomy in pet animals

Abstract

The sterilization of female dogs and cats can be achieved through the removal of both the ovaries and uterus, known as ovariohysterectomy, or by solely removing the ovaries, referred to as ovariectomy. Ovariohysterectomy, is a medical term denoting the spaying or neutering of a female dog. Two 3 and 4 years old female dogs and a one year old Queen were presented at the VTH, CVMA, AAU, on different occasions for birth control purposes. On comprehensive physical examination, both dogs as well as a queen, were revealed to be in apparent good health and their vital parameters were within normal limits. Then, an elective surgery of ovariohysterectomy was conducted on caudal midline under general anesthesia (ketamine and diazepam for bitches) and (xylazine, ketamine and diazepam for queen) as a measure to control unwanted litters. Finally, the wounds had fully healed without any complications.

Key words**:** *Bitches, Caudal midline, Ovariohysterectomy, Queen*

Introduction

Numerous studies focus on the ownership of companion animals, with cats and dogs being the most prevalent pet species. Dogs, often referred to as 'man's best friend,' are considered the epitome of animal companionship (Acar, 2020). Neutering involves eliminating the hormonal source that control reproduction and determine the distinctive physical and behavioral traits of males and females. In dogs and cats, this is commonly achieved through surgical procedures such as castration for males and spaying for females, involving the removal of testicles and ovaries, respectively. However, various surgical and non-surgical methods exist for contraception, aimed at preventing reproduction without eliminating the source of gonadal hormones (McKenzie, 2010).

In female dogs and cats, sterilization can be accomplished by removing both the ovaries and uterus, a procedure known as ovariohysterectomy, or by solely removing the ovaries, a procedure referred to as ovariectomy. Ovariohysterectomy has historically been recommended in the United States and Canada and is currently emphasized in veterinary medicine schools and colleges in these countries (DeTora and McCarthy, 2011). Ovariohysterectomy, often abbreviated as OHE, is a medical term denoting the spaying or neutering of a female dog. This procedure stands as one of the most commonly performed major abdominal surgeries in veterinary practice, conducted under proper general anesthesia and sterile operating conditions (Pearson, 1973; Jason, 2009). OVH is an irreversible technique utilized for the sterilization of female animals (Azizunnesa *et al*., 2017).

Ovariohysterectomy (OHE) offers several advantages, including a reduction in the occurrence of reproductive tract diseases such as pyometra and mammary neoplasia in female dogs. It also contributes to a decrease in pregnancy and parturition-related issues like metritis, mastitis, and dystocia. Additionally, OHE helps mitigate hormone-associated disorders like vaginal prolapse and minimizes undesirable sexual behaviors in female dogs (Kim *et al*., 2008; Kristiansen *et al*., 2013). However, it's important to note the potential drawbacks of OHE, which encompass surgical and anesthetic complications, an increased risk of neoplasia in various organ systems, obesity, and urinary incontinence in female dogs (Romagnoli, 2008). This surgical

case report was intended to conduct ovario-hysterectomy and present the results of this elective surgical sterilization procedure performed on two bitches and queen in our setting.

Ovariohysterectomy in Bitches

Description of the cases

Case history and clinical findings: Two female dogs were presented at the VTH, CVMA, AAU, on different occasions for birth control purposes. The first (Case 1) involved a 3-year-old bitch weighing approximately 14 kg, while the second case (Case 2) was a 4-year-old local breed bitch weighing around 17 kg. They had a history of two and three parities respectively, all delivered vaginally without complications. Prior to the procedures, both bitches were fasted for overnight, and prior to operation, the owners provided consent by signing a consent form. A comprehensive physical examination was conducted on both dogs, revealing them to be in apparent good health. The vital parameters for Case 1 were within normal limits, with a temperature of 38.2°C, a heart rate of 90 beats/minute, and a respiratory rate of 22 breaths/minute. Similarly, Case 2 also with a temperature of 38.5°C, a heart rate of 89 beats/minute, and a respiratory rate of 23 breaths/minute. Then, the decision was made to proceed elective surgery of ovariohysterectomy under general anesthesia as a measure to control unwanted litters.

Pre-operative preparations, anesthesia and animal control: Three hours before the initiation of the surgery, the bitches received penicillin (24mg/kg) and dihydro-streptomycin sulphate (30mg/kg) (Pen & Strep® Norbrook UK). Subsequently, the bitches were sedated with ketamine (10mg/kg IM) and placed on the surgical table in the surgical site preparation room, positioned in dorsal recumbence. Aseptic surgical preparation involved meticulous washing and cleaning the surgical site with a water and chlorhexidine surgical solution respectively, shaving the hair from the caudal midline at the ventral abdomen, specifically from the umbilical to the pubic region followed by a final scrub using a 2% povidone iodine solution.

The bitches were then taken in to operation room and put on surgical table in dorsal recumbence with their legs tied apart on table (Figure 6A), and an 18G intravenous

catheter was placed on cephalic vein and Intravenous fluids (0.9% lactated ringers solution) was administered @10 ml/ kg/hr at 1 drop per second throughout the surgery. After induced with combination ketamine at 5 mg/kg and diazepam at 0.25 mg/kg IV, sterile drapes were put, surgical gloves and surgical instruments were used during surgery for both cases. The same anesthetic agents were used for maintenance throughout the procedure.

Surgical procedure and techniques: At the caudal midline, overiohysterctomy was done in the following manner: On the caudal midline at the ventral abdomen, an incision of 5 to 6 cm was made. It started approximately 3 cm from the umbilicus and extended caudally (Figure 6B). Subsequently, a number 22 surgical blade was used to make an incision that exposed the abdominal contents through all layers (skin, linealba, and peritoneum). The incision was made above the linea alba on the ventral midline after the skin and fascia were cut. Subcutaneous fat was then removed. Using a blunt Mayo scissors, the abdominal contents were exposed by extending the incision to the length of the skin incision.

An index finger was used to locate the left uterine horn. The ovary was grasped between the thumb and index finger and withdrawn through the incision. The suspensory ligament of the ovary was stretched or broken by finger to facilitate better manipulation and observation of the pedicle. In case 1, three hemostatic forceps were applied to the ovarian pedicle for ligation. Double transfixation ligation was performed using 2-0 vicryl. The first ligature was placed distal to the third hemostat, farthest from the ovary. The jaws of the middle hemostatic forceps were then opened, and a second transfixation ligature was placed in the groove where the hemostat had crushed the pedicle, after which the jaws of the middle clamp were closed again. The pedicle was then severed between the clamp closest to the ovary and the middle clamp.

In case 2, the arteriovenous complex within the pedicle, originating from the ovarian artery and vein, was ligated using 2-0 vicryl. The ligation with transfixation was performed 2 cm proximal to the ovary, encircling the ovarian pedicle. A second ligature was applied 1 cm cranial to the initial one. The ovarian pedicle was then cut caudal to both ligatures, with its tip held by one hemostat. In both cases, the severed stump was carefully checked for hemorrhage before being returned to the abdomen.

After removing one ovary, the other ovary was located and removed in the same manner (Figure 6C).

The uterine body was carefully extracted from the abdomen. Three clamps were strategically positioned on the uterine body, just cranial to the cervix (Figure 6D). The uterine body, along with its arteries, was ligated caudal to the most caudal clamp. Subsequently, the middle clamp was removed, and a second ligation was placed on the groove created by the removed clamp. The uterine body was then severed between the cranial (nearest to the uterine body) and middle clamps, just cranial to the ligature. The uterine stump was inspected to ensure there was no hemorrhage before being returned to the abdomen.

The closure of the celiotomy at the surgical site was conducted as follows: the peritoneum and linea alba were sutured using a simple continuous pattern with 2-0 vicryl. The subcutaneous layer was secured using a lock-stitch pattern with 2-0 vicryl (Figure 6E). Finally, the skin was closed using a subcuticular suture pattern with 3-0 vicryl (Figure 6F). The surgical site was then scrubbed with a diluted iodine solution, and the drapes were removed from the bitches (Figure 6G).

Post operative care and outcome: Following the surgery, penicillin (24mg/kg) and dihydrostreptomycin sulphate (30mg/kg) (Pen & Strep® Norbrook UK) was continued for an additional two days for both bitches. Owners were recommended to use Elizabethan collars made from locally available plastic materials on the dogs' necks to prevent self-inflicted trauma(self mutilation), manage the risk of dislodging, monitor the dogs and restrict their exercise. Two weeks post-operation, the wounds had fully healed without any complications, exhibiting a positive outcome and prognosis (Figure 6H)**.**

Figure 6: Ovariohysterectomy procedures and its outcome in Bitches

(A) Aseptically prepared surgical site (B) Caudal midline skin incision (C) The severed ovaries (D) Three clamps placed on the uterine body (E) Closing the abdomen (F) The skin closed in a subcuticular pattern (F & G) The cases after operation in operation room (H) The healed status of bitch after two weeks

Ovariohysterectomy in queen

Description of the Case

Case history and clinical findings: A one-year-old, weighing approximately 4kg, female cat that had no history of any parity was presented to the Veterinary Teaching Hospital, CVMA, AAU for an elective sterilization surgery. The queen was fasted overnight before the procedure. During the physical examination, all vital parameters were found to be within normal limits. Subsequently, an ovariohysterectomy was performed under general anesthesia.

Pre-operative preparations, anesthesia and animal control: One hour prior to the surgery, the queen received an antibiotics penicillin (24mg/kg) and dihydrostreptomycin sulphate (30mg/kg) (Pen & Strep® Norbrook UK). The queen was then sedated with xylazine at a dose of 1.5mg/kg intramuscularly and placed on the surgical table in a dorsal recumbent position once she became calm. The ventral abdomen was aseptically prepared and scrubbed with 2% povidone iodine at the caudal midline. The queen was induced by an intravenous combination of ketamine at 5mg/kg and diazepam at 0.25mg/kg and sterile drapes were placed on her. The same anesthetic agents were used for maintenance throughout the procedure.

Surgical procedure and technique: During the surgery, a 3-4 cm long incision was made on the caudal midline of the queen (Figure 7A). The incision was made layer by layer, starting with the skin, subcutaneous tissue, linea alba, fascia, and peritoneum in order to reach the abdominal cavity (Figure 7B). The left uterine horn was grasped with a finger and triple clamping was performed on the ovarian pedicle. A transfixation ligature was executed on the pedicle, at the lowest and farthest clamp, using vicryl 2-0 suture. The ovarian pedicle was then severed between the clamp closure to the ovary and the middle one. Careful observation was conducted to ensure there was no bleeding from the pedicle, and then it was gently dropped back into the abdomen. The same procedure was repeated for the right ovary (Figure 7C).

On the uterine body, immediately cranial to the cervix, three clamps were positioned. From the cranial to the most caudal clamp, the two uterine arteries were tied off independently. After removing the middle clamp, vicryl 2-0 was used to transfix the

uterine on the groove. The uterine body was cut between the middle and proximal clamps. After the clamps were taken off, the pedicle was examined for bleeding and the pedicle was then carefully reinserted into the abdomen.

The closure of abdominal opening was conducted as follows: the linea alba, facia and peritoneum were sutured together by a simple continuous pattern, followed by securing the subcutaneous layer with a lock-stitch pattern, and ultimately, the skin was closed using simple interrupted suture pattern with vicryl 2-0 (Figure 7D**)**. Subsequently, the site was scrubbed with a diluted iodine solution (Figure 7E).

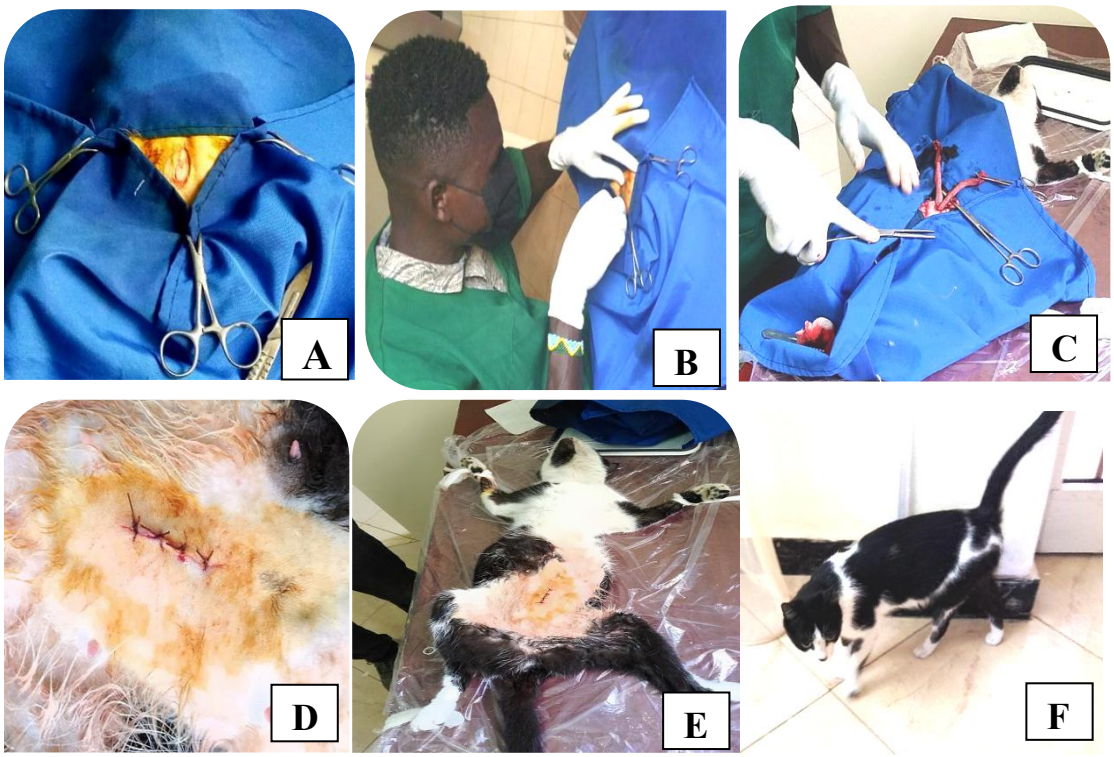

Figure 7: Ovariohysterectomy procedures in Queen

(A) 3-4 cm long incision on the caudal midline (B) Extending incision (C) Pedicles of ovaries (D) The closed skin by simple interrupted suture pattern (E) The operation completed with closed skin (F) Post operative performance of queen after one month.

Post operative care and outcome: Postoperative, the queen received a penicillin (24mg/kg) and dihydrostreptomycin sulphate (30mg/kg) (Pen & Strep® Norbrook UK) for an additional two days. The incision line was cleaned daily with iodine solution for 3 days. Owner was recommended to use collar made from locally available plastic material on the queen's necks to prevent self-mutilation, monitor and restrict its

exercise. The incision should be checked daily for any signs of swelling, redness, or heat. After one week, the wound had fully healed without any complications and after one month the queen was completely in normal condition (Figure 7F).

Discussion

Elective surgery through Ovariohysterectomy was successfully performed in two bitches and one queen and all animals were recovered completely with out any complication although there was depression by anaesthesia after operation for one to two hours. Elective surgical sterilization of female dogs and cats is one of the most common and routine procedures performed in veterinary surgical practice. However, it necessitates considerable skill, experience, and the use of safe anesthetic drugs (Bedoor *et al.*, 2014).

For routine spaying, the optimal timing is either before puberty or after any phase of the reproductive cycle, with a preference for performing the procedure before puberty, during anestrus, or after the animal has experienced one heat period (Romagnoli, 2008; Blender, 2012). Cats and dogs typically have their first heat between 5 and 12 months of age (White, 2012). However, in this case report the bitches were spayed at second and third parity, but the queen was spayed before it had any parity.

The main benefit of sterilization is population control and the reduction in euthanasia of unwanted dogs (Kutzler, 2020). This operation is indicated to avoid heat (estrus) cycles, prevent pregnancy, remove diseased or cancerous female reproductive organs and markedly decrease the risk of acquired diseases of the female reproductive system. The spay operation essentially removes the possibility of a severe infection of the uterus (pyometra) (Hagman, 2012). Similarly, the current case report had an alignment to the above findings in some objectives and thus had the aim to perform the surgical removal of ovaries and uterus, ovariohysterectomy in pet animals for controlling unwanted puppies and kittens.

The caudal midline approach was used to open the abdomen for OHE in the present case report which agreed with the study conducted by Asrat and Melkamu (2007) stated that Ovariohysterectomy is started at median coeliotomy from the umbilicus to os pubis. Finally, suturing the surgical wound and providing appropriate postoperative

care by realizing postoperative complications was taken place. The present procedure underscored the importance of sterilizing bitches and queens under strict aseptic principles, utilizing clean surgical instruments. This approach is crucial for minimizing the risk of complications related to contamination and ensuring the success of the surgery. This result agreed with those of (Greenfield *et al*., 2004; Brooks, 2014). Therefore, in this surgical case report, the caudal midline incision with aseptic procedure and appropriate post operative care was performed in two bitches and queen and successful recovery as well as positive outcome of the surgical activity was achieved.

En bloc ovariohysterectomy in bitch

Abstract

Canine Ovariohysterectomy (OHE), commonly known as a spay procedure, as a method for preventing pregnancy and diseases in female dogs, emphasizing the importance of ensuring the dog's fitness for general anesthesia before undertaking the procedure. The case report of this study indicates an En bloc ovariohysterectomy as a technique for removing ovaries and uterus as a single unit, particularly in cases of dystocia in dogs and cats. The case report focused on a pregnant local breed bitch involved in a car accident, necessitating an En bloc ovariohysterectomy to save the dam's life and prevent unwanted litters. The surgical procedure, anesthesia management, and postoperative care were detailed, highlighting the successful outcome and the benefits of En bloc ovariohysterectomy in such critical cases.

Key words: *Bitch, Car accident, En bloc Ovariohysterectomy*

Introduction

Canine Ovariohysterectomy, commonly referred to as a spay procedure, is the removal of the ovaries and uterus from the female dog, in order to prevent pregnancy and certain types of diseases. This procedure should only be undertaken if the bitch is in a fit state to withstand general anesthesia. (Asrat and Melkamu, 2018). The dam’s whelping date may be determined using breeding dates, time of luteinizing hormone (LH) peak, ovulation date, or the first day of diestrus. Gestation duration in the bitch

is approximately 57 to 72 days (average: 65 days) when established using breeding dates (Gendler *et al*., 2007).

En bloc ovariohysterectomy is the technique that involves ovariohysterectomy before hysterectomy and removal of the neonates were performed as treatment of dystocia on a dog and cat (Robbins and Mullen, 1994). En bloc ovariohysterectomy may be performed whether the fetuses are alive or dead, and this method permanently blocks the reproductive ability without the need for a second operation. It is an alternative to cesarean section in dogs and cats with dystocia (Robbins and Mullen, 2004). When this operation is performed on a uterus containing live fetuses, the time between the first ligature performed on the vessel and the delivery of the infants should be shorter than 60 seconds (Traas, 2008). This case report aimed to outline the En bloc ovariohysterectomy procedure as a surgical intervention for a pregnant bitch involved in a car accident.

Description of the Case

Case history and clinical findings: A pregnant local breed, 10Kg weighting multiparious bitch on its 60^{th} gestation day was presented to Veterinary Teaching Hospital of Addis Ababa University with a history of car accident at pelvic bone 12 hours ago. The owner complained that the bitch couldn't stand by her own hind legs after accident. The owner also added that there was restlessness, frequent moaning and anorexia. There was also licking of perineal area, putrid smelling black to greenish discharges from vagina after accident till reach the hospital (VTH). The animal didn’t get any medication until the owner brought it to VTH for the accident was occurred around 3 o’clock local time at night. The owner was asked about her plan to re-breed the bitch, and she told me that she didn’t want more puppies but wanted to only save the dam.

On examination by inspection, the bitch was distended in its abdomen, the hind legs couldn't stand well (Figure 8A), there was putrid smelling black to greenish discharges from vagina and there was restlessness with frequent moaning. A comprehensive physical examination was conducted revealing that rectal body temperature was subnormal (37.6^0c). On palpation of the hind legs, there was pain and inability to stand but no any fracture was discovered.

On external palpation of the abdomen, there was high amount of fluid, hard mass found in abdominal cavity and the bitch was feeling discomfort showing that there was uterine damage and oozing which was confirmed post laparotomy (Figure 8B). After laparotomy and OHE, rectum and other nearby visible structures were checked for any damage and the rectum was found swelled with strong appearance. Up on examination by vaginal digital palpation, the birth canal was closed but only foul smelling vaginal discharge was flowing. Then, an emergency surgery was decided to be conducted by an en bloc ovariohysterectomy under general anesthesia as a treatment of choice to save the life of the dam and control unwanted litters.

Pre-operative preparations, anesthesia and animal control: The bitch was administered with antibiotics ceftriaxone @ 22 mg/kg IM, analgesic diclofenac sodium @ 2mg/kg before the operation to prevent potential infection of surgical wound and control pain respectively. The bitch was sedated with xylazine @ 1.5mg/kg IM and taken unto the surgical table in the surgical site preparation room, positioned in dorsal recumbence. Then the ventral midline abdominal area was prepared aseptically for surgery and finally scrubbed with 2% povidone iodine. The bitch was then taken in to operation room and put on surgical table in dorsal recumbence with their legs tied apart on it. After that, an intravenous catheter was placed and lactated ringers solution was administered using 18 G IV cannula at a rate of 10 ml/kg/hr and delivered in calculated drop rate per second. Then ketamine hydrochloride @5mg/kg and diazepam @ 0.5mg/kg was administered (IV) as induction and ketamine hydrochloride @5mg/kg and diazepam @0.25mg/kg as maintenance.

Surgical procedure and technique: A skin incision of approximately 7-9 cm (Figure 8C) was made on the caudal ventral midline, approximately 3 cm caudal to the umbilicus, extending from the ischium to the pubis and further caudally as necessary. Sequential incisions were made through the skin, subcutaneous tissue, and linea alba to exteriorize the uterus. Hemostasis was achieved by applying pressure with gauze and/or artery forceps to control bleeding from small cutaneous arteries. The subcutaneous tissues and fat were then removed. The abdominal cavity was entered with caution, and the gravid uterus was exteriorized. The vascular pedicle containing the ovarian artery and vein was isolated by dissecting the mesovarium.

Three hemostatic forceps were applied to the left ovarian pedicle, and a double transfixation ligation was performed using chromic catgut 2-0 distal to the third hemostat, which was farthest from the ovary, and on the groove crushed by the middle hemostat. After reapplying the middle hemostat, the pedicle was severed between the clamp closest to the ovary and the middle clamp. This procedure was then repeated for the right ovarian pedicle (Figure 8D).

The cervix and vagina were carefully palpated for the presence of fetuses, which were then gently maneuvered into the uterine body. Three clamps were strategically placed on the uterine body, cranial to the cervix. Subsequently, the uterine body and its associated arteries were ligated using catgut 2-0 at the groove where the middle clamp had been removed. A second ligature was positioned caudally to the most distal clamp. The uterine body was meticulously severed (Figure E) between the cranial clamp (farthest from the cervix) and the middle clamp, just cranial to the ligature. The excised uterine body was handed to a team of assistants, who promptly opened the uterus, uncovering five deceased puppies (Figure 8F). Ensuring no hemorrhage from the uterine stump, it was reinserted into the abdominal cavity. The rectum and adjacent structures were inspected for any signs of damage, revealing a swollen but intact rectum.

The laparotomy site was closed in a meticulous three-layer process. First, the linea alba and peritoneal fascia were sutured with a simple continuous pattern using vicryl 2-0. Next, the subcutaneous layer was closed with a lockstitch pattern using vicryl 2-0. Finally, the skin was closed with a buried subcuticular suture pattern using vicryl 3-0 absorbable suture material to prevent licking (Figure 8G), following the technique outlined by Tobias (2010). The incision site was thoroughly scrubbed with a diluted iodine solution, culminating in a successful surgical procedure.

Post operative care and outcome: The surgical site was scrubbed daily by diluted iodine solution for four days after operation. Antibiotic, Ceftriaxone @ 22 mg/kg and NSAID Meloxiaum @2mg/kg were administered (IM) postoperatively for additional 4 and 3 days respectively. The owner was advised to keep Elizabethan collar and follow the animal for any complication as well as sign of discomfort.Outdoor intensive care was taken and on following post operative, inappetence, mild

depression, no defecation and inability to stand on hind limbs was found and reported. However, it began standing on its hind limbs on second day and walking on 3rd day.

As there was no defecation, to help bitch defecate in normal manner, paraffin oil, butter has been given daily orally as well as through rectum and meat gravy also provided. Subsequently, the bitch began defecation on fourth day on 7 O'clock local time post operative. On 5th day post-operative, the bitch fully recovered; walking, urinating, even could defecate normally and had normal appetite. Additionally, multivitamin was prescribed and the bitch was recovered successfully without any additional complications after one week. The bitch was seen alert and also gained body weight during followup up to 41th day of post operation (Figure 8H).

Figure 8: Enbloc ovariohysterectomy and its outcome in Bitch

(A) The bitch couldn't stand (B) Damaged uterine (C) Incising abdomen (D) Severed ovarian pedicles (E) Severed uterus& ovaries containing fetuses (F) Five dead puppies (G) The closed abdomen after operation (H) Completely healed status of bitch on 41th post-operative day

Discussion

En bloc ovariohysterectomy technique includes the application of ovariohysterectomy while the fetuses are still in the uterus (Traas, 2008). In this case report, a similar technique of ovariohysterectomy was employed while the fetuses remained within the uterus of the bitch. This procedure can be performed irrespective of the fetuses' viability, whether alive or deceased. This method effectively and permanently halts reproductive capability without necessitating a subsequent operation. Besides, ovariohysterectomy is performed on a compulsory basis during cesarean section in cases of fetal death, putrefaction, gangrene, or toxemia (Rışvanlı *et al*., 2017). Similarly, in this current case report, the fetuses dead due to car accident were found after the en bloc ovariohysterectomy operation when the uterus was opened.

In En bloc technique, the ovarian and uterine arteries are clamped or ligated and the entire uterus is removed and passed to waiting assistants. These assistants then remove the puppies or kittens, and begin resuscitation (Traas, 2008). In the current case report, before severing, three haemostatic forceps were applied on the left and then on right ovarian pedicle and double trans-fixation ligation was done with chromic catgut 2-0. Similarly, three clamps were placed on the uterine body cranial to the cervix and then uterine body, along with its arteries, was ligated on the groove from which the middle clamp was removed, and the second ligation was applied caudally to the most caudal clamp. The uterine body was then precisely severed between the cranial(farthest clamp from cervix) and middle clamps, and were given to a team of assistants, who immediately opened the uterus and five dead puppies were appreciated.

During the procedure, neither the animal's death nor any significant intra-operative complications were happened to the bitch related to operation. However, there were some injuries and traumas caused by car. The dorsal surface of the uterine body had a tear and injury that allowed uterine fluid and blood to leak into the abdomen. This led to a minor disruption during the procedure due to the large amount of fluid in the abdomen. This was confirmed when the abdomen was opened and the health of the internal organs was being assessed. The bitch's abdomen was typically closed after the ovariohysterectomy. In similar to Tobias (2010), the skin was closed using a buried

subcuticular suture design using vicryl 3-0 absorbable suture material to prevent licking. Daily, diligent monitoring was done to keep the animal safe following the procedure because it had multiple injuries due to car accident, but the animal was healed perfectly.

En bloc ovariohysterectomy has the advantage of requiring less time for the dam to undergo anaesthesia, even though she might be weak prior to the procedure, and it also reduces the risk of peritoneal contamination from uterine contents during hysterotomy. It also offers a chance to influence population control in clients of pets who might not have the financial means to undergo another ovariohysterectomy (Robbins and Mullen, 1994). En bloc ovariohysterectomy was deemed safe in this particular case because it did not jeopardize (compromise) the dam's health.

3.1.7. Cesarean section in pet animals

Cesarean section in bitch

Abstract

Dystocia is the inability of the dam to expel the fetus at parturition through the birth canal without assistance. It can be occurred due to uterine inertia. Uterine inertia is the failure to expel a fetus from the uterus when no obstruction exists; it can be classified as primary or secondary. Primary uterine inertia is again classified in to partial and complete. Partial primary uterine inertia is defined as initiation of normal labor but failure to deliver all puppies. After the case was diagnosed as a dystocia due to partial primary utertia, emergency surgery of cesarean section followed by Ovario-hysterectomy was decided to be conducted as a surgical intervention in an exotic breed, 14Kg weighting primiparous bitch. The bitch exhibited dystocia for more than 25 hours with only one fetus delivered and dead after 30 minutes of commencement of parturition signs. When examined, the bitch was dull and depressed with no overt signs of straining. Therefore the procedure was appeared to be a successful and effective technique for providing immediate relief to the bitch which was recovered successfully without any complications after one week.

Key Words: *Bitch, Cesarean section, Dystocia, Ovariohysterectomy*

Introduction

Dystocia is the inability of the dam to expel the fetus at parturition through the birth canal without assistance. The incidence of dystocia in companion animals like the bitch and queen are quite low but when it occurs it may constitute life threatening situations to both the dam and the young ones (Purohit and Gaur, 2004). Dystocia, the difficulty in passing the fetus through the pelvic canal, is a common small animal emergency. Significant disparity exists between the events of normal and abnormal canine parturition. Positive clinical outcomes can be expected only when the clinician has a thorough understanding and knowledge of normal canine parturition, the pathogenesis and underlying etiology of dystocia, the criteria for diagnosing dystocia, and the appropriate medical and surgical interventions (Gendler *et al*., 2007).

The gestation period in the bitch is 65 ± 5 days (Concannon *et al*., 1983) and the first stage of labor is characterized by nesting behaviour, panting, flank watching, restlessness and occasionally vomiting and mild straining (Jackson, 1995). During the second stage of labor, the bitch usually lies in lateral recumbency but sometimes walks around. The chorioallantois of each puppy ruptures at the pelvic inlet. The first puppy should be delivered within 2 hours of the commencement of second stage labor. The interval between puppies being 5-60 minutes (Purohit and Gaur, 2004).

Dystocia can be attributed to maternal or fetal factors, or a combination of both (Jackson, 2004). Maternal factors encompass small pelvic size, abnormalities of the caudal reproductive tract, primary or secondary uterine inertia, malnutrition, parasitism, and other uterine abnormalities (Domoslawska *et al*., 2011). Fetal causes include fetal anomalies, disproportionate fetal size relative to the maternal pelvis, malposition or malposture of the fetus, and fetal death (Farrow, 1998).

Uterine inertia is characterized by the failure to expel a fetus from the uterus in the absence of any obstruction and can be classified as either primary or secondary. Complete primary uterine inertia occurs when stage 2 labor fails to commence, resulting in no delivery of puppies. Partial primary uterine inertia is defined by the initiation of normal labor, yet an inability to deliver all puppies. Primary uterine inertia can develop because of litter size: either the litter is too small, or the

myometrium is overstretched secondary to a large litter (Gendler *et al*., 2007; Domoslawska *et al*., 2011).

Primary uterine inertia is also attributed to inherited predispositions, nutritional or neuroendocrine imbalance, age-related changes, nervous inhibition, and systemic disease. Secondary uterine inertia is the exhaustion of uterine musculature after contracting against an obstruction. Obstructions can include maternal changes or characteristics such as a narrow pelvis, congenital malformation, pelvic trauma, neoplasia or abscess, vaginal stricture, uterine torsion, uterine or vaginal prolapse, and vaginal hyperplasia (Wykes and Olson, 2003; Gendler *et al*., 2007).

Treatment of dystocia is divided into medical and surgical treatments with different aspects depended upon causes, physical examination, diagnosis of the problems, and types of uterine inertia (Trass, 2008). Medical treatment including oxytocin and calcium alone with physical manipulation of the vagina to assisted delivery (Pretzer, 2008). Surgical intervention is required in approximately 60–80% of dystocia cases in the bitch and queen (Gilson, 2003). Cesarean section is frequently indicated in protracted dystocia over 24 hours duration due to primary or secondary uterine inertia and in obstructive dystocia resulting from a grossly oversized fetus or abnormally small pelvic canal (Joseph *et al*., 2014). This case report attempted to present the procedures of cesarean section followed by Ovariohysterectomy as a surgical intervention for dystocia due to partial primary uterine inertia in bitch.

Description of the Case

Case history and clinical findings: An exotic breed, 14Kg weighting bitch of first parity with a history of anorexia, dull, depression, frequent licking of perineal area, putrid smelling black to greenish discharges from vagina was presented to Veterinary Teaching Hospital of Addis Ababa University. The owner reported that the bitch exhibited parturition symptoms like restlessness, nesting, and panting approximately 2-4hrs before delivery of one puppy which was died after 30 minutes, 25 hours before being taken to the hospital but after that, no other foetuses or placentae were delivered. The owner was asked about his plan to re-breed the bitch, and he told that he didn't want more puppies.

Clinical examination revealed that the bitch was dull and depressed with no overt signs of straining. On external palpation of the abdomen, there was hard mass found in abdominal cavity. Physical examination was conducted revealing that rectal body temperature was subnormal (37.8^0c) and the animal was dehydrated. Up on examination by vaginal digital palpation, the birth canal was found moist with foul smelling vaginal discharge and only limb extremities of fetus could be palpated at deep pelvic inlet. Manual traction of the fetus that remained in the uterus was challenging due to the presence of an emphysematous fetus. Prior to the procedures, the owner provided a consent by signing a consent form. After the case was diagnosed as dytocia due to partial primary uterine inertia, an emergency surgery was decided to be conducted by cesarean section followed by Ovariohysterectomy under general anesthesia as a measure to save the life of the bitch and control unwanted litters.

Pre-operative preparations, anesthesia and animal control: The bitch was administered ceftriaxone @22 mg/kg intramuscularly before the operation to prevent potential infection of the surgical wound, which could arise from the foul-smelling discharge and the presence of an emphysematous fetus contained in the uterus. The bitch was sedated with xylazine @ 1.5 mg/kg and placed on the surgical table (Figure 9A) in the surgical site preparation room, and then positioned in dorsal recumbence. Then the ventral midline abdominal area was washed using savlone solution, shaved for aseptic surgery and finally scrubbed with 2% povidone iodine. The bitch was then taken in to operation room and put on surgical table in dorsal recumbence with their legs tied apart. Subsequently, an intravenous catheter was secured on cephalic vein, and lactated Ringer's solution was administered using an 18-gauge IV cannula at a surgical rate of 10 ml/kg/hr, delivered at a calculated drop rate per second. Ketamine hydrochloride at 5 mg/kg and diazepam at 0.5 mg/kg were administered for induction, followed by ketamine hydrochloride at 5 mg/kg and diazepam at 0.25 mg/kg for maintenance (IV).

Surgical procedure and technique: An approximately 8-10 cm skin incision (Figure 9B) was performed along the caudal ventral midline, situated approximately 2 cm caudal to the umbilicus, with extension caudally as necessary. Sequential incisions were meticulously made through the skin, subcutaneous tissue, and linea alba to facilitate the exteriorization of the uterus. Hemostasis was achieved by applying

pressure with gauze and/or artery forceps to control bleeding from small cutaneous arteries. Subsequently, the subcutaneous tissues were incised, and fats were removed. With caution, the abdominal cavity was accessed (Figure 9C), and the uterus containing fetuses was exteriorized (Figure 9D). The vascular pedicle containing the ovarian artery and vein was isolated by dissecting the mesovarium. Sterile drapes were inserted through the abdominal incision to isolate the uterus before making an incision on its body, thus preventing peritoneal contamination.

A small incision was then made on the midline of the uterine body (Figure 9E) using a stab incision with a scalpel blade. The incision was further extended with Metzenbaum scissors to a sufficient length to facilitate the removal of the fetus, revealing two alive and two deceased puppies. But these two was also died after few minutes. After the incised part of uterus was hold closed by forceps (Figure 9F), Ovariohysterectomy was conducted (Figure 9G). The uterine stump was checked to ensure that there is no hemorrhage and then replaced back to the abdomen.

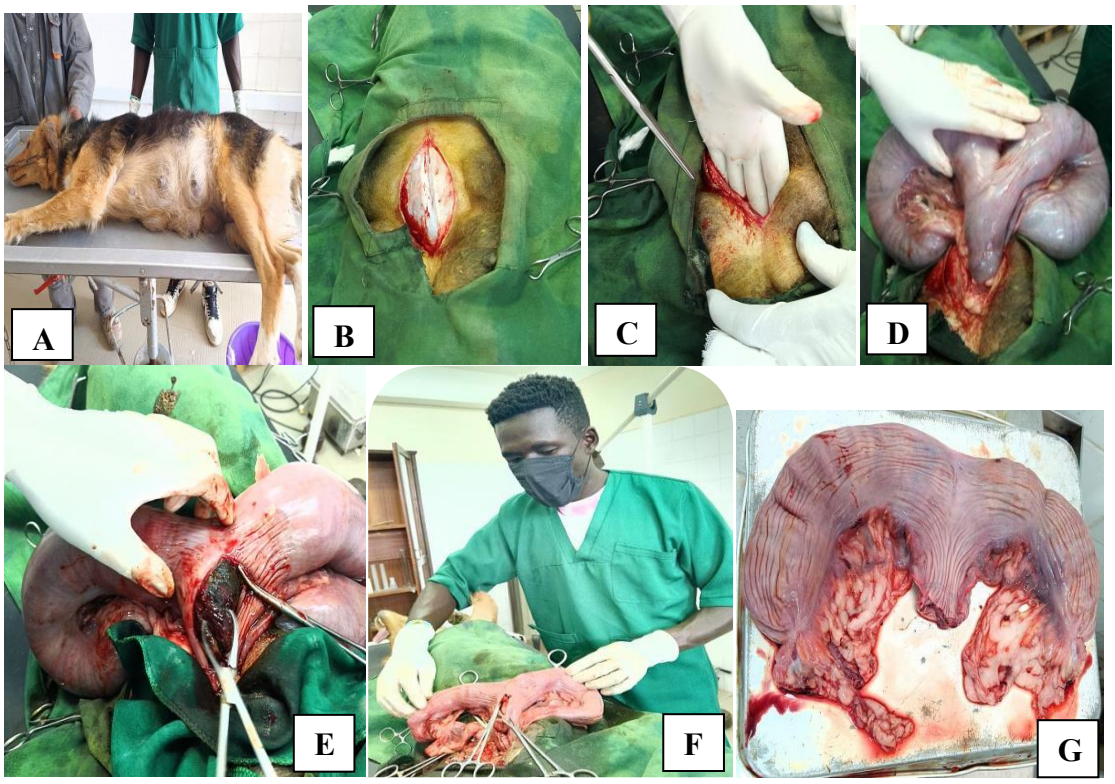

Figure 9: Cesarean section procedure and OHE in Bitch

(A) Sedated animal (B) Ventral abdominal mid-line skin incision (C) The abdomen entered (D) The exteriorized uterus (E) Incision on uterine body for fetuses removal (F) The temporally closed uterus by forceps for OHE (G) Removed organ after OHE

The laparotomy site was closed in three layers. As a first layer, linealba and peritoneal fascia were sutured together (Figure 10A) with simple continuous pattern and one knot after every two bites for more strength by using polyglycolic acid 910 (vicryl) 2-0 sizes. The subcutaneous layer was sutured with lock-stitch (Figure 10B) pattern using vicryl 2-0 and the skin by buried subcuticular suture pattern to avoid licking using vicryl 3-0 absorbable suture material (Figure 10C&D) as mentioned by Tobias, (2010). Then the incision site was scrubed with diluted iodine solution (Figure 10E). The operation was successfully performed.

Post operative care and outcome: The surgical site was scrubbed daily by diluted iodine solution for four days after operation. Antibiotic, ceftriaxone @ 22 mg/kg and analgesic tramadol @ 2mg/kg were administered (IM) postoperatively for additional 4 and 2 days respectively. The owner was advised to keep Elizabethan collar and follow the animal for any complication as well as sign of discomfort. The owner was also told to request veterinary assistance if he had noticed any complications and to restrict the animal from violent exercising. Up on following post operative, inappetence and mild depression was reported by the owner on second day and multivitamin was prescribed. The bitch was then recovered successfully without any additional complications after one week and seen alert and even playing with me and her owner at 40^{th} day of post operation (Figure 10F).

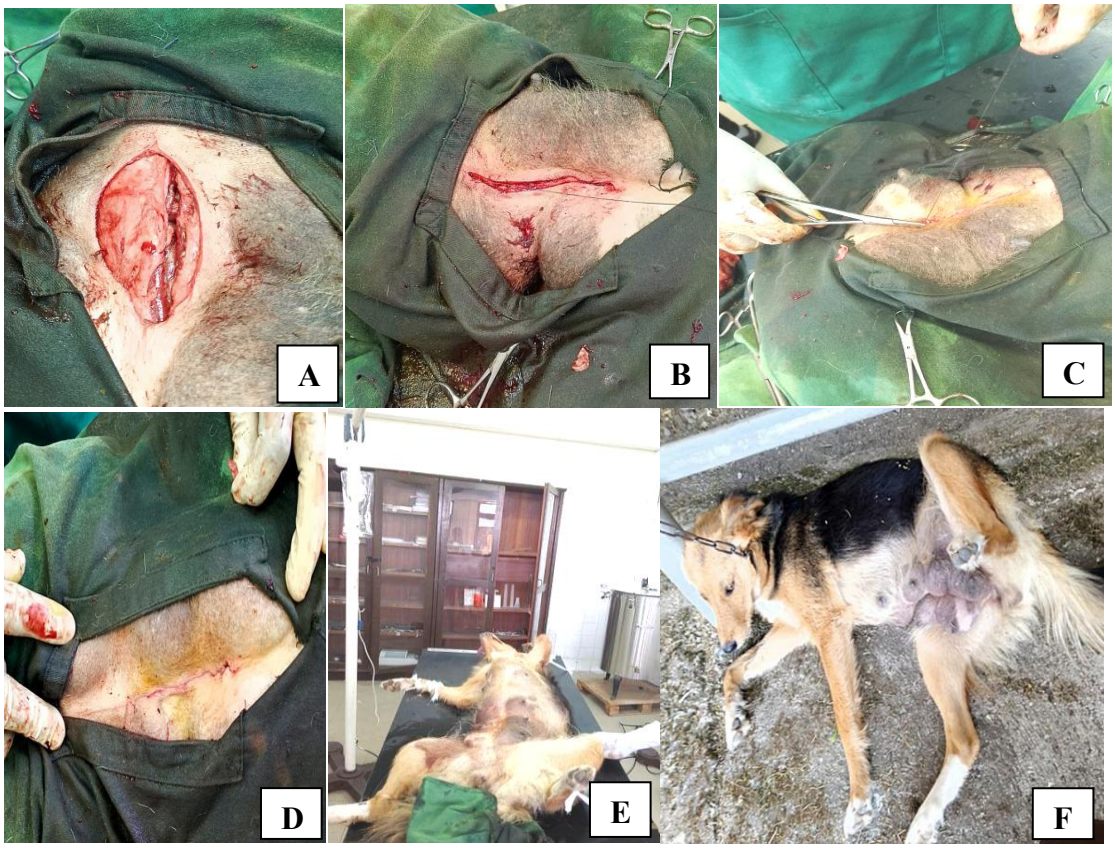

Figure 10: Laparotomy closure after C-S and OHE and its outcome in Bitch

(A) The first layer of laparotomy closure (B) The closed subcutaneous with lockstitch C) Closing skin by buried subcuticular suture pattern (D) Closed skin (E) The animal after operation in operation room (F) Status of bitch on 40th day

Discussion

In this study, the dam's life was saved by a Cesarean-section followed by OHE performed 25 hours after the onset of parturition and starting of dystocia, which was effective in removing two dead and two live fetuses. The dead fetuses seemed significantly larger due to gas buildup in the subcutaneous tissue (emphysematous syndrome), which may also be associated with bacterial infections. A strong uterine infection was strongly suggested during the surgery based on the colour of the uterus and the terrible odour coming from it. Therefore, after conducting c-section, the uterus and two ovaries were removed in order to control additional pregnancy and to prevent the development of toxaemia and septicemia.

According to reports, the neonatal survival rate in dogs undergoing caesarean sections using the enbloc technique is 75% (Kustritz, 2006), while the conventional procedure results in a 92% survival rate (Gilson, 2003; Moon-Massat and Erb 2002). However, in this case report, first, c-section was conducted followed by ovariohysterectomy to save the life of puppies but it was not occurred in way we aimed. However, this was not due to a failure of the procedure, but rather a period of dystocia, that made neonates to became exhausted while still in the womb and inturn led puppies to die. When the uterus opened, revealing two dead foetuses inside, and two alive foetuses that were removed from the uterus through standard surgery Caesarean section, but were died a few minutes later. This also could have been caused by the length of time the dystocia took, as the owner had complained that the bitch had began to deliver before the allotted 25 hours, bringing the bitch to the hospital at a late stage of parturition.

Primary uterine inertia may occur due to deficiency of oxytocin, serum calcium, and blood glucose (Singh *et al*., 2020). Some female queens and bitches, both young and old, have weak abdominal muscle tone, which makes it difficult for them to produce uterine contractions during the second stage of labour (Jackson, 2004b). The mother's dystocia may have been brought on by this main uterine atony (Voorwald *et al*., 2012). Additionally, it was thought that foetuses are incapable of producing enough cortisol and ACTH to initiate the birth process (Johnston *et al*., 2001a; Linde- Forsberg, 2010). In the present case, cervix was fully dilated, with the history of delivery of one live fetus naturally before 25 hours that died after 30 minutes and per vaginally no foetus was palpated in the vaginal passage but only limb extremities of fetus could be palpated at deep pelvic inlet, suggesting that uterine contractions could have stopped and partial primary uterine inertia was setup in the dam which requires immediate intervention for welfare of dam and foetuses which align with the finding of (Singh *et al*., 2020).

Additionally, in the current case report, the bitch was young and this was her first pregnancy; hence, one live fetus was ejected naturally, and following 25 hours of dystocia, two dead and two viable foetuses were surgically removed from the uterus. Therefore, partial primary uterine inertia, which is prevalent in canine and feline species, was the primary cause of the lack of foetus removal in the current case in

similar to finding of (Romagnoly *et al*., 2004). Similar case was also reported by (Linde Forsberg & Persson, 2007) classified as primary incomplete uterine inertia in bitches that had given birth to at least one pup before needing veterinary assistance.

In conclusion, cesarean sections followed by ovariohysterectomy appeared to be a successful and effective technique for the removal of neonates, then uterus and ovary during emergency due to dystocia for providing immediate relief to the bitch. Since in this current case report, at least the dam was saved and recovered successfully without any complications.

Cesarean section in queen

Abstract

Dystocia in queenis defined as difficulty in the expelling of the fetus or delivery of the kitten through the birth canal at the time (6-12 hours) of labor. A 17 months old, 4kg weighting primiparous domestic queen cat was presented to AAU, CVMA, VTH, with a history of dytocia; 23 hrs duration without giving birth to any kitten followed by exhaustion and depression with no signs of contraction. After thorough physical examination, and clinical findings, the case was found to be dystocia due to secondary uterine inertia and admitted for caesarean section under general anaesthesia. Post operatively, the queen was given vitamin B complex, warm lactated ringer's solution to prevent hypovolemic shock daily for three days. Besides 40% glucose was given on first and second day to facilitate generation of energy and body heat. Finally, the queen was uneventfully recovered.

Key words: *Caesarean section, Dystocia, Fetus, Queen, Ventral midline*

Introduction

Dystocia is a state in which the dam is unable to expel the fetus without manual assistance or medicinal or surgical interventions (Sahoo *et al*., 2018). It is considered as the main reproductive emergency requiring either medical or surgical intervention (Cavanagh, 2017). In case of queen, the gestation period is taken as 63 to 65 days on an average (Sparkes *et al*., 2006). Dystocia in cat (queen) is defined as difficulty in the exploding of the fetus or delivery of the kitten through the birth canal at the time

(6-12 hours) of labor. The causes of dystocia are classified into those caused by maternal, those caused by fetal, and in some cases combination between them (Talat, 2021). The fetal causes of dystocia include fetal oversize, malformation, malposition and abnormal posture. The maternal causes of dystocia mainly include abnormal force of contractions (abdominal and uterine) and incomplete dilatation of birth canal (narrow pelvis, uterine torsion, cervical/vaginal tumour, abscess, cyst and fibrosis etc.) (Talukder *et al*., 2021).

In queens, the predominant cause of dystocia often stems from uterine inertia, which may manifest as either partial or complete. Partial uterine inertia results in premature termination of labor, whereas in complete uterine inertia, the labor process fails to commence (Domoslawska *et al*., 2011). Among various factors contributing to dystocia in cats, uterine inertia represents the primary maternal cause (Deka *et al*., 2003). The etiology of inertias encompasses scenarios such as the uterus failing to respond to fetal signals due to the presence of one or two puppies, resulting in inadequate stimulation to initiate labor (known as the single puppy syndrome), or due to the overstretching of the myometrium caused by large litters, excessive fetal fluids, or oversized fetuses (Linde-Forsberg and Eneroth, 2000).

The treatment of dystocia involves both medical and surgical approaches, with interventions tailored to the underlying causes, findings from physical examinations, diagnostic assessments, and the types of uterine inertia present (Trass, 2008). Medical interventions may entail the administration of oxytocin and calcium, along with physical manipulation of the vagina to assist in delivery (Pretzer, 2008). Surgical intervention is required in approximately 60–80% of dystocia cases in the bitch and queen (Gilson, 2003). Cesarean section is frequently indicated in protracted dystocia over 24 hours duration due to primary or secondary uterine inertia and in obstructive dystocia resulting from a grossly oversized fetus or abnormally small pelvic canal (Joseph *et al*., 2014). Here, cesarean section was conducted for the surgical management of dystocia due to secondary uterine inertia in a domestic cat.

Description of the Case

Case history and clinical findings: A 17 months old, 4kg weighting primiparous domestic queen cat was presented to AAU, CVMA, VTH, with signs of dytocia. The

owner reported that the queen did not give birth to any kitten despite exhibiting parturition symptoms like restlessness, nesting, and panting 23 hours before being taken to the hospital. The owner added that the cat gradually reduced straining to deliver the fetus, became despondent and was found tired, lying down in one spot starting some hours after labor and that it had stopped eating and drinking anything. The queen was brought to the hospital in a collapsed state and on arrival, it was unconscious.

Examining the queen revealed that she was found sunken in her eyes, dehydrated, distended abdomen, exhausted, and depressed (Figure 11A) with soiled hair around the perineum. On vaginal digital palpation, the head of fetus was lodged in the vaginal opening in the pelvic inlet, and an unpleasant smelling vaginal discharge was discovered. In this condition, the uterus was capable in bringing the first fetus to the pelvic inlet, but it couldn't be delivered by abdominal straining through vagina. It was due to fetopelvic disproportion, in which the uterine contraction was normal but ceased afterwards due to exhaustion after a period of non-productive labor. After the case was tentatively diagnosed as dystocia due to secondary uterine inertia, the decision was made and passed to perform emergency surgery by Caesarean section under general anaesthesia.

Pre-operative preparations, anesthesia and animal control: Prior to the procedure, the queen received penstrep IM. The queen wasn't sedated because she was so tired and was not aggressive, so she was brought straight to the operating room, where she was positioned in dorsal recumbence with her legs tied on the surgical table. An intravenous catheter was then inserted, and lactated ringers solution was given via IV at a surgical rate of 10 ml/kg/hr, delivered at a calculated drop rate per second. Then the ventral midline abdominal area was washed using savlone solution, shaved for aseptic surgery and finally scrubbed with 2% povidone iodine and sterilized drapes was placed on the site (Figure 11B). After that, an intravenous combination of ketamine hydrochloride (5mg/kg) and diazepam(0.25 mg/kg) was given as induction, and only this anaesthesia was used throughout the entire procedure. So no additional anaesthesia was used for this procedure.

Surgical procedure and technique: A cesarean section was performed on the ventral abdominal midline, positioned caudal to the umbilicus. A three-finger-length incision

was made through the skin, traversing the subcutaneous tissue and linea alba along the ventral midline. The incision commenced two fingers caudal to the umbilicus and extended caudally, terminating just cranial to the pubic bone. With meticulous care, the abdominal cavity was entered, and the uterus containing fetuses was carefully exteriorized (Figure 11C), isolated with sterile drapes inserted through the abdominal incision to prevent peritoneal contamination before incising the uterine body. A small midline incision was made on the uterine body using a stab incision with a scalpel blade, then extended with Metzenbaum scissors to facilitate the removal of the fetus.

Subsequently, two deceased fetuses were extracted (Figure 11D), followed by the gentle removal of the placenta by traction from the endometrium. The interior of the uterus was palpated and thoroughly inspected from the cervix to the uterine horns and up to the level of the ovary to ensure no remaining fetus. Careful milking of fluid from the reproductive organ through the uterine body incision site was performed. The uterus was then sutured using chromic catgut 3-0 in an inverting suture pattern (Cushing fashion) in two layers of inversion. After confirming the absence of bleeding from the surgical site of the uterus, it was lavaged with sterile normal saline solution and returned to the abdominal cavity.

The laparotomy site was closed in three layers. Peritoneal fascia and linealba were sutured (Figure 11E) together with simple continuous pattern by using chromic cat gut 3-0 size as a first layer. The subcutaneous tissue were sutured in simple continuous with vicryl 2-0 size and skin was sutured using subcuticular (intradermal) manner by using vicryl 3-0 size with buried knot **(**Figure 11F). Then the incision site was cleaned and drapes were removed off the animal **(**Figure 11G).

Post operative care and outcome: Penicillin (24mg/kg) and dihydrostreptomycin sulphate (30mg/kg) (Pen &Strep® Norbrook UK) and analgesic tramadol @2mg/kg were administered (IM) postoperatively for 4 and 2 days respectively. The wound was cleaned very carefully on daily basis. As there was depression, exhaustion and inappetence, The cat given vitamin B complex, warm lactated ringer's solution to prevent hypovolemic shock daily for three days. The queen also received 40% glucose on first day immediately after surgery and again on second post operative day to facilitate generation of energy and body heat. Up on following post operatively until two weeks, the queen was recovered successfully.

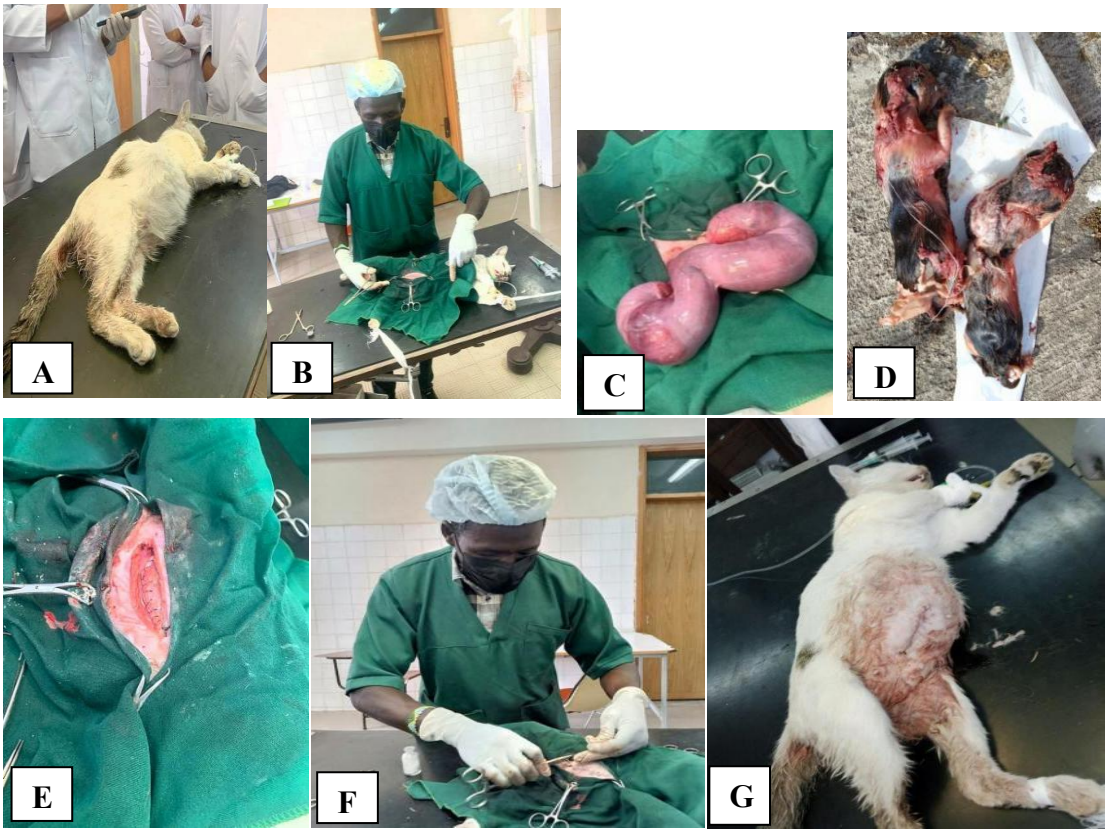

Figure 11: Caesarean section and its outcome in Queen

(A) Queen in depressed state before surgery (B) Draped queen (C) Exteriorized uterus (D) 2 dead puppies (E) Stitched inner layer of laparotomy (F) Closing of skin(3rd layer) (G) Queen after removal of drapes post surgery

Discussion

In this study, a C-section was carried out after 23 hours of dystocia in queen. The cause of dystocia in this case study was found unproductive uterine contraction due to an obstructing fetus that was located in the birth canal. This was confirmed during a laparo-hysterectomy that revealed normal fetal presentation (cranial presentation) but the dam could not able to expel because of the obstructing fetus. This was similarly reported by the study of (Andrew *et al*., 2007) that stated secondary uterine inertia due to exhaustion of uterine musculature after contracting against an obstruction.

In the case at hand, the uterus was capable in bringing the first fetus to the pelvic inlet, but the fetus couldn't be delivered by abdominal straining through vagina. It was due to fetopelvic disproportion, in which the uterine contraction was normal but ceased afterwards due to exhaustion after a period of non-productive labor. This may be due

to fetal oversize that obstructed the natural delivery orifice which is in agreement with (Bojrab & Monnet, 2015) who reported that fetal oversize to be the cause of difficult parturition in some breeds.

Cesarean section is common in small animal practice, especially practices devoted to reproduction or emergency and critical care. In one study, 58% of Cesarean sections were performed on an emergency basis (Moon *et al*.,1998). The survival of the fetus after initiation of second-stage labor is estimated to be six to eight hours. The pup delivered after prolonged labor could appear weak and might die because of different reasons (Romagnoli *et al*., 2004). Similarly, the present case was presented after 23 hours of labor and therefore two dead fetuses were removed from queen's uterus by surgery.

Cesarean section must be performed as soon as feasible as another way for treatment of dystocia in case of destructive dystocia or when medical treatment fails or is not practicable (Olivira, 2016). Present case report was in agreement with this conclusion that reported the cesarean section as another way of treatment for dystocia and so it was performed to give the queen relief and health that was disturbed by dystocia. Hence, an emergency cesarean section was found as the sole option to save lives. Appropriate post-operative care plays a major role in the prevention of surgical complications. Due to some post operative complications seen on the present case, serious postoperative care was taken. The cat was given vitamin B complex, warm lactated ringer's solution to prevent hypovolemic shock daily for three days and also 40% glucose on first and second day to facilitate generation of energy and body heat. In general, one of the dystocia management in queen is by cesarean section through caudal ventral midline followed by good post operative care.

3.1.8. Penile amputation due to traumatic urethral rupture in bull

Abstract

Ruptures of the distal urethra are manifested by swelling, pain, and tenderness due to extravasation of urine into the surrounding tissue. A five-year-old, 220kg estimated local breed bull was brought to the VTH, CVMA, AAU with a history of hit by a stick at ventral part of abdomen on the penis four days ago which resulted a large swelling

at ventral abdomen. Based on history and physical examinations, a diagnosis of urethral rupture from hit which caused obstruction was made and penile amputation was conducted as a salvage procedure. However, complication of the stricture was encountered on 5th week and surgery was performed again high in the perineal area proximal to the stricture. Finally, the animal gained sufficient weight and sold at an equivalent price on 8th week of operation and reported for slaughter.

Key words: *Bull, Penile amputation, Urethral rupture*

Introduction

The lower urinary tract is the conduit for transport of urinary waste from the kidney to the exterior through paired ureters, the urinary bladder, and the urethra (Breshears and Confer, 2017). Traumatic urethral injuries can result in a poor quality of life and carry substantial morbidity including stricture, repeated lower urinary tract infections, bleeding, recurrent pyelonephritis, peri-urethral abscesses and fistulas, incontinence, erectile dysfunction, and infertility (Battaloglu *et al*., 2019). Urethral injury may be the result of blunt abdominal trauma, pelvic fractures, gunshot injury, obstruction by calculi, bite wounds, or improper catheterization (Hay and Rosin, 1997). Ruptures of the distal urethra are manifested by swelling, pain, and tenderness due to extravasation of urine into the surrounding tissue. Rupture of the proximal urethra may lead to leakage of urine into the peritoneal cavity or retroperitoneal space (DeHoff *et al*., 1972).

Urethral obstruction denotes the partial or complete occlusion of the urethral lumen, posing a grave medical concern. In bovines, this condition frequently leads to bladder or extra-pelvic urethral rupture. Notably, urethral obstruction predominantly afflicts male ruminants owing to the anatomical configuration of their urethral tract, as opposed to females (Sultan *et al*., 2017). Anatomically, the distal part of the sigmoid flexure and vermiform appendage (urethral process) are areas of frequent urolith lodgements in large and small male ruminants respectively (Divers and Van Metre 2002). Because of narrowed urethral diameter, urethral calculi at these locations can result in partial or complete rupture of the urethra and bladder (Ewoldt *et al*., 2008; Rafee *et al*., 2015).

Animals with chronic partial urethral obstruction are termed as“dribblers” because of their characteristic slow or intermittent urine flow during voiding (Radostits *et al*., 2000). In case of urethral rupture urine escapes into the tissues surrounding penis and edematous type of swelling occurs on abdominal floor (Singh, 2005). Urethral rupture is characterized by the subcutaneous accumulation of urine in the inguinal area, prepuce and ventral abdomen. In bladder rupture, the abdominal cavity is filled with a large volume of straw colored, possibly blood tinged fluid (Smith *et al*.,1996).

Amputation of penis involves creation of a permanent perineal urethrostomy from the proximal part of the transected penis. The distal penis is resected and it is a salvage operation (Misk, 2003). In a present case report, the surgical procedure of post scrotal penile amputation was done in bull**.**

Description of the Case

Case history and clinical findings: A five-year-old, 220kg estimated local breed bull was brought to the VTH, CVMA, AAU. According to the history, the bull exhibited symptoms such as decreased food and water intake, arched stance, feet tread, teeth grinding, suspended rumination, and signs of depression. Notably, the bull displayed dribble urination tinged with blood on first day with straining, painful dribble urination continued, anuria (inability to pass urine), and large swelling on the ventral abdominal wall, causing discomfort beginning from day of hit. According to the owner, the condition was started after He accidentally hit the bull by a stick at ventral part of abdomen on the penis four days before date of admission with no history of previous treatment related to this case.

Upon examination, a distal peri-penile bilateral subcutaneous swelling (Figure 12A) was observed, which felt cool to the touch and showed pitting on digital pressure. This swelling extended from the base of the scrotum cranially to involve the entire ventrum. Rectal examination indicated that the urinary bladder was not full. External digital palpation of the urethra was attempted to locate the issue, revealing pain and slight inflammation on the caudal urethra near cranial to scrotal region. A rigid urinary catheter was inserted to investigate the situation, but it was not passing beyond a particular length. Aspiration of fluid from the ventral abdominal wall through abdominocentesis confirmed urine leakage in to interestitium around the

prepuce. Following a tentative diagnosis (verified after surgery) of urethral rupture caused by accidental trauma, which led to obstruction due to inflammation, penile amputation was deemed necessary as a salvage procedure.

Pre-operative preparation, anesthesia and animal control: Prior to the surgery, the bull was administered (Penicillin & dihydrostreptomycin sulphate) at a rate of 1ml per 20kg, and analgesics Diclofenac sodium @2mg/kg. The animal was restrained in lateral recumbent with its legs securely tied in a cranial position. To facilitate the surgical procedure, regional nerve block of caudal epidural administration at sacro-coccygeal space (Figure 12C), and local infusion around the incision site of 2% lidocaine was applied. Subsequently, the proposed surgical site (Figure 12B), extending from the perineum to the scrotum along the posterior midline, was meticulously prepared in an aseptic manner.

Surgical procedure and technique: The treatment involved amputation of the penis through post scrotal approach by creating a permanent perineal urethrostomy. To facilitate this, vertical skin incision (Figure 12D) was carefully made between the base of the scrotum and the ischial arch using a sterile scalpel blade. This allowed for easy exteriorization of the penis through a post-scrotal approach along the midline. The incision was extended through the subcutaneous tissue and the dense connective tissue between the semi-membranous muscles, exposing the paired retractor penis muscles located beside the midline. Subsequently, the retractor penis muscles were dissected to locate the penis. The penis was then firmly grasped, and traction (Figure 12E) was applied both caudally and dorsally through the incision. Concurrently, both sharp and blunt dissection techniques were utilized to free the penis from the encompassing fascial structures.

Upon successful externalization of the penis, the retractor penis muscles were ligated and severed as closely as feasible to the proximal end. Proximal to the amputation point, the vessels of the dorsal penis were ligated, and a tourniquet was meticulously applied using sterile gauze at the presumed site of amputation situated at the base of the penis. Subsequently, the penis was transected approximately 5cm distal to the dorsal apex of the skin incision. To secure the lateral sides of the penile stump to the surrounding skin, vicryl 2.0 suture was used, which could be passed through the corpus cavernosum. This not only served to control hemorrhage from the penis but

also ensured stability of penile stump. The muscle layers were closed together **(**Figure 12F**)** in a simple continuous pattern using vicryl 2.0. Finally, the skin was closed with an interrupted suture pattern using silk 2.0 then the site was scrubbed with iodine and the bull was allowed to stand **(**Figure 12G**)**. To confirm unobstructed urine passage, a catheter was inserted from the penile stump to some length. After catheter removal, the bull was able to urinate normally through the penile stump, indicating a functional urethra.

Post operative care and outcome: After the surgery, antibiotics along with NSAIDs dexamethasone at a dosage of 2mg/kg body weight was given for an additional two days intramuscularly. The suture line was dressed daily using a mild iodine solution. The owner was instructed to monitor the animal for any discomfort related to urination, observe the suture patterns, and ensure proper feeding. Minor complications, such as urine scalding, penile hemorrhage, and depression, occurred but were not severe and eventually resolved. The recovery proceeded smoothly, and the skin sutures were removed on the 16th day post-operation. The owner was also advised not to use the animal for draft purpose but to feed and consider selling the animal for slaughter. During post-operative followup, the complication of the stricture was encountered on 5^{th} week(35 days) and the owner was allowed to bring the bull back to hospital and another surgery was performed again high in the perineal area proximal to the stricture (Figure 12H). After the animal gained sufficient weight, it was eventually sold at an equivalent price on 8^{th} week(56 days) of operation and reported for slaughter.

Figure 12: Urethral rupture and penile amputation with its outcome in Bull

(A) Clinical presentation (B) Sacrococcygeal injection of 2% lidocaine (C) Surgical site preparation (D) Incision in progress (E) Exteriorization of the penis through the incision (F) While closing the site after cutting the penis (G) After completion of surgery (H) Surgery high in the perineal area for the next time due to stricture

Discussion

The surgical procedure of penile amputation by post scrotal approach at low perineal urethrostomy was performed on a bull in the current case report. Large texts on animal surgery contain several details of the procedure. The procedure is commonly referred to as a "low" perineal urethrostomy, which is situated closer to the scrotum, or a "high" perineal urethrostomy, which is located near the ischium (Ewoldt *et al*., 2008). According to Abdel-Fattah and Sedeek (2005), the animals slated for surgery were placed in lateral recumbency on the right side and then made ready for aseptic surgery. IM (xylazine HCl 2%), posterior epidural analgesia, and pre-pubic linear infiltration analgesia were used in conjunction with surgical interferences for penile amputation. Similarly, in the present case report, the animal was placed in a cast for right lateral recumbency to prevent rumen distension while its legs were tied cranially.

A caudal epidural anaesthetic was used during the surgical procedure, and 2% lidocaine was locally infused around the incision site in addition with IM diclofenac sodium analgesics administration.

Amputation of the penis is indicated following urethral rupture in steers, bulls, rams and bucks. This can be performed if urine has leaked into the tissues of the abdomen through a rupture of the distal urethra (Sultan *et al*., 2017). Similarly, in the present instance, the urethra was injured by blunt trauma caused by a stick, rupturing it and causing urine to flow out and accumulate in the interstitial tissue. This resulted in large swelling on the ventral abdominal wall and bilateral penile subcutaneous swelling extends from the base of the scrotum cranially and involves the entire ventrum. As a result, the amputation was recommended. This was also consistent with the 1997 study that found blunt abdominal trauma to be one of the cause of urethral rupture. Urethral injury may be the result of blunt abdominal trauma, pelvic fractures, gunshot injury, obstruction by calculi, bite wounds, or improper catheterization (Hay and Rosin, 1997).

The present case report opted to position the urethrostomy site lower in the perineum to mitigate the occurrence of urine scalding on the skin and to facilitate potential subsequent urethrostomy procedures higher in the perineum, in the event that the stricture at the original site develops. However, penile amputation (urethrostomy) can be performed at any site along the perineum. Van Metre's (2004) conclusion, which agreed with the findings of the current case report, indicated that stricture of the stoma is the most frequent urethrostomy problem and can happen quickly (weeks to months) following surgery. In light of this, in current instance, stricture was encountered as a post-operative complication during the 5^{th} week following operation, and a second operation was conducted high in the perineal region proximal to the stricture.

The predominant responses of the lower tubular tract to injury include dilation and pressure necrosis caused by obstruction to the ureter or urethra and inflammation in response to exposure to infectious etiologies. In addition, concentration of excreted urinary substances, such as drug metabolites, pesticides, and other toxins, can damage the surface of the lower urinary system and predispose it to infection, secondary hyperplasia and metaplasia, or neoplastic transformation (Breshears and Confer, 2017). In current case report, the inner wall of urethra on and around the rupture site

became discoloured and necrotic when opened. This may be due to the effect of urine accumulation.

In summary, a surgical penile amputation was carried out on a bull with a ruptured urethra resulting from a stick injury in a sterile manner. Following the procedure, the bull received postoperative antibiotics, anti-inflammatory medications, and ongoing wound care. Thus, this case report described the successful execution of penile amputation via a post-scrotal approach, positioned low in the perineal area, for salvage purposes.

3.2. Surgery of Digestive System

3.2.1. Exploratory rumenotomy in cow

Abstract

A 7 years old cross-breed Holstein Friesian dairy cow weighing 300 kg and possessing a medium body condition was handled at Bishoftu, Ethiopia. The cow was presented with grunting, frequent abdominal distention, teeth grinding, reduced feed intake, progressive weight loss, and a decline in milk production over the past two months. The cow had the history of previous treatment twice with drugs (Penestrep and albendazole on one occasion, and oxytetracycline and albendazole on another), but there was no improvement. Comprehensive examinations such as; inspection, external palpation, pole and pinch grip test were conducted. Then a tentative diagnosis of traumatic reticuloperitonitis due to an indigestible foreign body in the rumen was made. To confirm the diagnosis, an exploratory rumenotomy was performed and indigestible metallic as well as other foreign materials were taken out from the rumen and reticulum. Subsequently, the cow was completely healed without any complication.

Key Words: *Cow, Foreign body, Rumenotomy*

Introduction

Ethiopia boasts the largest livestock population in Africa, housing 65 million cattle (Mekuriaw, Harris-Coble, 2021). This sector plays a crucial role in the livelihoods of

85% of rural populations, contributing 15 to 17% to the country's GDP and forming 37 to 87% of household incomes. Beyond economic contributions, the livestock industry in Ethiopia serves multiple purposes, including transportation, export of commodities, acting as a security measure in times of crop failure, and functioning as a means of wealth accumulation (Rass, 2006). Unfortunately, the prevalence of numerous infectious and non-infectious diseases has led to low productivity, hindered growth, and eventual mortality in animals, resulting in significant economic losses for producers (Wegi and Urge, 2022).

Cattle exhibit a higher susceptibility to foreign body syndrome compared to small ruminants due to their feeding behavior, as they do not utilize their lips for prehension and are more prone to consuming chopped feed. The absence of oral discrimination in cattle increases the likelihood of ingesting foreign bodies that would be rejected by other species (Desiye and Mersha, 2012). Clinical signs become apparent when the ingested materials disrupt the normal functioning of the rumen. Common symptoms observed in affected animals include depression, partial or complete anorexia, recurrent bloat, reduced milk yield, weight loss, suspended rumination, ruminal impaction, and an elevated vulnerability to other disease conditions (Soni and Parihar, 2022).

Traumatic reticuloperitonitis, abbreviated as TRP, is a relatively common ailment in adult cattle resulting from the ingestion and migration of a foreign body in the reticulum. The typical foreign body are metallic objects, such as pieces of wire or nails, often exceeding 2.5 cm in length. There is a hypothesis that dairy cattle are more prone to this condition compared to beef cattle, possibly due to their tendency to consume chopped feed like silage or hay (Hailant *et al*., 1996). The ailment is typically induced by long, thin, and sharp foreign bodies like wires, needles, and nails that penetrate the reticulum, peritoneum, diaphragm, and pericardial sac, ultimately leading to traumatic pericarditis. This results in pericardial inflammation, accompanied by the accumulation of serous or fibrinous inflammatory products (Braun *et al*., 2007). Contributing factors to TRP encompass changes in livestock housing structure, careless handling of baling wires, pins, feed sack bags, and wires. The incidence tends to be higher in females than males, particularly shortly after calving (Fesseha, 2020).

Rumenotomy is a surgical procedure that entails both the opening and closing of the rumen within the same surgical event. It is employed in various situations, including traumatic reticuloperitonitis, esophageal obstruction, foreign body ingestion, and bloat (Asrat and Melkamu, 2015). This procedure provides the surgeon with direct access to the rumen, facilitating the extraction of ingested foreign bodies, penetrating hardware, and foreign objects lodged in the distal portion of the esophagus (Dehghani and Ghadrdani, 1995). The current case report described an exploratory rumenotomy in mature dairy cattle, including the history, physical examination, physical findings, surgical results, and outcomes.

Description of the Case

Case history and clinical findings: The case was attended during a farm visit, where a comprehensive examination was conducted on a 7 years old cross-breed Holstein Friesian dairy cow weighing 300 kg and possessing a medium body condition. The owner had reported several issues, including grunting, frequent abdominal distention, teeth grinding, reduced feed intake, progressive weight loss, and a decline in milk production over the past two months. The owner also mentioned that the cow had been previously treated twice with drugs (Penestrep and Albendazole on one occasion, and oxytetracycline and Albendazole on another), but there was no improvement. The cow spent most of its time confined, occasionally grazing on the nearby premises.

Upon arrival, a comprehensive physical examination was conducted. The cow exhibited lethargy and a high level of depression, coupled with a rough hair coat. Vital signs, including heart rate, respiratory rate, mucous membrane color, and pulse rate, were measured and showed slight increments. Notably, the cow experienced difficulty in regurgitation, demonstrated ruminal atony upon auscultation, and displayed intermittent straining at frequent intervals. External palpation of the abdomen revealed low ruminal motility, with one cycle occurring in 3 minutes. During the pole and pinch grip test, the cow displayed signs of pain and discomfort, accompanied by grunting and neck extension. Based on the history and clinical examinations, a tentative diagnosis of traumatic reticuloperitonitis due to an indigestible foreign body in the rumen was made. To confirm the diagnosis and even treat the animal, an exploratory rumenotomy was subsequently performed.

Pre-operative preparation, anesthesia and animal control: The cow underwent a pre-operative regimen, including a three-day course of antibiotics, and was withheld from both feed and water for 24 hours before the operation. The animal was maintained in a standing position during the procedure. A 16-gauge intravenous catheter was securely placed on the milk vein, managed on-site by an assistant, and fluid therapy ((0.9% Lactate Ringer solution 1000ml plus 40% Dextrose solution) was consistently administered throughout the surgery. The left paralumbar area, designated for the rumenotomy procedure, was meticulously prepared in an aseptic manner (Figure 13A). This involved clipping and shaving the hair, washing with a diluted chlorhexidine solution, completing with five rounds of scrubbing using a diluted iodine solution to minimize microbial presence in the area and left dried. Local anesthesia was achieved through the infiltration of 60ml of 2% lidocaine in an inverted "L" pattern, providing ample analgesia to desensitize the region encompassing the site of incision. A 10-minute waiting period followed the administration of anesthesia.

Surgical procedure and techniques: After the meticulous aseptic preparation of the surgical site, standard laparotomy and rumenotomy procedures were conducted on the cow. A vertical skin incision (Figures 13B), approximately 40 cm in length, was initiated on the left flank region beneath the lumbar transverse process. Subsequently, employing blunt dissection, the skin was separated from the subcutaneous tissue. Progressing systematically, the incision traversed through the external and internal abdominal oblique muscles, further through transverse abdominal muscle, until reaching the peritoneum.Any bleeding encountered during the procedure was effectively managed using sterile gauze and a variety of straight and curved hemostatic forceps. The rumen was carefully brought to the incision site and secured with stay sutures using thick nylon, with two assistants maintaining it in position. Drapes were placed beneath the rumen for preventing the abdominal incision wall contamination. Subsequent to the rumen incision, the extraction of some ingesta, exploration of the rumen and reticulum (Figures 13C), and removal of various metallic and plastic foreign bodies were meticulously performed (Figures 13D).

Subsequently, the ruminal incision site was meticulously cleansed of ingesta using sterile isotonic saline solution, followed by closure using chromic catgut 2-0 size

sutures in a double Lambert technique (Figures 13E). The rumen was carefully re-positioned into the abdomen to its normal anatomical position. Upon closure of the rumen wall, the hand was gloved with another surgical glove, removing the initial one, and the edges of the abdominal incision was cleansed with sterile saline water.

Following this, the peritoneum and transverse muscle were closed using a continuous Ford interlocking suture technique employing 1-0 size chromic catgut. Similarly, the two oblique muscles were sutured in a corresponding manner, and a powder of procaine penicillin was applied. The subcutaneous fascia was subsequently closed using a simple continuous suture pattern. Finally, the skin was sutured with interrupted cross mattress sutures using 2.0 silk material (Figure 13F). Lastly, the area was properly cleaned and dressed with diluted iodine solution.

***Post operative care and outcome*:** The animal underwent a four additional days postoperative antibiotic treatment using penicillin-streptomycin at 1ml/20kg administered IM and analgesic diclofenc sodium @2mg/kg for two subsequent days. The surgical wound was dressed with a diluted iodine solution on a daily basis for additional four days. The owner received advice to closely observe the cow, ensure proper nutrition to support wound healing, promptly report any issues, and dispose of polythene materials and iron sheets by burying them in the ground. Additionally, the owner was recommended to supplement the flock's diet with a salt lick for mineral supplementation. After the wound had fully healed, skin sutures were removed by the 20th day post-operation (Figure 13G). A two-month follow-up revealed that the cow had recovered without any apparent complications.

Figure 13: Exploratory rumenotomy and outcome in Cow

(A) Surgical site preparation (B) Skin incision (C) Exploring the compartments (D) Removed metallic and plastic foreign materials (E) While closing the rumen incision (F) Closed skin by interrupted cross mattress sutures using 2.0 silk (G) After skin stitch was removed on 20th day

Discussion

Rumenotomy involves opening and closing the rumen during the same surgical event. Indications for rumenotomy include traumatic reticuloperitonitis, esophageal obstruction, foreign body ingestion, and bloat (Asrat and Melkamu, 2015). It is the emergency way to remove metal and plastic foreign bodies from the rumen and reticulum. Similarly, there were several metallic and plastic foreign materials removed from rumen and reticulum of the present case that interrupt the animal and even lead to traumatic reticulo peritonitis in cow. Delayed wound healing, hemorrhage, fever, edema, wound infection (peritonitis), death, intestinal obstruction/adhesion and physical swelling are commonly observed postoperative complications. Emphasis should be placed on post-operative care through administration of antibiotics and analgesics to reduce the risk of post-operative complications (Anteneh and Ramaswamy, 2015).

This was in agreement with the current case report in terms of case handling, treatment and post-operative care. Therefore, systemic antibiotic therapy was given for five consecutive days as also done by Weaver et al. (2005) and Hendrickson and Baird, (2013). The current case report was also agreed with the study conducted by Hartnack and his colleagues stating that perioperative administration of antimicrobial drugs decreases the rate of infections after rumen surgery. Prophylactic use of penicillin in cattle significantly decreased the incidence of abscess formation following rumenotomy (Hartnack *et al*., 2015).

Surgical removal of the foreign body improved animal health by increasing feed intake, weight and productivity (Fubini and Ducharme, 2016). This finding agrees with the current case report which concluded that after removing foreign bodies, closing the ruminal and abdominal wall with appropriate suture patterns and techniques, the cow was recovered from the problem, got improved body condition, as well as well-being. Therefore, once the case occurred, early management is recommended to get successful recovery.

3.2.2. Atresia ani reconstruction in buckling

Abstract

The term atresia describes congenital occlusion of the lumen of the digestive tract. “Imperforated anus”, sometimes termed as atresia ani, is due to failure of the anal membrane to break down during the development. It is a common congenital anomaly that has been reported in all domestic animals but ruminants are more reported with this condition. It is categorized into four types. This paper reports a case of young male goat(buckling) with type II atresia ani, the surgical procedure adopted and its outcome. Following the desensitization process at the site, a circular incision was performed to mimic the typical anatomical opening by removing a circular piece of skin. Suturing skin and rectal mucosa by silk 2-0 was used to preserve the opening's patency and create a permanent anal orifice. The animal was followed up until complete healing. Then successful healing outcome was achieved.

Key words: *Atresia ani, Buckling, Congenital*

Introduction

Atresia can be defined as inborn occlusion of digestive tract lumen. The term atresia describes congenital occlusion of the lumen of the digestive tract. “Imperforated anus”, sometimes termed as atresia ani, is due to failure of the anal membrane to break down during the development(Kavanya and Rajendran, 2020). The most common congenital malformations are atresia coli, atresia ani and recto-vaginal fistula. Atresia ani is congenital, hereditary and an autosomal recessive gene anomalies occurred at embryonic stage (Parmar *et al*., 2021).

In Atresia ani, anal membrane fails to break down during development. It is a common congenital anomaly that has been reported in all domestic animals but ruminants are more reported with this condition (Reduan *et al*., 2020). The premature maturation of one or more ovarian follicles by degeneration and resorption. Usually, it is the consequence of stopped embryonic development. It results from improper chromatin material placement during the foetus's embryonic development or from the anal segment of the cloaca membrane being abnormally retained. This congenital embryological defect, which can occur alone or in conjunction with rectovaginal or

recto vestibular fistula (RVF), causes the hind intestine to be unable to connect with the perineum (Ubah *et al*., 2019).

Environmental teratogens, plant toxins and a few viruses are recognised complicating factors in calves (Loynachan *et al*., 2006). Atresia ani is categorized into four types. In type I, only stenosis of lumen is seen without imperforate anus. In type II, anus will be imperforate and blind rectal pouch < 1.5cm is seen. Type III is characterized by presence of blind rectal pouch more than 1.5cm distance from imperforate anus. Type IV is rare with atresia at multiples locations of intestine (Anand *et al*., 2022). This paper reported a case of young male goat(buckling) with congenital `atresia ani, the surgical procedure adopted and its outcome.

Description of the Case

Case history and clinical findings: An amazing case, a three months old, 5kg weighting young male goat(buckling) was handled at field that presented with the history of inability to pass feces since birth. The owner said that the buckling was neither eating nor drinking but was merely sucking very little milk of her mother. However, it stopped sucking completely the day before yesterday, and it also started to feel uncomfortable and depression. Upon clinical examination, there was no anal opening (Figure 14A). The buckling had an arched back with distended abdomen (Figure 14B) and seemed dull. An emergency surgical correction was scheduled after the history and clinical examination suggested the tentative diagnosis of atresia ani in Buckling.

Pre-operative preparation, anesthesia and animal control: The buckling was restrained by the owner by holding the body from thorax-head in between his legs and the hind legs were held apart by his hands. After that, the perineal area was scrubbed, shaved, and cleaned with a 2% povidone iodine solution. 2% lidocaine hydrochloride was administered into the caudal epidural space at the sacro-cocygeal area to anaesthetize the buckling.

Surgical procedure and technique: Following the desensitization process at the site, a circular incision was performed to mimic the typical anatomical aperture by removing a circular piece of skin. Upon inserting the tube through the opening, the

rectum appeared normal and only gas emerged immediately. The placement (Figure 14C) of interrupted sutures using silk 2-0 between the skin and rectal mucosa was used to preserve the opening's patency and create a permanent anal orifice (Figure 14D). The animal's congenital condition was successfully relieved after the operation. The animal was administered with diclofenc sodium 2mg/kg.

Post operative care and outcome: Following surgery, the surgical incision was cleaned, dressesd with povidone iodine once a day, and the animal administered injectable Penstrep 1ml/10kg (IM) for three days. The sutures were removed out on the seventh post-operative day when the buckling demonstrated regular eating and defecation, and the animal exhibited signs of recovery.

Figure 14: Surgical correction of atresia ani in Buckling

(A) No anal opening(imperforated anus) (B) The animal with an arched back and distended abdomen (C) While surgically correcting the defect (D) The surgically made anal opening

Discussion

In this case report, the presence of an imperforate anus, the absence of a bulge at the anal region upon abdominal pressing, and the presence of a blind rectal end less than 1.5 cm from the imperforate anus during surgery were used to diagnose the kind of atresia ani. However, diagnosis of type of atresia ani is based on history, physical examination, radiography and ultrasonography. Lateral radiograph of caudal abdomen is useful to locate gas filled rectum (Reduan *et al*., 2020). Thus, the present case was type II atresia ani as also reported by (Ubah *et al*., 2019) in a day-old Bunaji bull-calf. Atresia is typically caused by an autosomal recessive gene and manifests at the embryonic stage. It is acknowledged that plant poisons, some viruses, and environmental teratogens might cause complications in calves (Loynachan *et al*., 2006). However, the cause in this case report was unclear and impossible to determine as also reported by (Mana *et al*., 2019). Common post-operative complications includes fecal incontinence and this is associated with lack of anal sphincter (Ava *et al*., 2017). However, in present cases the fecal incontinence was not observed after one week of surgery.

Various cases of atresisa ani have been documented, with times between one and three days being particularly brief. For example: A 2-month-old female Sudanesse crossbred lamb (Mana *et al*., 2019), a day-old lamb and kid (Anand *et al*., 2022), seven cases (Parmar *et al*., 2021) consisting of one Mehsana calf and two HF cross calves, and four cases (from one to three days) had atresia ani in kids. These results show that no male case required longer than three days, whereas female cases with recto-vaginal fistula in addition to atresia ani may take up to two months. However, in the current case study, the young male goat (buckling) was three months old. Since surgery repair (anal reconstruction) is the only effective treatment option for these kinds of congenital anomalies, a 3-month-old male goat with type II atresia underwent surgery, and recovered well and experienced no complications.

3.3. Surgical Managements of Hernia and Evisceration

3.3.1. Ventral abdominal hernia repair on ewe

Abstract

Hernia is a protrusion of an organ or tissue through artificial or natural opening. A4-year-old, 32 kg local breed ewe was brought to the Veterinary Teaching Hospital of AAU, CVMA, with a history of horn gore. The ewe presented clinically with a big swelling on the ventral belly on the right side, unilaterally, caudal to the umbilicus and somewhat cranial to the udder. Herniorrhaphy was performed after a unilateral ventral hernia in the right abdomen was identified. After that, the sheep was placed in a hospital for four days so that it could be closely monitored and its movement restricted. After the wound had healed successfully on the fifth day, the animal was subsequently sent home. The animal recovered painlessly and without complications, and the procedure to correct the hernia was successful.

Key words: *Ewe, Hernia, Herniorrhaphy*

Introduction

Hernia is a protrusion of an organ or tissue through artificial or natural opening (Sutradhar *et al*., 2009). It is a bulge of skin contains material of a body cavity passes through a weak spot of the body wall. It is the protrusion of an organ or part through a defect in the wall of the anatomical cavity in which it lies (Jettennavar *et al*., 2010). A hernia is also defined as the protrusion or displacement of an organ, part of an organ, or tissue outside the abdominal cavity through an abnormal opening in the abdominal wall which can be noted from the outside of an animal's body and can be detected with an external examination. The opening is caused by a tear in the abdominal wall or it may be a natural opening like the inguinal canal or femoral canal (Fossum, 2013).

A hernia can be classified according to various criteria, including the anatomical site of herniation (such as ventral or lateral abdominal hernia, diaphragmatic, inguinal or scrotal, umbilical, perineal, pelvic, and femoral hernia). Additionally, hernias are categorized based on their etiology (congenital versus acquired) and the type of herniated tissue. Types of herniated tissue include enterocele (containing a portion of the intestine), epiplocele or omentocele (containing omentum), enteroepiplocele

(containing both intestine and omentum), gastrocele (containing the stomach), vesicocele (containing the bladder), hepatocele (containing the liver), and hysterocele (containing the uterus). Hernias can also be classified as either external or internal (Farman *et al*., 2018).

Differential diagnosis of hernia should consider abscess, tumor, hematoma, and cyst (Ali and ElHakiem, 2012). Abscesses, tumors, and cysts generally develop gradually, whereas hernias typically present suddenly. Abscesses exhibit local inflammation and do not fluctuate under the skin. Hematomas, characterized by the collection of blood, may feel like free fluid or produce a slight crepitating sound upon palpation (Misk *et al*., 2010).

Sheep and goats frequently present with various forms of hernias at veterinary clinics. Abdominal hernias in these animals may arise from severe trauma to the abdominal wall and can occur high or low in the flank, along the costal arch, or between the last few ribs. These hernias are typically caused by violent forces, such as blunt object impacts, or by overstretching of the abdominal muscles. Numerous corrective procedures for hernias have been described (Al-Sobayil and Ahmed, 2007).

Unilateral ventral hernias are common in ruminants, typically occurring on the right side of the abdominal floor, and are infrequent in advanced pregnancy. These hernias usually result from trauma, the increased weight of the gravid uterus and fetus, and other changes like a weak abdominal wall, leading to unilateral ventral sagging of the abdominal wall (Smeak, 2003). The hernia site can range from the lateral side of the thoracic cavity to the iliac crest (Yasin, 2004). Most hernias tend to enlarge over time, and if not surgically repaired, they may cause pain, anorexia, weight loss, or dystocia when a gravid horn is located in the hernial sac. Early surgical intervention is recommended to manage hernias before the hernia ring widens and the hernia contents increase in number due to involvement of nearby structures and organs (Radišić *et al*., 2010). The present case report aimed to describe the surgical management of right ventral abdominal hernia in ewe.

Description of the Case

Case history and clinical findings: A4 years-old, 32kg weighing local breed ewe was brought to the Veterinary Teaching Hospital of AAU, CVMA, with a history of horn gore which caused a clinical presentation of large swelling on the ventral abdomen caudal to umbilicus slightly cranial to udder on right side unilaterally (Figure 15A). The owner complained that the swelling was increasing gradually since 4 weeks ago despite a normal appetite. Clinical examination revealed that the swelling was around 20x16 cm in diameter with slightly firm, painless and reducible hernial content and had the hernial ring allowing five fingers pass through it. Clinical parameters like heart rates 70beats/minute, respiratory rates 25breaths/minute and rectal temperature 38.5^0C were within the normal physiological limits. Based on the above detail examinations, the case was diagnosed as a unilateral ventral hernia at right abdomen and elective surgery was decided by herniorrhaphy under local anaesthesia.

Pre-operative preparation, anesthesia and animal control: After the sheep withheld from feed and water overnight, it brought to hospital for herniorrhphy. Before commencing the surgical operation, Penstrep and Diclofenac sodium @1.5 mg/kg were given IM. The ewe was restrained in left lateral recumbency and her legs were tied on preparation table and right abdominal area around hernia was prepared aseptically and then scrubbed with 2% povidone iodine solution. The local anesthesia, 27ml of 2% lidocaine hydrochloride was infiltrated in circular manner around the hernial borders and parallel to incision line. The sheep was taken to operation room and restrained on surgical table in the same way and draped **(**Figure 15B).

Surgical procedure and technique: After being sure that every thing was ready for surgical operation, herniorrhaphy was conducted as follows: a linear skin incision of sufficient length was made on the swelling above the hernial sac in a perpendicular manner to caudal abdominal midline. After skin and subcutaneous tissue dissection, the condition of the hernial sac, content and ring was examined carefully to confirm the presence or absence of adhesion of the abdominal organs. The hernial sac itself was adhered on abdominal musculature under subcutaneous tissue. The stab incision was made on hernial sac and extended with scissors while the left index and middle fingers were introduced into the sac for controlling the contents of the hernia and some intestinal parts and omentum were found adhered to sac and manually detached.

The herniated content was repositioned in to the abdominal cavity manually. After detached bluntly, excess part of the sac was removed and hernial ring was exposed (Figure 15C) and its edges were refreshed. Thence, herniorrhaphy between the hernia ring and abdominal wall was achieved by interrupted horizontal mattress with vicryl size 2-0 followed by simple continuous pattern for more strength to avoid recurrence. Excess subcutaneous tissue with skin were cut out. The subcutaneous was sutured by simple continuous pattern with same suture material but the skin was close apposed by simple interrupted pattern using sterilized silk(2-0) (Figure 15D & E)**.** The site was scrubbed with povidone iodine then the sheep was allowed to stand (Figure 15F) and kept in hospital in animal welfare premises (Figure 16A**)** for four days for close followup, to limit its movement and take care of it. The animal was then sent home on fifth day after successful healing of wound.

Figure 15: Ventral abdominal herniorrhaphy on Ewe

(A) Clinical presentation of hernia (B) Aseptically prepared and draped surgical site (C) Hernial ring (D) While closing the skin (E) Closed skin (F) Ewe after surgery

Post operative care and outcome: The cleaning and dressing of the suture line was done using povidone-iodine solution on the additional three days post-operative while the ewe was in hospital. Antibiotic procaine penicillin (24mg/kg) and dihydrostreptomycin sulphate (30mg/kg) (Pen-Strep® Norbrook, Great Britain) was given intramuscular for successive three days. Diclofenac sodium at a dose rate of 1.5 mg/kg was given for the next 2 days. After the animal sent home, the owner was given advice to follow and immediately report any deviation and discomfort on the animal but fortunately no complication was observed. The wound was completely healed after one week and was adequate enough to remove suture material (Figure 16B). However, skin stitches were removed on 19th day for the assurance and continuity of complete healing(Figure 16C). After three weeks, the wound was healed successfully with good tissue edge apposition and the ewe also gained body weight with good health status and found alert.

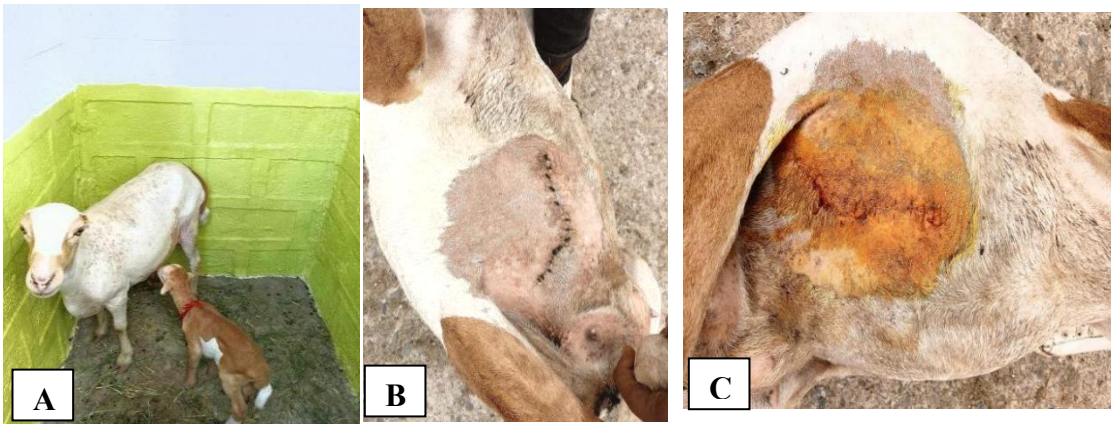

Figure 16: Ventral abdominal herniorrhaphy and its outcome on Ewe

(A) While the animal in hospital in premises (B&C) The healed wound and the suture was removed on 19th day

Discussion

In this study, the successful surgical correction of ventral abdominal hernia in ewe was reported. Hernias may be congenital or acquired; they may occur as isolated defects or they may be associated with defects of other parts of the body (Dennis, Leipold, 1968). The report of the present study indicated that there was acquired abdominal hernia in sheep caused by violent trauma with blunt object such as horn and leads horn thrust. This finding was supported by the finding of (Villar *et al*., 2011). The similar finding in terms of mechanical cause was also described by

(Ghamsari *et al*., 2008) where hernia is commonly acquired due to a defect in the abdominal wall musculature and can be caused by mechanical injury (kick, horn thrust or blunt trauma, abscess in the abdominal cavity, abdominal distention or straining during pregnancy and parturition, or occur without trauma due to weakness of the prepubic tendon.

The diagnosis of the current case of abdominal hernia was done based on history, clinical signs, and physical examination. Needle aspiration and auscultation were not performed since the ring was easily palpable and the hernial content was slightly firm, painless and reducible when palpated and easily reduced to abdominal cavity through the hernial ring. But other authors have used this additional examination in their diagnosis that might be due to difficulty in noticing the ring in some circumstances (Jaman *et al*., 2018). The only effective treatment for abdominal hernia is surgery to restore integrity of the abdominal wall and prevent incarceration and strangulation of herniated contents (Jahromi *et al*., 2009).

The finding of different researchers showed that abdominal hernias were the most prevalent type of hernias in sheep and goats followed by umbilical hernias. Ventral and Ventrolateral hernias are commonly seen in the ventral and ventro-lateral abdominal wall near the midline and the size of the hernial opening varies in diameter and the nature of hernia contents depends on the site of the herniation (Fesseha and Kidanemariam, 2020). Similarly, in the current case report, ventral abdominal hernial repair was conducted in sheep. Complications of the hernia include strangulation, incarceration of the contents, adhesions, infection in addition to the effect of the general appearance of the animal (Kitessa *et al*., 2021). In the presented case however, there were no encountered complications of the contents except for mild adhesions which was corrected by gentle detachment and blunt dissections.

In the finding of Dey et al. (2018) the hernia ring was >6 cm in width and that type of hernia was corrected by using a horizontal mattress pattern and absorbable sutures. In agreement with this finding, after refreshed, the hernial ring of the present case was approximately 11x8 cm in diameter and therefore repaired by interrupted horizontal mattress with absorbable suture material (vicry 2-0). The similar finding was also described by Vebclauskas et al. (2008); where hernial ring size was measuring >3 cm

and special precaution was taken at the time of suturing. The non absorbable sutures (silk) should be used if the hernia was at least 8 months old. If the hernia is less than 8 months old, then it is acceptable to use the absorbable sutures (Catgut or PDS) (Al-Sobayil & Ahmed, 2007). In contrast, the absorbable suture material was used in current case for the hernia took only one month after being occurred.

In conclusion, in presented case, interrupted horizontal mattress technique with vicryl 2-0 was used to suture hernial ring and abdominal wall and the skin was closed with sterile silk(2-0). Consequently, the animal was healed smoothly and without any issues, and the hernia repair process (herniorrhaphy) tried in this case was successful and recommended as an alternative technique for successful outcome.

3.3.2. Repair of traumatic abdominal evisceration on ewe

Abstract

Abdominal evisceration is the exposure of the abdominal viscera following the herniation of the contents of the peritoneal cavity through the body wall. It can be either congenital or acquired. The present case report was aimed to describe the surgical management and correction of right ventro-lateral abdominal evisceration on four years old ewe weighing 30kg presented to VTH with the history of corrugated iron thrust. Based on examinations, the case was diagnosed as open ventro-lateral evisceration of omentum. Following successful emergency surgical repair, the case was recovered without recurrence and other related complications upon frequent follow-up.

Key words: *Evisceration, Ewe, Omentum*

Introduction

The body surface of mammals is built to resist a wide variety of continuous and discontinuous forces, ranging from contact with surfaces while walking and resting to the sudden predicted and unpredicted impact of the body against animate and inanimate objects during voluntary movements. In most instances, the structure of the skin sustains the stress induced by such contact; however, under many circumstances, the energy of the impact can exceed the resistance and compliance of tissues, thus

producing visible damage. The latter represents a wound, an entity defined as the damage to any part of the body due to application of mechanical force (Ressel *et al*., 2016).

Abdominal evisceration is defined as herniation of the contents of the peritoneal cavity through the body wall with exposure of the abdominal viscera (Cigdem *et al*., 2006). According to Gower et al. (2009), abdominal evisceration is the term used to describe the exposure of the abdominal viscera following the herniation of the contents of the peritoneal cavity through the body wall. Abdominal viscera can be eviscerated either congenitally or acquired(acquisitively). Acquired traumatic abdominal wall injuries, which can arise from fights, mishaps, malevolent efforts, etc., are frequently seen in veterinary practice (Kamalakar *et al*., 2017).

The extent and location of tissue damage and wound contamination determine whether or not to close the abdominal wall and superficial tissue. For animals with acute evisceration, primary repair should be considered appropriate (Sethi *et al*., 2017). In this instance, regular surgical management of ventro-lateral abdominal evisceration was accomplished effectively in a sheep, which did not cause any intraperitoneal injury but only included considerable superficial abdominal tissue through which the omentum was eviscerated.

Description of the Case

Case history and clinical findings: A4 years-old, 30kg weighing local breed ewe was brought to the Veterinary Teaching Hospital of AAU, CVMA, with a history of corrugated iron thrust and laceration which the owner covered by cloth (Figure 17A). This led to a clinical presentation of large palpable protrusion of omentum at the right ventro-lateral abdomen just ventral to costal arch. The condition was occurred one hour before the animal reach the hospital. Upon clinical examination, around 9x4 cm small-lacerated wound at the right ventral abdomen was seen on which the skin was opened and the tissue was protrude through it without any perforation in the protruded abdominal content (Figure 17B). General physical examination revealed that hernial content was painful but reducible which had a ring that allows three fingers pass through it. All vital signs were under normal range. Based on the above detail examinations, the case was diagnosed as open ventro-lateral evisceration of omentum

and emergency surgical repairing was decided to be conducted under local anaesthesia.

Pre-operative preparation, anesthesia and animal control: Before commencing the surgical operation, antibiotics penicillin (24mg/kg) and dihydrostreptomycin sulphate (30 mg/kg) (Pen & Strep) and diclofenac sodium 1.5mg/kg were given IM. The ewe was restrained in left lateral recumbence and her legs were tied on preparation table and right abdominal area around the wound was prepared aseptically (Figure 17C), washed with water and soap, shaved, scrubbed with savlone then surgical site was scrubbed with 2% povidone iodine solution. The local anesthesia, 20ml of 2% lidocaine hydrochloride was infiltrated in circular manner around the wound borders. The sheep was taken to operation room and restrained on surgical table in the same way.

Surgical procedure: The wound including the protrude content was cleaned and washed very carefully. Under the skin ventral to the wound at ventral abdomen, there was coagulated black blood that had been flowed from the wound and therefore cleaned meticulously. The condition of the eviscerated content and ring was examined carefully and flushed with sterile water. Thence, the herniated content was reduced in to the abdominal cavity manually. The abdominal muscles of the opening(ring) was then closed by simple interrupted pattern with vicryl 2-0, the space in which blood collected was also closed by simple continuous vertical pattern after being cleaned. The subcutaneous was sutured by simple continuous pattern with care to avoid the formation of dead space with same suture material but the skin was close apposed by simple interrupted pattern using sterilized silk (2-0) (Figure 17D). The site was scrubbed with povidone iodine.

Post operative care and outcome: The suture line cleaning and dressing was done using povidone-iodine solution on the additional three days post-operative. Antibiotic was continued for consecutive three days with daily wound management. The owner was given advice to provide good quality feed for the animal, follow and immediately report any change and discomfort on the animal but fortunately not as such life threatening change and deviation was observed. The wound was healed after 8 days of operation and after the site was covered by hair (Figure 17E), the skin stitches were

removed on 15th day after successful healing (Figure 17F). During the eight weeks of follow-up, there was no report of complication.

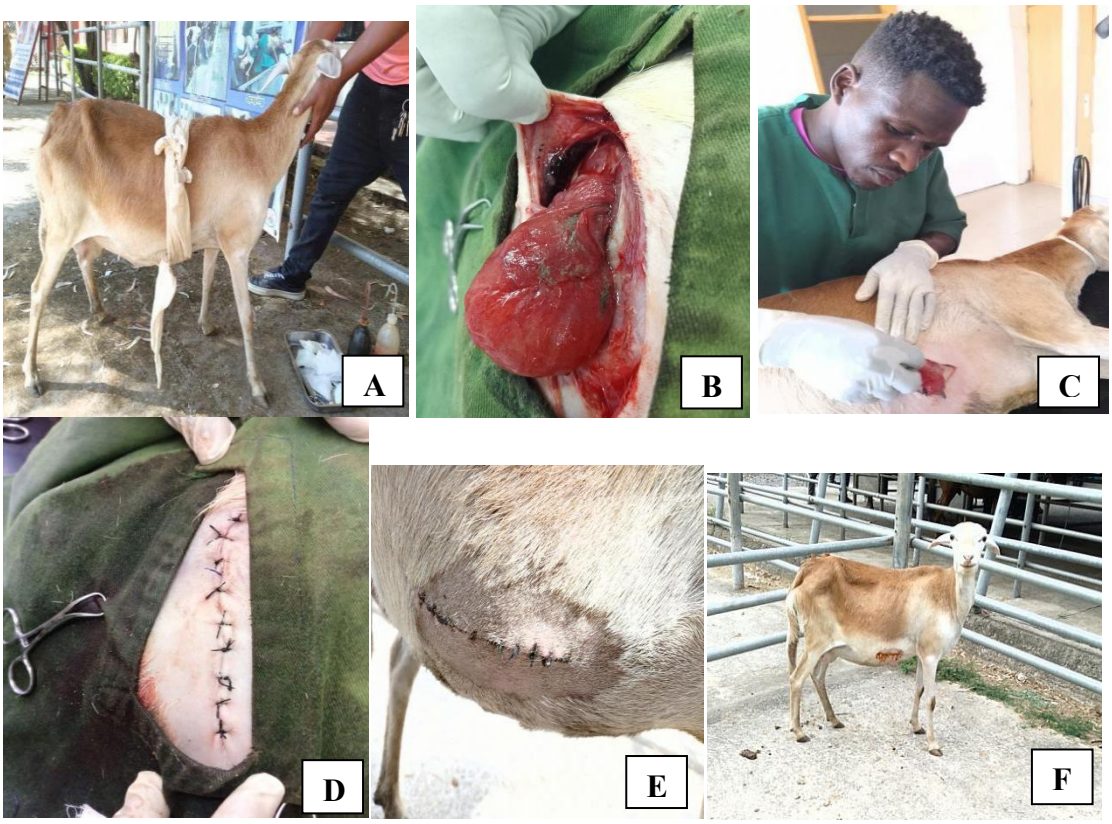

Figure 17: Repair of omental evisceration with its outcome on Ewe

(A) The time animal brought to hospital (B) Eviscerated omentum (C) While preparing the surgical site (D) The closed skin with simple interrupted pattern by silk 2-0 (E) Status of site on 15th day before removing suture (F) The sheep after skin stitch removal

Discussion

The case at hand is a right ventro-lateral abdominal evisceration of omentum that happened by accident as a result of a laceration by a corrugated iron thrust. The extent of trauma, location, exposed organs, bleeding, infection, stabilization, strangulation, antibiotic therapy, and prompt surgical intervention all affect the prognosis of evisceration. Complications are reduced by using appropriate surgical technique and postoperative care (Sethi *et al*., 2017). In the present report, a standard procedure

including all post-operative care was carried out, and a successful healing outcome free of complications was attained.

Susceptibility of the abdomen to injuries could be attributed to the minimal protection for underlying organ by bones. Abdominal organ evisceration is uncommon to be encountered, particularly after blunt abdominal trauma, therefore it warrants urgent laparotomy (Ibrahim *et al*., 2020). Regardless of the inciting cause, exposure and contamination of the abdominal viscera requires immediate surgical intervention (Dar *et al*., 2015). Early stabilization and surgical intervention might increase the survivability of the animals with less or no postoperative morbidity (Gower *et al*., 2009). This current study has been reported in line with these above conclusions. As a result, as soon as the animal arrived at the hospital, early surgical intervention and repair was performed, which helped the animal healed without incident.

Acquired evisceration i.e., the protrusion of the viscera through a defect in the body wall, secondary to trauma or as a postoperative complication with mortality rates ranging from 18 to 36% has frequently been reported in humans (Cigdem *et al*., 2006). Ruminants with congenital evisceration have been described; however, those apparently following direct trauma, gore injury, wound dehiscence, or due to penetrating foreign body, although commonly seen in clinical practice, are rarely reported (William *et al*., 2011). The present case report described the acquired evisceration in sheep which occurred by lacerating sharp material at lateral abdominal wall.

In conclusion, the outcome of this particular case indicated successful surgical management of acquired evisceration of omentum in ewe without any complications as the prompt surgical intervention was attempted without any delay. Therefore this surgical case report recommends surgical approach of treatment for quick relief and successful healing outcome attainment for such types of emergency cases.

3.4. Surgery of Integument System

3.4.1. Management of broken horn by flap method in bull

Abstract

Horn is one of the most important defense organ of an animal, which gets affected by bull fights, accidents, direct trauma, bishoping and genetic cause. Dehorning is therefore indicated in adult animals following irreparable injuries or horn cancer. The present case report was conducted to indicate the surgical horn amputation techniques used in the management of broken horn with its outcome on six years old local breed bull that was presented to Hospital(VTH), Addis Ababa University, Ethiopia with a history of broken horn in car. After proper pre-operative preparation including cornual nerve block and circular infiltration at horn base by 2% lidocaine HCL, an elliptical skin incision around the base of affected horn was made distal to the coronary corium. After making enough skin flap, then fetotomy wire was placed at the base of the horn below the corium and the horn was amputated at most distal ends. The skin was closed by cross mattress using 2-0 sized silk. The area was cleaned and fly repellents applied. After meticulous follow up, the wound was successfully healed and no complication was reported until sixth week.

Key words: *Amputation, Bull, Horn*

Introduction

Anatomically, horn is an extension of cornual process of frontal bone (Kalim *et al*., 2021). It is one of a pair of hard, pointed projection on the head of ungulates. Horn consists of central, conical core of living bone (cornual process), that grows out from frontal bone of skull. The dermis of horn is supplied by corneal nerve which is a branch of maxillary nerve (Jahangirbasha *et al*., 2016). The horn itself consists of dense keratin that is produced at the corium, the area of cells located at the junction of the horn and skin. The horn buds start to form during the first two months of life, when they are free-floating in the skin layer above the skull. As the calf grows older, the horn buds attach to the skull, more precisely to the periosteum of the frontal bones overlying the frontal sinuses, and massive bony horns then start to grow (Parsons and Jensen, 2006). Beginning around the age of 6 to 8 months these are increasingly

pneumatised from the caudal frontal sinuses so that the hollow centres of the horn cores are directly connected with the frontal sinuses of the skull. The bony cores of the horns are supplied by blood vessels and nerves and will continue to grow during the entire life (Knicker *et al*., 2015).

Horn is one of the most important defense organ of an animal, which gets affected by bull fights, accidents, direct trauma, bishoping and genetic cause (Mahla *et al*., 2021). The four most common conditions encountered in horn affections are horn facture, horn cancer, avulsion of horn and overgrown horns. Dehorning is therefore indicated in adult animals following irreparable injuries or horn cancer. The procedure is also indicated if horns are misdirected or overgrown to the extent of causing cutaneous injuries due to pressure (Jahangirbasha *et al*., 2016). Physical trauma is the most predisposing factor for many of the above-mentioned horn affections (Prasad *et al*., 2016). Additionally, the misdirected /overgrown horns may cause traumatic injuries to the head, neck, and eye leading to poor animal welfare (Kashyap *et al*., 2016).

Dehorning is amputation of the horns and is a more invasive and traumatic intervention. Tissue damage from disbudding or dehorning causes physiological and behavioral changes indicative of pain and distress (Vickers *et al*., 2005, Stafford and Mellor, 2011). As disbudding or dehorning are standard practices on cattle properties, a range of tools have been developed either to destroy or remove horn bud tissue (cautery, caustic paste, removal by knife) or cut off horns (saw, embryotomy wire, scoop, shears, electrical saw) (Stafford and Mellor, 2011). When horn management is indicated, disbudding; destroying the horn bud before attachment is preferred to dehorning as it results in no significant bone damage, less pain and distress and less risk of sinusitis, significant bleeding, and infection than dehorning (Adam *et al*., 2021). The present case report was conducted to indicate the surgical horn amputation techniques by flap method used in the management of broken horn with its outcome in a local breed bull.

Description of the Case

Case history and clinical findings: A six years old black colored healthy local breed bull with a medium body condition was presented to the VTH, AAU, CVMA, Ethiopia with a history of broken horn. The condition was occurred in car before 15

hours while the animal was being transported from Adama to Bishoftu. When examined, there was depression, raised hair coat, head shaking, almost 3/4th of the right horn was broken and fresh as well as coagulated blood was found on and around it (Figure 18A). The animal was nervous and hesitate when any person approaching because of it was too much suffering due to the pain of the broken horn. Then the case was managed surgically by unilateral horn amputation in modified flap techniques.

Pre-operative preparation, anesthesia and animal control: The bull was restrained and immobilized with physical and chemical method in standing position. Physically, the bull was kept in well built crush with it's head turned to one side and tied properly, the animal was additionally handled with bull holder by personnel to prevent disturbance during operation. As soon as the animal controlled physically in crush before aseptic site preparation, a course of antibiotics Oxytetracycline LA @ 20 mg/kg and diclofenac sodium @ 2 mg/kg, were administered IM. Chemically, 5ml of 2% lidocaine HCL was injected at the temporal ridge midway between the lateral canthus of the eye and the base of right horn for cornual nerve block and additionally, circular infiltration around the horn base was conducted to ensure all branches are blocked. Then the skin at the base of the horn was prepared by shaving hair, scrubbed routinely, and made ready for amputation.

Surgical procedure and technique: After proper pre-operative preparation for dehorning, an elliptical skin incision around the base of affected horn was made distal to the coronary corium and cornual artery was located and ligated with 2-0 vicryl. To get enough skin flap for closure and get the most distal line of horn for ease of amputation, the skin was bluntly and gently detached from the bone by scissor and retracted rostrally. Then fetotomy wire (Figure 18B) was placed at the base of the horn below the corium and the horn was amputated (Figure 18C) at most distal ends. Bleeding was controlled by continuous gauze pressure and by crushing with hemostats specially at caudal base of the horn. Blood clot at the entrance of frontal sinus was cleaned by sterile gauze. The skin edges were then apposed with cross mattress using 2-0 sized silk **(**Figure 18D) to get hopeful closing strength and forbearance**.** Subsequently, surgical area was cleaned with saline and an antiseptic solution and dried. Then fly repellant was applied around the wound by using sterile Vaseline.

Post operative care and outcome: The dressing of the wound by iodine tincture was done at three, fifth, seventh days up to fifteen days until healed and the suture material was removed on 19th day. Diclofenac sodium given preoperative was continued for 1 additional day. Oxytetra-cycline LA @20 mg/kg administered intramuscularly and repeated two more times after every three days. The owner was instructed to feed the animal well and in plenty, to keep a constant eye on it to prevent it from rubbing against objects, and to report any complications. On the first day following the surgery, the owner reported that the animal had experienced depression and a decrease in feed intake. However, on the second day, the animal resumed its regular appetite. Following a follow-up of two weeks, the wound had healed entirely (Figure 18E). Until the sixth week, no complications had been noted, and the bull appeared bright and healthy with an improved body weight (Figure 18F).

Figure 18: Horn amputation and outcome in Bull

(A) The broken horn (B) While cutting the horn by fetotomy wire (C) The amputated horn (D) The apposed skin edges with cross mattress (E) Status of animal and wound after 2 wks (F) The completely healed wound with the bull appeared bright and healthy

Discussion

Physical trauma is the most predisposing factor for many horn affections (Prasad *et al*., 2016). Likewise in the current case report, there was a accidental horn breakage in total accompanied by continuous bleeding until the time it corrected surgically. It was surgically amputated and followed up until healed completely. This method was successfully employed by (Reddy *et al*., 2017) and (Dugassa & Fromsa, 2019) for the treatment of horn cancer and septic horn respectively. Total horn tissue removal (amputation) through a modified flap method was recommended rather than treating conservatively. Similarly in present case study, flap technique was conducted believing that it will provide a high chance of preventing post surgical complications.

Many authors have used standing position for surgical management of various horn affections (Prasad *et al*., 2016; Dugassa & Fromsa, 2019). Likewise, in present case, the dehorning procedure was preferably conducted at a standing position. According to (Dugassa & Fromsa, 2019) after adequately exposing the proximal part of the bone and horn base, the base of the horn below the corium was cut with dehorning saw. But in the current case, fetotomy wire was used to cut the exposed horn base since it is easily applicable, short time consuming, shortens time of cutting and doesn't require too much skin reflection for positioning wire on the amputation line.

Suitable analgesia and anesthesia are required since the dehorning procedure is too painful and uncomfortable. Since this present case was fresh and the animal was in excruciating agony, non-steroidal analgesics such as diclofenac sodium was utilized to minimize pain and edema in addition to a cornual nerve block with 2% lidocaine HCL. This agrees with the idea of Winder et al. (2016) stating that procedures for the disbudding and dehorning are painful when done without appropriate anesthesia and analgesia. It also agrees with the finding stating that local anesthesia, commonly given as a cornual nerve block, prevents acute pain, but, when given alone, a protracted rise in physiological and behavioral indicators occurs after the duration of the block. Addition of a non-steroidal anti-inflammatory drug (NSAID) reduces pain behaviors (Duffield *et al*., 2010), extending up to 44 h after disbudding when injectable meloxicam is used. Pre or post use of non-steroidal analgesics has proven effective in reducing pain and swelling in the dehorned site (Cattle, 2012). Likewise, the present case study provided pre and post NSAIDs diclofenac sodium for the animal.

The use of sedation (e.g., xylazine, an α-adrenergic agonist) has been shown to reduce handling stress and may improve safety when dehorning older animals or when handling facilities are lacking (Winder *et al*., 2016). However, in present case, direct infiltration at the caudal incision line in conjunction with cornual nerve block was conducted. Reports of (Prasad *et al*., 2016) mentioned that the buffaloes with massive and curly horns receive innervation from branches of cervical spinal nerves in addition to cornual nerve and this could be a similar case in some cattle. This had a similarity with present case report where local circular infiltration of 2% lidocain HCL at the base of horn was adminstrated .

In summary, the surgical process of horn amputation involves removing the horn, particularly in mature animals, primarily from below the corium. One potential side effect of dehorning is infection, but this usually happens after invasive operations that expose the sinus cavity to the surrounding contaminated environment. Thus, in the current case report, horn amputation using flap technique combined with stringent post-operative follow-up was used and proved to be an extremely effective strategy for preventing postoperative infection.

3.4.2. Ear cropping as a surgical procedure in dog

Abstract

Ear cropping is the surgical removal of the ear-flaps, cutting through the cartilage, skin, blood vessels and very sensitive nerve endings. In dogs, it involves reshaping the appearance of the external ear, usually by removing up to half of the caudal portion of the pinna (auricula). A 6 months old male dog weighting 7kg was presented to the surgery unit of the VTH, CVMA, Addis Ababa University for purpose of cosmetic ear cropping. Then appropriate surgical cropping of the ears was performed under general anaesthesia, along with standard pre- and post-operative care, by attending to all aspects of patient health and discomfort. Clamp was used to keep the shape line accurate and ear posts were applied on ear after cropping to get upright positioned ears. After two weeks, the wounds on both ears were fully healed, and a month later, when the ear cartilages gained strength, and the ears took on the necessary reshaped form.

Key words: *Ear cropping, Ear posts, Puppy*

Introduction

The veterinary procedure is known as "cosmetic otoplasty"(Slatter, Douglas 2002), and involves the removal of a part or whole pinnae, the external flap of the ear. Ear cropping is the surgical removal of the ear-flaps, cutting through the skin, cartilage, blood vessels and very sensitive nerve endings. This procedure must be performed by a veterinarian who already has the necessary experience and skills in that area (Packová and Takáčová, 2020). Historically, ear cropping was performed to prevent ear damage during hunting or fighting, and some proponents of ear cropping continue to suggest that cropping is necessary to prevent accidental tearing of pendulous ears, particularly in hunting dogs (Mills *et al*., 2016).

Cropping is performed when dogs are between 6 and 12 weeks old depending on breed and body condition (Hancock, 1968). In dogs, it involves reshaping the appearance of the external ear, usually by removing up to half of the caudal portion of the pinna (auricula). Following removal of the pinna, the ears are taped and splinted to facilitate healing in the desired shape. Most often, dogs are anesthetized during the procedure and may or may not be given analgesics afterward (Mills *et al*., 2016). Although controversial, dog “cosmetic surgery” continues to be performed and has reached epidemic proportions (Quartarone *et al*., 2012).

It has been suggested that ear cropping reduces the risk of ear infection, as a result of less trapping of moisture and debris in the ear canal (Rosser, 2004) While there is some evidence to suggest that dogs with pendulous ears have a higher risk of otitis externa, compared with dogs with erect ears, it appears that specific breeds tend to have a higher predisposition than others regardless of ear conformation (Lehner *et al*., 2010). It is possible that ear cropping may alleviate ear infections by increasing the airflow. The erect ear remains drier and it is less likely to develop a health problem. The most common problem is ear inflammation – Otitis externa. For a dog it is a very painful condition. Otitis externa is an inflammation of the auditory canal from the pinna to the tympanic membrane commonly observed in canine patients in small animal veterinary practice (Murphy, 2001).

Description of the Case

Case history and clinical findings: A 6 months old male dog weighting 7kg was presented to the surgery unit of the VTH, CVMA, Addis Ababa University for purpose of cosmetic ear cropping. The dog's owner claimed that because the ears were occasionally growing longer, floppy, and covered the ear canal, the puppy was not able to hear normally. The owner also mentioned that the ears should be cut to a necessary and attractive shape because their current forms are uninteresting. Upon examination, the puppy's vital signs were within normal range, and it appeared to be in good health. Its ears were floppy, rested on and cover the ear canal (Figure 19A) but had natural shape, with no evidence of illness. Then appropriate surgical cropping of the ears was performed under general anaesthesia, along with standard pre- and post-operative care, by attending to all aspects of patient health and discomfort.

Pre-operative preparation, anesthesia and animal control: No sedatives were required to quiet the dog because it was docile. Preparing the surgical site started while the animal was in an aware state. During preparation, the owner kept the dog held on the table in sternal recumbence, but during surgery, a team assistant and anaesthesia were used to keep it quit. To prevent fluid and other unclean particles from trickling into the aural cavity, clean cotton was used to pack the canal, and surgical shaving and cleaning of outer of both left and right pinna was done. Following aseptic preparation of the ears, an IV combination of 0.5 mg/kg diazepam and 5 mg/kg ketamine hydrochloride was given as needed during the procedure until both ears cropped.

Surgical procedure and technique: For ear cropping, I made the ear posts that have ear like shapes (Figure 19B) using of materials that were readily available locally, such as paper, gauze, and adhesive plaster. To ensure that the ears would be taken out in equal sizes and needed shapes, the ears were measured before being cropped and line was drawn on them by pen. Then curved intestinal clamp (Figure 19C) was applied on the right ear just lower to the line from the upper to lower points of flattened ear flap so as to adjust the flap to the desired shape. This clamp was used to keep the required shape of ear as well as control bleeding. Then that ear was cut with a scalpel blade, the major blood vessels were ligated separately when they bleed, while other diffuse bleeding were controlled by continuous pressure mobbing. Finally,

the wound edge was apposed with a simple continuous suture using 3-0 Vicryl (Figure 19E) and cleaned with iodine solution, and subsequently, second ear was cropped (Figure 19D) and sutured in the same manner. After cleaning the region, the cotton plug was taken out from ear canal, and ear posts were put, a material that resembles a dog's ear, to both ears (Figure 19F). To maintain the ears standing straight, the ear post was fixed in place with adhesive plaster and left in place for seven days.

Figure 19: Ear cropping in Dog

(A) Floppy ears rested on and covering the ear canal (Arrow) (B) Locally made ear posts (C) Cutting the ear by applying clamp (D) The cropped ear flaps (E) While suturing the ear edges (F) Posts were put on ear and stay fixed by adhesive plaster (G) The healed ears with upright position outcome after one month

Post operative care and outcome: Antibiotics, procaine penicillin G @ 20,000 IU, IM was administered immediately after completion of surgery and continued for 2 days. The owner was advised how to prepare a modified Elizabethan collar from locally available material to prevent rubbing against objects. Additionally, the owner was told to request quickly if he noticed any complications. The ear post was changed on 7th

day and stayed again for additional five days. The ear post and suture materials were removed on 12th day post operative and the ears were washed and cleaned routinely. Finally, the surgical wounds on the ears were healed fully without any complications and after one month, the ear cartilages were get strength with a final outcome of pointed ears that were upright and erect were achieved (Figure 19G).

Discussion

This case report described a dog's successful healing from cosmetic ear cropping surgery that produced a pleasing appearance for the ear. Utilizing newer, more advanced surgical techniques, like laser surgery, appears to be the best course of action these days in terms of health. The surgical field is clear, the sections are more accurate and cause less tissue damage, and the surgeon can execute precise surgery because of the minimum to nonexistent bleeding. Very soon after the surgery, the dog can resume its regular activities. In addition, the laser eliminates nerve endings, which lessens discomfort (Quartarone *et al*., 2012). In agreement, the current surgical technique was done by surgeon and overly helpful in achieving the required form since it used contemporary materials (forceps) to control bleeding with less tissue damage and maintain the accurate cutting line during surgery.

Hancock (1968) concluded that the ears are positioned with tape, bandages, or other devices to encourage an upright position following surgery. This conclusion was supported by the findings of Mills et al. (2016), who stated that, following the removal of the pinna, the ears are taped and splinted to facilitate healing in the desired shape. The aforementioned results align with the current surgical protocol, which involves the use of a bandage, and ear post. These items are applied to the ears for one week, removed on the seventh post-operative day to maintain the ear in an upright posture, and then changed on the seventh day and left for an additional five days. On the twelfth day following the procedure, the ear post and sutures were taken out, and the ears were regularly cleaned and bathed. As a result, after one week the ear straightened in place, and after two weeks to one month the cartilages of the remaining ears gained strength. However, it takes a few more days for larger animals to get their ears in an erect position.

The findings of Hayes et al. (1987) first documented a significantly higher risk of otitis externa in dogs with hairy, floppy ears. The frequency of diagnosis was significantly higher in dogs with floppy ears, but it was not affected by ear hairiness. Dogs with floppy ears are prone to a higher frequency of middle ear inflammation compared to breeds with erected ears, although the ears were not hairy (Perry *et al*., 2017). However, according to the current report, ear cropping was done on a puppy that did not exhibit any symptoms of illness, solely for cosmetic purposes. However, it was also necessary to shorten the ear flaps in order to facilitate the puppy's easy communication with its surroundings because the puppy's floppy ears covered the canal thereby rendering it difficult for it to hear well.

Since the puppy in this report was just six months old, complete anaesthesia was used along with careful consideration to ensure a safe surgical procedure. This was necessary because older animals tend to exhibit evident signs of bleeding, pain, and discomfort during surgery, which might lead the animal to become upset and disturbed. This was in agreement with the conclusion stating that cropping should always be carried out under full anesthesia (Brodbelt, 2009). Because ear cropping is a surgical procedure and general anaesthesia is required, the procedure is generally carried out by a veterinarian, although it often may be attempted by breeders and dog owners who do it unskilful (Quartarone *et al*., 2012). The current report concurred with this finding and concluded that ear cropping surgery should exclusively be performed by veterinarians.

In summary, the present study strongly recommending that ear cropping should be carried out on young animals up to 12 weeks of age. However, if an older animal is presented, the procedure should be conducted under general anesthesia to ensure the animal's comfort and pain free. Effective management of bleeding is imperative, along with precise shaping of the ear using modern surgical tools, followed by meticulous stitching as needed. It is crucial that only veterinarians perform this surgical procedure.

3.4.3. Management of saddle sore that grew into an abscess in camel

Abstract

Camel is one of the livestock species uniquely adapted to arid and semi-arid areas of the world. Dromedaries are regularly used in pastoral nomadic areas as packing and riding animals, produce milk, meat, wool, hair and hides. But the poor use of saddle may cause superficial swelling in camels like saddle sore which may grow to abscess when not managed quickly with care and so hinders the use of camels. Thus, the current case study details the surgical treatment of a saddle sore that developed into an abscess because of a poor saddle on an eight year old, 400kg estimated one hump having (dromedary) male camel brought to the VTH, AAU, CVMA, with a complaint of large growth at wither around shoulder region since last thirteen days. The animal exhibited significant improvement after the eighth post-operative day and restored normal with a normal appetite within 14 days. After five weeks, the animal healed completely and resumed its previous level of function

Key words: *Abscess, Camel, Saddle sore*

Introduction

Camel is one of the livestock species uniquely adapted to arid and semi-arid areas of the world. Arid lowlands of Eastern Africa namely, Somalia, Sudan, Ethiopia, Kenya and Djibouti, are mainly known for camel rearing (Dejene 2015). Major camel-keeping societies in Ethiopia include Afar, Somali, Oromo (Karayu, Gabra, Boran and Guji groups), Kunama and Irob peoples, among others. The Afar and the Somali peoples are known for their camel-keeping traditions for centuries; the Boran and Guji pastoralists, on the other hand, started camel production recently. Gabra and Somali, who have been keeping camels for centuries, are believed to play instrumental roles in introducing camels to the Borana Plateau (Coppock 1994).

In Ethiopia, camels are predominantly kept in the pastoral and agro-pastoral production systems. Only few male camels are to be found in the mixed crop-livestock system (Mirkena *et al*., 2018). Besides, farmers and agro-pastoral communities in mid-altitude areas who were not traditionally camel keepers recently started adopting camels. Consequently, one can nowadays see camels along a vast

expanse of central, north-eastern and north-western mid-altitude regions of the country (Aklilu and Catley 2011). According to the Central Statistical Agency (2018), the camel population of Ethiopia is estimated to be above 1.42 billion that set the country sixth in Africa in camel population.

The one-humped camel, dromedary(Camelus dromedarius) is an important livestock species uniquely adapted to hot and arid environments. It produces milk, meat, wool, hair and hides and serves for riding, as a beast of burden and draught animal for agriculture and short-distance transport (Schwartz and Walsh 1992; Mirkena *et al*., 2018). The one-humped camel dromedary, (Camelus dromedarius), referred to as the Arabian or dromedary camel, was domesticated approximately 4,000 years ago in the southern Arabian Peninsula, possibly in present day Yemen and Oman (Legesse *et al*., 2018). All camels in Ethiopia are dromedaries (Camelus dromedarius). Its introduction into east Africa is thought to have occurred through the Horn of Africa, via the Suez canal, approximately 3,500 yrs ago (Tefera and Getachew, 2013).

Dromedaries are regularly used in pastoral nomadic areas as packing and riding animals. There are multiple riding and packing saddle styles positioned variedly over the withers, the hump or the lumbar areas (Dioli, 2013). But the poor use of saddle may cause superficial swelling in camels like saddle sore which may grow to abscess when not managed quickly with care and so hinders the use of camels. The most common welfare issue in riding and packing dromedaries is the development of pressure sores, particularly in body areas where the skin is directly covering bony prominences such as the withers and the transverse lumbar processes. The most frequent reasons for the development of saddle sores are the incorrect use of insufficiently padded saddles, non-symmetrical load placement and the excessive weight of the load and/or the prolonged carrying activity (Dioli, 2022).

An abscess is a circumscribed inflammatory lesion characterized by the accumulation of purulent exudates. The formation of abscesses can be attributed to various causes, including breaches on the skin or mucous membranes that allow the entry of pyogenic microorganisms, infected foreign bodies migrating from the digestive tract lumen, the use of non-sterilized needles for intramuscular injections, and puncture or penetrating wounds (Sahoo and Ganguly, 2015). It should be differentiated from empyemas,

which are accumulations of pus in a preexisting rather than a newly formed anatomical cavity. Other conditions that can cause similar symptoms include: cellulitis, a sebaceous cyst and necrotising fasciitis. Cellulitis typically also has an erythematous reaction, but does not confer any purulent drainage (Singer and Talan, 2014). Thus, the current case study detailed the surgical treatment of a saddle sore that developed into an abscess in a camel because of a poor saddle.

Description of the Case

Case history and clinical findings: An eight year old, 400kg estimated one hump having (dromedary) male camel was brought to the VTH, AAU, CVMA, with a complaint of large growth at wither around shoulder region since last thirteen days due to harness and poor saddle. On palpation and inspection, the mass was hot, painful, fluctuating and the affected site became alopecic(lack hair) (Figure 20A). Due to this swelled mass the animal was being disturbed and frequently licking it, with gradual reduction of feed and water consumption. All physiological parameters were within normal limit. Exploratory puncture was done with 16 gauze needle on the swollen mass which revealed thick, yellowish, creamy pus comes out through the punctured site which shows that it was the already matured abscess. On the basis of history, clinical findings and exploratory puncture, the case was diagnosed as a case of abscess due to poor saddle. Ultimately, it was determined to undertake surgical drainage while keeping the animal on antibiotics.

Pre-operative preparation, anesthesia and animal control: The animal was secured in sternal recumbency by owner. The animal was administered with (Pen &Strep® Norbrook UK) at 1ml/20kg. Diclofenac sodium (Nonsteroidal anti-inflammatory drug (NSAID), was administered to assist in pain and fever control caused by traumatic surgery, inflammation. The site was prepared by clipping, shaving of hairs and scrubbed with diluted chlorhexidine solution thoroughly.

Surgical procedure: After being sure that the abscess was matured enough for drainage and aseptically preparing the area, a excruciating incision was given over the swollen mass on dependent part. Complete draining (Figure 20B) was done under pressure. When the pus has stopped flowing, the cavity was flushed with 2%

povidone iodine solution. Then packing of the wound with 2% tincture of iodine soaked gauze held with forceps was followed (Figure 20C). Thence the wound was left open for drainage of fluids and limit accumulations and the animal was sent home (Figure 20D).

Figure 20: Abscess management and outcome in Camel

(A) Large swelled alopecic wound (B) Draining by pressure (C) Packing the cavity with iodine soaked gauze (D) The camel allowed to go home after operation (E) The healed wound after five weeks (F) The animal resumed its previous level of function

Post operative care and outcome: The camel was administered with antibiotics (Pen &Strep® Norbrook UK) for additional four days to avoid secondary bacterial complications. Dressing was performed three times in two days interval by 2% povidone iodine solution to fasten the healing of the wound. Eliminating the causal factor should be the main goal of treatment for these kinds of instances. The owner was therefore instructed to concentrate on replacing the tack, adding more cushioning(a soft mass of material stuffed in to a cloth bag, used for support), and

making sure the tack(saddle) and the skin underneath it are kept as dry and clean as possible. The owner was also advised to rest the animal till the damaged area healed completely. During follow up, the animal exhibited significant improvement after the eighth post-operative day and restored normal with a normal appetite within 14 days. After five weeks, the animal healed completely (Figure 20E) based on the photo the owner supplied me and resumed its previous level of function (Figure 20F).

Discussion

Abscess, a localized collection of pus in a cavity formed from tissues that have been broken down by infectious bacteria or through wound. It is caused when bacteria such as staphylococci or streptococci gain access to solid tissue (e.g., by means of a small wound on the skin). The toxins released by these multiplying bacteria destroy cells and thus trigger an acute inflammation at the site, with its characteristic signs of redness, pain, swelling, and heat (Bernard *et al*., 1989). An abscess is a circumscribed inflammatory lesion, which consist of purulent exudates caused due to infection, trauma by sharp object, migration of emboli in circulation etc. the bacteria enter in circulation causing septicemia and necrosis of tissue leading to migration to the area of least resistance to form the abscess (Venugopalan, 2000). Likewise, in the present case report, the wound was occurred by poor saddle use in camel which cause saddle sore and became abscess. It was swelled on the wither region, painful, warm and alopecic (lack skin).

The standard treatment for an uncomplicated skin or soft tissue abscess is opening and draining and it is recommended to use antibiotics in minimum cases (Singer and Talan, 2014). Treatment of large abscess includes evacuation of pus from the abscess cavity along with antibacterial therapy (Thorat *et al*., 2008). In the present study, similar line of treatment and management of the abscess was followed in camel in which the pus of the wound was drained very carefully and the cavity was packed with iodine soaked gauze along with antibiotics therapy.

In summary, the surgical treatment and management of this specific case involved opening the swelling, completely draining the abscess with pressure, flushing the cavity with antibiotics, packing the wound with gauze soaked in 2% tincture of iodine, leaving the wound open to allow fluid to drain, and limiting accumulations. All of

these processes were used step by step and this measurement was found to be effective. Thus, the study of case at hand strongly recommends using saddles correctly, and if a saddle sore develops in any way, it needs to be treated right away to prevent an abscess. However, if it developed into an abscess, the current case management method is advised for these kinds of situations and must be addressed as soon as possible to guarantee a safe and effective recovery.

3.4.4. Hyena bite wound management in jack and jenny

Abstract

This case study addressed the management of a hyena bite wounds in a seven and ten-year-old, 130 and 120kg estimated male and female donkeys respectively in Ethiopia. The Jack(Case 1) was bitten at perineal area lower to anus with less tissue loss. It involved a contaminated avulsion wound with deep lacerations and contusions on the right hind leg and perineum(Case 2). The study outlined the anesthesia, pre-operative preparations, and surgical treatment, including the careful removal of dead tissues and drainage. After wound treated surgically, it was deliberately left open, allowing it to undergo healing through the secondary intention process, because of it had suffered tissue loss, making it extensive and impractical to close. Postoperative care involved administering antibiotics and regular wound debridement, lavage, and dressing until complete healing was achieved. Finally, case 2 was died due to extensive tissue loss but case 1 was completely healed.

Key words**:** *Hyena bite, Jack, Jenny, Open wound*

Introduction

It is estimated that the world donkey population is about 44 million; half is found in Asia, just over one quarter in Africa and the rest mainly in Latin America (Fielding and Starkey, 2004). Ethiopia has about 6.75 million donkeys or 32% of all the donkeys in Africa and 10% of the world population. Although donkeys are found in all the ecological zones of the country (arid to alpine) the majority are found in the highlands (Birhan, 2012; CSA, 2010). In Ethiopia, the rugged terrain characteristics, absence of well-developed modern transport networks and the prevailing low

economic status of the community necessitate the use of equines for transportation (Mengistu, 2003).

In Ethiopia, the use of equines for transportation will continue for years to come because of rugged terrain characteristics inaccessible for modern road transportation facilities as well as the absence of well-developed modern transport networks and prevailing low economic status of the community (Wilson, 1991). Though donkeys provide several advantages, health and welfare is a visible problem and most of the animal owners are not even aware of animal welfare and management practices; as a result animals have to undergo significant suffering due to improper husbandry practices. Studies to elucidate the magnitude of this problem are lacking. Such information would be useful for designing strategies that would help improve donkey health and welfare (Mekuria *et al*., 2013; Pearson *et al*., 2003).

Wound is an open mechanical injury of the skin (epidermis), underlying tissues and organs. It is characterized by pain, gaping, bleeding and functional disturbance. The most common cause of wounds in working equine are over loading, accidents, improper position of load predisposing to falling, hyena bites, donkey bites, injuries inflicted by horned Zebu (DACA, 2006). Some hobbling methods, inappropriate harnesses or yokes that may be heavy and ragged, long working hours may cause discomfort and inflict wounds (Mekuria *et al*., 2013). This case was handled and managed very carefully and therefore could briefly described the open wound management of hyena bite in male(Jack) and female donkey(Jenny).

Description of the Cases

Case history and clinical findings: A7**(**Case 1**)** and ten years old(Case 2), 130 and120kg estimated local breed Jack and Jenny were presented to the Dire clinic and AAU VTH, Donkey sanctuary veterinary clinic, following a hyena bite over posterior body part (Figure 21A and B) 4 and 6 days ago respectively. On physical and clinical examination, Case 1 was bitten on the perineal area lower to anus with less tissue loss and not as such life threatening. Case 2 was a contaminated large avulsion wound with deep lacerations and contusions to the lateral and median thigh including the dermis and fascia of the upper quarter of right hind leg and perineum with irregular wound edges and dead tissues on it. The clinical parameters like heart rate, respiration

rate and temperature of the animal were within physiological limits. Therefore, the cases were diagnosed as contaminated type of open wounds and were managed through open wound management.

Pre-operative preparation, anesthesia and animal control: The case 1(Jack) was restrained in lateral recumbence but case 2(Jenny) was physically restrained and stabilized by lifting her right forelimb and keeping flexed in hanged position by owner. The operation was conducted in standing position. In addition the animals were sedated with detomidine hydrochloride at dosage rate of 40mg/kg I.V in to juguilar vein. The wounds and hair surrounding the periphery of the wound were washed with water and area around wounds were also washed by chlorhexidine solution (savlone) and then shaved well (Figure 21C).

Surgical treatment: After site preparation, the dead as well as dirty tissues on the wounds and their edges were trimmed out and the sites were refreshed well (Figure 21D & E) and Case 2 was drained very carefully because of the wound site of living jenny was infested by maggots. Subsequently, in both cases the wounds were deliberately left open, allowing them to undergo healing through the secondary intention process. This decision was made because the wound had suffered tissue loss, making it extensive and impractical to close. At the end, the wound periphery was pasted with Zinc oxide (Figure 21F).

Post operative care and outcome: The donkeys received intramuscular administration of antibiotics fortified procaine penicillin at 4,000,000IU for a duration of three days. Subsequently, the wounds underwent regular debridement, lavage, and dressing with antiseptics at three-day intervals for a period of two weeks, and followed until the complete healing was achieved. The owners received guidance to regularly assess the overall health and status of the wound. Furthermore, an advice was given to construct a sturdy shelter for the donkeys, capable of withstanding potential interactions with wild animals. Eventually, confirmation through subsequent phone communications affirmed the successful healing of the Jack(Case 1) but unfortunately, case 2(Jenny) was died after one month because of extensive tissue loss was occurred and made it difficult to easily heal.

Figure 21: Open wound management in Jack and Jenny

(A& B) Clinical presentation of wounds (C, D&E) Surgically treating the wounds (F) Finally the wound was pasted by zinc and left open for second intention of wound healing

Discussion

Human-wildlife conflicts primarily emerge due to the destruction, deterioration, and division of habitats caused by human activities. As habitats become fragmented, the extent of the interface, or 'edge,' between human and wildlife expands. Simultaneously, animal populations become confined in isolated refuges. This situation results in heightened interactions and conflicts with humans, as wild animals strive to meet their nutritional, ecological, and behavioral requirements (Addis and Megra, 2017).

A disruption in the integrity of the skin is referred to as a wound, characterized by the disturbance of normal anatomical structures and functions (Venkatesh, 2022). Wounds are recognized as the second most significant health issue following

polyparasitism. In Ethiopia, donkeys are commonly employed for harness-related tasks. An imminent threat to the well-being of working donkeys in central Ethiopia is posed by hyena bites (Donkey Sanctuary, 2006). This was in agreement with the current case report where wounds on Jack(Case 1) and Jenny were due to hyena bite that caused life threatening wound in (Case 2) as it included wide area and most thigh muscles and it became an inevitable threat to the jenny which resulted in death.

When there is a more extensive loss of cells or surface wounds leading to large defects, the reparative process becomes more intricate. Granulation tissue grows in from the edges to facilitate the repair, resulting in the formation of unsightly scars (Shenoy, 2000). This type of healing is known as healing by secondary intention, differing from primary healing in various aspects. In secondary healing, the inflammatory reaction is more intense, larger amounts of granulation tissue are generated, and wound contraction is more pronounced (Chhabra *et al*., 2017). These facts aligned with the current wound scenario, where the wound was intentionally left open to undergo healing by secondary intention for both cases, resulting in the formation of a sizable scar composed of connective tissues over the course of several months(Case 1).

The typical anatomical sites for hyena bites were observed to be the thigh and perineal muscle areas, possibly influenced by the quantity and quality of the muscle in those regions. Conversely, limbs were less prone to hyena bites, potentially due to their lower muscle quality. The avoidance of limb bites could be attributed to the upward movement of limbs during kicking, making them less susceptible to hyena bites (Addis and Megra, 2017). These observations agreed with the current case, where the Jack and Jenny were bitten in the upper thigh and perineum areas, likely influenced by the presence of different muscles.

The current case report agreed with the (2015) finding, which state that after appropriate analgesia, the wound should be explored to determine trauma severity. Wound debridement and lavage are essential for minimizing risk for postoperative complications. Devitalized tissue should be removed via sharp excision and bleeding controlled with digital pressure, application of hemostats, ligatures, or electro coagulation. Thorough wound lavage (eg, with 0.05% chlorhexidine solution) is effective in flushing loose foreign bodies from the wound and reducing bacterial

numbers. Hyena bites can be managed using various methods, including open or closed wound management (Balsa and Culp, 2015). In this particular case report, the hyena bite inflicted extensive wounds that were managed by open wound treatment at the clinics. Ultimately, case 2 was dead, while case 1's wound was healed, resulting in the formation of scar tissue.

3.4.5. Repair of lacerated wound due to dog bite in bitch

Abstract

The Addis Ababa University Veterinary Teaching Hospital received a six-year-old, 7kg weighting bitch that had been bitten by a dog on dorsal neck during a walk into a road. The condition was occurred 30 minutes prior to the owner reach the clinic and was diagnosed as fresh wide and deep lacerated type of open wound and thus an emergency surgery was conducted by closing the wound in three layer fashion under general anesthesia. The closed wound site was disinfected with iodine daily, penstrep was administered intramuscularly for three days as postoperative antibiotic and tramadol 2mg/kg was injected for pain management. The wound was completely healed and the operation site was also covered with hair after two weeks.

Key words: *Bitch, Wound, Dog bite*

Introduction

Wound is an injury usually involving disruption of tissue or rupture of the integument or mucous membrane due to external violence, mechanical or chemical agents and sometimes due to a disease manifestation. Wounds in domestic animals maybe encountered due to injury while fighting, animal or insect bites, injury due to barbed wire while grazing, accidents and blows. Complications associated with a wound arises due to an infection as toxins are released by the bacteria at the site leading to abscess, necrosis, slough etc. (Rai *et al*., 2017). Apart from these, wound may occur due to mechanical trauma, surgical interventions and reduction in blood supply, burns, or senility (Allgower *et al*., 1995).

Wounds can be classified according to their degree of contamination and the length of time between injury and treatment of the wound. Although time can be used as a

guideline, it should not be the ultimate factor for determining the level of contamination (Pavletic, 2010). Clean wounds, usually seen only in surgical situations, are not infected and do not involve the respiratory, alimentary, or urogenital tract. Clean contaminated wounds, generally seen in surgical situations, involve the lumen of the respiratory, alimentary, or urogenital tract. Contaminated wounds are generally traumatic in nature and may have gross contamination and necrotic debris. Infected wounds generally involve large numbers of bacteria, inflammation, edema, and suppuration (Mohammed and Birhan, 2019).

Wound healing is a biological complex cascade of predictable over-lapping events and is a natural restorative response to tissue injury. The continuum of interrelated processes is classically divided into the inflammatory, proliferative, epithelialization and remodeling phases. Each phase is regulated by biochemical mediators such as cytokines, growth factors and other cellular components that stimulate or inhibit the cellular responses that facilitate healing. The biologic process for wound healing is same for all wounds, although the specific mechanisms may vary (Hanks and Spodnick, 2005).

Numerous factors can negatively affect wound healing and therefore should be considered when managing wounds. These factors include but are not limited to chemotherapy, diabetes mellitus, geriatric age, hematoma, hyperadrenocorticism, hypotension, hypothermia, malnutrition, necrotic tissue, radiation therapy, seroma, skin disease, and patient species (e.g., wounds can be slower to heal in cats than in dogs) (Cornell, Stanley 2018). Treatment methods that are employed in the management of wounds focus on rapid and efficient evaluation, scrupulous, aseptic surgical techniques, and conscientious and prolonged aftercare. Appropriate antibiotic treatment regimens are routinely employed when the wound is at risk of becoming infected or is known to be infected (Griffiths *et al*., 2003). This report described a case of surgical reconstruction of laceration wound on the dorsal neck of local breed female dog.

Description of the Case

Case history and clinical findings: The Addis Ababa University Veterinary Teaching Hospital received a six-year-old, 7kg weighting bitch that had been bitten by a dog on

dorsal neck during a walk into a road. The condition was occurred 30 minutes prior to the owner reach the clinic. The owner informed that the dog that had bitten her bitch was from her village that had received regular rabies vaccines. She also said that her village had received enough information regarding the vaccinations from veterinary professionals. According to a clinical assessment, the bitch had a deep(1.2 cm deep), length(10cm long), wide(2.6cm wide) dorsal neck open wound that included some muscle beneath the skin (Figure 22A and B). The clinical parameters were: heart rate(107 beats/min), respiration rate(22 breaths/min) and temperature(38.1^0c) of the animal were within physiological limits. Therefore, the case was diagnosed as fresh wide and deep lacerated type of open wound and thus an emergency surgery was decided to be conducted to manage the case by closure and allowed to be healed through first intention of healing.

Pre-operative preparation, anesthesia and animal control: Even though the wound was fresh, the animal was administered with penicillin (24mg/kg) and dihydrostreptomycin sulphate (30mg/kg) (Pen &Strep® Norbrook UK) to prevent infection. After sedation with ketamine (Ketamine Hydrochloride, Germany) at 10mg/kg IM, the bitch was put on surgical table in sternal recumbence. Long hairs near the wound were cut short, shaved, the wound and area around it was washed with water, disinfected by diluted chlorhexidnie solution (savlone) (Figure 22C), scrubbed by iodine.The dog was then taken to operation room and put on surgical table in sternal recumbence. Then Sterile drapes were put on the wound site and 3ml local anesthetic agent; Lignocaine HCL 2% was flushed on to the wound to enhance pain management.

Surgical treatment: The repairing of the wound was taken place by three layer closure (Figure 22D) after the procaine penicillin powder was applied on it. First, because there was a deep irregular hole continued from wound on to the right side of the neck, a simple interrupted suture pattern was employed to close it with absorbable suture material polyglycolic acid 910 (vicryl) 2-0. Then the muscle underneath skin along with subcutaneous tissue was closed by simple continuous suture pattern with the same suture material. Lastly, the skin was sutured by simple interrupted suture technique by utilizing catgut suture material 2-0 and then iodine tincture solution was

applied on to the area (Figure 22E) and tramadol 2mg/kg was injected for pain management.

Figure 22: Surgical repair of lacerated wound and its outcome in Bitch

(A&B) The clinical feature of wound on dorsal neck (C) Aseptically prepared site (D) Closing of wound on progress (E) The closed wound (F) The healed wound and covered with hair after 2 weeks (G) The hair grown full and covered the wound on 2 months

Post operative care and outcome: The closed wound area was disinfected with iodine daily, a broad-spectrum antibiotic (Penicillin (24mg/kg) and dihydro-streptomycin sulphate (30mg/kg)) was administered intramuscularly for three days as postoperative antibiotic. The owner was advised to not let loose a companion dog into the locality full of stray dogs unless they are at friendly terms. To keep a properly secured chain with neck belt or body belt for her pet dog which is tight enough during a walk into a road or a garden. Sutures were removed on 8th day post operation after the surgical wound healed. The wound was completely healed and the operation site was also

covered with hair after two weeks (Figure 22F) and fully covered with hair after 60th day post operative (Figure 22G).

Discussion

A laceration usually occurs as the result of a sharp object penetrating the skin and, possibly, the tissues beneath the skin. The resulting wound may be superficial, which involves a cut or tear in the skin only, or it may be deep, with damage to the tissues below the skin, such as muscles, tendons, blood vessels, or nerves. Superficial lacerations involving only the skin and subcutaneous tissue can be closed with skin sutures alone. Buried sutures may be necessary if there are fascial layers that need to be reapposed, if there is excessive dead space, if there will be tension on closure, or to improve cosmesis (Fahie, 2011). For this particular case, the reconstruction procedure was taken place in the following manner: the wound was cleaned and assessed well and then the cut edges were brought together by suture materials. Following the treatment, the animal was sent home, and a follow-up was conducted. A week later, the bitch was discovered to be in good health and had fully recovered from its ailment.

3.4.6. Advanced flap technique in hyena bite wound in ewe

Abstract

A five-year-old ewe weighing 20 kg was brought to the Veterinary Teaching Hospital of Addis Ababa University with a history of a hyena bite to the right side of the head two hours prior. Upon examination, it was observed that a significant portion of the right lateral wall of the head, extending from the tip of the mouth to the entire jaw, had been torn away, exposing all layers of muscle and creating a large opening through which the tongue protruded freely. Emergency surgical intervention involving the advancement flap technique was promptly performed. Subsequently, the ewe experienced alleviation of discomfort and distress post-surgery. Upon follow-up, the wound exhibited successful healing, and the animal was observed to have fully recovered both physically and functionally.

Key words: *Advanced flap, Ewe, Hyena bite*

Description of the Case

Case history and clinical findings: A five years old, 20kg weighting ewe was presented to a VTH of Addis Ababa University, with history of hyena bite at head on right side two hrs ago. Upon examination, it was found that the right lateral wall of the head from the tip of the mouth including the entire jaw had been avulsed, exposing all layers of muscle and leaving a big orifice through which the tongue was hanging easily (Figure 23A). The hyena's tearing action caused severe soft tissue damage to the site; just bones and the lower and upper jaw teeth on the right side were visible, along with very little muscle. The wound was extended and skin was also opened on left side caudal to nostril. The animal's mouth was left open, making it uncomfortable to feed or drink. Subsequently, emergency surgical intervention by advanced flap technique was deemed necessary to preserve the ewe's well-being.

Pre operative preparation, anesthesia and animal control: Preparation was conducted in the following manner. Administration of 2ml of 20% Penstrep intramuscularly (IM) before the surgery to prevent infection. Sedation of the ewe with ketamine at a dose of 10mg/kg to induce relaxation. Injection of analgesic medication, meloxicam 2 mg/kg IM for pain management. Restraint of the ewe in left lateral recumbence (lying on its side) on the surgical table in the operating room. Cleaning and preparation of the surgical site by scrubbing the area with 0.05% chlorhexidine solution to ensure sterility.

Surgical procedure and technique: Closure of the surgical site by advancement flap technique was occurred in two layers: First layer: Stitching of remaining muscles around bones, though this was difficult due to extensive tissue loss. Second layer: Creation of a flap of skin, advancing it to cover the area that needed to be addressed, and then suturing the advanced skin flap together using silk 2-0 suture material (Figure 23B). Lastly, glyco spray (Figure 23C) was applied topically on the wound then the animal was kept in hospital in animal welfare premises for four days. This detailed description provides insight into the surgical techniques and precautions taken to ensure a successful operation on the ewe. The surgical procedure was completed with a favorable outcome as the wound was successfully closed and covered by the skin (Figure 23B), with the exception of a narrow area. Despite this

minor detail, the ewe experienced relief from discomfort and distress. The ewe was followed and care was taken in a hospital for four days.

Post operative care and outcome: For a duration of four days during the ewe's hospitalization, topical application of Glyco spray along with intramuscular injections of Penstrep 1ml/10kg was taken place, supplemented by routine aseptic wound dressing. Subsequently, upon observing signs of normal feeding and water intake, the ewe was discharged and sent home. The owner received instructions to provide diligent care, including soft feeds, to prevent the ewe from disturbing the sutures. Over the course of one week, the wound was being healed successfully, and the animal was seen with a full recovery and function (Figure 23D).

Figure 23: Advanced flap technique in hyena bite wound in Ewe

(A) Clinical presentation of wound (B & C) The closed and sprayed wound (D) The nice status of healing during week that the ewe could feed and drink

Discussion

Wounds in domestic animals may be encountered due to an injury while fighting, animal or insect bites, injury due to barbed wire while grazing, accidents and blows (Rai *et al*., 2017). The present case report described how the ewe with wound due to hyena bite handled. The principal objective in wound management is to expedite healing while attaining superior functional and aesthetic outcomes. This objective is most effectively pursued through the prevention of infection and additional trauma, alongside the provision of an environment conducive to the optimal healing of the wound. In summary, despite significant tissue loss in the wound of the present case, employing a surgical technique involving the advancement of adjacent skin onto the wound site, followed by suturing and rigorous postoperative care, this led to the complete recovery of the ewe from the condition.

4. SUMMARY OF COMPILED SURGICAL CASE REPORTS

In the current case report a total of 22 surgical procedures were performed in 28 domestic animal species, (8(28.6%) Canine, 5(17.9%) Swine, 4(14.3%) Ovine, 4(14.3%) Equine, 3(10.7%) Bovine, 2(7%) Feline, 1(3.6%) Caprine, 1(3.6%) Camelus), using various techniques. These procedures comprise: Open castration (8(28.6%), OHE 3(14.3%), CS 2(7%), open wound management 2(7%), closed wound management 2(7%), Enblock OHE, ear cropping, hernia, evisceration, atresia ani, rumenotomy, dehorning, penile amputation, second degree perineal laceration, third degree perineal laceration and abscess management on table 1. During this study period, 26(92.8%) animals were completely recovered but 1 patient (3.6%) was died after 1 month, and 1(3.6%) was slaughtered on 56 days after surgical intervention.

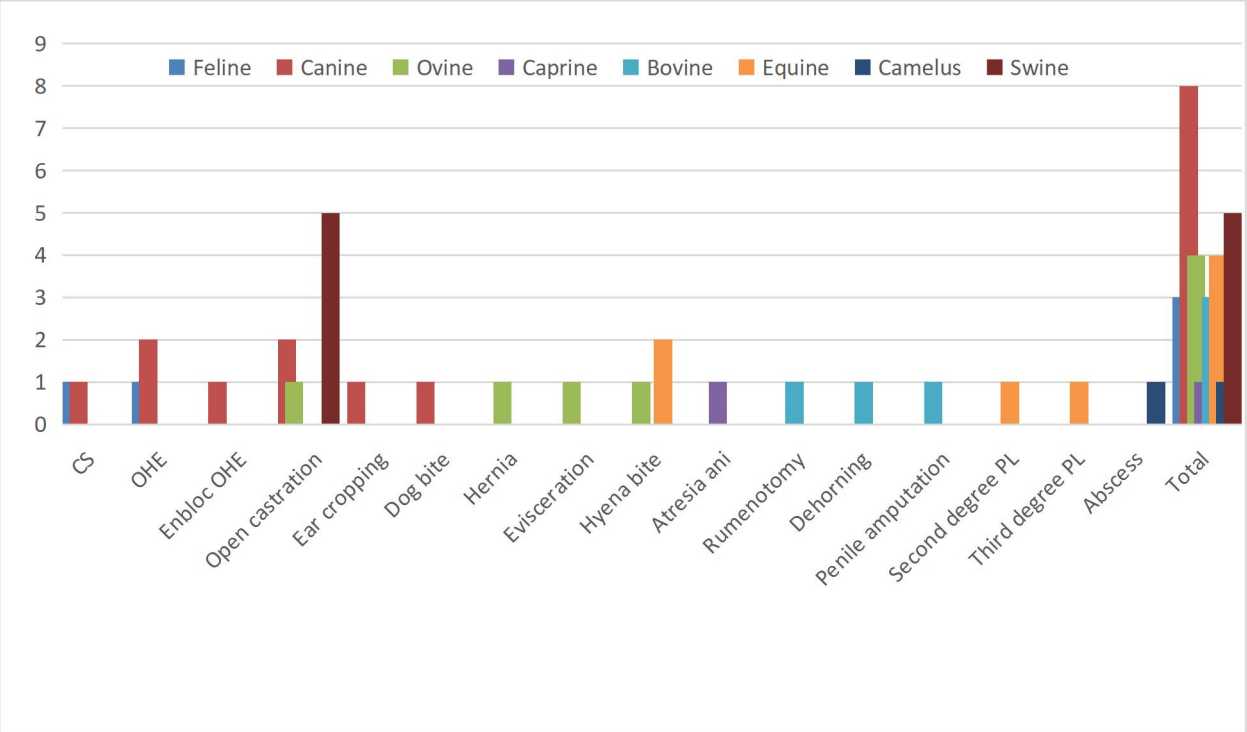

Figure 24: Types of surgical procedures in domestic animal species

Table 1: Every detail encompassing types, number and percentage of operations performed in each animal species, and their outcomes.

Animal species	Procedures /affections	No of animal subjected				Percentage	Outcome
		M	F	t	T		
Feline	CS	-	1	1		1/28x(100)=3.6%	Recovered
	OHE	-	1	1	2(7%)	1(3.6%)	Recovered
Canine	CS	-	1	1		1(3.6%)	Recovered
	OHE	-	2	2		2(7%)	Recovered
	Enblock OHE	-	1	1		1(3.6%)	Recovered
	Open castration	2	-	2	8(28.6%)	2(7%)	Recovered
	Ear cropping	1	-	1		1(3.6%)	Recovered
	Dog bite (Closed wound mgt)	-	1	1		1(3.6%)	Recovered
Swine	Open castration	5	-	5	5(17.9%)	5/28x100=17.9%	Recovered
Ovine	Open castration	1	-	1		1(3.6%)	Recovered
	Hernia	-	1	1		1(3.6%)	Recovered
	Evisceration	-	1	1	4(14.3%)	1(3.6%)	Recovered
	Hyena bite(Closed wound mgt)	-	1	1		1(3.6%)	Recovered
Caprine	Atresia ani	1	-	1	1(3.6%)	1(3.6%)	Recovered
Bovine	Rumenotomy	-	1	1		1(3.6%)	Recovered
	Dehorning	1	-	1		1(3.6%)	Recovered
	Urethrostomy	1	-	1	3(10.7%)	1(3.6%)	**Slaughtered on 8th week(56 day)**
Equine	2O Perineal lace	-	1	1		1(3.6%)	Recovered
	3o perineal lace	-	1	1		1(3.6%)	Recovered
	Hyena bite (Open wound mgt)	1	1	2	4(14.3%)	2(7%)	1 Recov. & **dead after 1month**
Camelus	Abscess	1	-	1	1(3.6%)	1(3.6%)	Recovered
Total		14	14	28	100%	100%	

(**Note:** CS= Cesarean section, OHE= Ovariohysterectomy, M= male, F= Female, t= Total of each case, T= Total number of cases in each animal species)

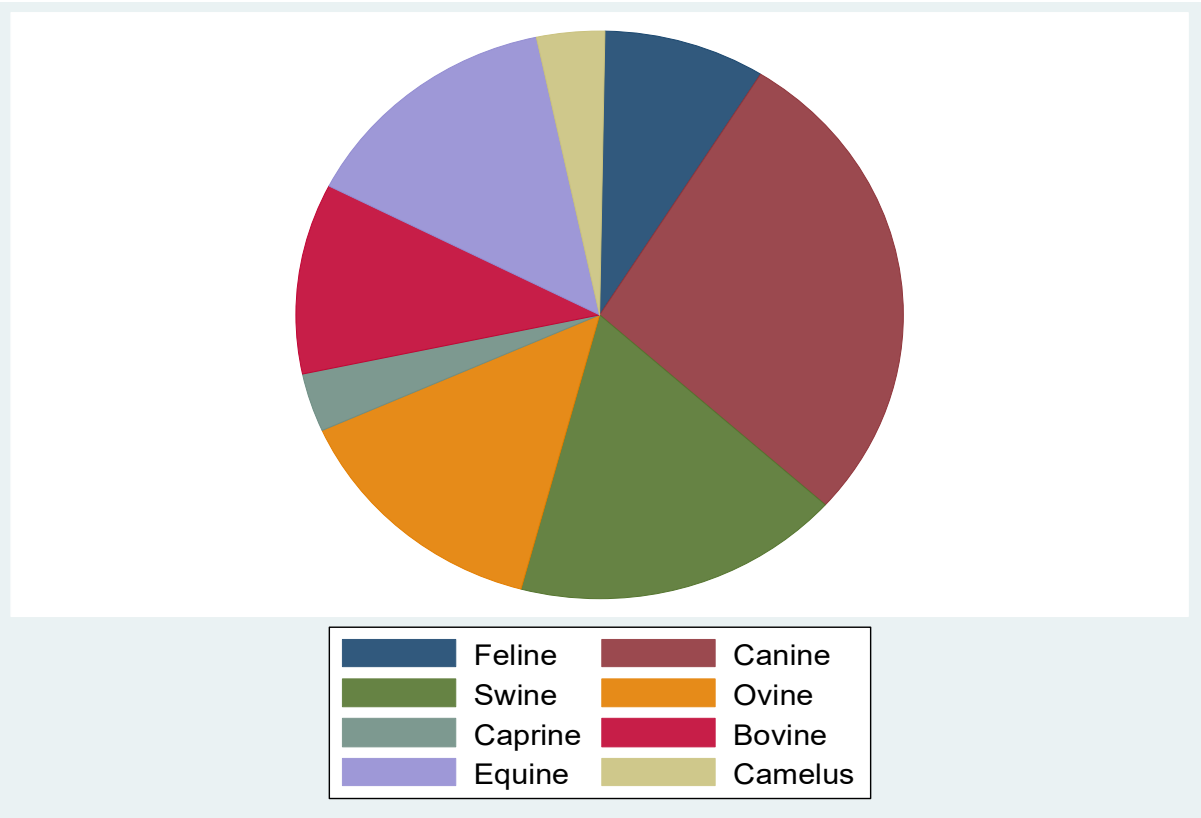

Figure 25: The number of animals that undergone various surgical managements

They are presented here with their percentages; Canine 8(28.6%), Swine 5(17.9%), Ovine 4(14.3%), Equine 4(14.3%), Bovine 3(10.7%), Feline 2(7%), Caprine 1(3.6%), Camelus 1(3.6%).

5. CONCLUSION AND RECOMMENDATIONS

Ethiopia owes huge livestock potential which can generate GDPs and on which many of the livelihoods are dependent. Despite their high significance, their production and productivity are hampered, suffered from animal welfare and one of which is due to various ailments deeming surgical interventions and limited veterinary services. In the current cases report, various surgical treatments and corrections comprising different systems like reproductive, integumentary and gastro intestinal were handled in different domestic animals. Among 28 animals undergone surgical procedures, 26(92.8%) were successfully recovered while 1(3.6%) was died and 1(3.6%) was slaughtered. Due to meticulous preoperative, intraoperative, and stringent postoperative care, almost all animals were fully recovered except one which was dead due to extensive tissue loss inflicted by a hyena bite. Although surgical procedures in the study were executed successfully, limited surgical facilities such as operation theaters, room for an intensive care unit, and supportive diagnostic amenities were notable. Furthermore, the scarcity of basic surgical equipment, instruments, and limited access to anesthetic drugs were evident. Therefore, in light of these conclusions, the following recommendations were forwarded.

- Principles of surgical asepsis should have to be maintained in all domestic animals.
- Veterinary service centers should be equipped with sufficient veterinary drugs, surgical equipment and operation theatres.
- Different surgical procedures and techniques should be performed only by veterinary surgeons, recorded, documented and commercialized for future references.
- Further research on novel surgical procedures and techniques should have to be performed.

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7. ANNEXES

Annex 1: Patient Card

Date._____

Case No._____

Name of the Hospital: VTH☐, Donkey Sanctuary☐, Dire Veterinary Clinic☐, SPANA ☐ , Farm☐ , Kebele ☐

Animal Detail

Species: Bovine__, Ovine___, Caprine__ , Feline__, Canine__, Swine __, Avian__, Equine____

Breed _____ Sex: Male☐ , Female ☐, Age _____

Animal identification _____ Name /if any/ _____

Owner detail

Owners' Name: _____, Address Town: _____, Kebele: _____ House No_____

Occupation_____ Phone No _____

Case history

_____

_____

Clinical findings

Body Temp _____^{o}c, Respiration rate _____Breaths/min, Heart rate _____ Beat/min, Ruminal Motility ____/min, Gut sound _____,

VMM: Normal___ pale___Congested___Jaundice____, Cyanotic__, CRT:_____, Body Condition:_____Superficial Ln: PF___, PS___, OTHER_____

Description of Case

_____

_____

Organ or system affected: Nervous__, Musculo-skeletal___, Respiratory__, Circulatory__, Digestive__, Urogenital__, Integument__, Other (specify) _____

SAMPLE TAKEN

Faeces ☐ Blood ☐ Skin scraping ☐ Nasal swab ☐ Vaginal swab ☐ Ruminal content ☐ Urine ☐ Other ☐

Tentative Diagnosis:_____

Differential Diagnosis List:_____

Laboratory Result:_____

Definitive Diagnosis:_____

Prognosis:_____

Observation and treatment

Clinical Work To Be Performed: Surgical_____, Medical_____, Gynecology/Obstetric_____, Follow up /Quarantine_____

MEDICAL TREATMENT ADMINISTERED

_____

_____

Student in Charge: _____Signature_____

Name of Staff in Charge: _____Signature_____

Annex 2: Owner's Consent Format Translated from Amharic

Owner's name: _____ Telephone: _____

Animal species: _____, Breed:_____ Animal name:_____

Sex: _____ Age:_____

I, the owner of the above mentioned animal, am informed on the terms of the procedure and consented for the surgery (name of procedure) to be performed on my animal.

Signature: _____ Date: _____

Annex 3: Pre-Anesthetic Evaluation Format

Time:_____

Date:_____

Patient Name:_____

Requested By:_____

History:_____

_____

_____

Physical exam data: _____

_____

_____

_____

Findings/Case/ and Diagnosis: _____

Labs/Rads/Other:_____

Procedure/Reason for Anesthesia:_____

Plan/Recommendations:_____

_____

_____

Further Diagnostics:_____

Pre-anesthetic Therapy:_____

Premedication:_____

Induction:_____

Maintenance:_____

Analgesia:_____

Fluids:_____

Monitoring:_____

Annex 4: Post-Operative Care Evaluation Format

Date: _____to**_____**

Surgical procedure: _____

Surgical techniques (Approachs) _____

Antibiotics_____

Analgesia_____

Fluid_____

Others_____

Post-operative complications and treatment

1._____

2._____

3._____

4 _____

Outcome_____

Annex 5: Anesthetic and Intra Operative Observations Format

Group						**Date**		**Procedure**	
Surgeon								As surgeon	
Anaesthetist								Patient monitor	
Animal	Sex	Weight	Physical status						
			Good	Mediu m	Poor				
Pre-anaesthetic Drugs						Anaesthetic Drugs			
Drugs	Dose	Route		Time	Drug		Dose	Route	Time
					Total dose				

Record of Different Parameters

Vital Parameters	**Before Medication**	**After Induction of Anaesthesia**			
		5min	10min	20min	End
Temperature					
HR/min					
RR/min					
MM Color					
Pulse quality					
CRT					