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ADDIS ABABA UNIVERSITY

COLLEGE OF VETERINARY MEDICINE AND AGRICULTURE

DEPARTMENT OF CLINICAL STUDIES

COMPILED CASE REPORTS ON DIFFERENT SURGICAL CASES: THEIR PROCEDURES, OUTCOMES, AND ENCOUNTERED COMPLICATIONS IN DIFFERENT DOMESTIC ANIMALS IN AND AROUND BISHOFTU, OROMIA, ETHIOPIA

MVSc THESIS

BY:

MARANATA MILKIAS KASTO

JUNE, 2024

BISHOFTU, ETHIOPIA

ADDIS ABABA UNIVERSITY

COLLEGE OF VETERINARY MEDICINE AND AGRICULTURE

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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 Surgery.

By:

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DEPARTMENT OF CLINICAL STUDIES

MVSc IN VETERINARY SURGERY

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JUNE, 2024

BISHOFTU, ETHIOPIA

APPROVAL SHEET

Addis Ababa University

College of Veterinary Medicine and Agriculture

Department of Clinical Studies

As a Masters of Veterinary Surgery research advisor, I hereby certify that I have read and evaluated this Thesis prepared under our guidance by Maranata Milkias Kasto entitled "**COMPILED CASE REPORTS ON DIFFERENT SURGICAL CASES: THEIR PROCEDURES, OUTCOMES AND ENCOUNTERED COMPLICATIONS IN DIFFERENT DOMESTIC ANIMALS IN AND AROUND BISHOFTU, OROMIA, ETHIOPIA**", **We approved for submittal to the dissertation assessment committee.**

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As a member of the examining board of the final Masters of Veterinary Surgery open defense, we certify that we have read and evaluated the thesis prepared by Maranata Milkias Kasto entitled "**COMPILED CASE REPORTS ON DIFFERENT SURGICAL CASES: THEIR PROCEDURES, OUTCOMES AND ENCOUNTERED COMPLICATIONS IN DIFFERENT DOMESTIC ANIMALS IN AND AROUND BISHOFTU, OROMIA, ETHIOPIA**" and recommended that it be accepted as fulfilling the thesis requirement for the degree of Masters of Veterinary Surgery (MVSc).

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STATEMENT OF THE AUTHOR

Firstly, I hereby declare that this thesis is an authentic representation of my own work and that I have appropriately acknowledged all sources of materials used in the preparation of this thesis. This thesis has been submitted as a partial fulfillment of the requirements for the advanced Master of Veterinary Surgery (MVSc) degree at Addis Ababa University, College of Agriculture and Veterinary Medicine. It has been deposited at the university/College library, where it will be made accessible to borrowers by the library's regulations. I hereby affirm that this thesis has not been submitted to any other institution to obtain an academic degree, diploma, or certificate.

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Date of submission: _____

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LIST OF ABBREVIATIONS

AH	Aural Hematoma
CS	Cesarean Section
EO	En Bloc Ovariohysterectomy
GDP	Gross Domestic Product
GIT	Gastrointestinal Tract
HCL	Hydrochloride
MCT	Mast Cell Tumor
OH	Ovariohysterectomy
PGA	Polyglycolic Acid
POCs	Postoperative Complications
SPANA	Society for the Protection of Animals Abroad
SSI	Surgical Site Infections
TAT	Tetanus Anti-Toxin
TVT	Transmissible Venereal Tumors
UH	Umbilical Hernia

ABSTRACT

Livestock is an indispensable component of Ethiopian agriculture, with live animals and their byproducts contributing approximately 40% of the agricultural economy. Disease significantly impacts livestock productivity by reducing growth rates, reproductive performance, and milk production while increasing mortality rates and economic losses. Surgical interventions play a critical role in treating various diseases and conditions in livestock, thereby enhancing their health, productivity, and overall well-being. Complications following surgery at the incision site can include swelling, local infection, sinus formation around sutures, hematoma (blood accumulation), drainage from the incision site, incisional opening (dehiscence), and hernia formation. The present case report was compiled between September 2023 and May 2024 GC aimed to document a variety of surgical conditions affecting different body systems in domestic animals. The cases were referred to or directly presented to esteemed institutions such as Professor Fiseha Gebreab Memorial Veterinary Teaching Hospital, Society for the Protection of Animals Abroad, Donkey Sanctuary Veterinary Clinic, and Amanuel Veterinary Clinic located in Dire. The objective was to analyze the outcomes of these surgical interventions, their procedures and encountered complications. All the cases presented in this study were thoroughly examined to determine the organ or system that was affected. The animal's medical history, clinical observations, and laboratory results were meticulously documented in the patient record format. Animals with urgent surgical conditions underwent premedication, aseptic preparation, and anesthesia. They subsequently received specific surgical treatment and corrections, followed by adequate postoperative care and routine follow-up. A total of twenty-one cases were handled, 13 out of 21 (61.90%) were large animals and 8 out of 21(38.01%) were small animals. 4 out of 21 (19.05%) cases died, while 17 out of 21 (80. 95%) animals recovered. Continued research and detailed documentation of surgical cases should be encouraged to build a robust database of case studies that can serve as valuable references for veterinary practitioners.

Keywords; *Case reports, Surgery, Surgical interventions*

1. INTRODUCTION

In Ethiopia, agriculture serves as a cornerstone of both the economic and social fabric of the nation, engaging approximately 80-85 percent of the population and contributing significantly to the overall Gross Domestic Product (GDP). With a heavy reliance on agriculture, the Ethiopian economy hinges greatly upon this sector. Livestock stands as an indispensable component of Ethiopian agriculture, with live animals and their byproducts accounting for approximately 40% of the agricultural economy. Livestock in Ethiopia fulfills multiple roles within the economy, serving as sources of sustenance, traction, manure, raw materials, investment opportunities, cash income, security, and foreign exchange revenue, as well as contributing to the nation's social and cultural identity. Ethiopia boasts the largest livestock population in Africa, estimated at approximately 70.3 million cattle, 42.9 million sheep, 52.5 million goats, 2.15 million horses, 10.80 million donkeys,0.38 million mules, and about 8.1 million camels in the country, and 57 million chickens in 2021 (Gelan *et al*., 2012; Asresie and Zemedu, 2015; Boka, 2020; CSA, 2021).

Veterinary surgery involves the management and prevention of animal diseases and disorders. While some veterinarians specialize in specific animal species, others provide care for a diverse range, including livestock, wildlife, and pets (Shan, 2020). Surgery is conducted either to prevent undesired reproduction or to treat a disease, anomaly, or traumatic injury (Fiorello *et al*., 2016). Surgical disorders are among the leading causes of death in animals. Repair of umbilical hernia, atresia-ani, navel infection, gangrenous mastitis, teat blockage, teat fissures, and lameness are among the most frequent surgical issues. When surgical treatment service is not available, culling becomes the only option available (Sarker *et al*., 2013). The most critical aspect of achieving success in surgery lies in the ability to accurately diagnose the condition, which relies on a thorough understanding of pathology. Prompt surgical intervention after reaching a diagnosis significantly increases the likelihood of saving the animal and its productivity (Wright, 1937). A total of 689 surgical conditions and required procedures were documented during nine-years spanning from 1999 to 2007 at the clinic of the at the clinic of the

College of Veterinary Medicine and Agriculture, AAU as reported by Tiruneh *et al*., (2014).

Postoperative complications (POCs) following surgeries in general, have been documented in veterinary teaching or referral hospitals. Complications refer to adverse health outcomes linked to surgery occurring within three weeks of the procedure (Pollari and Bonnett, 1996). Complications following surgery at the incision site can include swelling, local infection, sinus formation around sutures, hematoma (blood accumulation), drainage from the incision site, incisional opening (dehiscence), and hernia formation (Klohnen, 2009).

Studying the outcomes and complications of veterinary surgical case reports that contain information about the success and failures of various surgical techniques, treatment regimes, and postoperative care strategies can contribute to the enhancement of future protocols and surgical success rates. Moreover, veterinary case reports have the potential to serve as a foundation for future research and innovation in the field of veterinary surgery. These reports can inspire new investigations, clinical trials, and advancements in surgical procedures, equipment, and drugs, all aimed at improving patient outcomes and advancing the discipline of veterinary surgery and they provide detailed information on the diagnosis, treatment, and resolution of postoperative complications can assist aspiring veterinary students and surgeons in gaining a better understanding of risk factors, preventive measures, and effective management strategies. Despite the significant demand for comprehensive case reports on major and minor surgical procedures performed on domestic animals, the availability of such reports in the field of veterinary surgery has been limited. Therefore the objectives of this case report are:

- To document various surgical procedures performed on domestic animals and report the outcomes of surgical interventions:
- To identify complications encountered after surgery:
- To perform surgical operations on animals presented with diseases that require surgery.

2. MATERIALS AND METHODS

2.1.Study area

The study was conducted from September 2023 to May 2024 GC in and around Bishoftu town, which is approximately 45 kilometers southeast of Addis Ababa, Ethiopia. Bishoftu is located within the Ada'a district of the East Shewa zone in the Oromia Regional State, positioned at coordinates 9° N and 40° E, at an average altitude of 1850 meters above sea level. The area experiences an annual rainfall of 866 mm, occurring in two distinct rainy seasons. The average annual maximum and minimum temperatures in the region are 26°C and 14°C, respectively, accompanied by a mean relative humidity of 61.3% (Worku *et al*., 2023). Farmers near Bishoftu are engaged in mixed crop and livestock farming. Furthermore, Bishoftu and its surrounding areas exhibit diverse yet representative agroecologies typical of the country. These agroclimatic zones support various plant and animal species (Ismael *et al*., 2021). Different surgical affections of domestic animals are reported to be handled at Professor Fiseha Gebreab Memorial Veterinary Teaching Hospital, Society for the Protection of Animals Abroad, Donkey Sanctuary Veterinary Clinic, and Amanuel Veterinary Clinic found at dire and at the home of owners.

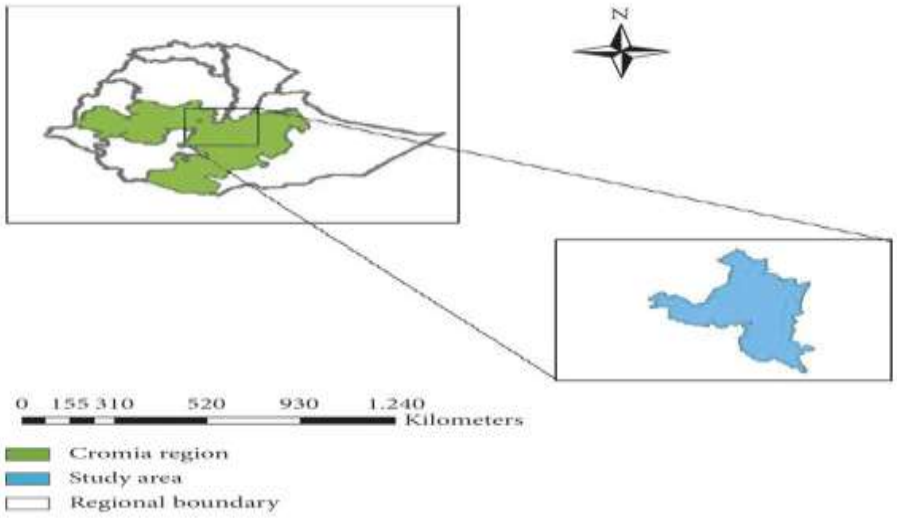

Figure : Geographical location of the study area.

Source: (Getachew *et al*., 2020).

2.2.Study population

The study animals included in the case reports are individual domestic animals presented with surgical conditions and that have undergone specific surgical procedures for therapeutic purposes. The study animals were purposively picked for only surgical treatment from the animal populations living in the study area. Small animals, equines, swine, bovines, and ovine species were included. Common surgical procedures in dogs, horse, and cats, involving reproductive issues were also included. Surgical case reports involving cattle focusing on procedures related to reproductive health (e.g., cesarean section) and sheep, swine, and donkeys that required surgical interventions were included in this report.

2.3.Study design

A descriptive case report study design was used to summarize and document different surgical procedures performed on domestic animals with a particular clinical condition or problem. The surgical case report details the management, interventions, complications, and outcomes of surgical procedures performed.

2.4.Study method

Various domestic animal species presented to veterinary hospitals and clinics with diverse surgical conditions were documented, including patient signalment, history, clinical findings, and laboratory results. Surgical patients were selected based on the diversity of surgical procedures required in different domestic animals. Species, breed, age, sex, clinical presentation, and specific surgical procedures were described in detail. Detailed descriptions of the patient's history, including presenting complaints, duration of clinical signs, previous treatments, and diagnostic workup (e.g., image, laboratory tests) were provided. The surgical approach, anesthesia protocol including general and local anesthesia, intraoperative findings, and techniques employed. The pre-and postoperative

management and care provided to the patient were outlined and explained. Pain management protocols by using different analgesic drugs, wound care, activity restriction, and follow-up evaluations were stated. The immediate outcomes of the surgical procedure (e.g., immediate postoperative complications, recovery from anesthesia) were also reported. Information, including healing progress, resolution of clinical signs, and any long-term complications or sequelae was provided.

Patient history encompassed owner-reported chief complaints, disease duration and progression, animal management practices, and previous treatments. During the clinical examination, each admitted patient underwent a comprehensive clinical assessment of the affected organ or system, along with an evaluation of vital signs (body temperature, heart rate, and respiratory rate), tissue perfusion (capillary refill time and mucous membrane color), body condition, hydration status, overall health, and prognosis. The preoperative preparation, including anesthesia protocols, preoperative medications (e.g., antibiotics, analgesics), and patient stabilization were outlined where necessary. Findings of anesthesia monitoring carried out during the surgical procedure including vital signs (e.g., heart rate, respiratory rate), depth of anesthesia, and patient response were also recorded and described.

Laboratory examinations, including cytology, were conducted depending on the availability of resources and the need based on the nature of the cases.

The individual case reports were compiled/grouped based on the relative similarity of surgical procedures conducted in different domestic animal species.

2.5.Ethical consideration

The ethical review committee of Addis Ababa University College of Veterinary Medicine and Agriculture has thoroughly reviewed the proposed research and approved the implementation of the research, considering the soundness of the methodology with no ethical concerns.

3. INDIVIDUAL SURGICAL CASE REPORTS DESCRIBING COMMON SURGICAL PROCEDURES, COMPLICATIONS, AND THEIR OUTCOMES

3.1.Cesarean section in cow and ewe

3.1.1. Cow

Abstract

Cesarean section (C-section), also called laparohysterotomy, is an important emergency veterinary surgical procedure in bovine obstetrics to ensure live fetal birth and save the life of the dam. Calving difficulty or dystocia, is commonly encountered during parturition with prolonged time that requires assistance during birth. This case report describes the successful management of dystocia due to uterine torsion and fetal malposition in a four and a half year old primigravid local zebu heifer that was presented to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital. Per rectal examination, a live fetus with abnormal position and presentation was detected. Vaginal examination, revealed uterine torsion and transverse presentation of the fetus, indicating dystocia with a less likelihood delivery through the vagina. The Cesarean section was performed in a standing position through left paralumabar celiotomy under epidural anesthesia and inverted "L" field block. The uterus was closed with a double layer of the Cushing suture pattern, taking care to incorporate the placenta in the suture line. The abdominal wall and skin were closed routinely. Finally, the cow fully recovered within 15 days of the operation.

Keywords: *Cow, Cesarean section, Dystocia, Uterine torsion*

Introduction

Calving difficulty or dystocia is defined as difficulty encountered during parturition with prolonged time that requires assistance during birth (Abera, 2017). Generally, the causes

of dystocia are classified into maternal and fetal causes. Constriction/obstruction of the birth canal or deficiencies of maternal expulsive forces are the causes of maternal origin that result in dystocia (Purohit *et al*., 2011). Causes including abnormal fetal presentation, position or posture, and fetal oversize are of fetal origins that result in dystocia (Weldeyohanes and Fesseha, 2020). Uterine torsion which is defined as a rotation of the uterus on its long axis with twisting of the anterior vagina is a common cause of dystocia in bovines (Mekonnen and Moges, 2016). In the presence of a uterine torsion expulsion of a fetus occurs only after the condition is reversed. During pregnancy, the elongation of the broad ligaments is relatively small when compared to the massive elongation of the gravid uterine horn, which leads to the uterus curving around the point of attachment (Zaborski *et al*., 2009).

In the absence of timely intervention, dystocia can lead to significant mortality and morbidity, including stillbirths and severe trauma, with consequences for the welfare of the dam or the offspring (Weldeyohanes and Fesseha, 2020). The incidence of dystocia is highest in cattle and buffaloes when compared to other domestic animals (Purohit *et al*., 2011). Dystocia in cattle can be treated using different obstetric methods including caesarean section and fetotomy. Recently C-section is most commonly used by veterinarians in cattle practice and considered a routine obstetric technique (Vermunt, 2008).

Caesarian section, also called laparohysterotomy, is the technique used for the extraction of a fetus from the pregrant animal through an incision made on the abdominal wall and uterus (Fesseha *et al*., 2020). According to Schultz *et al*., 2008, there are eight available surgical sites or approaches for bovine cesarean section; these are; standing right paralumbar celiotomy, standing left paralumbar celiotomy, recumbent right paralumbar celiotomy, recumbent left paralumbar celiotomy, recumbent ventral paramedian celiotomy, recumbent ventral midline celiotomy, the standing left oblique celiotomy and ventrolateral celiotomy. Each approach has its advantages and disadvantages. The selection of these approaches is based on the type of dystocia, the cow's health status, environmental condition, assistance availability, and surgeon's preference. Although

there are different surgical approaches for cesarean section in cows, most surgeons use a standing left paralumabar celiotomy. However, the left oblique approach is the most preferable for the uterus can be easily exteriorized with limited peritoneal cavity contamination (Adugna *et al*., 2022). The survival rate of calves born from cows affected by torsion varies. The duration and severity of the torsion seem to affect the chances of the calf surviving, while the survival of the mother cow depends on how quickly the torsion is corrected after the start of labor (Jayakumar *et al*., 2014). Cesarean section is often indicated in cases of severe dystocia to alleviate maternal distress, prevent calf mortality, and preserve the future reproductive potential of the cow. Therefore, the objective of this case report is to describe the management of dystocia in the local zebu heifer by cesarean section performed under clinical conditions with lateral recumbent position using inverted 'L' block anesthesia and standing left paralumbar celiotomy.

Case history and presentation: A four and a half year old primigravid heifer was presented to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a history of repeated straining that started a day ago. The owner complained that while grazing in the field with other animals, the heifer was hit/horn thrusted by other animals, leading to straining, reduced feed, and water intake. The owner stated that the cow was in her last trimester of pregnancy.

Clinical and diagnostic assessment: A general physical examination was performed before proceeding to surgery, and the heifer's respiratory rate was 27 breaths/minute, heart rate 48 beats/minute, and body temperature of 38.4^{o}C. The heifer was depressed and standing in one place. There was a clear, watery discharge from the vulva which indicates calving is nearing. Examination through the vagina using an arm-length glove revealed a uterine torsion and transverse fetal malposition. Attempts to correct the uterine torsion and fetal malposition were not successful. Thus, based on clinical findings and obstetric assessment, a diagnosis of dystocia secondary to uterine torsion and fetal malposition was made, and the cow was transferred for emergency caesarean section to deliver the fetus using standing left paralumbar celiotomy.

Preoperative preparations: The estimated body weight of the heifer was 270kg. Before beginning surgery, the heifer was given procaine penicillin (24mg/kg) and dihydrostreptomycin sulfate (30 mg/kg) at a normal dose of 1ml/25kg, (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China) 10 ml intramuscularly, which was followed by the preparation of the surgical site. While the animal was standing, the left paralumbar fossa and its surrounding areas were shaved using a surgical blade (Figure 2A), washed using cetrimide and chlorhexidine gluconate, and the area was scrubbed with povidone-iodine solution.

Anesthesia and animal control: The animal was kept in a standing position and properly physically restrained by available personnel. Inverted L block anesthesia with caudal epidural anesthesia and infiltration into the incision site was performed using 10 ml of 2% lidocaine hydrochloride at 0.22mg/kg (Manufactured by Sakar Healthcare Ltd., India). The cow was placed in right-side recumbency in the middle of the surgery due to complications encountered during the procedure.

Surgical treatment and intervention: A 30 cm long vertical incision was made on the skin in the cranioventral direction at the lower-left flank. The four abdominal muscles were incised layer by layer using a sterile scalpel blade, following the subcutaneous layer. Bleeding from small blood vessels was controlled with hemostatic forceps, and bleeding from major blood vessels was ligated using 3-0 chromic catgut. After entering the abdominal cavity, then the uterus was identified, but exteriorizing the uterus to the incision site was impossible, necessitating changing the position of the animal from standing to right side recumbency. Following this, the uterus was brought near the abdominal wall, and an incision was made along the greater curvature of the uterus while avoiding major blood vessels.

To clear the neonates' airways, the fetus was held by the two hind legs and the mucus was cleared from the mouth and nose immediately using towels after it was extracted from the uterus on the outside. However, the calf died after a few minutes despite our many efforts to keep it alive. After the fetus was pulled out and easily removable placenta was

removed, while the others were left in place to avoid damage to the caruncles. After cleaning, the uterus was closed with a double layer of the Cushing suture pattern using a synthetic absorbable monofilament polyglycolic acid (PGA) (2-0) attached to an atraumatic needle starting above the upper commissure of the uterine incision site. Then, the uterus was gently placed in its normal abdominal position. The first layer of the abdominal wall was closed together with the peritoneum and transverse abdominis muscle were closed together using a simple continuous suture pattern using # 2 PGA. The two oblique muscles and subcutaneous fascia were sutured together in the second layer with an interrupted continuous pattern using the same suture material (Figure 2C). Finally, the skin was closed using a 2-0 silk with an interrupted horizontal suture pattern technique.

Figure : Caesarian section in cow, its progress and outcome

A). Preparation of the surgical site B). The process of pulling out the calf

C). Closure of the abdominal wall D). The cow with a healed wound

Post-operative care and outcome: After the surgery was completed, the animal was given enough fluid replacement and analgesic (tramadol) intramuscularly. The dam stayed at the hospital for five days, which made it easy to follow up on the postoperative

care. Antibiotics were administered for five consecutive days, and the surgical wound was checked daily for any signs of complications and cleaned with iodine tincture solution. Easily digestible green forage was provided while the dam was at the hospital, and the owner was advised to continue feeding the same at home until the cow fully recovered after being discharged from the hospital. No serious post-operative complications were encountered. The suture material was removed on the fifteenth day after the wound healed completely (Figure 2D).

Discussion

In severe cases of dystocia in a cow, a cesarean section is indicated to save the lives of the dam and the calf. Timely intervention, proper surgical technique, and postoperative care are critical for favorable results. In the current case, early detection of dystocia and a quick cesarean section enabled us to save the life of the dam and restore its health and future reproductive capacity. In the present case, the dystocia was due to the maternal and fetal problem which is similar to the case reported by Kumar *et al*., (2018). According to Purohit *et al*., (2011), in cases of uterine torsion it is considered an emergency and therapy needs to be instituted as soon as possible. The rotated uterus can be managed using different techniques such as rolling of the animal, rotation of the fetus and uterus per vagina, laparotomy with manual intra-abdominal manipulation, and laparohysterotomy (Ghuman, 2010).

Fetal maldisposition, which refers to the abnormal presentation, position, or posture of the fetus, is often linked to uterine torsion. This condition typically occurs when the fetus is weak, unresponsive, or deceased, and cannot adopt the correct position in the uterus. In delayed cases of uterine torsion, or when the degree of torsion is severe, fetal death is mostly caused by compromised blood supply to the fetus (Kumar *et al*., 2018). In cases where rolling fails to correct uterine torsion, laparohysterotomy is recommended as reported by Purohit *et al*., (2011). The above statement supports the laparohysterotomy technique applied to the current case.

In a cow that can undergo surgery while standing, the left paralumbar fossa or flank approach is the commonly used technique for removing a viable or recently deceased fetus that is uncontaminated (Mekonnen and Moges, 2016). In the present case, the cow was able to undergo the surgery in a standing position and the fetus was also alive. The standing left paralumbar celiotomy surgical technique was used under inverted L block and low epidural anesthesia as used in previous reports (Fesseha *et al*., 2020; Mekoria *et al*., 2022). Exteriorizing the uterus is very important as it aids in limiting peritoneal cavity contamination and prevention of peritonitis. Sometimes, it can be extremely difficult to bring the uterus to the operative site and pack it to prevent any spillage of uterine contents into the abdomen. In such cases, surgeons are left with no alternative but to make an incision in the uterus while it is still in the abdomen (Kumar and Purohit, 2022). Similarly in the present case, the uterus was incised while it was inside the abdomen.

Newman and Anderson, (2005) described, in emergency cases, or if the uterine wall is compromised, it is best to use continuous inverting suture patterns such as the Cushing suture pattern. This pattern creates a tight seal, reduces suture exposure, and aids in the healing process, as the uterus initially heals through contact between the serosal surfaces. The uterus was closed with absorbable monofilament suture on a tapered needle in a continuous inverting Cushing pattern and the suture was placed only in partial thickness incorporating the serosa and muscular layer of the uterus as indicated by Schultz *et al*., (2008). Mekoria *et al*., (2022), closed the uterus using sutured in two layers using absorbable catgut size 2 (6 m) in an inversion (Lambert) pattern, while Fesseha *et al*., (2020) used a double layer of Utrecht suturing pattern with 1-0 size sterile absorbable polyglycolic acid. Also Prakash *et al*., (2019) reported closing the uterus using a continuous Cushing suture pattern, followed by a continuous Lembert suture pattern using catgut 1.0. For the present case, a double-layer Cushing pattern with 2-0 size sterile PGA was used to close the uterus.

The closure of the abdominal wall typically involves two to three layers. The peritoneum and transversus are usually closed together in a single layer, using absorbable suture

material in a simple continuous pattern which was reported by Abera, (2017), Newman and Anderson, (2005), and Kumar and Purohit, (2022). The same suture pattern was used for the present case. While an Interlock pattern with chromic catgut size (3-0) was used to seal the abdominal wall was used by Mekoria *et al*., (2022).

Conclusion and recommendation: Cesarean section is a successful treatment for dystocia caused by uterine torsion in cattle. Although the fetus didn't survive in this case, the result demonstrates the importance of early diagnosis, quick intervention, and appropriate peri- and post-operative care to save the life of the dam and restore its health.

3.1.2. Sheep

Abstract

Cesarean section is a critical surgical intervention used in sheep farming to address obstructive dystocia. It has been reported that a cesarean section is the most effective method to treat most types of dystocia, and it is also safe for both the dam and the fetus when performed as early as possible after the onset of labor. An ectopic pregnancy refers to a pregnancy that occurs outside of the uterus. This case report describes the successful management of dystocia in five year old pregnant ewe with a closed cervix, ectopic pregnancy, and a dead fetus that came to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital. Per vaginal examination revealed failure of the cervix to dilate and a dead fetus, indicating dystocia with a low possibility of vaginal delivery therefore, the case was decided as an emergency, and a cesarean section was carried out through lower flank left para-lumbar laparotomy to save the life of the ewe under local anesthesia. The abdominal cavity was entered routinely, and the uterus was exteriorized. The dead fetus inside the uterus was removed; then, a dead and deformed fetus was excised and removed after proper ligation. Then the abdominal wall was closed routinely, and there were mild post-operative complications observed and it was successfully treated. Finally, the wound healed completely, and the ewe returned to normal health condition.

Keywords; *Cesarean section, Ectopic pregnancy, Ewe*

Introduction

In small ruminants, the occurrence of dystocia is of low incidence worldwide when compared to large ruminants (<5%) (Ismail, 2017; Pandey *et al*., 2018). Dystocia is difficulty in parturition that requires the intervention of humans. It is also defined as the failure of transmission from stage one to stage two of labor (Mulatu and Kefyalew, 2022). It is often one of the major causes that result in the loss of lamb and causes great economic loss to the farmers (Amen and Ali, 2010). Dystocia was observed in 10% of single births, 11% of twins, and 14% of triplets. The causes of dystocia can be divided into fetal and maternal causes, but most reports indicate that fetal maldisposition (especially lateral deviation of the head) and birth canal obstruction (especially failure of cervix to dilate) are the most common causes of dystocia in sheep (Govind *et al*., 2022). An ectopic pregnancy, or an extrauterine pregnancy, refers to a pregnancy that occurs outside of the uterus. There are two main types of ectopic pregnancies. A tubal pregnancy happens when an egg is fertilized but remains in the fallopian tube due to various factors that prevent it from reaching the uterus. An abdominal pregnancy occurs when the pregnancy develops in the peritoneal cavity (Corpa, 2006).

Several methods are used for the treatment of dystocia in ewes which includes correction of fetal maldisposition with traction and cesarean section. It was reported that cesarean section is the most effective method to treat most types of dystocia and it is also safe for both the dam and the fetus when performed as early as possible after onset of labor (Amen and Ali, 2010). Cesarean section is a lifesaving surgical procedure that's performed in animals that fail to deliver vaginally (dystocia) (Pandey *et al*., 2018). Cesarean section can be performed via paralumabr fossa mostly on the left side, low flank or ventrolateral incision, ventral midline laparotomy, or lateral oblique in ewes. Surgical procedures on the flank are performed after local anesthesia but ventral midline procedures are best done under general anesthesia (Anderson, 2012). Therefore, the objective of this case report is to describe the management of dystocia in local ewe by a

caesarean section performed under clinical conditions in lateral recumbent position using inverted ‘L’ block anesthesia and lower flank left para-lumbar laparotomy and to safely and effectively resolve these complex obstetric emergencies, ensuring the health and survival of the ewe.

Case history and presentation; A five-year-old pregnant ewe that was in the last trimester came to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a history of straining that began three days ago and reduced appetite. The ewe has a history of giving birth to twins in previous pregnancies. After taking the history, a general physical examination and diagnosis were conducted accordingly.

Clinical and diagnostic assessment: Upon clinical examination, the ewe exhibited signs of depression and a symmetrical distension of the abdomen. The temperature was slightly elevated from the normal range and was 41^{o}C. Both the respiratory and pulse rates were also higher than normal, 30 breaths/min and 72 beats/min respectively. A transvaginal examination was performed using a vaginal speculum, revealing a closed cervix and a dead fetus. However, red to brown colored blood was coming out through the vagina upon removal of the speculum. Taking into consideration the clinical examination and the ewe's history, it was determined that an emergency cesarean section was necessary.

Preoperative preparation; Ringer's lactate was administered at a rate of 2 ml/kg/hour before the surgery began for 30 minutes and continued until the completion of the surgery. 2 ml of diclofenac sodium at a dose of 75 mg/3 ml (Manufactured by Reyoung® Pharmaceuticals Co., Ltd, China) and 3 ml of Procaine penicillin at a dosage of 24 mg/kg, as well as Dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical Co., Ltd, China), were administered intramuscularly. The left lower flank area was clipped, shaved, and aseptically prepared for surgery (Figure 3A). The estimated body weight of the ewe was 45 kg.

Anesthesia and animal control: The ewe was placed in right-side lateral recumbency on the surgical table and the legs were tied to the table using gauze. The surgical site was properly covered with sterile drapes and an inverted L block using 10 ml local anesthetic solution of 2% Lidocaine hydrochloride (Manufactured by Sakar Healthcare Ltd., India) was used to achieve anesthesia at the surgical site.

Surgical treatment and intervention: Around a 20 cm long vertical skin incision was made, followed by cutting the abdominal muscles using scissors while grasping them with thumb forceps. Then, the abdominal cavity was explored and the uterus was carefully identified and exteriorized to the incision site while avoiding tearing. Sterile surgical drapes were packed around the abdominal incision to prevent spilling and contamination of the abdominal cavity with uterine content. Then, the uterus was incised large enough to remove the fetus, and a dead fetus was pulled out. The fetal membrane was removed, and the uterus was thoroughly cleaned using normal saline and sterile gauze. Bleeding was controlled by using hemostatic forceps, and ligation using chromic catgut 3-0. The uterus was fragile and easily torn due to inflammation requiring great care and gentle manipulation. The uterus was closed with double layers of an inverting Cushing suture pattern using chromic catgut #2-0. Then, procaine penicillin was applied on the uterus and gently placed back in the abdominal cavity. Exploration of the abdominal cavity after putting the uterus inside revealed the existence of a second fetus that had grown outside the uterus, indicating an ectopic pregnancy. The fetus was pulled out through the incision site (Figure 3B), and drapes were placed in a similar manner as mentioned above. There was a separate blood supply from a large number of blood vessels to the fetus, and they were properly ligated to prevent excessive hemorrhage. The fetus, along with the intact membrane, was removed. The fetus was deformed and dead. Then the peritoneum and the first underlying muscle were closed with a simple continuous suture pattern using chromic catgut #2-0 (Figure 3C). The remaining muscle layers were sutured using a simple continuous suture pattern using polyglycolic acid #2-0, procaine penicillin powder was sprinkled over the abdominal muscles and suturing was completed. While the skin was closed with non-absorbable suture material (silk) #2-0

using an interrupted horizontal mattress suture pattern. Finally, the skin was scrubbed with iodine tincture.

Figure : A cesarean section in ewe and its outcome

A). Aseptic preparation of the surgical site B). Pulled out fetus that grew outside the uterus C). Closure of the abdominal muscles D). Ewe in a good body condition after recovery.

Post-operative care and outcome: An antibiotic was continued for six consecutive days. The wound was cleaned daily with iodine tincture and checked for secondary bacterial complications. The owner was also advised to keep the ewe in a clean and warm place to prevent surgical site contamination and hypothermia. Tramadol (Manufactured by Huons Co., Ltd, Republic Of South Korea) was given on the second day to reduce the feeling of pain, and it was discontinued after that. Gradually, small, easily digestible meals were given to the ewe to support recovery. The ewe was made to rest in a quiet, comfortable, and clean environment. There was a mild post-operative complication observed but it was handled and resolved quickly. The condition of the ewe was checked through telephone, and the skin suture was removed on the 20th day, and the wound completely healed in 40 days (Figure 3D).

Discussion

A cesarean section is necessary in severe cases of dystocia in an ewe to save both the mother and the calf's lives. Achieving positive outcomes requires timely intervention, proper surgical technique, and postoperative care. In this particular case, early detection of dystocia and a prompt cesarean section successfully saved the mother's life, restored her health, and ensured her future reproductive capacity. Dystocia can arise due to issues with either the ewe (maternal dystocia) or the lamb (fetal dystocia) (Jacobson *et al*., 2020). Various methods are employed to manage dystocia in ewes, including medical interventions, correction of fetal positioning followed by traction, and cesarean section. Cesarean section has been documented as an effective and safe approach for addressing most forms of dystocia, benefitting both the ewe and the fetus, particularly when performed promptly after the onset of labor (Amen and Ali, 2010). Kumar *et al*., (2020), Mulatu and Kefyalew, (2022), and Naikoo *et al*., (2017) performed Cesarean section to treat the cases of dystocia in the ewe. The above case reports support the present case of dystocia which was also treated through a cesarean section.

Cesarean section (C-section) is a critical surgical intervention used in sheep farming to address obstructive dystocia and ensure the safe delivery of lambs (Smith and Sherman, 2009). The decision to perform a cesarean section in ewes involves careful consideration of maternal and fetal well-being. Additionally, maternal health concerns such as uterine torsion or rupture further justify the use of cesarean section as a life-saving measure for both ewe and lamb (Radostits *et al*., 2007).

According to Ismail, (2017) to perform a paralumbar fossa laparotomy, analgesia can be administered locally using 1% Lidocaine. The techniques that can be used for local infiltration include line block, inverted L block, or paravertebral block. Mulatu and Kefyalew, (2022) reported using field block anesthesias making line infiltration and inverted “L” blocks with 2% Lidocaine hydrochloride along the surgical incision site. Also Naikoo *et al*., (2017) reported the usage of local infiltration anesthesia using 2% Xylocaine Hydrochloride, while for the present case, local anesthetics Lidocaine was

used. Bhattacharyya *et al*., (2015), reported administration of diazepam intravenously in addition to line infiltration of local anesthetic (1% lignocaine hydrochloride).

Similar to the reports of Anderson, (2012), Bhattacharyya *et al*., (2015) left paralumbar fossa surgical approach was used. After delivering the fetus or fetuses, removing any remaining fetal membranes and fluid, the uterus was sutured in two layers using chromic catgut (size 1) in an inverted (Lambert) pattern which was reported by Bhattacharyya *et al*., (2015). Additionally, Thorne and Jackson, (2000) reported using chromic catgut to close the uterus using an inverted suture pattern. Similar to what Mulatu and Kefyalew, (2022) reported the uterus was closed with a continuous inverting pattern (Cushing) followed by a lambert suture pattern.

Ismail, (2017) reported that the peritoneum and muscle layers are then closed using size 1 absorbable suture material in a simple continuous pattern. The abdominal wall was then closed using standard techniques (Bhattacharyya *et al*., 2015). The same suture material was used for the current case but the size was #2 and the abdominal wall was closed in the same manner.

Conclusion and recommendation: Cesarean section plays a vital role in managing obstructive dystocia and ectopic pregnancy in ewes, allowing for the safe delivery of lambs and preserving maternal health. Understanding the indications, surgical techniques, and postoperative care associated with cesarean section in ewes is essential for veterinarians and sheep farmers alike to ensure successful outcomes in challenging birthing situations.

3.2.En bloc ovariohysterectomy in queens

Abstract

En-bloc ovariohysterectomy is indicated when the uterus is devitalized and fragile and cannot hold the suture for secure closure. It is a secure method that facilitates cesarean

delivery and sterilization of cats experiencing prolonged dystocia. Uterine inertia is frequently identified as the primary cause of dystocia in cats, which accounts for approximately two-thirds of cases. Queens (case 1 and case 2) that had been in labor for the past three days and seven days due to dystocia came to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital, respectively. A vaginal examination revealed a bad odor and greenish vaginal discharge. After diagnosing the cases as dystocia, an emergency en-bloc ovariohysterectomy was carried out to save the mothers. Routine en-bloc ovariohysterectomy was performed in both queens, and dead and mummified fetuses were removed. The abdominal cavity was closed routinely. Unfortunately, both queens did not survive a few days post-surgery.

Keywords; *Dystocia, En bloc ovariohysterectomy, Queens, Uterine inertia*

Introduction

The term dystocia is derived from the Greek roots "dys," meaning difficult, painful, disordered, or abnormal, and "tokos," meaning birth, refers to a condition where the normal progression of parturition is disrupted or halted (Pretzer, 2008). The incidence of dystocia in cats is relatively infrequent, ranging from 3.3% to 5.8% of all feline pregnancies. Dystocia can be categorized as either maternal or fetal, depending on whether the issues arise from problems with the queen (maternal dystocia) or the kittens (fetal dystocia) (Niyas *et al*., 2023). Dystocia is commonly caused by maternal factors such as a fractured pelvis or inadequate uterine contractions, as well as fetal factors including an oversized fetus, malformations, or fetal death (Salci *et al*., 2020).

Uterine inertia is frequently identified as the primary cause of dystocia in cats, which accounts for approximately two-thirds of cases. This condition is categorized as primary or secondary uterine inertia. Primary uterine inertia is further classified into two types: complete and partial primary uterine inertia. Complete primary uterine inertia occurs when the second stage of labor fails to initiate, leading to the inability to expel any fetus. Partial primary uterine inertia occurs when there is normal delivery of a portion of the

litter, but the uterus becomes fatigued before delivering all the fetuses. Primary uterine inertia is more prevalent in multiparous species (such as cats) compared to uniparous species, and its occurrence is also higher in primiparous animals than in pluriparous ones. Conversely, secondary uterine inertia results from another cause of dystocia, such as fetopelvic disproportion, where uterine contractions cease due to exhaustion after a period of unproductive labor (Talukder *et al*., 2021).

Management of dystocia involves both medical and surgical interventions tailored to the specific causes identified through physical examination, diagnosis, and classification of uterine inertia. The treatment approach is determined by the underlying issues identified during the assessment. Depending on the type of uterine inertia, timely and appropriate interventions, either medicinal or surgical, are required for the survival of the dam and fetus as well. When medicinal treatment fails or is not possible, an immediate surgical intervention is required (Talat Naoman, 2021; Talukder *et al*., 2021). The surgical approach can be tailored to the specific requirements of each case. This includes flexibility in choosing the appropriate anesthetic protocol, abdominal approach, location of the uterine incision, and methods for managing post-operative pain (Traas, 2008).

En-bloc ovariohysterectomy is a secure and efficient alternative method that facilitates cesarean delivery and sterilization in cats experiencing dystocia. En bloc ovariohysterectomy is a surgical option for managing dystocia in cats as an alternative to cesarean section (Salci *et al*., 2020; Gemeda *et al*., 2021). An en bloc ovariohysterectomy, where the ovaries and uterus are removed before delivering the neonates, has been proposed as a safe alternative to cesarean section for queens. While this method is considered safe for the queen, the survival rate of the kittens using this approach is relatively low. En bloc ovariohysterectomy may be most appropriate when the fetuses are deceased, particularly if there is concern about infectious material within the uterus (Holst, 2022).

The ventral midline approach is the preferred method for pregnant queen cats or in cases of uterine pathology, but it is associated with increased hemorrhage from the skin and

subcutaneous tissue, higher risks of wound inflammation or infection, and challenges in recognizing wound complications due to the ventral location, which may not be readily visible to owners (Babu *et al*., 2018). Therefore, the objective of this case report is to describe the management of dystocia in local breed cats by En bloc ovariohysterectomy performed under clinical conditions with dorsal recumbency under general anesthesia to resolve the dystocia and prevent future reproductive complications through caudal ventral midline incision.

Case history and presentation (case 1); A one year old primigravid queen weighting 5 kg was presented to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a complaint of experiencing difficulty during birth after the onset of labor three days ago. The queen was in a recumbent position with distended abdomen, dehydrated, anorexic, dull, and weak. There was a foul smell coming from the perineal area, and dark-greenish liquid was covering the area. The queen was also making frequent grunting sounds. The queen had been straining but was unable to give birth to a kitten through the vagina.

Clinical and diagnostic assessment: During the vaginal examination, it was detected that the cervix failed to dilate adequately, which made the passage of fetuses impossible. A foul-smelling odor and vaginal discharge were present. Therefore, an en bloc ovariohysterectomy was performed to save the queen's life.

Case history and presentation (case 2); A thirteen-month-old primigravid queen weighting 3 kg was presented to the Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a complaint of dystocia. The owner informed us that labor began a week ago. The queen gave birth to one kitten normally on the first day. On the third day, she also gave birth to one kitten with the assistance of traction. Unfortunately, two of the kittens that were born died during parturition.

Clinical and diagnostic assessment: Routine clinical and physical examinations were performed. The queen was dehydrated, weak, and recumbent, and the area around the

perineum was wet with a foul odor. It was then decided to perform an En bloc ovariohysterectomy to save the mother's life. Additionally, the queen was unable to strain due to a lack of energy and was simply lying on the ground.

Preoperative preparations: Before beginning the surgery, the queens were administered 1 ml Procaine penicillin intramuscularly at a dosage of 24 mg/kg and Dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China). The site of incision was shaved, cleaned, and prepared aseptically. After preparing the site in the preparation room, the queen was moved to the surgical room and properly dressed with sterile surgical drapes (Figure 4A). One hour prior to the surgery, Ringer's lactate together with 40% glucose solution of 10 ml/kg/hour was secured intravenously and continued until the end of the surgical procedure and for some time afterward.

Anesthesia and animal control: The queens were already very weak due to the lengthy period of labor. General anesthesia was achieved by intramuscular administration of a 0.5 ml mixture of Diazepam (Manufactured By Intas Pharmaceutical Ltd., India) at a dose of 0.15mg/kg and ketamine (Ketamine Hydrochloride Manufactured by Neon Laboratories Ltd, India) at a dose of 5mg/kg I.M. respectively. The queens were kept in dorsal recumbency with their limbs tied to the surgical table. Both of the queens were pre-medicated with 1 ml atropine sulfate 1mg/ml (ATIS, Manufactured by Humanwell Pharmaceutical, Ethiopia, PLC) intramuscularly.

Surgical treatment and intervention (case 1): A caudal ventral midline incision was made on the skin and the subcutaneous tissue. The abdominal muscles were dissected routinely using scissors. Any bleeding that occurred was ligated with hemostatic forceps. Next, the gravid uterus and ovaries were gently exteriorized (Figure 4B). The ovaries, which are attached to the uterine horns by ovarian ligaments and blood vessels, were identified. The ovarian pedicles were tied off (ligated) using PGA #1 to prevent bleeding and secure the blood vessels properly. After ligation, the ovarian pedicles were cut off, and the uterus was also ligated cranial to the cervix in the same manner and completely

removed. The area was then inspected for any bleeding, and the abdominal wall was closed using a simple continuous suture technique by PGA #2 to approximate the linea alba. The skin was closed in an intradermal (subcuticular) manner using PGA #2 sutures with buried knots to prevent suture material from being exposed due to licking (Figure 4D). After the skin was closed, the incision site was cleaned with a diluted iodine solution to remove contaminants.

Figure : En bloc ovariohysterectomy in queen and its progress

A). Aseptic preparation of the surgical site B). The exteriorized gravid uterus C). The closing of the abdominal cavity on progress D). The queen after the completion of the surgery

Surgical treatment and intervention (case 2): The abdominal cavity was opened and entered routinely, as in case 1 and it was filled with pus, and then the uterus was pulled to the incision site (Figure 5B). The uterine horns were empty, and the fetus was found near the cervix, where it was stuck. The ovarian pedicles were then tied off (ligated) using PGA #1 to prevent bleeding and secure the blood vessels properly. Then, the ovarian pedicles were cut off, and the uterus cranial to the cervix was also ligated in the same manner after pushing the fetus backward and removed. The abdominal cavity was then

cleaned with warm saline water, and procaine penicillin powder was sprinkled. Finally, the abdominal cavity and the skin were closed in a routine manner, similar to case 1 (Figure 5C and D). The inside of the uterus was filled with abscesses, and the fetus was mummified.

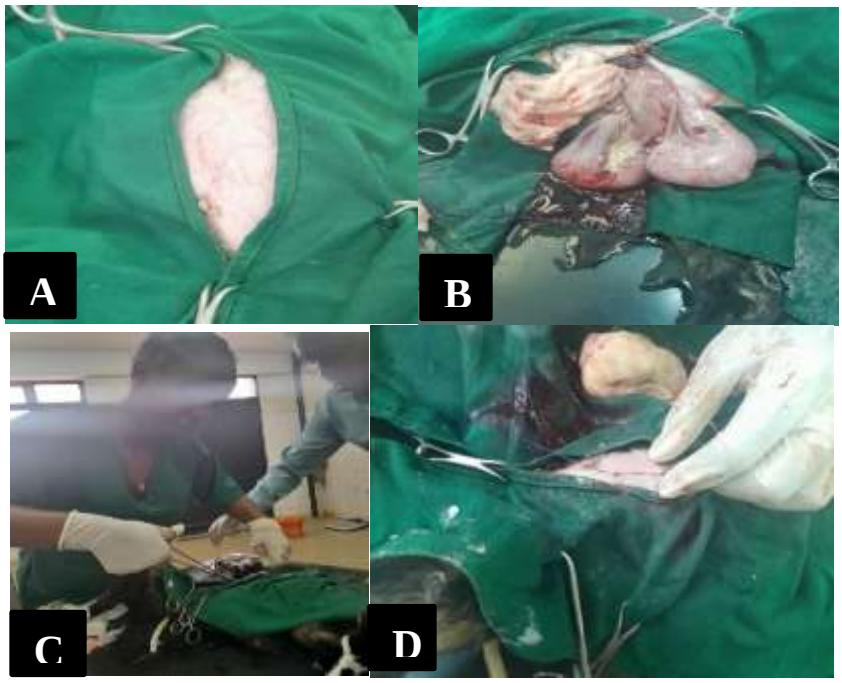

Figure : En bloc ovariohysterectomy in queen and its progress

A). Aseptic preparation of the surgical site B). The uterus pulled out to the incision site.

C). Suturing the abdominal cavity. D). Subcuticular closure of the abdomen on progress

Post-operative care and outcome: Upon completion of the surgery, the queens were placed in a warm area to prevent hypothermia. Ringer's lactate with 40% glucose was continued for two hours, and the queens were closely monitored until they woke up from the anesthesia. Tramadol was administered intramuscularly to reduce the pain burden. The owners were instructed to use an Elizabethan collar and monitor the animal for any signs of discomfort or complications. The same antibiotic was continued for a few days. Unfortunately, the queens did not survive a few days after the operation due to delayed surgical intervention and infection.

Discussion

In the queen, in severe and delayed cases of dystocia, en bloc ovariohysterectomy is recommended to save the life of the queen and to prevent future pregnancies. For favorable results, it is crucial to have timely intervention, proper surgical technique, and postoperative care. In the current case, due to the late detection of dystocia and delayed en bloc ovariohysterectomy, it was impossible to save the life of the queens. Therefore, timely detection and intervention of dystocia can save both the life of the queen and the kittens. Dystocia is a critical reproductive emergency that poses life-threatening risks to both the mother and kittens, causing significant distress to the breeder (Holst *et al*., 2017). En bloc ovariohysterectomy (EO) is a common surgical procedure performed in queens for various reasons, including prevention of unwanted pregnancies, management of reproductive diseases, and treatment of dystocia. This technique involves the complete removal of the ovaries and uterus through a ventral midline abdominal approach. EO is considered a safe and effective method for sterilization in queens, offering benefits such as prevention of mammary tumors and uterine infections (Davidson *et al*., 2010). Uterine inertia being the cause of dystocia is supported by Parmar *et al*., (2017) and Talat Naoman, (2021).

According to Babu *et al*., (2018), ovariohysterectomy in cats is commonly performed using either a ventral midline approach or a lateral flank approach. The ventral midline approach is the preferred choice when the queen cat is pregnant or has uterine pathology. Many authors including Talat Naoman, (2021), and Kefyalew *et al*., (2021), reported using the ventral midline incision in treating dystocia in queens which supports the present cases surgical approach.

Premedication of cats with Atropine sulfate to reduce drooling and respiratory tract secretions was described by Kefyalew *et al*., (2021), Talat Naoman, (2021), Babu *et al*., (2018), Parmar *et al*., (2017), and the same premedication protocol was applied for the present cases. Parmar *et al*., (2017), attained general anesthesia through a diazepam (0.25

mg/kg) and ketamine (5 mg/kg) combination, which is a similar anesthetic protocol to the current cases, while Kefyalew *et al*., (2021) used xylazine + ketamine combination. Talukder *et a*l., (2021) used only ketamine to induce general anesthesia after pre-medicating the queen with atropine sulfate. Then a standard en bloc ovariohysterectomy procedure was carried out through caudal ventral midline incision, in which the same procedure was described by Salci *et al*., (2020), Babu *et al*., (2018), and Kefyalew *et al*., (2021).

Conclusion and recommendation: En bloc ovariohysterectomy (EO) is a valuable surgical technique used in queens for sterilization, prevention of reproductive disorders, and management of dystocia-related risks. This procedure offers numerous benefits, including prevention of pregnancy-related complications, reduction of reproductive diseases, and improvement of overall health and welfare in queens.

3.3.Surgical management of hernia in pig and sheep

3.3.1. Umbilical hernia in pig

Abstract

An umbilical hernia is one of the most common hernias in pigs, in which the contents of the abdomen protrude through the umbilical ring. This condition occurs due to acquired weakness of the muscles and connective tissues in the navel and umbilical areas of the animal. This case report aims to explain the successful surgical management of an umbilical hernia in a piglet at the pig farm. In this case, a three-month-old piglet was observed with swelling around the umbilicus on the farm. Clinical examinations revealed a reducible, painless, and fluctuating swelling on the umbilicus. Following the examination, the piglet was diagnosed with an umbilical hernia and admitted for herniorrhaphy. After the skin and subcutaneous tissue was incised, the hernial contents (intestine) were exposed, reduced and the hernial ring was refreshed and sutured using a

simple interrupted technique with chromic catgut. The surgery was successful, and the piglet made a complete recovery. There has been no recurrence during the two months of follow-up.

Keywords; *Hernia, Herniorrhaphy, Piglet*

Introduction

Hernia is defined as a protrusion of the contents of the body cavity through weak spots of the body wall. Hernia has three contents namely the hernia ring, which may be a persistent prenatal opening or an accidental rupture in the abdominal wall, the hernial sac which is made up of skin, muscle fibers, or fibrinous connective tissues and sometimes the peritoneum and the hernia contents, which may include a portion of the uterus, loop of intestines or the omentum. Hernias are classified as umbilical, inguinal, scrotal, ventral, peritoneal, or diaphragmatic hernia according to their location. Hernia may also be described according to their pathologic content; i. A reducible hernia is one in which the content can be completely and easily returned into the abdominal cavity. ii. An irreducible hernia is one in which the content cannot be completely returned into the abdominal cavity because the content is incarcerated or strangulated or there are adhesions between the content and the hernia sac or ring. Scrotal and umbilical hernias are the most common anatomical defects that occur in pigs (Babalola, and George, 2016; Amith and Vidyasagar, 2020).

Umbilical hernia is one of the most common hernias in pigs in which the contents of the abdomen protrude through the umbilical ring. This condition happens due to acquired weakness of the muscles and connective tissues that the navel and umbilical areas of the animal (Fernandes *et al*., 2018). Another possible cause of the occurrence of hernia could be the cutting of the umbilical cord too close to the abdomen. Other factors that can influence the development of umbilical hernias are abnormal traction of the umbilical cord at birth or any movement that leads to abnormal stretching of the cord (slippery floors, long cord that gets trapped in the grating, long cord on which supports the sow's

foot. Therefore, umbilical hernia may be congenital or acquired due to hypoplasia or damage to the abdominal muscles and improper closure of the abdominal muscles respectively. Reduced performances, low growth rates, low meat quality, pain, and discomfort that could cause death are some of the consequences that are observed in animals that suffer from umbilical hernia (Vigneshwaran *et al*., 2018; Spadola *et al*., 2022).

It is documented that the majority of umbilical hernias in swine manifest between 9 and 14 weeks of age, likely attributable to the rapid growth of swine during this period. This growth, coupled with the increased weight of abdominal organs, contributes to a notable enlargement of the hernia. After birth, iodine or similar antiseptic solutions are commonly applied to the umbilicus to reduce the risk of infection. Piglets with umbilical hernias may experience stunted growth, and those with smaller hernias are susceptible to having their intestines trapped within the hernial sac (Reesink, 2017; Spadola *et al*., 2022).

Repairing hernia would permit recovery of the affected animals and limit economic loss, even though surgical intervention is very expensive compared to the market value of the animal. Repairing an umbilical hernia in pigs is considered a straightforward procedure, and many veterinarians have observed greater success with smaller pigs. In larger pigs, the hernial ring is typically larger and accompanied by a weakness in the surrounding abdominal wall (Knudson, 1961). Thus, the objective of this case report is to describe in detail the surgical management and intervention carried out to treat umbilical hernia in pig through herniorrhaphy with dorsal recumbency by infiltration of local anesthetics Lidocaine in a circular manner around the hernia ring.

Case history and presentation; A three-month-old piglet was seen with swelling around the umbilicus that started around two weeks ago, according to the pig farm workers. The piglet was in good body condition, fed, and drank without any problem. Additionally, the piglet was active and showed no signs of infection.

Clinical and diagnostic assessment: General clinical examination revealed a temperature of 38.7^{o}C, heart rate 72 beats/minute, and respiratory rate 34 breaths/minute. Then the hernia was inspected and the ring was identified.

Preoperative preparations: The piglet was made to withhold feed and water for 12 and 6 hours prior to the surgery, respectively. Before beginning the surgery, the piglet was administered intramuscularly with 2 ml procaine penicillin at a dosage of 24 mg/kg and dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China) one hour before the operation. The area around the umbilicus was cleaned and scrubbed using both cetrimide and chlorhexidine gluconate and a diluted povidone-iodine tincture solution. The area was properly covered with a sterile surgical drape (Figure 6A). The estimated weight of the piglet was 35 kg.

Anesthesia and animal control: The piglet was kept in dorsal recumbency with its limbs controlled by the farm workers. Then, the hernial ring was desensitized in a circular manner using 10 ml of local anesthetic 2% Lidocaine (Manufactured by Sakar Healthcare Ltd., India). The site of the incision was also desensitized using the same local anesthetic. The surgery was conducted in the field at the pig farm.

Surgical treatment and intervention: The hernial ring was identified, and the contents were pushed back to prevent damage. Then, an incision large enough to access the hernial contents was made in the center of the hernia, and the subcutaneous tissue and abdominal muscles were dissected using scissors. Any bleeding observed was controlled using hemostatic forceps. Next, the herniated organ (intestine) was identified and gently pushed back into the abdominal cavity after checking for any damage. There were few adhesions encountered, and they were detached gently. The extra hernial sac was removed, and the hernial ring was refreshed to promote fast and effective healing. The hernial ring was then closed using a simple interrupted suture technique with chromic catgut #2. The closure of the hernial ring was carried out very carefully and gently to avoid damaging the underlying organs with the needle. As usual, after the closure of the hernial ring, the subcutaneous tissue was sutured with absorbable suture material PGA #2, using a double-

layered closure technique (intradermal closure) (Figure 6C). The skin was left in place to prevent the licking of the suture line. Finally, the incision site was sprayed with wound spray

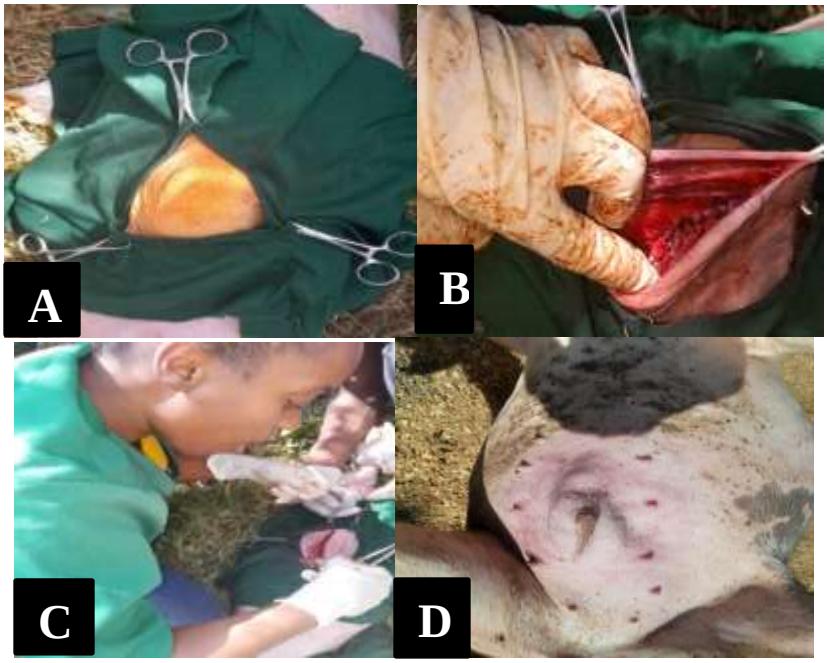

Figure : Surgical management of umbilical hernia in pig and its outcome

A). Surgical area aseptically prepared and dressed with drape B). The hernia ring after complete closure C). The subcutaneous tissue closure on progress D). The wound after complete healing at 14 days.

Post-operative care and outcome: The farm workers were advised to place the piglet in a separate area and provide food and water in small amounts to prevent overfeeding in the first few days post-surgery. Procaine penicillin at a dosage of 24 mg/kg and Dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China) was given intramuscularly for three days, and the wound was checked daily for any signs of infection. Diclofenac sodium injection at a dose of 75mg/3ml (Reyoung® Manufactured by Reyoung Pharmaceutical Co., Ltd, China) was given intramuscularly for three consecutive days. The farm workers were contacted by telephone to check on the status of the piglet. The wound was dressed with antiseptics until the wound healed. There was a minor sign of secondary bacterial

complication observed on the sixth day, but it resolved quickly after treatment. Finally, after two weeks, the piglet's wound fully healed (Figure 6D). Not only that, but the piglet also gained weight during the recovery period.

Discussion

In cases of umbilical hernia in piglets, herniorrhaphy is indicated if the size of the hernia ring can easily be repaired surgically, the presence of hernia results in retarded growth and prevents weight gain. Early detection, proper surgical repair, and post-operative care guarantee increased survival of the piglets. In the present case, the hernia was detected early, and immediate surgical correction resulted in a good recovery of the piglet's health status. A hernia is a condition where internal organs, typically the intestines, protrude through an opening in the layers of muscle and connective tissue. There are two primary types of hernias umbilical and inguinal. Umbilical hernia is a prevalent congenital anomaly observed in pigs. This condition poses a significant challenge in pig farming, resulting in economic losses due to surgical expenses, higher mortality rates, and diminished carcass value (Nowacka-Woszuk, 2021; Amith and Vidyasagar, 2020; Monsang *et al*., 2014). The size of the hernia is determined by the extent of the umbilical defect and the volume of internal organs that have protruded through the umbilical ring. A true umbilical hernia is reducible, but if it becomes irreducible, there is a risk of an umbilical abscess developing. Pigs with this defect typically experience lower daily weight gain compared to unaffected pigs (Mattsson, 2011). This defect is linked to a failure in the closure process of the umbilical ring (Rodrigues *et al*., 2021). The present case of hernia was reducible and the hernia was due to a congenital anomaly.

Babalola, and George, (2016), Spadola *et al*., (2022) Monsang *et al*. (2014), reported after the area was sterilized, pain relief was provided by injecting Lidocaine 2%, 2 mg/kg. Specifically, Lidocaine 2% was applied to both the surgical layers (skin and muscle layer), which supports the anesthetic protocol that was used in the present case. Similar to what Reesink, (2017) described, the hernial sac was separated, and dissection was carried out down to the hernial ring.

According to Amith and Vidyasagar, (2020), case report, they cleaned and refreshed the hernia ring meticulously and carefully closed using a simple interrupted suture pattern employing size 2 chromic catgut, which is a similar suture technique applied to the present case, while Babalola and George, (2016), used simple continuous suture using number 2 chromic catgut to close the hernia ring. But Pollicino *et al*., (2006) applied elastrator rings on the hernial sac, close to the abdominal wall to treat umbilical hernias in pigs. However, Monsang *et al*., (2014) and Vigneshwaran *et al*., (2018), also reported doing herniorrhaphy using black braided silk in a simple interrupted pattern after the ring was freshened.

Conclusion and recommendation: The surgical management of umbilical hernia in piglets is an effective approach to resolving this common developmental defect. By isolating and dissecting the hernial sac, and freshening the edges of the hernia ring, surgeons can successfully repair the defect. Assessment of bowel viability and careful closure of the hernia ring with appropriate sutures are critical steps to ensure a successful outcome. Postoperatively, the use of antibiotics helps to prevent infection and promote healing. Overall, surgical intervention offers a reliable method for addressing umbilical hernias in piglets, contributing to improved health and welfare outcomes in swine production.

3.3.2. Ventral hernia in sheep

Abstract

Herniorrhaphy is a commonly performed surgical procedure in veterinary medicine. A ventral hernia occurs when there is a protrusion of abdominal contents through a tear in the abdominal wall, excluding natural orifices. This case report describes the surgical management of a ventral hernia in a three-year-old ewe that was presented to the Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with swelling around the ventral area of the right abdomen that occurred following a horn thrust by an ox. After a careful diagnosis, the case was decided to undergo herniorrhaphy

to correct the problem. Then, the area was aseptically prepared, and the ewe was sedated with diazepam intramuscularly. The hernial ring was desensitized in a circular manner using Lidocaine. The hernia ring was closed using a horizontal mattress suture pattern using PGA #2, followed by the closure of the subcutaneous tissue and skin in a routine manner.

Keywords: *Ewe, Hernia, Herniorrhaphy*

Introduction

The abdominal cavity is primarily composed of muscles surrounded by aponeuroses, which are fibrous sheets that provide strength and flexibility, acting as a supportive structure for the organs within. An abdominal wall hernia occurs when there is a defect in all layers of the abdominal wall, allowing intraperitoneal contents typically parts of the omentum or bowel to protrude through this opening. An abdominal wall hernia, or herniation, refers to a structural weakness in the abdominal wall that causes an intermittent or continuous protrusion of tissue, sometimes containing intra-abdominal contents. While some hernias can be asymptomatic, others may cause discomfort, pain, cosmetic concerns, or core instability, particularly with larger hernias. In severe cases, hernias can lead to incarceration, where the protruding tissue becomes trapped, necessitating emergency surgical intervention (Schreinemacher, 2015; Simon *et al*., 2015; Posthuma-Kaufmann, 2019). A ventral hernia occurs when there is a protrusion of abdominal contents through a tear in the abdominal wall, excluding natural orifices. This type of hernia is situated ventral to the stifle skin fold and typically results from trauma such as kicks, horn thrusts, violent contact with blunt objects, or sudden jumping. Overstretching of the abdominal muscles can also contribute to the development of these hernias (Al-Sobayil and Ahmed, 2007; Fesseha and Kidanemariam, 2020).

Exploratory laparotomy followed by herniorrhaphy is the surgical approach that is most commonly preferred for the treatment of this defect (Munif *et al*., 2022). Herniorrhaphy is a commonly performed surgical procedure in veterinary medicine. Hernias typically

increase in size over time, and if left untreated, they can lead to symptoms such as pain, reduced appetite, weight loss, or even dystocia if a pregnant horn becomes trapped within the hernial sac (Fesseha and Kidanemariam, 2020). Complications associated with the hernia include strangulation, where the blood supply to the protruding contents is compromised, as well as incarceration of the contents within the hernia sac. Adhesions and infections can also develop, affecting the overall health and appearance of the animal (Kitessa *et al*., 2021). Therefore, the objective of this case report is to describe and provide detailed information about surgical management of ventral hernia by herniorrhaphy in local sheep performed in left side lateral recumbency after sedating the ewe with diazepam and circular infiltration around the hernia ring using Lidocaine.

Case history and presentation: A three-year-old ewe came to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a complaint of being horn-thrusted in the ventral part of the abdomen by cattle 15 hours ago. The ewe was in severe pain making grunting sounds and kicking the ground. The ewe was also showing signs of depression and refused to consume any forage or water.

Clinical and diagnostic assessment: A proper clinical examination was performed, and it revealed a swelling in the ventral area of the abdomen. It was painful upon palpation, and a clear hernia ring was identified. There was another swelling near the hernia ring that contained the fluid that escaped through an opening in the abdominal wall due to damage by the horn that was confirmed by palpation. The respiratory and heart rates were higher than the normal range 32 breaths/min and 78 beats/min respectively, but the temperature was within the normal range.

Preoperative preparations; Before beginning the surgery, the ewe was administered intramuscularly with 3 ml of Procaine penicillin at a dosage of 24 mg/kg and Dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China) prior to the operation. Then, the hair around the hernia was clipped, shaved, and cleaned with antiseptics. A sterile drape was placed over the area. Tramadol HCL (Manufactured by Huons Co., Ltd, Republic of South

Korea) injection was given intramuscularly to reduce the burden of pain. The estimated weight of the ewe was 40 kg.

Anesthesia and animal control: The ewe was sedated with 2 ml diazepam at a dose of 10mg/2ml (Zesop® manufactured by Humanwell Pharmaceutical Ethiopia PLC, Amhara Region, Ethiopia), and the animal was positioned in left side lateral recumbency with the affected side uppermost. The limbs were tied to the patient table. Then, the hernia ring was desensitized in a circular manner using 5 ml of local anesthetic 2 % Lidocaine (Manufactured by Sakar Healthcare Ltd., India) subcutaneously, with a dose rate of 1 ml/cm area (Figure 7A). The site of the incision was also desensitized using the same local anesthetic.

Surgical treatment and intervention: A vertical incision over the selling was made at the center. Care was taken not to puncture any visceral organs lying beneath during the incision. The skin was separated from the underlying subcutaneous tissue using blunt dissection. All layers of muscle, along with the skin, were held with a handheld retractor to achieve sufficient surgical field exposure of the hernial ring. Due to the freshness of the hernia, no adhesion was observed. The surrounding area was dark-colored following bleeding at the site due to the trauma. Upon reaching the hernial ring, a large amount of dark-colored fluid mixed with blood was drained, and the intestine, together with the omentum, herniated through the damaged hernial ring (Figure 7B). After cleaning the area with sterile gauze, the protruded organs were gently reduced. Then, the hernial ring was gently and carefully closed using a simple continuous horizontal mattress suture technique using PGA #2 (Figure 7C). The subcutaneous tissue was closed using a simple interrupted horizontal mattress suture technique using PGA #2, and procain penicillin powder (Manufactured by Hebei Yuanzheng Pharmaceutical Co., Ltd, Hebei Province, China) was sprinkled over the subcutaneous tissue. The skin was sutured using a simple interrupted technique with silk size 2-0 (Figure 7D). After suturing, the surgical site was thoroughly cleaned and dressed with an antiseptic solution.

Figure : Herniorrhaphy in ewe and its progress

A). Desensitizing the hernia ring in a circular manner on progress B). The hernial contents

C). Closure of the hernia ring in progress D). The skin after closure

Post-operative care and outcome: The ewe was kept at the hospital for two days post-operation. Tramadol, procaine penicillin (24 mg/kg), and dihydrostreptomycin sulfate (30 mg/kg) (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China) were continued for two days. The ewe was kept in a warm place and had limited exercise. The wound was also checked daily for any signs of infection and cleaned with antiseptic. Green fodder and water were given in small amounts. However, the ewe died on the third day following different post-operative complications. The cause of death could be internal bleeding.

Discussion

Hernias caused by horn thrusts in sheep can have significant adverse effects on the health and well-being of the animal. Surgical intervention is essential to correct the defect and prevent complications. Proper surgical technique and post-operative care are crucial for a successful outcome and the restoration of normal function in affected sheep. A ventral abdominal hernia is frequently observed in sheep, often resulting from horn thrust within the flock, indicating an acquired condition. The hernial contents of ventral hernias vary depending on the location of the hernia. The most commonly herniated organs include loops of the intestine, parts of the rumen, spleen, and urinary bladder. Previously, repair and reconstruction of ventral hernias and abdominal wall defects involved using heavy suture materials to close the hernial defects. However, these methods often lead to complications such as wound dehiscence, hernia recurrence, and delayed wound healing (Kitessa *et al*., 2021; Doijode and Beerappa, 2019). The repair of abdominal wall defects remains a complex challenge, particularly for significant defects. While smaller defects can often be closed directly, larger defects that create tension in the wound require the use of prosthetic materials for successful repair (Karrouf *et al*., 2016).

For abdominal hernias, circular infiltration anesthesia was done using 2% lidocaine for the present case, in which the same anesthetic protocol was used and reported by Al-Sobayil *et al*., (2007) and Kitessa *et al*., (2021). But Kumar *et al*., (2019) used caudal epidural anesthesia which was accomplished by injecting 2 ml of 2% Lignocaine hydrochloride epidurally in between the last sacrum and first coccygeal vertebrae in addition to local infiltration of the site with 2% Lignocaine hydrochloride @ 1 ml/cm area.

Similar to what Simon *et al*., (2015) reported, the same herniorrhaphy procedure was used for the current case. Then the hernial ring was sutured by interrupted horizontal mattress sutures using No. 2 chromic catgut which was similar to what Al-Sobayil *et al*., (2007) reported.

Conclusion and recommendation: Herniorrhaphy is an effective surgical approach for managing ventral hernias in sheep. Performing exploratory laparotomy and repairing the

hernia can successfully address this acquired condition often caused by horn thrusts. This procedure helps prevent complications associated with hernial sacs and restores the integrity of the abdominal wall, promoting the health and well-being of affected sheep.

3.4.Trauma-induced omental evisceration in sheep.

Abstract

Evisceration of the abdomen refers to the protrusion of abdominal cavity contents through a breach in the body wall, leading to the exposure of internal organs to the external environment. This condition can arise from various factors such as genetic anomalies or physical trauma. This case report describes the successful surgical management of omental evisceration in a six-year-old ewe that came to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital, wrapped in cloth and plastic around the abdomen. The owner informed me that a sharp piece of wood had pierced the abdomen, causing the contents to come out (evisceration) one hour ago. A routine clinical examination was performed, and the ewe was immediately taken for surgical repair of the condition. The eviscerated omentum was sutured, cleaned with normal saline, and gently reduced into the abdominal cavity. Then, the opening of the abdominal wall was closed using a horizontal mattress suture technique with chromic catgut and the skin was closed in a simple interrupted manner using silk. The ewe made an uneventful recovery.

Key words; *Ewe, Evisceration, Omentum*

Introduction

The greater omentum serves a crucial role in immune function by shielding the peritoneal cavity from bacteria carried in the bloodstream and other potential contaminants. It facilitates the migration of immune cells, predominantly macrophages, T cells, and B cells, into the peritoneal cavity for rapid response to threats (González-Domínguez *et al*.,

2010). Evisceration of the abdomen refers to the protrusion of abdominal cavity contents through a breach in the body wall, leading to the exposure of internal organs to the external environment. This condition can arise from various factors such as genetic anomalies, physical trauma, weakened muscles, improper umbilical cord cutting, or excessive pulling during difficult deliveries with oversized fetuses. Abdominal evisceration injuries could lead to devastating injuries (Sethi, *et al*., 2017; Pugazharasi *et al*., 2019). The organ that protrudes during evisceration typically experiences severe congestion and necrosis. The exposed tissue quickly becomes swollen and inflamed, making it vulnerable to further injury (Kalim *et al*., 2015). Regardless of the initial cause, immediate surgical intervention is necessary when abdominal viscera are exposed and contaminated (Dar *et al*., 2015).

Surgical principles involve evaluating organ viability, cleaning, repairing, and returning eviscerated organs to their proper place, examining other intra-abdominal organs, flushing the peritoneal cavity with ample fluids, and trimming away nonviable or infected edges before closure (Gower *et al*., 2009). The outlook for evisceration hinges on factors such as the extent of trauma, the site of injury, the exposed organ, bleeding, contamination levels, stabilization, potential strangulation, antibiotic administration, and timely surgical treatment. Employing correct surgical methods and providing diligent postoperative care can help reduce complications. Swift stabilization and surgical attention could enhance the chances of survival for animals with minimal or no postoperative complications (Sethi, *et al*., 2017). Thus, the objective of this case report is to describe surgical management of omental evisceration following trauma in local breed sheep by circular infiltration around the wound using local anesthetic Lidocaine on the left side lateral recumbency with the affected side uppermost.

Case history and presentation; A six-year-old non-pregnant ewe came to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital in a recumbent position, wrapped and tied with plastic and clothes around the abdominal cavity (Figure 8A). The owner informed us that a sharp object (wood) had pierced the

abdomen and its contents came out one hour ago. They promptly brought the ewe to the clinic.

Clinical and diagnostic assessment: Following a routine clinical examination, it was found that the respiratory and heart rates were higher than normal 30 breaths/min and 77 beats/min respectively, while the body temperature remained within the normal range. The ewe exhibited shallow breathing and appeared to be in significant pain. There was distension of the rumen, likely caused by the ewe being in a lateral recumbent position for an extended time. In an attempt to alleviate the distention, a long needle was used to pierce the rumen, resulting in the release of fluid mixed with blood. Upon removing the plastic and cloth wrap, the omentum had been eviscerated from the abdominal cavity. Some parts of the omentum were torn, and it appeared inflamed. It was decided to proceed with surgical repair after completing the examination.

Preoperative preparations; 2 ml of dexamethasone sodium phosphate injection (Inflamgo® Manufactured by Chongqing Fangtong Animal Pharmaceutical Co., Ltd, China) was administered intramuscularly together with 3 ml Procaine penicillin at a dosage of 24 mg/kg and Dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China) prior to the operation. Then while in lateral recumbency the area surrounding the eviscerated organ was shaved, cleaned with antiseptics, and made ready for operation after placing a sterile drape. The estimated weight of the ewe was 40 kg.

Anesthesia and animal control: The ewe was placed in lateral recumbency on the left side, with both the fore and hind limbs tied to the patient table. Next, 7 ml of local anesthetics 2 % Lidocaine (Manufactured by Sakar Healthcare Ltd., India) was administered circularly around the skin.

Surgical treatment and intervention: First, the torn omentum was closed using chromic cat gut #2 by simple continuous suture technique with an interlocking suture pattern; due to the very delicate nature of the organ it was done in a very gentle manner. Any bleeding

observed was either tourniquet with hemostatic forceps or ligated with PGA #2. Then the omentum was thoroughly cleaned and debrided with normal saline and gently reduced into the abdominal cavity (Figure 8B). Doing this was a bit difficult due to the distended rumen pushing but it was successfully reduced. Then the torn abdominal wall was sutured using a continuous horizontal mattress with chromic catgut #2. Then the subcutaneous tissue was closed using a simple continuous suture technique using PGA #2 and procaine penicillin powder was sprinkled over the subcutaneous tissue. Then, the skin was closed with a simple interrupted suture technique using silk #2. Finally, the area was cleaned with diluted povidone-iodine solution (Figure 8C).

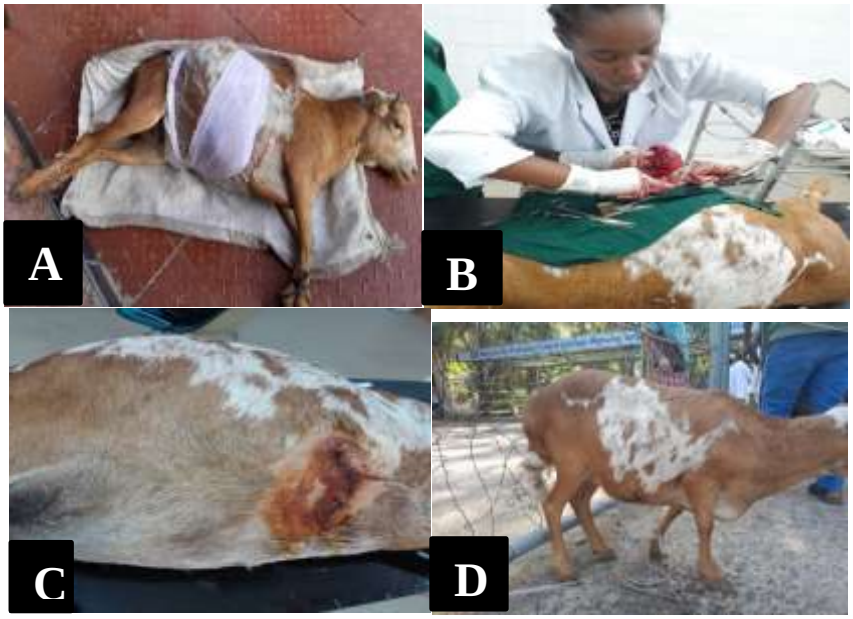

Figure : Surgical management of omental evisceration and its outcome in ewe

A). The ewe wrapped in plastic and cloth B). Reduction of the eviscerated omentum on progress C). The skin after closure together with distended abdomen E). The ewe on the fourth-day post-operation.

Post-operative care and outcome: The owner was advised to prepare a clean, warm, and dry resting are for the ewe due to the wound is located on the ventral side and its more prone to being contaminated by dirt and other contaminants. The same antibiotics as the preoperative one were continued for three days post-operation. The wound was cleaned

with diluted iodine tincture solution until it healed completely and skin sutures were removed. The animal recovered without any major post-operative complications.

Discussion

Omental evisceration due to trauma in sheep is a serious condition that requires immediate surgical intervention. The surgical repair of the abdominal defect and careful post-operative care are crucial for the recovery and well-being of the affected sheep. In the present case, immediate surgical intervention and proper management of the case prevented severe complications and restored the health and functionality of the ewe. Abdominal evisceration occurs when the contents of the peritoneal cavity protrude through the body wall, leading to exposure of the abdominal viscera. Regardless of the triggering factor, exposure and contamination of the abdominal viscera necessitate immediate surgical intervention (Sethi, *et al*., 2017). Preoperative management involves stabilizing hemodynamics, administering antimicrobial treatment, extending the abdominal rent to prevent vascular compromise of eviscerated organs, and applying a sterile dressing until surgical intervention (Gower *et al*., 2009). Abdominal evisceration, resulting from a hernia penetrating the body wall and skin, can be classified into major and minor categories. Major eviscerations involve the herniation of a significant portion of abdominal contents, while minor eviscerations typically involve only the omentum or abdominal viscera without significant contamination. Trauma or post-surgical dehiscences are common causes of evisceration. The prognosis varies from excellent to poor, depending on the severity of the case (Jafari *et al*., 2022). The above statement supports the cause of evisceration for the current case.

Local infiltration of 2% lignocaine around the site of the skin wound was done for the current case in which a similar anesthetic protocol was reported by Kalim *et al*., (2015) and Begum *et al*., (2023) for omasal evisceration and abomasal rupture in heifer and calf respectively. Then, similar to what was described by Pugazharasi *et al*., (2019) and Sethi *et al*., (2017) the exposed and soiled organ was cleaned with normal saline and examined thoroughly for any perforation, contamination, and viability.

Determining whether to close the abdominal wall and superficial tissues hinges on the extent and site of tissue injury and wound contamination. Primary closure is typically suitable for animals experiencing acute evisceration with minimal tissue damage or contamination which was reported by Kalim *et al*., (2015). This supports the current case that was handled by primary closure of the abdominal wall due to acute evisceration with minimal organ damage and the prognosis was favorable due to the prompt arrival of the animal after the accident and the prompt diagnosis.

Conclusion and recommendation; The Prognosis for sheep undergoing surgical treatment for eviscerated omentum depends on various factors, including the severity of the trauma, extent of tissue damage, and promptness of intervention. With timely and appropriate surgical management, coupled with diligent postoperative care, many sheep can achieve a favorable outcome and resume normal function. Surgical treatment of eviscerated omentum in sheep requires a thorough understanding of surgical principles and meticulous attention to detail. Prompt intervention and proper tissue management are essential for optimizing outcomes and minimizing complications in affected animals.

3.5.Surgical excision of tumors in different domestic animals

3.5.1. Mammary gland tumor in bitch

Abstract

Tumor is defined as an abnormal mass of tissue that results from progressive, autonomous, excessive proliferation of body cells that are not integrated into normal tissue. Mammary gland tumors are one of the most common tumors in dogs and they are a more common type of neoplasms in sexually intact female dogs. This case report aims to describe the successful surgical management of a mammary tumor through radical mastectomy in a four year old bitch presented to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a swelling on the mammary gland that began two months ago. A routine clinical examination with history

was done and a large, painless swelling covering the entire mammary gland was observed, then the case was passed to be treated with radical mastectomy. The mammary gland was completely removed by making a circular incision covering the whole gland. The area was closed routinely and there was little secondary bacterial complication observed but it was controlled. The wound healed completely and the bitch returned to normal health status after twenty days post-surgery.

Keywords; *Female dogs, Mammary gland tumors, Radical mastectomy*

Introduction

Tumor is defined as an abnormal mass of tissue that results from progressive, autonomous, excessive proliferation of body cells that are not integrated into normal tissue and they exhibit varying degrees of fidelity to their precursors. Mammary gland tumors are one of the most common tumors in dogs and they are a more common type of neoplasms in sexually intact female dogs. Many factors determine the prognosis which includes the size of the tumor, ulceration, fixation to underlying structures, the status of lymph nodes, and stage of the tumor. Dogs affected by tumors measuring larger than 3cm in diameter have a statistically significantly worse outcome than dogs with smaller tumors (Fesseha, 2020; Hörnfeldt and Mortensen, 2023). The etiology of this pathology is unknown. In dogs, however, three main factors play important roles in mammary neoplasia: age, hormonal exposure, and breed. Hormonal exposure, primarily during mammary gland development, is the major risk factor. Estrogens and progestins stimulate mammary tissue growth and may influence tumorigenesis through direct growth factor activity (Neamțu *et al*., 2021).

Mammary tumors are a prevalent form of cancer in female dogs, constituting approximately half of all tumors in intact females. Mastectomy is the primary surgical procedure used for treating mammary tumors. Dogs undergoing mastectomy or other skin and reconstructive surgeries are at risk of developing surgical site infection (SSI) and other postoperative complications. To reduce the risk of SSI, the surgeon should

implement various precautions before, during, and after the surgery (Spåre *et al*., 2021). Most canine mammary tumors are typically managed solely with surgery, even though approximately 50% of them are malignant and often result in recurrence or metastasis over time. Mammary gland carcinomas are a frequently encountered malignancy in adult female dogs. Around half of all mammary gland tumors in dogs are malignant, with about half of these tumors showing infiltrative growth into surrounding tissues and a tendency to metastasize to regional lymph nodes and lungs (Marconato *et al*., 2008).

Surgical resection is widely recognized as the most effective treatment for mammary gland tumors in dogs, providing optimal local tumor control, except in cases of inflammatory carcinoma or distant metastases. The closure of the surgical wound following mastectomy is often the most demanding aspect of the procedure and can be approached using different techniques. Addressing dead space and managing tension along the incision line are critical considerations in mastectomy closure. The conventional closure method typically involves using absorbable sutures to minimize dead space and reduce tension (Papazoglou *et al*., 2014). Therefore, the objective of this case report is to describe surgical intervention carried out to treat mammary gland tumor in bitch by radical mastectomy under general anesthesia by keeping the dog in dorsal recumbency and the post-operative complications encountered.

Case history and presentation: A four year old bitch came to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital. with a history of swelling on the mammary gland that began growing 2 months ago. Ovariohysterioctomy was done a year ago. Additionally, the bitch came to the hospital seven months ago with swelling and foul-smelling vaginal discharge from the vulva following tumor growth, and thus, the vulva was completely removed together with the tumor back then.

Clinical and diagnostic assessment: On clinical examination, the mammary gland was swollen and the mass was firm up on palpation. All pairs of teats were affected. The bitch was in good body condition with a body temperature of 38.3^{o}C, heart rate 74 beats/minute, and respiratory rates 20 breaths/minute. The swelling was painless up on

palpation. The bitches feed and water intake was also not affected. Thus, based on the history and clinical examination of the bitch the final diagnosis was concluded as a mammary tumor, and radical mastectomy was carried out to repair the condition.

Preoperative preparations; Due to the selective nature of the surgery, the bitch was sent home after informing the owner to withhold water and feed for 6 and 12 hours respectively and the case was appointed for the next day. Before beginning the surgery the bitch was administered intramuscularly with 3 ml of Procaine penicillin at a dosage of 24 mg/kg and dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China) one hour prior to the operation. The surgical area was aseptically prepared by clipping and shaving the hair around the mammary and a surgical drape was placed. The animal was also given intravenous (IV) administration of 10 mL of 40% glucose and lactated ringer's solution at a rate of 5 mL/kg/hr for one hour to stabilize the patient and it was continued until the dog woke up from anesthesia. The estimated weight of the bitch was 30 kg.

Anesthesia and animal control: The bitch was pre-medicated with 2 ml of diazepam at the dose of 10mg/2ml (Zesop® Manufactured by Humanwell pharmaceutical Ethiopia PLC, Amhara Region, Ethiopia) administered through I.M, then the animal was kept in dorsal recumbency with the limbs tied to the surgical table. 3 ml of Diazepam (Manufactured By Intas Pharmaceutical Ltd., India) @0.15mg/kg and ketamine combination (Ketamine Hydrochloride Manufactured by Neon Laboratories Ltd, India,) @5mg/kg respectively was administered intravenously to achieve general anesthesia.

Surgical treatment and intervention: A circular skin incision covering the entire mammary gland and some part of healthy tissue was made (Figure 9A). Then slowly using scissors the subcutaneous and abdominal muscles surrounding the gland were incised/dissected to expose the tumor. There were a large number of blood vessels supplying the tumor, due to that there was excessive bleeding and the blood vessels were ligated using PGA #2. Then, the tumor mass was slowly dissected and removed from the root including all pairs of teats (Figure 9B). After the tumor was removed the was a wide

void was left in the area i.e. the subcutaneous tissue together with the muscle left on the area was sutured together using PGA #2 to prevent the accumulation of fluid during the healing period. Then the skin was sutured together using silk #2 by a simple interrupted suture technique and the area was scrubbed with iodine tincture (Figure 9C).

Figure : Surgical excision of mammary tumor and its outcome in bitch

A). Circular skin incision making on progress B). The area after the complete removal of the tumor C). Closed skin scrubbed with iodine tincture solution D). The completely healed wound.

Post-operative care and outcome: Ringer lactate was continued for two hours after the operation and the bitch stayed in the hospital until she woke up from the anesthesia. A close eye was kept on the dog's incision site for signs of infection, swelling, redness, or discharge. The owner was advised to provide a quiet and comfortable recovery area for the bitch to rest and recuperate. A collar was used to prevent the dog from licking or chewing the surgical site. The same pre-operative antibiotics were administered for five consecutive days intramuscularly and the incision site was cleaned daily using iodine tincture. Tramadol was also administered for two days to reduce the pain following the

surgery. On the second day, the small area of the skin suture was disrupted and it was sutured again using silk #2. There was a serous-like fluid oozing out of the surgical site observed on the third day but it disappeared on the seventh day. There was a continuous follow-up with the owner through a telephone and the owner was informing me about the status of the bitch until the wound healed. The skin suture was removed on the 15^{th} day and the wound completely healed (Figure 9D).

Discussion

Depending on the extent of tumor invasion, radical mastectomy is indicated in the bitch. Timely intervention, proper surgical technique, and postoperative care are critical for favorable results. In the present case, radical mastectomy was carried out to save the life of the bitch and restore its health. Mammary tumors are prevalent in dogs. Tumors may be linked to either glandular tissue or the nipple. Surgery stands as the fundamental treatment for canine mammary tumors, proving most efficacious in achieving regional disease control. A variety of surgical methods are available for addressing canine mammary tumors. The objective of the surgical procedure is to completely excise all tumors with adequate surgical margins and/or to prevent the occurrence of new mammary tumors. Surgical methods for removing these tumors encompass lumpectomy, mammectomy, regional mastectomy, unilateral mastectomy, bilateral mastectomy, and radical mastectomy. The most suitable technique for each scenario is contingent upon factors such as the species involved and the number, size, and position of the mammary tumors. While the exact etiology of mammary cancer in various species like dogs and cats remains uncertain, genetic predisposition and dietary influences are believed to contribute. Although the exact mechanisms of tumor development are not fully understood, it's widely recognized that estrogen and/or progesterone hormones significantly influence the hyperplasia and neoplasia of mammary tissue (Ehrhart, 2013; Cassali *et al*., 2020; Vazquez *et al*., 2023; Horta *et al*., 2014; Akter and Alam, 2022).

The same anesthetic protocol that was described by Meharu and Kitessa, (2024) which used diazepam as a premedication that was followed by a diazepam-ketamine

combination used as induction of general anesthesia was applied for the present case. While Akter and Alam, (2022), atropine sulfate was used as a premedication and intramuscular injection of xylazine hydrochloride and ketamine hydrochloride at 1.1 mg/kg BW and 5.5 mg/kg BW, respectively was administered as induction agents. Similar to Hörnfeldt and Mortensen, (2023), Papazoglou *et al*., (2014), and Neamțu *et al*., (2021), radical mastectomy involving the complete removal of the entire mammary chain was used to treat the present case.

Conclusion and recommendation; Radical mastectomy remains a crucial surgical option for managing mammary tumors in bitches. This procedure involves the complete removal of the mammary chain and associated lymph nodes, either unilaterally or bilaterally, depending on the extent of the disease and the patient's overall condition. While radical mastectomy is considered an aggressive approach, it offers the potential for disease control and prevention of recurrence. However, it's essential to carefully consider the individual patient's factors and tumor characteristics when selecting the appropriate surgical approach. Further research is needed to establish consensus guidelines and optimize outcomes for bitches undergoing radical mastectomy for mammary tumors.

3.5.2. Transmissible venereal tumor in bitch

Abstract

Transmissible venereal tumor (TVT) is a contagious round-cell tumor found in dogs, typically transmitted horizontally during mating through viable tumor cells. The exact cause of reproductive tumors in canines remains uncertain. This case report presents the successful management of a transmissible venereal tumor in four year old bitch presented to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a swelling on the vulva that began growing three months ago. On physical and clinical examination, a firm mass that was attached to the vulva was identified, and foul-smelling vaginal discharge was also observed. The case was diagnosed as a localized mass growth on the vulva and passed for surgical treatment. After putting the animal under general anesthesia, the mass was gently excised and removed. The bitch was able

to recover without major post-operative complications and the tumor did not reoccur until six months.

Key words; *Bitch, Reproductive tumors, Transmissible venereal tumor*

Introduction

In female dogs, the majority of tumors arise from the lower reproductive tract rather than the upper reproductive tract. Vaginal and vulvar tumors rank as the second most prevalent reproductive tumors in dogs, following mammary tumors in terms of frequency. Genital system tumors also referred to as venereal sarcomas, can affect both male and female dogs. Common tumors in the genital system include uterine adenocarcinoma, uterine leiomyosarcoma, transmissible venereal tumors, and Leiomyoma (Ahuja et *al*., 2018; Balamurugan and Sivasudharsan, 2021; Utami and Tophianong, 2022). Less frequent tumor varieties encompass lipoma, fibrous histiocytoma, benign melanoma, myxoma, myxofibroma, adenocarcinoma, hemangiosarcoma, osteosarcoma, and epidermoid carcinoma (Gajendirane *et al*., 2023). While the exact cause of reproductive tumors in canines remains uncertain, there is a strong suspicion that ovarian hormones contribute significantly to their formation. Tumors affecting the female genital system of dogs predominantly manifest in older animals, often making early detection challenging. Surgical removal represents the primary treatment option, especially when complete eradication is feasible. Vaginal and vulval tumors are typically benign and generally have a favorable prognosis (Leil *et al*., 2018).

The canine transmissible venereal tumor (TVT), also referred to as infectious sarcoma, venereal granuloma, transmissible lymphosarcoma, Stricker's sarcoma, sticker tumor, contagious venereal tumor, venereal granuloma, infectious granuloma, and canine condyloma, is classified as a benign reticuloendothelial tumor (Utami and Tophianong, 2022). Transmissible venereal tumor (TVT) is a contagious round-cell tumor found in dogs, typically transmitted horizontally during mating through viable tumor cells. While

it primarily affects the external genitalia, it can occasionally involve the internal genital organs (Abeka, 2019).

Because of its distinctive mode of transmission through sexual contact, naturally occurring canine transmissible venereal tumors (CTVT) typically arise in the external genitalia. Occasionally, the tumor can also spread to the nasal or oral cavities, skin, conjunctiva, and rectum through sniffing or licking (Birhan and Chanie, 2015). Clinical signs typically manifest in the genital region of both male (penis and foreskin) and female (vulva and vagina) dogs (Costa *et al*., 2022). Patients with Transmissible venereal tumor (TVT) typically exhibit symptoms such as significant swelling, continuous bloody discharge from the external genitalia, floor soiling, foul odor, swelling, ulceration, and reduced appetite (Parikh *et al*., 2022). Suspicions of diagnosis arise from observing typical clinical lesions in the genitalia of dogs, but confirmation necessitates conducting cytopathological and/or histopathological examinations (Costa *et al*., 2022). Vaginal cytology is the most convenient diagnostic approach for this tumor. It involves identifying round or oval cells with pale blue or colorless cytoplasm containing vacuoles, along with a prominent nucleus (Küçükbekir *et al*., 2021).

Various treatments such as surgery, radiotherapy, immunotherapy, biotherapy, and chemotherapy have been utilized to address Transmissible venereal tumors. Surgery, particularly for small, localized tumors, has been widely employed. However, recurrence rates can be significant, ranging from 50 to 68% for large invasive tumors. Additionally, contamination of the surgical site with TVT cells poses a risk of recurrence (Martins *et al*., 2005). Thus, the objective of this case report is to describe in detail the surgical treatment of a transmissible venereal tumor in an exotic breed bitch under general anesthesia.

Case history and presentation; A four year old bitch came to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a history of swelling inside the vulva that started growing three months ago. The bitch was neutered

five months ago at the hospital and the doctor that neutered the bitch informed me that there was a foul-smelling fluid coming out of the vagina at the time.

Clinical and diagnostic assessment; Routine clinical examinations were done and all the body parameters were in the normal range. There was firm tissue that grew inside the vulva and there was a vaginal discharge that had a foul smell. The bitch was in a good body condition and eats and drinks without any problem. Then the case was diagnosed as a localized abnormal vulvar mass growth and passed for a surgical treatment.

Preoperative preparations; Due to the selective nature of the surgery, the bitch was sent home after informing the owner to withhold water and feed for 6 and 12 hours respectively and the case was appointed for the next day. The bitch was administered intramuscularly with 2 ml of Procaine penicillin at a dosage of 24 mg/kg and dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China) one hour prior to the operation. Then the area around the vulva was shaved and prepared aseptically (Figure 10A). the estimated weight of the bitch was 10 kg.

Anesthesia and animal control: The bitch was pre-medicated with 2 ml of diazepam (Manufactured By Intas Pharmaceutical Ltd., India) administered through I.M. after the animal was kept in ventral recumbency with the limbs tied to the surgical table. 2 ml of Diazepam at the dose of @0.15mg/kg and ketamine (Ketamine Hydrochloride Manufactured in Neon Laboratories Ltd, India,) @5mg/kg I.V. combination was administered intravenously to induce general anesthesia.

Surgical treatment and intervention: First the anus was sutured using purse-string suture technique using silk #2. Then a vertical incision was made on the area lower from the anus to the tip of the upper vulvar skin and the mass was reflected for easy access (Figure 10B). Then its root was reached and carefully excised with scissors and the area was checked for any remnants. Any bleeding was controlled using hemostatic forceps and the inside was cleaned with sterile gauze and cotton. Then the subcutaneous tissue

was sutured using PGA#2 in simple continuous suture technique and procaine penicillin powder was sprinkled over. Finally, the skin was closed with a simple interrupted suture technique using silk #2. The area was cleaned by iodine tincture solution (Figure 10C).

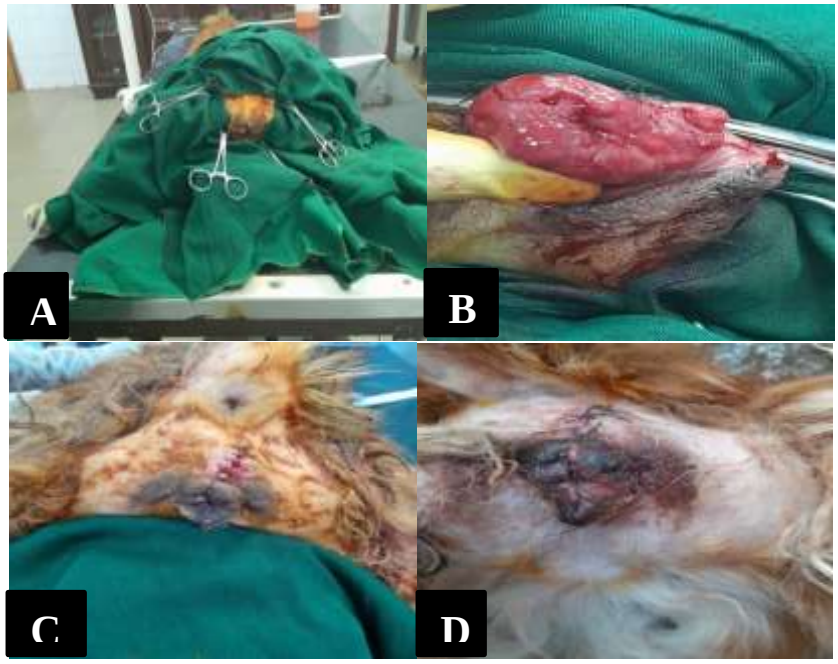

Figure : Surgical management of transmissible venereal tumor in bitch and its progress A). Aseptic preparation of the surgical area B). The exposed tumor

C). The skin after closure D). The wound on the fifth-day post-surgery

Post-operative care and outcome: The owner was advised to put on Elizabeth's collar to prevent the licking of the area and to provide a warm and clean resting are for the bitch. An antibiotic was continued for five days and daily cleaning of the wound using antiseptics was done until the wound healed. The suture material was removed after the 13th day and the dog made an uneventful recovery and had no recurrence of the tumor within a six-month post-operative period.

Discussion

Transmissible venereal tumor is one of the benign tumors in dogs that is sexually transmitted from one dog to the other. Surgical intervention to treat TVT is important to

prevent the transmission of the disease from one dog to another. Timely intervention, proper surgical technique, and postoperative care are critical for favorable results and to prevent transmission to other dogs. Transmissible venereal tumor (TVT) stands out as one of the most widespread tumors in dogs, transmitted primarily through mating. It represents one of the most prevalent benign tumors observed in dogs, affecting both genders. While the tumor typically originates in the external genital region, instances of metastasis to internal organs have been documented (Küçükbekir *et al*., 2021). Apart from being spread through mating, TVT tumors, composed of tumor histiocytes, can also be transmitted through activities like licking, biting, or sniffing in the tumor area (Utami and Tophianong, 2022).

While there isn't a specific predisposition based on age, gender, or breed, larger breeds tend to be more commonly affected. TVT, the most widespread tumor in dogs, is found across all breeds in regions with tropical and subtropical climates (Das *et al*., 2020). This disease tends to occur more frequently during the peak age of sexual activity and is prevalent in countries where the canine population lacks strict epidemiological control. Females are more commonly affected than males (Abeka, 2019). Successful treatment options for external genital tumors encompass surgical removal, cryosurgery, immunotherapy, and chemotherapy. Among these, surgical excision stands out as the most efficacious, particularly for animals with limited, small, well-defined lesions that are easily reachable and lack local invasion or metastases (Leil *et al*., 2018). For the present case, surgical excision treatment was carried which is supported by the above statement. However, Atanaskova *et al*., (2012), Kisani and Adamu, (2009), and Takariyanti *et al*., (2021) used a combined treatment, after removing the tumor surgically which was followed by chemotherapy.

Utami and Tophianong, (2022), surgically excised the vulvar tumor after the bitch was under general anesthesia after pre-medicating with atropine sulfate and induced general anesthesia by using a combination of ketamine at a dose of 10 mg/kg body weight and xylazine at a dose of 2 mg/kg body weight intramuscularly. But for the present case, the bitch was pre-medicated with diazepam, and general anesthesia was induced by the

ketamine-diazepam combination. In another case report done by Kisani and Adamu, 2009, the dog was pre-medicated with xylazine and anesthesia and was induced with thiopentone sodium at 15mg/kg intravenously.

Conclusion and recommendation; Surgical removal remains a vital component in the treatment arsenal against transmissible venereal tumors (TVT). While it is one of the most common and benign tumors in dogs, its unique transmission through mating necessitates effective interventions. Surgical excision has been extensively employed, especially for small, localized TVTs. However, the recurrence rate can be significant for large, invasive tumors, often due to contamination of the surgical site with tumor cells. Hence, while surgery plays a crucial role, a comprehensive approach involving other treatment modalities may be necessary for optimal management and long-term outcomes.

3.5.3. Cervical tumor in cow

Abstract

Cattle from various regions globally have been documented to experience tumors within their reproductive systems. This case report describes the successful management of a cervical tumor in a six year old recently bought cow that was presented with a mass bulging out of the vagina that was recently detected by the owners to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital. A circular, covered in dirt a pendulous mass, firm up on palpation was observed. Routine physical and clinical examinations were done and the case was tentatively diagnosed as an abnormal mass grown on the cervix and surgical excision was carried out. The cow was controlled in standing position and caudal epidural anesthesia with Lidocaine was administered. Then after ligating, the mass was excised carefully. The cow recovered without any severe post-operative complications.

Keywords; *Cow, Cervical tumor, Surgical excision*

Introduction

Cattle from various regions globally have been documented to experience tumors within their reproductive systems (Hamali and Ashrafihelan, 2010). These tumors are categorized into two groups: those originating from the ovaries and those originating from the tubular genitalia. It's crucial to discern whether these growths are benign or malignant and to distinguish them from other conditions like hyperplasia, granulation tissue, or abscess formation (Yeruham *et al*., 1999). Tumors affecting the genital tract are categorized as ovarian, fallopian tube, uterine, cervical, vaginal, and vulvar tumors (Martz *et al*., 2020). Typically benign and pedunculated, some tumors may extend through the vulva, necessitating surgical intervention for removal (Kumar *et al*., 2019b). Instances of tumors in cattle are comparatively infrequent compared to other domesticated animals. One probable explanation is that the majority of cattle do not live long enough to be predisposed to tumor development (Martz *et al*., 2020).

Tumors in the female reproductive tract of large animals are exceedingly uncommon. A neoplasm refers to the uncontrolled proliferation of new cells lacking a specific function and organization. The etiology of tumors is a topic of investigation, with elevated hormonal levels being one of the various suspected causes (Prasad *et al*., 2019). The primary impact of these tumors on the cattle sector is the elevated culling rate resulting from metastases to vital organs like the lungs, liver, and regional lymph nodes, leading to significant complications (Hamali and Ashrafihelan, 2010). The prognosis and result of genital tumors in cattle rely on the tumor's stage upon diagnosis, the presence of metastases, and the type and timing of treatment (Martz *et al*., 2020). Thus, the objective of this case report is to describe the surgical intervention carried out to remove the cervical tumor in a local breed cow under low epidural anesthesia in a standing position.

Case history and presentation; A six year old recently bought cow was presented to the Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a history of swelling inside the vulva. A very firm up on palpation and a circular mass was observed inside the vulva. The cow was in good health.

Clinical and diagnostic assessment; Up on routine clinical examination respiratory rate was 28 breaths/minute, heart rate 46 beats/minute, and body temperature of 38.5^{o}C. An abnormal circular mass was attached to the dorsal end of the cervix (Figure 11C) which was revealed per vaginal examination using a vaginal speculum. The mass was pendulous and on palpation, it was hard in consistency while the area exposed to the environment was contaminated with dirt (dark and covered with dead tissues) and the part that was inside had a red color. The previous owners hid the mass by suturing some parts of the vagina before selling the cow. Based on clinical findings, it was tentatively diagnosed as a localized cervical mass and was decided to surgically excise the mass.

Preoperative preparations; The cow was administered intramuscularly with 11 ml of Procaine penicillin at a dosage of 24 mg/kg and Dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China). The mass was cleaned and debrided as it was contaminated with dirt and other contaminants. The estimated weight of the cow was 280 kg.

Anesthesia and animal control: Lower epidural anesthesia was achieved using 1 ml of 2% Lidocaine (Manufactured by Sakar Healthcare Ltd., India), using a 16 GG syringe. The animal was in a standing position inside the crush controlled by rope with the help of the owners. The tail was moved to one side for a clear visual of the mass and easy access. The edges of the vulva were exposed to the opposite side with sterile hands by assistants (Figure 11C).

Surgical treatment and intervention: After cleaning the mass (Figure 11B), the mass was held tightly with tissue forceps. Then, it was ligated near the base about 5cm from the cutting site using PGA #2 for easy removal and to prevent bleeding. The mass was surgically excised using scissors. Then the cervix was checked for any bleeding.

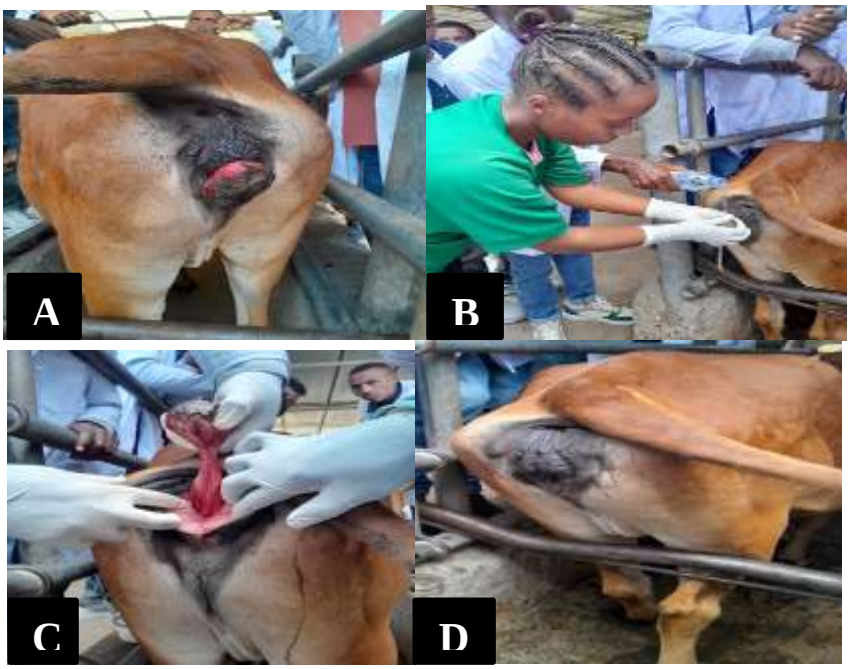

Figure : Surgical excision of cervical tumor in cow and its progress

A). The cow before surgery B). Cleaning the mass

C). The mass attached to the cervix is exposed D). The cow after the removal of the mass

Post-operative care and outcome: The same antibiotic was continued for three days. The incision site was checked for any bleeding daily until the site healed. The cow recovered.

Discussion

Cervical tumors are rare in cows, but if they occur, they can lead to reduced reproductive performance. Timely intervention, proper surgical technique, and postoperative care are critical for favorable results. In the present case, the tumor was surgically removed and the cow returned to normal health condition and reproductive performance. Tumors of the cervix occur very rarely, with leiomyomas being the most common, followed by fibromas to a lesser extent. Fibromas are a type of mesenchymal tumor that typically presents as hard, white, and spherical masses. They can exist as solitary or multiple

tumors, consisting of a dense accumulation of collagenous fibrous connective tissue (Prasad *et al*., 2019). Genital system tumors are infrequently seen in cows. Studies have shown that around 10-50% of these tumors arise from smooth muscle tissue, with roughly 10% of them classified as malignant (Gündüz *et al*., 2011). The prevalent neoplasms observed included squamous cell carcinomas and fibromas, fibropapillomas, and fibrosarcomas (Yeruham *et al*., 1999). Genital tumors have the potential to interfere with artificial insemination procedures and may also contribute to dystocia during calving (Sendag *et al*., 2008).

Sendag *et al*., (2008), Prasad *et al*., (2019), Raja *et al*., (2020), and Kumar *et al*., (2019b), Reported inducing epidural analgesia by administering 7 ml of 2% lignocaine hydrochloride at the sacrococcygeal junction before removing the cervical tumors, which is similar to the anesthetic protocol used for the present case.

Conclusion and recommendation; Genital tumors in cows are rare but can have significant implications for animal health and productivity. While the incidence of these tumors is low compared to other domestic animals, they can still impact reproductive efficiency and overall herd management. Tumors arising from the genital tract, including the uterus, vulva, and cervix, may vary in type and severity, ranging from benign growths to malignant neoplasms. Despite their rarity, these tumors require prompt diagnosis and appropriate management to mitigate potential complications such as infertility, dystocia, and metastasis. Further research into the etiology, diagnosis, and treatment of genital tumors in cows is warranted to improve our understanding and management of these conditions in bovine populations.

3.5.4. Mast cell tumor in dog

Abstract

A wide array of growths can develop in the skin, subcutaneous tissue, and associated structures. Cutaneous neoplasms are the primary concern in male dogs. This case report

presents the surgical management of a cutaneous mast cell tumor in thirteen year old dog that was presented to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a localized circular swelling on the right thigh that began growing around a year ago. Routine physical and clinical examinations were carried out. A firm circular mass that had grown inside the skin on the right hind thigh was identified through palpation and passed for surgical treatment. The mass was surgically removed and the subcutaneous tissue was sutured in simple continuous suture technique using PGA #2. The skin was closed using silk #2 in a simple interrupted manner.

Keywords; *Cutaneous neoplasms, Dog, Cutaneous mast cell tumor*

Introduction

A wide array of growths can develop in the skin, subcutaneous tissue, and associated structures. Skin tumors rank among the most common conditions in dogs presented for histopathological evaluation. Given their conspicuous nature, owners often notice them early, prompting veterinary consultation. Cutaneous neoplasms are the primary concern in male dogs, while they rank second in frequency for female dogs (Martins *et al*., 2022). Skin and mammary tumors are the most common neoplasms observed in canines, occurring at a rate twice as high as in humans. A diverse array of tumor types can affect the skin, subcutaneous tissue, and adnexal structures in dogs (Kashyap *et al*., 2013). Skin tumors are prevalent in dogs due to the skin's susceptibility to damage from various physical and chemical factors. Additionally, the skin's high cell turnover rate increases the likelihood of genetic disorders and subsequent mutations. Approximately 30% of all canine tumors originate in the skin (Hassan *et al*., 2022). Skin tumors, which encompass a diverse range of both benign and malignant growths, are frequently observed in dogs. Notably, specific types of skin tumors such as mast cell tumors, lipomas, histiocytomas, and soft tissue sarcomas (like perivascular wall tumors) were consistently found to be more prevalent in dogs across various studies, despite discrepancies between them (Kok *et al.,* 2019).

Mast cell tumor (MCT) stands out as the most prevalent malignant skin tumor in dogs. Clinically staging the tumor and assessing its histologic grade are common methods for estimating its biological behavior. The recommended approach for addressing localized mast cell disease involves surgically removing the tumor along with margins of adjacent healthy tissue, known as surgical margins. The primary objective of surgical intervention is to fully excise the tumor, thereby reducing the risk of local recurrence (Selmic and Ruple, 2020). Mastocytomas, also known as mast cell tumors, are abnormal growths originating from mast cells, although their exact cause remains unclear. While they commonly manifest as elevated, reddened, and hairless masses, mast cell tumors can exhibit either benign or aggressive clinical behaviors and affect various anatomical locations. They typically afflict older dogs, with a higher incidence observed in breeds such as boxers, bulldogs, Boston terriers, Golden Retrievers, and Labrador Retrievers (Rani *et al*., 2013).

In most instances, surgical removal remains the favored approach for addressing cutaneous tumors. However, the choice of treatment hinges on factors like the tumor type, its grade, stage, and where it's located. For malignant tumors, radiation therapy or chemotherapy may be employed either independently or alongside surgical intervention (Martins *et al*., 2022). According to Ribeiro *et al*., (2022), the most frequent locations for primary mast cell tumors were observed to be the inguinal area and the limbs. Therefore, the objective of this case report is to provide detailed information about the surgical treatment of cutaneous mast cell tumors in dogs performed in lateral recumbency under general anesthesia.

Case history and presentation; A thirteen years old dog was presented to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a localized circular swelling on the right thigh that began growing around a year ago.

Clinical and diagnostic assessment; Routine physical and clinical examinations were carried out. A firm and hairless circular mass that was grown inside the skin on the right hind thigh was identified through inspection and palpation. The dog was in good body

condition and ate and drank normally. The animal was alert and showed no sign of infection. The body temperature, respiratory, and heart rate were found between the normal ranges. Finally, the circular mass was decided to be removed surgically.

Preoperative preparations; The dog was made to withhold water and food for 6 and 12 hours respectively. The dog was administered intramuscularly with 2 ml of Procaine penicillin at a dosage of 24 mg/kg and dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China) one hour prior to the surgery. The area around the mass and the mass itself was shaved, cleaned, and prepared aseptically for surgery. Then drape was placed on the site and made ready for surgery (Figure 12A). The estimated weight of the dog was 30 kg.

Anesthesia and animal control: The dog was controlled on lateral recumbency with the affected leg upwards. The dog was pre-medicated with 2 ml of diazepam at the dose of 10mg/2ml (Zesop® Manufactured by Humanwell Pharmaceutical Ethiopia PLC, Amhara Region, Ethiopia) administered through I.M. 3 ml of Diazepam (Manufactured By Intas Pharmaceutical Ltd., India) @0.15mg/kg and ketamine (Ketamine Hydrochloride Manufactured in Neon Laboratories Ltd, India,) @5mg/kg combination was administered intravenously to achieve general anesthesia.

Surgical treatment and intervention: A circular skin incision around the mass was made with a surgical blade, which was followed by a blunt incision of the subcutaneous tissue with scissors (Figure 12B). The blood supply was high around the mass and any bleeding encountered was ligated either with hemostatic forceps or with suture material if the bleeding was heavy. Then after completely dissecting the surrounding tissues the mass was completely removed from the site. Following the removal wide hallow area was left, which was sutured together using PGA #2 in a simple continuous manner (Figure 12C). Then procaine penicillin powder was sprinkled over the subcutaneous tissue. Then the skin was sutured using silk #2 in a simple interrupted suture technique. Finally, the site was scrubbed with diluted iodine tincture solution (Figure 12D).

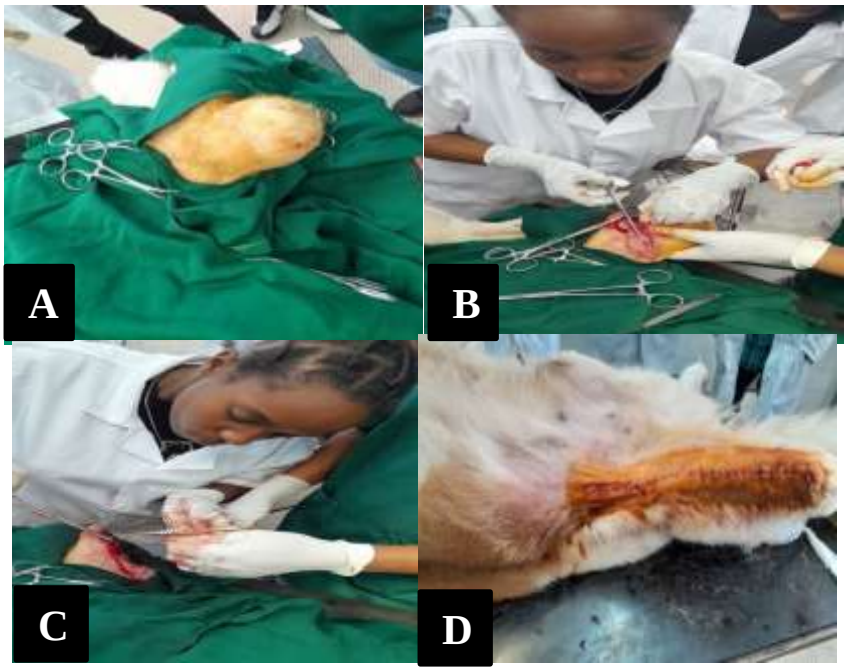

Figure : Surgical excision of cutaneous tumor in dog and its progress

A). Aseptic preparation of the site, ready for surgery. B). Dissection of the tissues using scissors on progress. C). Suturing the subcutaneous tissues in progress. D). The thigh after the mass was removed and the skin was closed.

Post-operative care and outcome: The dog was closely monitored until it woke up from anesthesia. The owner was advised to keep the dog in a collar and to prepare a clean and warm resting area for the dog. Unfortunately, the dog died the next day, which could be due to anesthesia complications, as the dog was a geriatric patient.

Discussion

Mast cell tumors of the skin can be treated surgically but for favorable results, it is critical to have timely intervention, proper surgical technique, and postoperative care. In the present case, the dog was not treated immediately which led to the death of the animal. Mast cell tumor (MCT) of the skin is commonly encountered in dogs, representing approximately 16% to 21% of all skin tumors diagnosed in this species. MCT exhibits a diverse range of biological behaviors, varying from solitary, well-defined

tumors to aggressive forms with metastatic spread. Due to its wide array of clinical manifestations, prognostic factors play a crucial role in the diagnosis and classification of MCT (Ribeiro *et al*., 2022). Mast cells play a pivotal role in acute hypersensitivity reactions and allergic conditions. Initially originating in the bone marrow, they subsequently migrate to peripheral tissues for maturation. Typically absent in the bloodstream, mast cells are primarily concentrated in lymphoid organs and well-vascularized tissues like the lungs, liver, skin, and gastrointestinal (GI) tract (Gieger *et al*., 2005).

The cause of canine mastocytoma is uncertain but likely involves multiple factors. Mastocytomas are typically solitary tumors found in the subcutaneous connective tissue, most commonly occurring around the age of 8.5 years on average. While not always malignant, they possess the potential to be so. Mast cell tumors account for up to 25 percent of skin tumors in dogs (Rani *et al*., 2013). The skin, being the largest organ system in the body, is frequently afflicted by neoplastic conditions in dogs (Mukaratirwa *et al*., 2005).

The primary therapeutic modality recommended for cases of canine MCT is surgical excision (De Nardi *et al*., 2022). In most veterinary practices, definitive surgery can be conducted without the need for extra instruments or specialized equipment. This approach is particularly suitable for dogs with localized mast cell tumors of low or intermediate histologic grade (grade I or II). Additionally, surgery is most effective for tumors located in areas where wide resection is feasible (Fan and De Lorimier, 2005). The above report supports the surgical intervention used to treat the present cutaneous mast cell tumor.

According to Rani *et al*., (2013) case report, the animal was premedicated with Atropine sulfate at a dose of 0.04mg/kg body weight subcutaneously, and Xylazine hydrochloride at a dose of 1mg/kg body weight intramuscularly. General anesthesia was then induced with Ketamine hydrochloride at a dose of 10mg/kg body weight intramuscularly. While for the present case, general anesthesia was induced with a diazepam-ketamine

combination administered intravenously. A similar surgical procedure to Kashyap *et al*., (2013), was applied for the current case.

Conclusion and recommendation; Cutaneous tumors are frequently encountered in dogs, presenting a range of benign and malignant neoplasms. Among these, mast cell tumors (MCTs) stand out as one of the most commonly diagnosed malignant skin tumors. Surgical excision remains the preferred treatment option for most cutaneous tumors, including MCTs, particularly when they are localized and of low or intermediate histologic grade. The success of surgical treatment depends on various factors, including tumor type, grade, stage, and location. Additionally, for malignant tumors, adjuvant therapies such as radiation or chemotherapy may be considered to improve outcomes. Overall, prompt diagnosis and appropriate surgical intervention are essential in managing cutaneous tumors in dogs, aiming to achieve complete tumor removal and minimize the risk of recurrence.

3.6.Aural hematoma in bitch

Abstract

Aural hematoma or othematoma in dogs is a blood-filled subcutaneous fluctuant swelling on the pinna, formed when traumatic rupture of the capillaries and separation of the auricular cartilage and skin occurs. The objectives of surgical treatment involve eliminating the hematoma, facilitating drainage, preventing reoccurrence through proper tissue alignment, and preserving the natural appearance of the pinna by reducing scar tissue formation. A four year old bitch was presented to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a swelling on the left ear that began a week ago. Routine clinical examinations were done and the case was diagnosed as aural hematoma after checking with needle aspiration and passed for surgical management. Under general anesthesia longitudinal incision was made on the swollen part of the ear avoiding major blood vessels and the contents were drained, the inside was cleaned and a simple horizontal mattress suture technique was used to close

the incision. Then the suture material was removed on the 15th day and the wound completely healed.

Keywords; A*ural hematoma, Bitch, Pinna*

Introduction

Aural hematoma or othematoma in dogs is a blood-filled subcutaneous fluctuant swelling on the pinna, formed when traumatic rupture of the capillaries and separation of the auricular cartilage and skin occurs, clinically traduced by the presence of fluctuating hematogenous collections, disposed on the external (convex) face (Beteg *et al*., 2011; Hewitt and Bajwa, 2020). It is a common problem in dogs that have a floppy pendulous ear like cookel spanil, labrador, and basset hound, and it was also reported in dogs with erect ears like German Shepherds and some breeds of Spits. Aural hematomas typically manifest unilaterally, occasionally leading to hematoma formation in the opposite ear, albeit less frequently. In rare instances, they may occur bilaterally. They typically develop on the concave surface of the pinna (Falih, 2010). Secondary to otitis externa ear scratching and head shaking are thought to be the main causes of cartilage disruption, the disruption of cartilage leads to the rupture of blood vessels that are found in the auricular cartilage which consequently results in aural hemorrhage formation. The presence of fluid buildup within the cavity delays the healing process, leading to persistent discomfort and, over time, deformation of the pinna if auricular hematomas are left untreated (Itoh *et al*., 2022). It's crucial to manage or address the underlying factors causing otitis to prevent both secondary otitis and the formation or recurrence of aural hematomas (Hewitt and Bajwa, 2020).

Different management protocols are used for AH disorder which are based on both the severity and the effectiveness of the procedures. The different management protocols include; AH fluid aspiration, dexamethasone infusion, and surgical incisions. The most commonly used treatment is surgical intervention due to its effectiveness in preventing the reoccurrence of hematoma and can also maintain both the natural and aesthetic

appearance of the ear pinna. Various conservative and surgical techniques are available for treating this condition, ranging from surgical incision followed by closure using pin sutures, sometimes combined with the application of a compression sponge. An alternative approach involves inserting a Penrose drain between the two ends of the hematoma into the inner sagittal side of the inner auricle. This method offers the benefit of significantly reduced anesthesia time (Győrffy and Szijártó, 2014; Feyisa *et al*., 2020).

The objectives of surgical treatment involve eliminating the hematoma, facilitating drainage, preventing reoccurrence through proper tissue alignment, and preserving the natural appearance of the pinna by reducing scar tissue formation. There exist various surgical methods, yet the majority of veterinarians opt for one of four techniques: incisional, punch biopsy, laser, or drain (Asinga, 2006). The management of aural hematoma presents various options, with surgical interventions being the most common approach. Nonetheless, the outcomes are not consistently favorable overall. As indicated by several authors, regardless of the chosen therapy, early treatment initiation upon diagnosis is crucial to forestalling lesion extension or ear deformity resulting from fibrosis (Makker *et al*., 2021). Thus, the objective of this case report is to describe the surgical management of aural hematoma by surgery in bitch under general anesthesia.

Case history and presentation; A five year old bitch came to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a history of swelling on the left ear that began a week ago. The owner complained that they observed a swelling on the left ear.

Clinical and diagnostic assessment; A careful physical examination was done. The body temperature was 38.6^{o}C, heart rate 76 beats/minute, and respiratory rate 22 breaths/minute. The bitch was in a good body condition. A soft, fluctuating swelling was detected on the inner (concave) surface of the left ear flap, and needle aspiration revealed blood. The dog also exhibited a high prevalence of flea infestation. Given these observations, the condition was diagnosed as an aural hematoma, prompting the decision for surgical treatment.

Preoperative preparations: The bitch was made to withhold feed and water per usual for 12 and 6 hours respectively. The inner part of the affected ear was cleaned with antiseptics and the hair on the external part was shaved, and cleaned properly, and a sterile drape was placed around the affected ear (Figure 13A). One hour prior to the operation the bitch was administered intramuscularly with 1 ml of Procaine penicillin at a dosage of 24 mg/kg and dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China). The estimated weight of the bitch was 20 kg.

Anesthesia and animal control: The bitch was pre-medicated with 1 ml diazepam administered through I.M., after the animal was kept in lateral recumbency with the affected ear uppermost, with the limbs tied to the surgical table. General anesthesia was achieved with 3 ml of Diazepam at the dose of @0.15mg/kg and Ketamine (Ketamine Hydrochloride Manufactured in Neon Laboratories Ltd, India,) @5mg/kg I.M combination administered intravenously.

Surgical treatment and intervention: A ball of gauze was placed in the ear canal, and then a small longitudinal incision was made on the inner surface of the ear flap (pinna) over the area of the hematoma. It was typically made in the most dependent area to allow for proper drainage. Then accumulated blood within the hematoma immediately oozed, and it was carefully drained by applying gentle pressure. Any bleeding vessels were ligated to achieve hemostasis and prevent further bleeding into the ear. Then the inside was cleaned with sterile gauze soaked in diluted povidone-iodine solution and dried (Figure 13B). Parallel horizontal interrupted mattress sutures were utilized along the incision line by PGA #2 in a manner that minimizes tension on the incision site then, the ear was dressed with antiseptic.

Figure : Surgical management of aural hematoma in bitch and its outcome

A). The affected ear aseptically prepared B). Cleaning of the hematoma on progress
C). The ear on the third day D). The dog after recovery

Post-operative care and outcome: The dog was closely monitored as it recovered from anesthesia. Pain management medication (Tramadol HCL, manufactured by Huons Co., Ltd, Republic of South Korea) was administered intramuscularly for two days to keep the dog comfortable during the recovery period. 1 ml of Procaine penicillin at a dosage of 24 mg/kg and dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China) was also given intramuscularly for five consecutive days. The incision site was monitored and cleaned with antiseptics daily until the wound healed. The suture material was removed on the 15th day and the wound healed completely.

Discussion

In cases of aural hematoma in the dog, timely surgical intervention results in a good prognosis. In the present case, the hematoma was detected and treated early and the dog was able to recover without severe post-operative complications. An ear hematoma refers to the gathering of blood between the skin and cartilage of the ear, typically presenting as a fluid-filled swelling on the inner, concave surface of the pinna. Additionally, factors such as infestations with ear mites, bites from flies, or certain dermatological conditions can also contribute to the development of hematomas (Falih, 2010). Various surgical methods have been outlined for treating ear hematomas, aiming to eliminate the hematoma, prevent its recurrence, and preserve the natural appearance of the ear. The typical approach involves making an incision in the affected tissue to drain the blood clots and fibrin, followed by stabilizing the cartilage to facilitate scar tissue formation (Beteg *et al*., 2010).

Several surgical methods have been documented in scientific literature. Surgery stands as the primary treatment option for hematomas in dogs. The predominant technique often described involves making a linear incision followed by suturing. Placing cotton balls or gauze in the ear canal beforehand serves to prevent fluids from seeping into the canal during the procedure (Hewitt and Bajwa, 2020; Asinga, 2016; Mikawa *et al*., 2005). The above statement is in alignment with the current surgical intervention used to treat aural hematoma.

According to Reddy and Kumar, (2020), case reports the dog was premedicated with atropine sulfate @ 0.04mg/kg subcutaneously xylazine @ 1mg/kg, and ketamine @ 10mg/kg. While Feyisa *et al*., (2020), reported pre-medicating the dog with tramadol 2mg/kg and xylazine 1mg/kg and anesthetizing with ketamine 5mg/kg and diazepam 0.5mg/kg intravenously the same anesthetizing agent was used for the present case, while diazepam was used for the pre-medication. Beteg *et al*., (2011) reported injecting acepromazine followed by Ketamine 10 minutes after acepromazine administration.

"S" shaped incision of the skin and cartilage on the concave (internal) along the length of the auricular hematoma was reported by Beteg *et al*., (2011) and Reddy and Kumar,

(2020), while longitudinal incision over the length of the hematoma on the pinna's concave surface was made according to the report made by Feyisa *et al*., (2020) which similar procedure used in the current case.

Conclusion and recommendation; Surgical intervention remains a prevalent and effective treatment modality for aural hematomas in dogs. Various surgical techniques, including incision with sutures, placement of drains, or fenestration, have been described, each with its advantages and considerations. Timely diagnosis and prompt surgical intervention are crucial to prevent complications and promote optimal outcomes. Additionally, postoperative care, such as bandaging and drain removal, plays a vital role in the healing process. Overall, with appropriate surgical technique and diligent postoperative management, aural hematomas in dogs can be effectively addressed, providing relief to the affected animals and improving their quality of life.

3.7.Obstructive urolithiasis in bull

Abstract

Obstructive urolithiasis is defined as the concentration of urinary calculi that may lodge in a different part of the urinary system but most of the time occurs at the distal end of flexture in ruminants and it is a metabolic disease of male ruminants. This case report describes the successful surgical intervention to treat obstructive urolithiasis in a four year old bull that was presented to Amanuel Veterinary Clinic (Dire) with a history of complete cessation of urination and reduced feed and water intake. Regular clinical and physical examination was conducted and the case was decided to perform a post-scrotal urethrostomy after tentatively diagnosing it as obstructive urolithiasis. The penis was infected and infested by worms. Both epidural and local desensitization were used and the penis was exteriorized near the post-scrotal area, after ligating the blood vessels the penis was resected and sutured together with skin leaving a permanent opening that enables the bull to urinate through it. The skin sutures were removed on the 16^{th} day. The

animal recovered without any severe complications and was used for fattening purposes. After two months the bull has gained weight.

Keywords: *Bull, Obstructive urolithiasis, Post-scrotal urethrostomy*

Introduction

Obstructive urolithiasis is a worldwide disease that has major importance in domestic animals, and it is the 5th most prevalent cause of death in feedlots. It is defined as the concentration of urinary calculi that may logde in different parts of the urinary system but most of the time occurs at the distal end of flexture in ruminants and it is a metabolic disease of male ruminants. The cause of obstructive urolithiasis mostly involves both the anatomic and dietary factors. The distal part of the sigmoid flexure is the anatomical factor, in this area there is frequent urolith lodgement in large ruminants. Due to narrowed urethral diameter, urethral calculi at this location can cause partial or complete blockage of the urethra and rupture of the urinary bladder. Following the above reasons urolithiasis is more common in male cattle when compared to females (Abdallah *et al*., 2021; Meharu 2022).

The exact etiology is complex and multifactorial but it may occur due to excessive or imbalanced intake of minerals. Uroliths and external trauma are the two most common causes of urethral obstruction. Urinary obstruction may also occur due to cystitis. Urethrostomy, bladder marsupilisation, tube cystotomy penile catheterization, and penile amputation are the different surgical procedures that are used to treat urolithiasis (Kumar *et al*., 2016; Sultan *et al*., 2017; Sutradhar *et al*., 2018; Kushwaha *et al*., 2023).

Urinary calculi can become lodged at various points along the urinary tract, from the renal pelvis to the glans penis. However, when they obstruct the bladder neck, or urethra, they can cause complete urinary flow blockage, exacerbating the severity of the condition. Bovine urinary calculi vary in size and diameter and are commonly found at the insertion point of the retractor penis muscle in the distal sigmoid flexure (Sultan *et*

al., 2017). The makeup of urinary stones differs depending on the region. Urinary calculi typically exhibit varying mineral compositions across different animal species. Predominant constituents include silica, magnesium ammonium phosphate (known as phosphatic or struvite), calcium carbonate, and calcium oxalate, particularly in ruminants (Makhdoomi and Gazi, 2013).

Clinical manifestations of obstructive urolithiasis include the absence of urine production (anuria), signs of discomfort such as restlessness, and strenuous and painful attempts to urinate. Affected animals may exhibit abdominal pain, often indicated by kicking at the belly, and may frequently change positions between standing and lying down. Other symptoms include bladder distention, tail swishing, flank movements (both inward and outward), and pulsations of the urethra near the ischial arch due to urine accumulation proximal to the calculus. Severe cases may also lead to rectal prolapse and the presence of calculi or sandy material on preputial hair, with varying degrees of reduced appetite or anorexia (Kushwaha *et al*., 2023). Therefore, the objective of this case report is to describe surgical treatment and intervention of urethral obstruction by perineal urethrostomy in a local breed bull by epidural anesthesia and its outcome.

Case history and presentation; A four year old bull came to Amanuel Veterinary Clinic (Dire) with a history of complete cessation of urination and reduced feed and water intake. The bull was emaciated, depressed, and with a rough hair coat.

Clinical and diagnostic assessment; Routine clinical and physical examinations were done. The bull was emaciated, half of the penis was gangrenous and the skin around the penis was also ruptured, revealing a very infected and wounded part of the body that was created to help the bull urinate through it three days ago and was stuffed with cloth. The bull had a rough hair coat and was dehydrated and attempting to urinate with no luck. The entire gangrenous penis was hanging down outside contaminated with dirt. Based on the above diagnosis, the case was diagnosed as obstructive urolithiasis and passed to be treated surgically.

Preoperative preparations; One hour prior to the operation the bull was administered intramuscularly with 8 ml Procaine penicillin at a dosage of 24 mg/kg and Dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China). The region behind the scrotum was extensively readied for urethrostomy through hair removal and thorough surgical cleansing. The estimated weight of the bull was 200 kg.

Anesthesia and animal control: The patient was positioned in left lateral recumbency following the administration of light epidural anesthesia at the sacrococcygeal space using a 16 G needle with a dosage of 1 ml of 2% lidocaine hydrochloride (Manufactured by Sakar Healthcare Ltd., India). Additionally, line infiltration was also administered subcutaneously and into deep muscles on the incision site. The fore and hind limbs were secured together to expose the surgical area supported by assistants.

Surgical treatment and intervention: The gangrenous part of the penis was cleaned, revealing the presence of worms and infection (Figure 14B) and it had a foul odor. The cloth used to fill the ruptured skin around the penis was subsequently extracted, exhibiting a putrid odor and bearing traces of abscess. Then above the scrotum, a longitudinal incision was made and the muscles were dissected using scissors. Then the urethra and entire penis were reached but it was very difficult to exteriorize due to its high adhesion with the surrounding tissues but it was exteriorized successfully (Figure 14C). Any bleeding encountered was controlled with hemostatic forceps or ligated with suture material. The urethra had ruptured and obstructed in the middle. Then, double ligature was applied to the dorsal penile blood vessels, and the penis was cut proximal to the obstructed part and about 5cm distal to the proximal end of the skin incision. Then, urine immediately came out and a catheter was inserted for the animal to urinate properly until the surgery was completed. A roughly 3 cm long segment of the penis was extended and secured to the border of the skin incision using a simple interrupted suture on each side. Additionally, interrupted sutures were positioned beneath the penis segment at the skin edge to prevent it from retracting inward. The rest of the skin incision was closed similarly with simple interrupted sutures using silk #2.

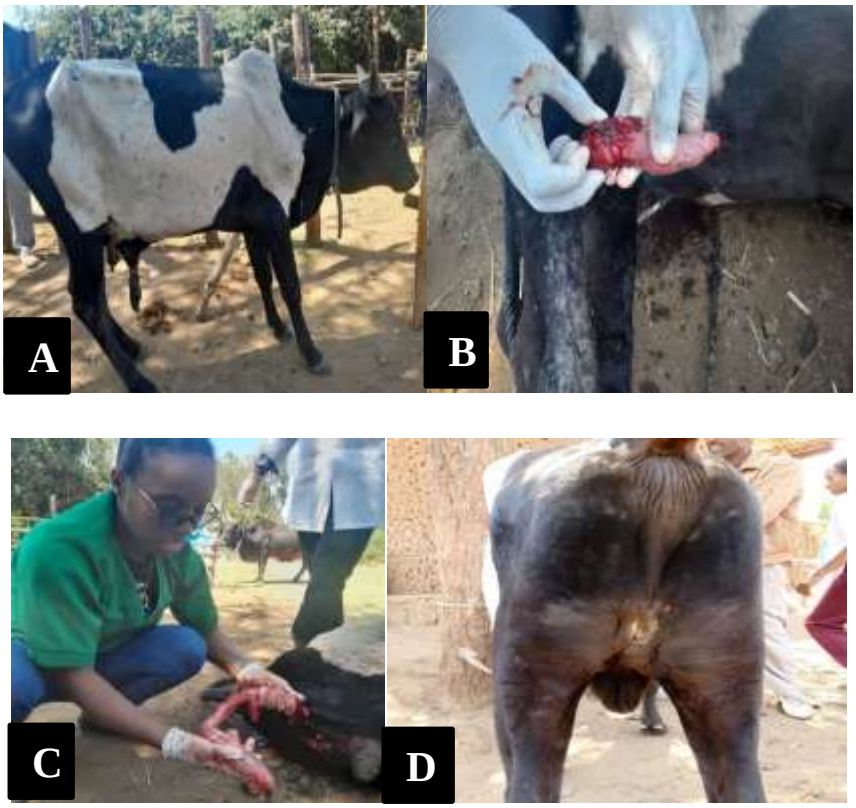

Figure : Surgical management of obstructive urolithiasis and its outcome in bull

A). The bull pre-operation presented to the clinic B). The penis filled with worms and infected C). The exteriorized penis D). The completely healed wound and the bull after two months.

Post-operative care and outcome: Following the completion of the surgical procedure, the animal was allowed access to water and resumed normal feeding after going home. The owner received instructions to ensure the animal had an adequate supply of water and food. Additionally, they were advised against using the animal for heavy labor and instead consider feeding or selling it for slaughter within three months. Luckily the owner informed us he would be using the bull for a fattening purpose. The preoperative antibiotics were administered for five days post-surgery, and the wound area was regularly cleansed and irrigated with antiseptics until complete healing occurred. No stricture formation occurred post-operative. Skin sutures were removed on the 15th day

without severe complications, and the animal successfully recovered, regaining body weight (Figure 14D).

Discussion

In severe cases of obstructive urolithiasis, post-scrotal urethrostomy is indicated to save the life of the animal. For favorable results, it is critical to have timely intervention, proper surgical technique, and postoperative care. In the current case, the obstruction was detected early and perineal urethrostomy saved the life animal and restored its health. Urinary calculi formation, known as urolithiasis, involves the aggregation of stones that can obstruct various parts of the urinary system, commonly lodging in the distal end of the sigmoid flexure in ruminants. This condition poses a significant challenge, particularly in males, owing to the anatomical structure of their urinary tract. Obstructive urolithiasis in male ruminants arises from a blend of anatomical and dietary factors (Abdallah *et al*., 2021).

Uroliths typically obstruct the urethra at points like the distal sigmoid flexure or the vermiform appendage, where the urethra narrows. Blockage at these junctures may lead to urethral or bladder rupture (Ewoldt *et al*., 2008). Urethrostomy involves the creation of an opening in the urethra, which can be either temporary or permanent. Typically used to facilitate urination in animals, this procedure, like perineal urethrostomy, permanently establishes an opening in the urethra by suturing the mucous membrane and skin together (Sultan *et al*., 2017). Perineal urethrostomy is frequently employed to address obstructive urolithiasis, particularly in feedlot steers, serving as a last-resort measure. However, this procedure renders the animal unsuitable for breeding. Its main goal is to sustain the animal's life and growth until it reaches the point of slaughter (Zazulak, 2022).

Meharu (2022) and Kushwaha *et al*., (2023) reported using caudal epidural anesthesia that was induced using 2% lidocaine hydrochloride at a dosage of 0.22 mg/kg with a 16G needle which supports the present case report. Subsequently, local infiltration of 3-4 ml of 2% lignocaine hydrochloride was administered subcutaneously and into deep muscles

for the current case. But Kumar *et al*., (2019), reported using local infiltration of lidocaine at the site of incision.

Conclusion and recommendation; Post-scrotal urethrostomy stands as a crucial intervention for addressing obstructive urolithiasis in bulls, particularly in cases where other treatment modalities have proven ineffective or impractical. While it serves as a salvage procedure primarily employed in feedlot steers, its significance lies in providing a viable solution to maintain the health and well-being of affected animals, ensuring their continued growth and development until eventual slaughter. Despite rendering the bull unsuitable for breeding, post-scrotal urethrostomy plays a pivotal role in preventing further suffering and enabling the animal to thrive until the end of its production cycle.

3.8.Open castration in domestic animals

3.8.1. Hyena bite in jack

Abstract

The donkey, also known as an ass, serves as a significant draft animal across various regions globally, particularly in underdeveloped countries where equids play a vital role in agricultural economies. Hyena bites are becoming a huge problem for the farmers rearing animals, especially donkeys. This case report presents the surgical management of a hyena bite in six year old jack that was presented to Amanuel Veterinary Clinic (Dire) with a history of being bitten on the scrotum by a hyena 10 hours ago. A complete clinical examination was conducted. The scrotum and the penile skin were eaten and torn by the hyena and the penis was completely hanging freely. Blood was dripping and the entire hind limbs were covered with blood. Immediate action was taken to arrest the profuse bleeding from the spermatic cords and the scrotum. Then the spermatic cords were ligated using PGA #2, the remaining testes were removed and the penis was cleaned and returned to its original position. The remaining skin was sutured together using fords

interlocking simple continuous suture technique using silk#2. Then the jack died 30 minutes post-operation after entering into hypovolemic shock.

Keywords; *Hyena bite, Jack, Ligation, Scrotum*

Introduction

The donkey, also known as an ass, belongs to the Equidae family and is classified as Equus asinus. It serves as a significant draft animal across various regions globally, particularly in underdeveloped countries where equids play a vital role in agricultural economies. Despite their importance, donkeys often lack adequate care, despite being susceptible to numerous diseases that can impact their health and diminish their capacity to work effectively (Saul *et al*., 1997). Hyenas are frequently sighted across various regions of Ethiopia, although their prey population seems to be relatively scarce. This trend was also noted in Ada'a district, located in central Ethiopia. The spotted hyena is known for its tendency to hunt and scavenge domestic animals, primarily donkeys, sheep, and goats (Beyene and Asfaw, 2017).

Castration stands as one of the oldest and most commonly practiced surgical procedures in veterinary medicine, particularly in equine practice. Despite its routine nature, castration is associated with a higher incidence of complications compared to other elective surgeries, with some complications posing life-threatening risks (Robert *et al*., 2017). Multiple studies have detailed various techniques for surgically castrating equines, encompassing methods such as open, modified open, closed, semi-closed (via scrotal or inguinal approach), section-ligation-release (SLR), and laparoscopic procedures performed with the animal standing, in lateral or dorsal positions (Ibrahim *et al*., 2021). The primary origin of bleeding is typically the testicular artery, although occasionally it may arise from a scrotal vessel, such as branches of the external pudendal vessels or a vessel within the cremaster muscle (Badawy, 2009).

Primary closure of castration wounds offers benefits like quicker recovery, reduced postoperative care, and improved cosmetic results with a lower risk of eventration. Despite being a straightforward procedure for skilled equine veterinarians, complications are frequent. Some, like hemorrhage and eventration, can be severe. Postoperative swelling and edema in the prepuce and scrotal region are typical, with infection being the next most common issue following castration (Badawy, 2009). Thus, the objective of this case report is to describe a surgical intervention done to treat the scrotum bitten by a hyena in jack and its outcome.

Case history and presentation; A six year old jack came to Amanuel Veterinary Clinic (Dire) with a history of being bitten by a hyena 10 hours ago.

Clinical and diagnostic assessment; A complete clinical examination was conducted. The scrotum and the penile skin were torn by the hyena and the penis was completely hanging freely (Figure 15A). Blood was dripping and the entire hind limbs were covered with blood. There was profuse bleeding and the donkey was in very severe pain. The spermatic cord was also severely damaged and bleeding nonstop. There were parts of the testes that were left in place.

Preoperative preparations; The donkey was administered intramuscularly with 7 ml of Procaine penicillin at a dosage of 24 mg/kg and Dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China). Diclofenac sodium injection at the dose of 75mg/3ml was administered intramuscularly to reduce the pain. (Reyoung® Manufactured by Reyoung Pharmaceutical Co., Ltd, China). Due to the acuteness of the case, the donkey was immediately handled.

Anesthesia and animal control: The animal was controlled in a lateral recumbency with both the hind and fore limbs tied together to properly expose the wound. Then a light epidural anesthesia was given at the sacrococcygeal space using an 18 G needle with a

dosage of 1 ml of 2% lidocaine hydrochloride (Manufactured by Sakar Healthcare Ltd., India).

Surgical treatment and intervention: The wound that was covered in dirt was cleaned by washing it with water and soap and it was properly exposed so the spermatic chord was easily reached and ligated with hemostatic forceps to stop the profuse bleeding. The entire penis was held by an assistant while the ligation took place. Then both the spermatic chords were ligated with absorbable suture material chromic catgut #2 and the remaining testes were removed. Then the penis was washed with clean water and soap and returned to its place in the remaining piece of skin that was in place. Additionally, tetracycline ointment was applied all over the penis and the surrounding tissue. Finally some of the skin that was left in place after the bite we sutured using a continuous interlocking technique using silk #2 (Figure 15B). Then the wound was sprayed with antiseptics.

Figure : Open castration in jack due to hyena bite and its progress

A). Pre-operative presentation B). Suturing of the skin on progress C). The donkey after the surgical treatment

Unfortunately, the donkey could not make it after the surgery. After a few minutes, the donkey entered into shock and died.

Discussion

Hyena bites are becoming a huge problem for the farmers rearing animals, especially donkeys. Immediate control of the blood vessels should be carried out to save the animal. In the present case, due to the delayed handling of the case and excessive blood loss, the jack did not survive. The spermatic cord spans from the abdominal inguinal ring to the testis, serving as a conduit for the deferent duct, nerves, and blood vessels. Running adjacent to the cord is the cremaster muscle. The testicular artery, a sizable vessel, winds alongside the testicular veins to form the pampiniform plexus, responsible for regulating the testis temperature, maintaining it at approximately 4-5ºC cooler than the body. Donkeys exhibit a distinctively prominent spermatic cord, measuring 23-28 mm in diameter, with unique histological characteristics, including a capsule rich in muscular tissue and veins featuring a thick muscular layer. These features likely facilitate efficient venous blood flow from the testis, thereby enhancing testicular function (Canisso *et al*., 2019).

Donkeys possess larger testicles, a more substantial penis, and a thicker scrotum compared to stallions, factors crucial to consider when undertaking castration procedures on jacks. Multiple sources indicate that castrating jacks carries a heightened risk of hemorrhagic complications. While the precise cause for this elevated incidence remains unidentified, there is a prevailing notion that the larger testicles in jacks correspond to larger blood vessels supplying them, thereby increasing the tissue volume removed during castration and consequently raising the likelihood of bleeding (Van den Branden, 2021). Donkeys and mules are more prone to bleeding after castration, likely due to their larger testicles, which have larger blood vessels supplying them. Additionally, many donkeys have thicker scrotal tissue with larger blood vessels, further increasing the risk of bleeding during and after castration (Badawy, 2009). The hyena bit the scrotum which resulted in excessive bleeding which led to the death of the donkey.

Conclusion and recommendation; Ligation of the spermatic cords following a hyena bite in a jack is a crucial surgical intervention aimed at preventing complications and promoting the animal's recovery. By effectively ligating the spermatic cords, veterinarians can minimize the risk of hemorrhage and other post-operative

complications, ensuring the jack's well-being and facilitating its return to normal activities. This procedure underscores the importance of prompt and skilled veterinary care in managing injuries caused by wildlife encounters, such as hyena bites, in working animals like jacks.

3.8.2. Open castration in horse

Abstract

Castration stands out as one of the frequently conducted standard surgical practices in horses. This case report aims to describe the successful surgical management of open castration in three year old stallion living in SPANA that was presented to be castrated. The horse was very active without any signs of disease, which was revealed through the routine physical and clinical examination. The stallion was controlled in lateral recumbency and local infiltration of Lidocaine was done on the sites of incision and directly into each testes. The two testicles were removed by an emasculator through the two incision sites made on the scrotum after ligating the spermatic cords. The wound was left open to heal by second intention. Routine post-operative care was given for the stallion and the horse recovered without any severe post-operative complications.

Keywords: *Castration, Stallion, Tunica vaginals*

Introduction

Stallion castration is frequently carried out to alter behavior or address issues in the testicle and scrotum. The procedure can be either open, involving incision of the vaginal tunic, or closed, where the tunic remains intact. Typically, the scrotum is left to heal naturally, but closure with or without removal may also be performed (Anderson, 2021). Castration stands out as one of the frequently conducted standard surgical practices in horses. It serves to mitigate undesirable aggressive behaviors not fit for breeding purposes and also as a therapeutic measure for conditions like testicular neoplasia,

trauma, inguinal hernias, and spermatic cord torsion. Various castration methods have been outlined for horses (Abou-Ahmed *et al*., 2012).

Various methods have been outlined for equine castration, including open, closed, and semi-closed techniques. Among these, the open technique is the most commonly employed in equine veterinary practice. Both closed and semi-closed methods necessitate general anesthesia, which carries inherent risks, along with the need for aseptic surgical facilities, specialized expertise, and increased costs. Additional castration techniques, such as scrotal ablation with subsequent primary closure and laparoscopic approaches, have also been documented (Marzok *et al.,* 2016). While castration is often viewed as a routine procedure, it still carries risks, and complications arising from it are a frequent source of malpractice claims against equine veterinarians. While many complications are minor and can be managed with minimal intervention, more severe issues like eventration, peritonitis, and hemorrhage may also arise. A comprehensive understanding of male reproductive anatomy and physiology, coupled with proficient surgical skills, is crucial in minimizing the occurrence of complications associated with this procedure (Kilcoyne, 2013).

The disparity in complication rates reported can be attributed to various factors such as diverse field and stall conditions, variations in surgical expertise, availability of equipment and medications, disparities in postoperative care and patient monitoring, as well as differences in the definition and identification of complications. However, a majority of these complications stem from contamination leading to acute and chronic infections, or inadequate ligation resulting in postoperative hemorrhage and eventrations. Given the contamination risk in field castrations, both intraoperative and postoperative antimicrobial treatment are essential, while anti-inflammatory medication is typically administered to anticipate inflammatory responses. Castrations conducted under optimal surgical conditions demonstrate significantly fewer complications compared to those performed under less favorable field conditions (Riemersma, *et al*., 2023). Thus, the objective of this case report is to describe the surgical management of open castration in horse and its outcome.

Case history and presentation; a three year old stallion that lives in SPANA, was brought for castration. The stallion was in great body condition, alert, and active.

Clinical and diagnostic assessment; Routine physical and clinical examinations were done and the temperature was 37.3 ^{o}C, heart rate 29 beats/minute, and respiratory rate was 13 breaths/minute. Then surgical management was carried out accordingly.

Preoperative preparations; The stallion was administered intramuscularly with 12 ml of Procaine penicillin at a dosage of 24 mg/kg and Dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China). Additionally, an anti-tetanus toxin was also administered. Then the scrotum and the areas around it were clipped and aseptically prepared. The estimated weight of the stallion was 300 kg.

Anesthesia and animal control: The horse was made to lie on bedding and was controlled in lateral recumbency with the limbs tied together by rope and assisted by workers. 15 ml of 2% Lidocaine was infiltrated around the base of the scrotum and additionally, incision line infiltration together with injection of Lidocaine directly into the testicles was done.

Surgical treatment and intervention: Two incisions were made in the scrotum, exposing the testicles one followed by the other. Care was taken to avoid excessive tissue trauma and bleeding. Both testes were grasped and squeezed caudally in the scrotum so that the scrotal skin was tight and the median raphe was visible. After incising the vaginal tunics (Figure 16B) the testicles were exteriorized through the incision, allowing access to the spermatic cords. Then the spermatic cords were double ligated to prevent bleeding using PGA #2, and then the testicles were carefully removed using an emasculator. Finally, the incision was left open to heal by the second intention. The scrotal area was finally cleaned using antiseptics.

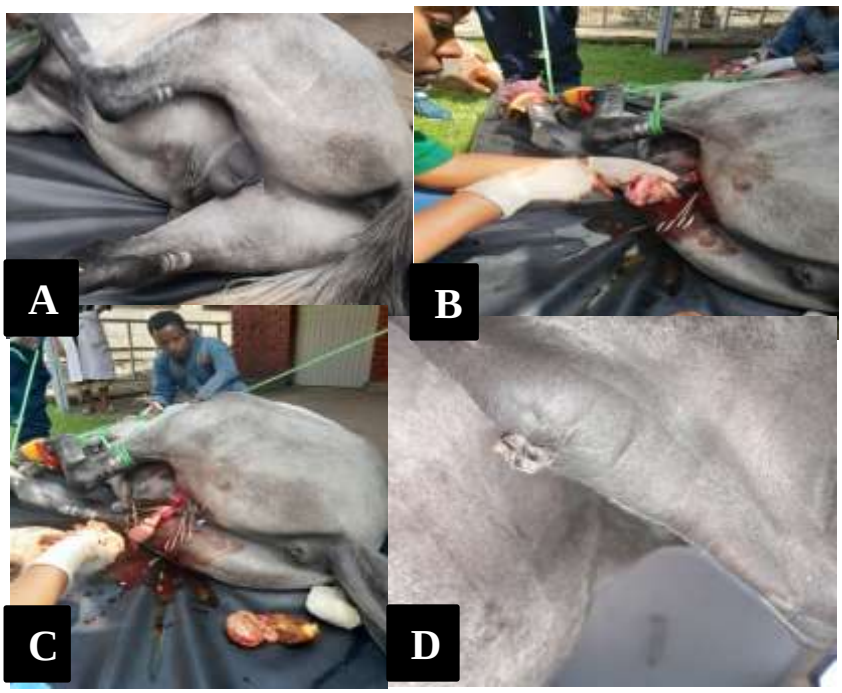

Figure : Open castration in stallion and its outcome

A). The stallion on lateral recumbency B). Incision of tunica vaginals in progress
C). The spermatic cord ligated by hemostatic forceps D). The scrotum after complete healing

Post-operative care and outcome: After the procedure, the horse was monitored closely for any signs of complications such as bleeding, swelling, or infection. An antibiotic was continued for five days and dexamethasone sodium phosphate injection (Inflamgo® Manufactured by Chongqing Fangtong Animal Pharmaceutical Co., Ltd, China) was also administered intramuscularly. The stallion was isolated in a single pen and a clean, warm place was prepared for the stallion to rest until the wound healed. The wound was daily dressed with antiseptics until it completely healed (Figure 16D).

Discussion

Open castration in equines is done for different reasons including, to treat the disease of the scrotum and to modify the behavior of the animals. In the current case, the owners

wanted to improve the behavior of the stallion, and open castration was carried out. The horse recovered in a good manner. Various methods for equine castration have been outlined, including open, closed, and semi-closed techniques. Alternative techniques like scrotal ablation with subsequent closure and laparoscopic removals have also been discussed (Badawy, 2009; Omar *et al*., 2013). For the present case, open castration by allowing the scrotal wound to heal by secondary intention was applied.

Similar to Searle *et al*., (1999) and Rijkenhuizen *et al*., (2017) tetanus prophylaxis was provided by injecting tetanus anti-toxin (TAT). Mason *et al*., (2005) described injecting Lidocaine into the body of the testes which supports the present case, while Crosa and Desjardins, (2018) reported using general anesthesia that was induced by using xylazine hydrochloride (1.1 mg/kg, IV), diazepam (0.05 mg/kg (0.023 mg/lb) IV), and ketamine hydrochloride, while Stover and Caulkett, (2021), used IV induction of anesthesia with diazepam and ketamine. Similar to what Mason *et al*., (2005), reported in their case, the same open castration procedure was followed for the current case. Crosa and Desjardins, (2018), reported primary skin closure after castrating the stallion, while Rijkenhuizen and Van Der Harst, (2017) and Mason *et al*., (2005), reported leaving the incision open to allow healing by second intention which supports the present case.

Conclusion and recommendation; Open castration in stallions is a common surgical procedure performed in equine practice. While it is considered routine, it's crucial to acknowledge that complications can arise, making a thorough understanding of male reproductive anatomy and physiology essential for successful outcomes. By adhering to proper surgical techniques and postoperative care, practitioners can mitigate the risk of complications and ensure the well-being of their equine patients. Regular observation and prompt intervention in the postoperative period are paramount for early detection and management of any complications that may arise With proper knowledge, skill, and attention to detail, open castration can be performed safely and effectively, benefiting both the animal and its owner.

3.8.3. Open castration in sheep

Abstract

Castration refers to the removal or incapacitation of the testes, epididymis, and a portion of each spermatic cord in a ram. Delayed or unsuccessful surgical interventions often leave culling as the only viable option. This case report describes the successful surgical management of orchitis through open castration in a recently bought ram presented to the Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital, with swelling on the scrotum (Orchitis) that began a week ago. Physical and clinical examinations revealed an inflamed and painful scrotum. After diagnosing it as orchitis, it was decided to treat the disease with surgery. After locally anesthetizing the root of the scrotum a longitudinal incision was made over the scrotum, after exteriorizing the testes, the tunica vaginalis was incised and yellowish discoloration was observed due to the presence of hydrocele. Then both of the spermatic cords were double ligated and the testes were removed. The subcutaneous tissue and the skin were closed routinely after removing the extra skin. The ram recovered in a good manner.

Keywords; *Open castration, Orchitis, Ram*

Introduction

Castration refers to the removal or incapacitation of the testes, epididymis, and a portion of each spermatic cord in a ram. It is recommended to perform castration at the earliest possible age to minimize the negative impact on growth, as older animals may experience increased stress from the procedure. There are three main methods commonly used for castrating sheep: the Burdizzo method, the banding or elastrator method, and the knife or surgical method (Yami, 2009; Bonelli *et al*., 2008).

Orchitis, characterized by inflammation of the testes, can manifest as unilateral or bilateral and in acute or chronic forms. During acute episodes, the testes are swollen and

painful, accompanied by fever, lethargy, and reluctance to move in the affected animal. Chronic orchitis may lead to fibrous adhesions restricting scrotal movement and eventual atrophy and fibrosis of the testicles (AM Farghali *et al*., 2020). Scrotal enlargement primarily arises from inflammation of the testis or epididymis, encompassing conditions like orchitis, periorchitis, epididymitis, hydrocele, scrotal hernia, scrotal hematoma, and unilateral cryptorchid testis. Orchitis, often provoked by infection or injury, is the most frequent cause of discomfort (Naoman *et al*., 2022).

The vaginal tunics' cavity communicates with the peritoneal cavity, making it prone to the buildup of ascitic fluid. When fluid accumulates around the scrotal contents, it's termed hydrocele, developing due to similar factors as ascites. Hydrocele can cause significant degeneration of the affected testicle and, to a lesser degree, the opposite side (Foster, 2016). Therefore the objective of this case report is to describe surgical intervention and treatment of orchitis by open castration local breed ram and its outcome.

Case history and presentation; A recently bought ram was brought to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a complaint of swelling of both testicles that began a week ago. The owner bought the ram for a fattening purpose. For four days the ram was treated with broad-spectrum antibiotics (oxytetracycline) and dexamethasone sodium phosphate injection (Inflamgo® Manufactured by Chongqing Fangtong Animal Pharmaceutical Co., Ltd, China) for two days. The medical treatment was not successful thus, surgical removal of the testes was carried out.

Clinical and diagnostic assessment; Routine physical and clinical examinations were done which revealed a hot and painful scrotum upon palpation. The ram has lost weight and also had a reduced appetite. The body temperature was raised a little from the normal range 41^{o}C, while the respiratory 25 breaths/minute, and the heart rate 73 beats/minute. The size of the scrotum was almost two times the normal size and it was bilateral. The ram was also showing signs of depression and dehydration. The hair coat was also rough.

Based on the above diagnosis the case was diagnosed as orchitis and surgical treatment was recommended.

Preoperative preparations; The ram was administered intramuscularly with 2 ml of Procaine penicillin at a dosage of 24 mg/kg and Dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China) one hour before the operation. The scrotum and the surrounding area were shaved and aseptically prepared. Then the ram was moved to the surgical room and the scrotum was covered with sterile drapes (Figure 17A). the estimated weight of the ram was 30 kg.

Anesthesia and animal control: The ram was sedated with 2 ml diazepam (Manufactured By Intas Pharmaceutical Ltd., India) intramuscularly. Then local anesthesia was administered by infiltrating 5 ml of 2 % lidocaine (Manufactured by Sakar Healthcare Ltd., India) around the base of the scrotum and directly into the testicles. The ram was controlled in lateral recumbency with fore and hind limbs tied to the patient table.

Surgical treatment and intervention: A longitudinal incision was made through the skin and dartos tunic along the midline of the scrotum, starting cranially from the tip and extending caudally towards its base. Care was also taken to avoid injury to the testicular arteries and veins. Up on opening the scrotal skin and the testis were exteriorized. The tunica vaginalis was incised and it was filled with water-like fluid (hydrocele) and the inside was yellowish (Figure 17B). Then the spermatic cords were isolated and double ligated (transfixation) using absorbable suture material chromic catgut #2 to prevent bleeding (Figure 17C). Once adequately ligated, the testicles were excised from the spermatic cords using scissors. Any bleeding vessels were carefully ligated to achieve hemostasis. Then the extra scrotal skin together with the abnormal tunica vaginalis was removed, procain penicillin powder was sprinkled and the subcutaneous tissue was sutured using simple continuous suture technique using PGA #2. Finally, the skin was apposed evenly to promote proper wound healing using non-absorbable suture material silk # 2, leaving a small open space for fluid drainage.

Figure : Open castration in ram and its outcome

A). Aseptic preparation of the scrotum B). The inside of the testes after opening
C). Ligation of the spermatic cord in progress D). The wound after complete healing.

Post-operative care and outcome: The owner was advised to provide a clean and warm resting area for the ram. The ram was monitored closely postoperatively for signs of bleeding, infection, or other complications. Pain management and antibiotic therapy were administered for five days. Adequate rest and limited activity were recommended during the recovery period to facilitate healing. Daily checkups through a phone with the owner. On the third day, there was a swelling observed, and dexamethasone sodium phosphate injection (Inflamgo® Manufactured by Chongqing Fangtong Animal Pharmaceutical Co., Ltd, China) was administered for two consecutive days and the swelling resolved on the fifth day. The wound was also disinfected daily with antiseptics until it completely healed. Then the skin suture was removed after two weeks and the wound also healed completely (Figure 17D). The ram's body condition was good and the skin was very shiny and even gained weight.

Discussion

Open castration ram is carried out to treat the scrotal inflammation and save the life of the ram. Timely intervention, proper surgical technique, and postoperative care are critical for favorable results. In the present case, early treatment of orchitis saved the life of the ram and returned its health. Orchitis, a prevalent condition affecting the testes in small ruminants, exhibits a wide range of incidence rates influenced by factors such as geographical location, environmental conditions, breed characteristics, seasonal variations, and study methodologies (Ali *et al*., 2019). Orchitis poses significant economic ramifications by diminishing fertility rates and decreasing lambing or kidding rates in sheep and goats, resulting in substantial financial losses for producers (Ramadan *et al*., 1991). A hydrocele refers to an accumulation of fluid within the tunica or processus vaginalis, often originating congenitally in young individuals and developing secondarily in adults. This condition is frequently linked to ascites, intestinal edema, and trauma (Parmar *et al*., 2020). The origins of acquired scrotal hydroceles are uncertain, yet inflammatory reactions, tumors affecting the testis or epididymis, and testicular torsion are potential factors contributing to their emergence (Yu *et al*., 2011). The above statements support the cause of the orchitis that to surgical treatment with open castration in the ram.

Similar to the reports of Yadav *et al*., (2019) and Ramadan *et al*., (1991) following thorough aseptic preparation, a mild sedative diazepam was administered intramuscularly at a dose rate of 0.25mg per kilogram. Local anesthesia was then administered using 2% lignocaine hydrochloride, which was infiltrated locally in a circular pattern around the neck of the scrotum, the same anesthetic protocol was followed for the present case.

Conclusion and recommendation; Open castration in rams due to orchitis is a surgical procedure aimed at alleviating the effects of testicular inflammation. Despite its intended benefits, orchitis remains a prevalent issue in small ruminants, leading to economic losses through reduced fertility and lambing rates. Proper diagnosis, timely intervention, and appropriate surgical techniques are crucial in managing this condition effectively.

Through continued research and veterinary practices, efforts can be made to minimize the impact of orchitis on the reproductive health and productivity of ram populations.

3.8.4. Open castration in dogs

Abstract

Castration of male dogs is a routine surgical procedure performed for various reasons, such as managing population growth, modifying behavior, and addressing health issues related to infections, hormonal imbalances, or testicular pathologies. This case report describes the successful management of open castration in three year old dogs that were presented to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital, and at the owner's home for open castration, one for behavioral modification and the other one due to testicular pathology. Routine physical and clinical examinations were done routinely. Then open castration was done on both animals under general anesthesia. Pre-scrotal and scrotal incision sites were used for the two cases. After the incision, the subcutaneous tissues were separated carefully exposing the testicles. Then the spermatic cord was ligated properly and the testes were removed. The subcutaneous tissue was sutured routinely. The dogs recovered.

Keywords; *Male dogs, Open castration, Spermatic cord*

Introduction

Castration of male dogs is a routine surgical procedure performed for various reasons, such as managing population growth, modifying behavior, and addressing health issues related to infections, hormonal imbalances, or testicular pathologies. Traditionally, it involves an incision cranial to the scrotum to minimize manipulation of scrotal tissues during the procedure (Brunn, 2022). Castration in dogs presents both advantages and disadvantages. On the positive side, it can lead to a lower occurrence of reproductive tract disorders, such as issues with the testes and prostate, a decrease in reproductive

behaviors, and potentially increased lifespan and reduced wandering. Conversely, castration may elevate the risk of hematologic, bone, and prostate cancers, susceptibility to knee injuries, obesity, and various postoperative complications (Raheem, 2017). The impact of gonadectomy on the behavior of male dogs is a topic of debate and not fully comprehended. Contrary to popular belief, castration does not consistently lead to improved behavior in male dogs. While the reduction of testosterone might decrease behaviors like roaming, mounting, and urine marking, its effect on aggression is variable and could sometimes even exacerbate it. Additionally, castrated dogs may display increased fearfulness and sensitivity to handling (McCarthy, 2019).

Possible issues following castration encompass scrotal swelling, bleeding, bruising, and infection. Among dogs, swelling and bruising of the scrotum are frequently observed following an open procedure. Bleeding can be severe, leading to scrotal hematoma or internal bleeding, requiring careful management and, in severe cases, surgical intervention to locate and tie off the spermatic cord. Severe scrotal hematoma might even require removal of the scrotum (Howe, 2006). Thus, the objective of this case report is to describe the successful surgical treatment and intervention of open castration in dogs and their outcome.

Case history and presentation (case 1); The owner wanted his three year old dog to be castrated. The dog guards their house and he disturbs them at midnight by barking and they wanted to subdue his sexual drive.

Clinical and diagnostic assessment; Routine physical and clinical examinations were done. The dog was alert, had good body condition, and a body temperature of 38.3^{o}C, heart rate 74 beats/minute, and respiratory rate 20 breaths/minute. Then routine open castration was carried out inside the owner's home.

Case history and presentation (case 2); A three year old dog weighting 30 kg was presented to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary

Teaching Hospital with a swollen scrotum that began three weeks ago. The dog had a reduced feed and water intake and was emaciated.

Clinical and diagnostic assessment; Routine clinical and physical examination was carried out. The body temperature was higher than the normal range (41^{o}C) while the heart rate was 74 beats/minute, and the respiratory rate was 20 breaths/minute. For the first five days, the dog was treated medically with 2 ml of penicillin G and streptomycin and 2m of dexamethasone sodium phosphate injection (Inflamgo® Manufactured by Chongqing Fangtong Animal Pharmaceutical Co., Ltd, China) combination to resolve the swelling for five days but it was not successful. The skin over the penis was wounded. Therefore surgical treatment was recommended and used to treat the condition.

Preoperative preparations (cases 1 and 2); The dogs were administered intramuscularly with 2 ml of Procaine penicillin at a dosage of 24 mg/kg and Dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China) one hour before the operation. The scrotum and the area surrounding were shaved and aseptically prepared. Then the scrotum was covered with sterile drapes.

Anesthesia and animal control (cases 1 and 2): The dogs were pre-medicated with 2 ml of diazepam at the dose of 10mg/2ml (Manufactured By Intas Pharmaceutical Ltd., India) administered through I.M. 3 ml of Diazepam (Manufactured By Intas Pharmaceutical Ltd., India) @0.15mg/kg and ketamine (Ketamine Hydrochloride Manufactured in Neon Laboratories Ltd, India,) @5mg/kg I.M respectively combination was administered intravenously to achieve general anesthesia. The dogs were controlled in dorsal recumbency with the limbs tied to the table.

Surgical treatment and intervention (case 1): A small incision was made in the skin just cranial to the scrotum (pre-scrotal region) (Figure 18A). Then the skin and underlying tissues were dissected to expose the testicles. Care was taken to identify and protect surrounding structures, such as blood vessels and nerves. Tunica vaginalis was incised. Then the spermatic cords were identified and ligated (tied off) using PGA #2 to

prevent bleeding and sperm flow (Figure 18B). Then each testicle was removed by cutting the spermatic cord with a scissor. Finally, the subcutaneous tissue in the scrotum was closed using sutures, typically using a simple-continuous suture technique by PGA #2 (Figure 18C) to close the incision. The skin was cleaned using a diluted iodine tincture solution (Figure 18D).

Figure : Open castration and its outcome in dog

A). Prescrotal incision of the scrotum B). The testis ligated with hemostatic forceps for easier trans fixation of the spermatic cord C). Suturing of the subcutaneous tissue on progress D). The skin after closure

Surgical treatment and intervention (case 2): A longitudinal incision was made over the scrotum. There was bleeding due to increased blood supply to the inflamed scrotum and it was controlled using hemostatic forceps. The scrotum was very thick in size when compared to the normal one. Up on opening the scrotum a clear fluid that filled the inside was drained and cleaned using sterile gauze. Then the skin and underlying tissues were dissected to expose the testicles. Surprisingly the sizes of the testicles were not that much

larger when compared to the normal ones. Care was taken to identify and protect surrounding structures, such as blood vessels and nerves. The spermatic cords were identified and ligated (tied off) using PGA #2 to prevent bleeding after incising tunica vaginalis. Then each testicle was removed by cutting through the spermatic cord cranial to the ligated area (Figure 19B). Then the spermatic cords were checked for any bleeding. Finally, the extra scrotal skin was trimmed off and the subcutaneous tissue was sutured using a continuous suture technique using PGA#2 (Figure 19C). Then the skin was closed using silk#2 in an interrupted manner and the wound was scrubbed with diluted iodine tincture solution.

Figure : Open castration in dog and its outcome

A). The dog on the surgical table ready for surgery. B). The scrotum after the testicles were removed. C). Suturing the scrotum in progress. D). The wound completely healed.

Post-operative care and outcome (cases 1 and 2): The dogs were monitored closely as they recovered from anesthesia. Similar to the preoperative antibiotics were administered for three days (case 1) and five days (case 2). Instructions were given to the owners

regarding post-operative care, including monitoring for signs of complications and keeping the surgical site clean and dry. For case 2; the owner was additionally advised to use a collar for the dog to prevent licking the wound and contaminating and loosening the suture material. Unfortunately, the owner couldn't do that and the dog licked the wound and the skin suture was loosened on the third day. Following this, the wound was managed as an open wound, and wound spray was used after cleaning. The wound completely healed (Figure 19D).

Discussion

Open castration in dogs is done for different reasons including diseases of the testes, and scrotum and modification of behavior in males by subduing the sexual drive. In the current cases, open castration was carried out and the dogs recovered successfully and are in good health condition. The most common method employed in male dogs is orchiectomy, where the testis is positioned cranially and accessed through a pre-scrotal incision for removal (Tavares *et al*., 2021). Modulation of certain undesirable behaviors and intervention in the control of some health conditions caused by infectious which is described by Brunn, (2022) and Raheem, (2017) the above statement supports the reasons for open castration in dogs for the present cases.

Similar to the reports of Brunn, (2022) pre-scrotal open castration was used for case 1. This approach avoids excessive tissue handling of the scrotal skin and a higher infection risk related to the canine scrotum resting on the ground during sitting (Silva *et al*., 2020; McCarthy, 2019; Tavares *et al*., 2021). While similar to the reports of Miller *et al*., (2018), a solitary incision was made along the underside midline of the scrotum, granting access to both testes, this procedure was applied for case two.

According to the reports of Tavares *et al*., (2021), the dogs were premedicated by acepromazine and tramadol intravenously and anesthesia was induced with intravenous propofol and maintained with isoflurane, while Woodruff *et al*., (2015), used butorphanol, ketamine, and dexmedetomidine mixture intravenously to induce general

anesthesia and Miller *et al*., (2018), premediated the dogs with buprenorphine hydrochloride I.M and induced general anesthesia with a combination of midazolam hydrochloride and ketamine hydrochloride I.V. The dogs were pre-medicated with diazepam and general anesthesia was induced with ketamine and diazepam combination for the present case.

Possible complications of both pre-scrotal and scrotal techniques comprise wound reopening, scrotal enlargement, bleeding, bruising beneath the skin, scrotal blood clots, and self-inflicted injuries at the surgical site. While some dogs may not require treatment for minor issues, others may necessitate veterinary attention (Woodruff *et al*., 2015).

Conclusion and recommendation; Open castration in dogs is a commonly performed surgical procedure with various benefits and risks. While it effectively addresses issues like population control, behavior modification, and management of certain health conditions, it also carries the potential for complications such as wound dehiscence, swelling, hemorrhage, and self-trauma. However, with proper surgical technique, post-operative care, and timely veterinary intervention when necessary, these complications can be minimized, allowing for successful outcomes in the majority of cases.

3.9.Management of abscesses in cattle

3.9.1. Abscess drainage in calf and bull

Abstract

An abscess refers to the accumulation of pus within restricted tissue spaces, typically triggered by bacterial infection. This case report describes the successful surgical intervention to manage an abscess in four month old calf and a five year old bull which were presented to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a swelling under the ventral and on the lateral side of the neck that began a week and three months ago respectively. The contents of the

swelling were checked with needle aspiration to confirm the cases as abscesses. The site was washed, shaved, and prepared for drainage. Routine pus drainage was carried out and the inside was cleaned with gauze soaked in iodine tincture it was repeated and continued for a week and three days for case 1 and case 2 respectively. The wound was left open for healing with second intention. Both animals recovered and returned to their normal health status.

Keywords; *Abscess, Bul, Calf, Drainage*

Introduction

An abscess refers to the accumulation of pus within restricted tissue spaces, typically triggered by bacterial infection, with Staphylococcus aureus being the most prevalent bacteria involved. Entry of organisms into the tissue may occur through direct penetration from a contaminated object or dissemination via lymphatic or bloodstream routes originating from a distant location. Abscess formation often initiates in areas of injury or compromised tissue where there is an accumulation of leukocytes (Hassan *et al*., 2019). Abscesses have the potential to emerge in various body regions. A skin abscess, also known as a boil, manifests as a raised bump either within or beneath the skin's surface. It represents a prevalent type of abscess that externally presents as a swollen lump containing pus underneath the skin. Conversely, internal abscesses form within the body, typically within an organ or the interstitial spaces between organs (Fesseha and Getachew, 2020).

Other bacterial species capable of causing abscesses include S. epidermidis, S. hycus, Arcanobacterium pyogenes, Klebsiella pneumoniae, Vibrio vulnificus, Pseudomonas aeruginosa, Actinomyces bovis, E. coli, and Salmonella spp. These bacteria typically gain entry into the body through hair follicles or via cuts or wounds that penetrate or break the skin. Once inside, the bacteria trigger a response from white blood cells, leading to the death of nearby tissue and the formation of a cavity filled with pus, characteristic of an abscess (Zulkiflil, 2023).

Abscesses typically manifest as defined nodules that progress into closed lesions filled with pus, either bloody-tinged or creamy, along the pathways of lymphatic vessels in areas like the forelimbs, abdomen, and thigh. The subcutaneous layer is the primary location for abscesses to develop. These localized inflammations are confined by a wall of granulation tissue, presenting as tender, fluctuant red nodules often encircled by erythematous swelling. They are typically polymicrobial, harboring bacteria from the normal skin flora as well as organisms from nearby mucous membranes (Sogebi *et al*., 2016).

The symptoms of an abscess vary depending on its location within the body. Internal abscesses can be challenging to detect as they are situated internally. However, common signs of an abscess include redness, tenderness, and pain in the affected area, elevated temperature, swelling if the abscess is near the skin's surface, or constitutional symptoms if the abscess is deep-seated. Additionally, loss of function may be observed in the affected area. To differentiate an abscess from other conditions like bursitis, cysts, hematoma, hernia, and other swellings, an exploratory puncture is often necessary (Rahman and Shaifur, 2020). Treatment approaches for abscesses vary based on their type and size. Common options include antibiotic therapy, drainage procedures, and surgical intervention (Khanday, 2021). Therefore, the objective of this case report is to describe the surgical management of abscesses in cattle and their outcomes.

Case history and presentation (case 1); A four month old calf came to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary Teaching Hospital with a complaint of having a large swelling under the neck that began a week ago (Figure 20A). The condition was treated with broad-spectrum antibiotics (oxytetracycline) for three days and drained one time after confirming it as an abscess by needle aspiration but it still came back. The calf lost so much weight as the owner informed. Routine physical and clinical examinations were done. Then surgical management of the case was commenced.

Case history and presentation (case 2); A six year old bull that was used for ploughing came to Addis Ababa University, Professor Feseha Gebreab Memorial Veterinary

Teaching Hospital with swelling on the left side of the neck that began three months ago (Figure 21A). The swelling was palpated and aspirated using a syringe to confirm the case as an abscess.

Preoperative preparations; The swelling was washed and cleaned with antiseptics. Then the ventral part of the swelling was clipped, shaved, and prepared for surgical management.

Anesthesia and animal control (case 1 and 2): The calf was controlled in a lateral recumbency assisted with people and the bull was controlled in a standing position inside the crush.

Surgical treatment and intervention: A straight incision enough for complete drainage of the pus was made. After opening the swelling, a clear liquid came out immediately, and upon squeezing it a thick white-yellowish liquid oozed out (Figure 20B). Then after removing the pus, the inside was cleaned several times using povidone-iodine tincture-soaked gauze (Figure 20C). This was done for a whole week.

Figure : Subcutaneous abscess management in calf and its outcome

A). The calf before treatment. B). Removal of pus in progress. C). Gauze soaked in iodine tincture placing it inside after totally draining the pus. D). The calf after a week

Figure : Abscess management in bull and its outcome

A). The bull with swelling on the neck B) . Drainage of the pus on progress C). After complete drainage of the pus D). The bull after complete healing.

For case 2, the same surgical technique was used and upon drainage, there was a huge sac, where the abscess was accumulated that was exposed and cleaned properly.

Post-operative care and outcome: The gauze soaked in iodine that was placed inside was changed daily for five days. An antibiotic was injected for four days and on the sixth and seventh day procaine penicillin powder was directly added to the site. Then after a week, the swelling disappeared and the calf recovered completely. For the bull antibiotics were administered for three days the wound was cleaned daily and the gauze was changed daily. Both the calf and bull were able to recover and also both of them gained weight.

Discussion

Abscesses in cattle can significantly affect the health, productivity, and economic viability of livestock operations. Prompt and effective surgical intervention, combined with appropriate medical treatment and post-surgical care, is essential in managing abscesses and mitigating their impact. In the current cases, drainage of abscesses was carried out to improve the health and productivity of the animals. An abscess is the most frequently occurring lump found on an animal's skin, typically resulting from a microbial infection. It manifests as a localized inflammatory area containing pus, encased by a protective membrane known as the pyogenic membrane (Mulatu *et al*., 2022). Skin and subcutaneous abscesses can be diagnosed through a physical examination involving inspection and palpation. This entails observing any swelling and determining whether it contains pus. An incision may be necessary to inspect the contents of the swelling further (Zulkiflil, 2023). Treating an abscess can vary depending on factors such as its type, location, and size. The primary treatment options include drainage procedures, surgical intervention, and antibiotic therapy. Before any manipulation begins, it's crucial to properly restrain the animal physically or chemically. Following aseptic procedures during the intervention helps minimize the risk of further infection and improves the overall prognosis for the condition (Rahman and Shaifur, 2020).

The majority of subcutaneous abscesses stem from traumatic skin penetration followed by infection. For instance, in cattle, facial subcutaneous abscesses often arise from consuming roughage containing foxtail grass, with several animals in a herd potentially affected simultaneously. Most abscesses are bacterial in origin, with Staphylococcus species, particularly Staphylococcus aureus, being the most common culprits. These bacteria typically enter the body through a hair follicle or via a wound or injury that breaks or punctures the skin. In rare instances, abscesses may be triggered by viruses, fungi, or parasites (Fesseha and Getachew, 2020). A similar treatment procedure that was reported by Khanday, (2021); Hassan *et al*., (2019); and Fesseha and Getachew, (2020), was used to treat the abscess for both cases.

Conclusion and recommendation: Abscess drainage in cattle is a crucial veterinary procedure aimed at alleviating pain and preventing further complications associated with abscess formation. Surgical evacuation of pus from the abscess followed by thorough irrigation and packing of the cavity with appropriate antiseptic solutions, facilitates optimal healing and prevents recurrence. Continuous monitoring and postoperative care are imperative to detect any complications early and ensure the overall well-being of the animal. Abscess drainage in cattle represents a vital aspect of veterinary medicine, contributing to the health and welfare of livestock.

3.10. Open wound management in jenny

Abstract

A wound is described as a disruption in the seamless surface of the skin, mucous membrane, or tissue, resulting from physical, chemical, or biological factors. In working equids, wounds represent a significant welfare issue, manifesting as pain, open wounds, bleeding, and impaired function. This case report describes the successful open wound management in six year old Jenny that came to the Donkey Sanctuary Veterinary Clinic with a hyena bite that happened five days ago. Up on physical examination; the perineal area was bitten off including part of the muscles on the thighs. The wound was very contaminated and heavily infected. There was pus on the inside of the wound and there were also maggots seen. Based on the clinical and physical examination the wounded was decided to be managed and treated as an open wound. Through wound debridement, after shaving the surrounding skin was done using antiseptics, which was followed by antibiotic therapy for five days. The wound completely healed.

Keywords; *Jenny, Wound debridement*

Introduction

A wound is described as a disruption in the seamless surface of the skin, mucous membrane, or tissue, resulting from physical, chemical, or biological factors. Typical sources of wounds in domestic animals include horn punctures, calves being accidentally stepped on in crowded barns, nose ropes being pulled too tightly, barbed wire causing injuries to the chest area in horses or cattle, and damp sores forming on the inner shoulder and groin areas of cattle due to skin friction and lack of exposure to air and sunlight (Majid *et al*., 2019). In veterinary practice, wounds are a prevalent issue that often prompts owners to seek medical attention for their animals. How these wounds are handled significantly influences factors such as the speed of healing, the duration required to regain normal function, the ultimate cosmetic outcome, and consequently, the satisfaction of clients. The approach to wound management varies based on the stage of wound healing and may involve procedures such as cleansing, mechanical and chemical removal of dead tissue, application of antiseptics and antibiotics, and the use of different types of dressings, including those that adhere or do not adhere to the wound (Liptak, 1997).

In working equids, wounds represent a significant welfare issue, manifesting as pain, open wounds, bleeding, and impaired function. These wounds in working donkeys encompass various types, ranging from tissue damage with or without fluid discharge or pus to the formation of abscesses or secondary bacterial infections. Lacerations, indicated by irregular wound edges and tissue loss, along with bleeding, are common signs of bite wounds (Mitiku *et al*., 2023). Despite being characterized as resilient creatures, donkeys are prone to a range of illnesses and conditions that can diminish their ability to contribute effectively to the country's needs. Many donkeys experience injuries, with improper harnesses, hobbles, and saddle designs, as well as bites from hyenas or other donkeys, and accidents involving cars or human-caused injuries, being cited as common sources of wounds (Garoma, 2018). Wounds in working donkeys are seen on the leg, girth, tail, saddle, and wither regions (Getnet *et al*., 2014).).

In general terms, wounds fall into two main categories: open and closed. Open wounds encompass various types such as abrasions, avulsions, ballistic and penetrating wounds,

hernias, lacerations, and excised or surgical wounds. Additionally, wounds can be categorized based on their cleanliness status, including clean, clean-contaminated, contaminated, or infected. The primary purposes of wound irrigation are mechanical and dilutional. By irrigating the wound, bacterial populations are decreased, and necrotic tissue, foreign material, exudate, and wound gels are removed (Liptak, 1997).

Open wounds can be categorized based on their duration, level of contamination, cause, and depth of tissue involvement. Understanding the anatomy is crucial for effectively managing wounds in donkeys. The main goal of wound management should be to facilitate a swift transition from acute inflammation to healing, minimizing the risk of chronic inflammation, a key contributor to wound healing complications (Mitiku *et al*., 2023). Thus, the objective of this case report is to describe the management of the hyena bite in Jenny and its outcome.

Case history and presentation: A six year old Jenny came to the Donkey Sanctuary Veterinary Clinic with a hyena bite that happened five days ago (Figure 22A).

Clinical and diagnostic assessment; Up on physical examination; the perineal area was bitten off including the skin and some parts of the muscles on the thighs. The wound was very contaminated and infected heavily. There was pus inside parts of the wound and there were also maggots seen. The donkey was in severe pain, depressed, and weak. The wound was also very deep and some muscles were torn down and there were empty spaces between the muscles. The base of the tail was also torn and wounded.

Preoperative preparations; The Jenny was administered intramuscularly with Procaine penicillin at a dosage of 24 mg/kg and Dihydrostreptomycin sulfate at a dosage of 30 mg/kg (H-PENSTREPTO® Hebei Hope Harmony Pharmaceutical CO., Ltd, China). Diclofenac sodium was injected intramuscularly. The skin around the edges of the wound was clipped and shaved properly.

Anesthesia and animal control: The Jenny was kept in a standing position restrained and controlled by the owner.

Wound treatment and management: after shaving the skin around the wound (Figure 22B), the wound was washed with diluted cetrimide and chlorhexidine gluconate solution. The wound had a very bad odor. The dead tissues were removed and the pus and the maggots were deeply washed using gauze and cotton soaked in diluted iodine tincture. After complete debridement of the wound and deep cleaning of the wound, zinc oxide was applied all over the wound and its edges (Figure 22C).

Figure : Open wound management in jenny and its outcome

A). The wounded jenny. B). Shaving the skin surrounding the wound. C). Application of zinc oxide d). The wound after complete healing.

Post-operative care and outcome: The owner was advised to wash the wound with warm water mixed with salt in the morning and night daily. Jenny was injected with penicillin G and streptomycin for five days. The wound was washed with iodine tincture for three days. The wound completely healed (Figure 22D).

Discussion

Wounds in jenny can significantly impact their health, productivity, and economic value. Effective open wound management is crucial to ensure proper healing, prevent complications, and restore Jenny's well-being. Open wound management provides a comprehensive approach to treating wounds in jenny. By implementing these practices, owners can enhance the recovery process, minimize economic losses, and ensure the overall welfare of their animals. The presence of pus in a wound indicates a serious condition. In such situations, it is essential to thoroughly irrigate the wound site with antiseptics and eliminate the pyogenic membrane. It is recommended to diligently flush abscess cavities with 10% Povidone-iodine solutions (Majid *et al*., 2019). Similarly, there was a pus formation in the present case and the pus cavities were properly flushed and cleaned with povidone-iodine solutions. Solá and McClure (1997) suggested surgical intervention involved extensive removal of affected tissue Surrounding hair was clipped, and the area was disinfected with povidone-iodine before the procedure. Due to the type of the wound, for this present case, open wound management was applied.

Unfortunately, mechanical debridement, although commonly utilized in equine wound management, is notably more traumatic. It is imperative to exercise gentle pressure during this process. In cases where more aggressive debridement is warranted, sharp debridement should be considered (Seid and Birhan, 2019). Mechanical debridement was used for the present case. Open wounds encounter challenges in healing through secondary intention due to impaired processes such as neovascularization, wound contraction, fibroplasia, and epithelialization. Additionally, the deficiency of fibroblasts and their stem cells further hinders the formation of blood vessels (Pavletic, 2018).

Conclusion and recommendation; The management of open wounds in donkeys following a hyena bite is crucial for ensuring optimal healing and preventing complications. Proper wound care, including thorough cleaning and debridement, is essential to remove debris and reduce the risk of infection. Additionally, the use of appropriate dressings and medications can aid in promoting tissue regeneration and minimizing discomfort for the animal

4. SUMMARY OF THE SURGICAL CASE REPORTS.

This summary encompasses twenty-one case reports detailing various surgical treatments performed on domestic animals, of different species, sex, and ages, highlighting the diversity of conditions addressed and the surgical interventions utilized. These case reports demonstrate the critical role of surgery in veterinary medicine for both emergency and elective procedures, aimed at improving animal health and welfare. Total of 2 (9.5%) cesarean section in cow and sheep, 2 (9.5%) En bloc Ovariohysterectomy in queens, 2 (9.5%) herniorrhaphy, in piglet and sheep, 1(4.7%) Omental evisceration in sheep, 4 (19.04%) surgical excision of tumors in three dogs and cow, 1 (4.7%) aural hematoma in bitch, 1 (4.7%) urethrostomy in bull, 4 (19.04%) open castration in horse, dogs, and sheep, 2 (9.5%) abscess management in calf and bull and 2 (9.5%) hyena bites in jenny and jack. A total of 13 (61.9%) surgical cases were done on large animals while 8 (38.09%) cases were on small animals. 4 (19.04%) animals out of 21 died due to different reasons, while the remaining 17 (80.95%) survived.

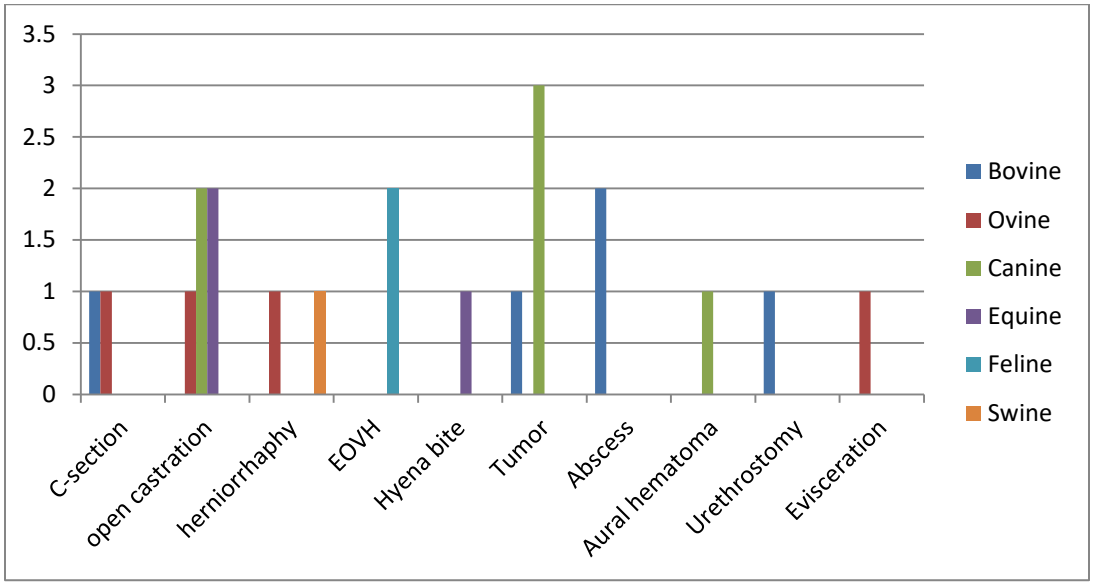

Figure : Summary of case reports

5. CONCLUSION AND RECOMMENDATIONS

Livestock plays a pivotal role in global agriculture, serving as a cornerstone for food production, economic stability, and cultural practices. The health and productivity of livestock have a direct impact on food security, rural livelihoods, and overall economic development. Veterinary surgery is an essential component of veterinary medicine that significantly contributes to maintaining and enhancing the health and welfare of livestock. The aforementioned case reports illustrate the wide range of conditions that can be effectively managed through surgical interventions, ranging from emergency procedures such as cesarean sections to elective operations like tumor excisions. The successful outcomes observed across various species of animals highlight the advanced surgical techniques and the crucial impact of timely interventions on animal health and welfare. Furthermore, these case studies underscore the importance of comprehensive surgical care in resolving complex medical conditions, improving the quality of life, and promoting the overall well-being of domestic animals. Thus, based on the above conclusion the following recommendations are forwarded:

- Veterinary professionals should pursue continuous education and advanced training in surgical techniques to stay updated with the latest advancements and improve surgical outcomes.
- Emphasis should be placed on comprehensive preoperative assessments and meticulous postoperative care to minimize complications and enhance recovery in surgical patients.
- Early diagnosis and prompt surgical intervention are crucial for successful outcomes.
- Veterinary practices should invest in state-of-the-art surgical equipment and facilities to support a wide range of surgical procedures and improve the success rates of surgeries.
- Continued research and detailed documentation of surgical cases should be encouraged to build a robust database of case studies that can serve as valuable references for veterinary practitioners.

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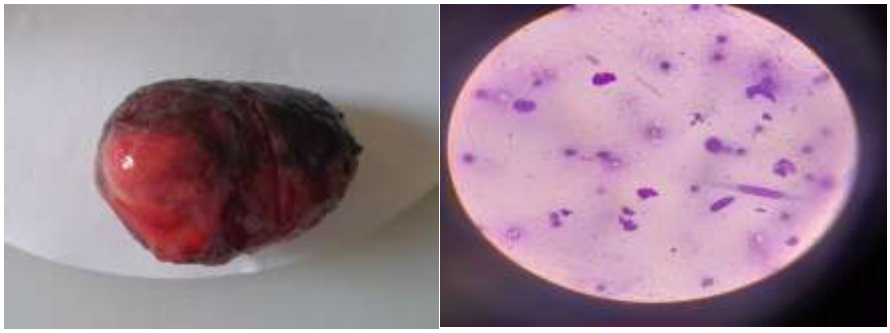
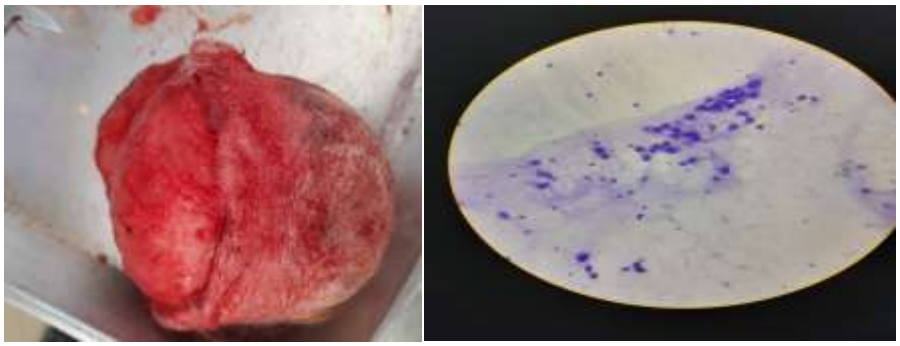
7. APPENDICES

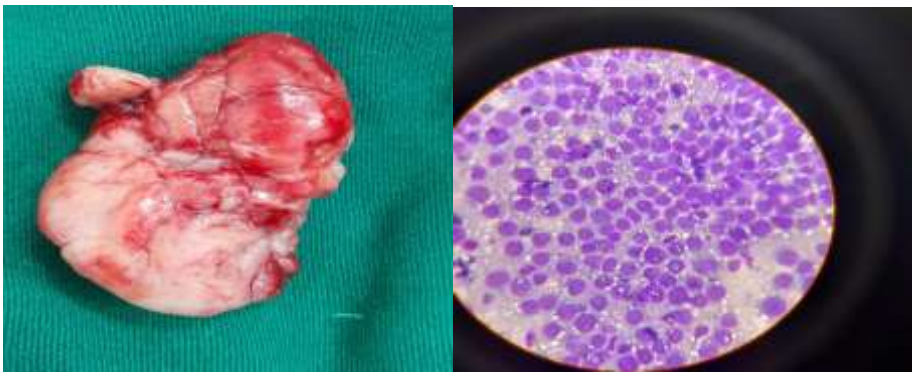
Appendix I. Cytological examination of masses



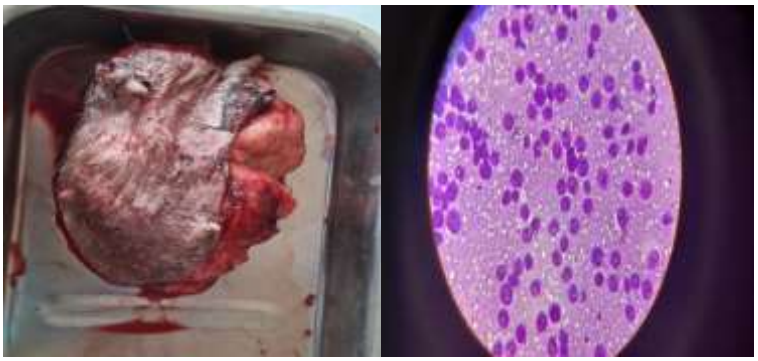
Removed mass from the tip of the cervix of cow cervical tumor



Removed mass from the thigh of dog mast cell tumor



Removed mass from the vulva of bitch transmissible venereal tumor



Removed mass from the mammary gland of bitch transmissible venereal tumor

Appendix II: Case recording and management format

Date._____

Case No._____

Name of the Hospital: VTH Donkey Sanctuary Veterinary Clinic Dire

Veterinary Clinic

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 Joundice

Cyanotic CRT:_____Body Condition:_____Superficial Ln: PF___ PS___MND

_____RPH_____ OTHER_____

Description of Case

_____

____

_____

_

Organ or system affected: Nerous Muskulo skeletal Respiratory Cerculatory

Digestive Urogenital Intigument Other (specify)

SAMPLE TAKEN

Faeces Blood skin scraping Nassal swab vaginal swab Ruminal content Urine Other

Differential Diagnosis List:_____

Laboratory Result:_____

Tentative Diagnosis: _____

Definitive Diagnosis:_____

PATIENT CARD

Prognosis:

_____

____

_____
__

OBSERVATION AND TREATMENT

CLINICAL WORK TO BE PERFORMED:
Surgical_____

Medical_____ Gynaecology/Obstetric Follow up /Quarantine

MEDICAL TREATMENT ADMINISTERED

Date:_____
__

Name of Staff in Charge: _____Signature_____

Student in Charge: _____Signature_____

Appendix III::Pre-anesthetic evaluation form
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-AnestheticTherapy:
_____

Premedication:
_____

Induction:
_____

Maintenance:
_____

Analgesia:
_____

Fluids:_____
____

Monitoring:

_____

Appendix IV: Post-operative care evaluation format
Date: _____to_____

Surgical procedure: _____

Surgical techniques _____

Antibiotics_____

Analgesia_____

Fluid_____

Others _____

Post-operative complications and treatment

1._____

2._____

3._____.

4

Outcome_____

Appendix V: Owner's consent format translated from amharic

Owner's name: _____ Telephone: _____

Animal species: _____ 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: _____