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SCHOOL OF VETERINARY MEDICINE

COMPILED CASE REPORTS ON MINOR AND MAJOR SURGICAL CASES ON VARIOUS DOMESTIC ANIMAL SPECIES IN AND AROUND JIMMA TOWN, OROMIA REGION, SOUTHWESTERN ETHIOPIA

MVSc THESIS

BY

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Compiled Case Reports on Minor and Major Surgical Cases on Various Domestic Animal Species In and Around Jimma Town, Oromia Region, Southwestern Ethiopia

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A Thesis Submitted to the Jimma University, College of Agriculture and Veterinary Medicine, School of Veterinary Medicine, in a Partial Fulfillment of the Requirements for Master of Veterinary Surgery and Diagnostic Imaging

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BIOGRAPHICAL SKETCH

The author, Getahun Teshome, was born on May 05, 1989, G.C. from my father, Teshome Haile, and my mother, Alemtsayi Etana, in Enango 01 Kebele, Lalo-Asabi District, West Wollega Zone, and Oromia Regional State, Ethiopia.

I attended my elementary education (from grades 1–8) at Enango Elementary School from 1998–2004 G.C. and followed my secondary school (from grades 9–10) at Enango Secondary School from 2005–2006 G.C. After the completion of my high school education, I joined Alage ATVET College in 2007 G.C., to study veterinary assistance. After the successful completion of a three-year academic journey, I was awarded the Diploma of Animal Health in July 2010 (G.C.).

After my graduation, I was hired at the Lalo-Asabi District, Livestock and Fishery Office on August 8, 2010 (G.C.). After working for six years, I joined Jimma University in 2017 G.C. and gained my BVSc degree in Veterinary Science on May 20, 2021, G.C. From that moment, I was assigned as a veterinary clinician in the Enango town veterinary clinic, and I have been proficiently serving the community for the past 13 years.

Finally, after I took and passed the entrance examination of the postgraduate program, I joined again Jimma University College of Agriculture and Veterinary Medicine (JUCAVM) to follow my Master (MVSc) degree in Veterinary Surgery and Diagnostic Imaging at the School of Veterinary Medicine in December 2021. In conclusion, after completing my class course and research work, today I am here to defend my MVSc thesis.

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LIST OF ABBREVIATIONS

ALT	Alanine transaminase
AST	Aspartate aminotransferase
Cm	Centimeters
CS	Cesarean-section
HCl	Hydrochloride
HF	Holstein-Friesian
Hrs	Hours
IM	Intramuscular
IV	Intravenous
JUCAVM	Jimma University College of Agriculture and Veterinary Medicine
Kg	kilogram
LDA	Left Displacement of Abomasum
Ml	Milliliters
NaCl	Sodium chloride
OHE	Ovariohysterectomy
OSCC	Ocular Squamous Cell Carcinoma
RVF	Rectovaginal Fistula
WAD	West African Dwarf

ABSTRACT

Livestock plays a significant contribution to the Ethiopian economy as a source of meat, milk, drought power, income, and foreign exchange and is essential for communities and societies as a whole. Veterinary surgery plays a crucial role in saving the life of animals through surgical manipulation and treatments involving various ailments. This study aimed to perform various surgical procedures on domestic animals in the cities of Jimma and Jimma University, College of Agriculture and Veterinary Medicine, from April 1, 2023, to April 2024. The surgical interventions were performed at the open-air clinic or in the field at the owners' homes. Descriptive study design was used to document cases and provides detailed clinical reports on an individual animal patient. The animals were subjected to thorough medical evaluation, including patient signalment, history, physical examination, and laboratory diagnosis. After Patient were evaluated for anesthesia and surgical risk. Specific surgical manipulations and management were prescribed and performed under aseptic conditions and safe anesthetic protocols. Of all the operated animals, 94.12% (16/17) were recovered and cured where as 5.88% (1/17) was died. Generally, swelling, bleeding, anorexia, surgical site inflammation, and loss of body condition were observed in some of the patients and recorded as postoperative complications. The use of appropriate aseptic and surgical techniques and post-operative care can be suggested to minimize postoperative complications.

Keywords: *Case report, Complication, Jimma, Surgery, Surgical treatment*

1. INTRODUCTION

Ethiopia has the largest livestock population in Africa: 70,291,776 cattle, 42,914,865 sheep, 52,463,535 goats, 2,148,492 horses, 382,784 mules, 10,791,896 donkeys, 8,146,790 camels, 56,992,987 poultry, and 6,986,100 beehives(CSA, 2021). The Jimma zone has one of the largest livestock populations in Ethiopia. Its livestock population is estimated at 2,560,207 heads of cattle, 859,914 heads of sheep, 570,387 heads of goats, 68,664 heads of horses, 21,395 heads of mules, 191,054 heads of donkeys, 2,235,702 heads of poultry, and 532,728 beehives(Desa *et al.*, 2021). This livestock sector has contributed considerably to the economy of the country and is still promising for spearing the economic development of the country (Nouala *et al.*, 2012, Mekuanint *et al*., 2017). Livestock contributes approximately 16.5 % of the national GDP and 35.6 % of the agricultural GDP and currently provides livelihoods for 80 % of the people living in rural areas (Wendimu *et al.*, 2023). Livestock plays a significant role in the national economy, particularly in rural areas, by generating income for farmers, providing draught power, ensuring food security, and contributing to the asset, social, cultural, and environmental values, as well as sustaining people's livelihoods (Amistu *et al.*, 2023). Sheep and goats are major sources of income (cash) for poor rural farmers in most parts of the tropics including Ethiopia (Kenfo *et al*., 2018, Mekuanint *et al.*, 2017). Furthermore, livestock plays an important role in providing export commodities such as live animals, hides, and skins to support foreign exchanges (Ayele, 2019, Mekuanint *et al.*, 2017, Tilahun, 2023).

Despite the high livestock population and favorable environmental conditions, the current livestock output of the country is low due to various contributing factors such as low coverage of veterinary services (Kebebe, 2015, Leta and Mesele, 2014). This is linked to some intricately linked issues, including insufficient nutrition and feed, a high prevalence of diseases, poor genetic potential in local breeds, market issues, and ineffective livestock development services for infrastructure, credit, extension, and marketing (Gurmessa, 2021, Terefe, 2022, Leta and Mesele, 2014). Livestock diseases have impacts that include loss of livestock and farm productivity, reduction of market opportunity, and disturbance of human health (Duguma, 2020). Poor livestock health services remain one of the main constraints to the development of livestock production in many countries (Kebede *et al*., 2014). In Ethiopia,

there is an increase in demand for better veterinary services due to the increasing awareness of the importance of treating individual animals in both rural and urban communities(Tiruneh *et al.*, 2014, Hussen, 2018). The growing trend of keeping pure or crossbred companion pets, especially dogs, in urban areas has also contributed to the increased demand for the veterinary care of individual animals (Hussen, 2018).

Among different veterinary disciplines, veterinary surgery plays a crucial role in saving the life of animals through surgical manipulation and treatment of various ailments and abnormalities or deformities (Kumari *et al.*, 2022). Surgical disorders are a major problem and failure of surgical intervention provides no alternative except for culling or eventual loss of a productive or valuable animal through death (Hussen, 2018). This problem can also hinder the growth, performance, and economic value of the animal (Arju *et al*., 2014). Veterinary surgeons are required to perform various surgical operations both at the surgical theater and field levels. Surgical effects such as dystocia, uterine prolapse, hernia, urethral obstruction, preputial injuries, and fracture can cause great loss to the Ethiopian farmers. However, performing major surgical operations is challenging for general veterinary practitioners and is highly costly(Tiruneh *et al.*, 2014).

Generally, Veterinary surgery is one of the veterinary specializations required to treat different kinds of surgical disorders with the best outcomes in a variety of animals. Sufficient hands-on training exposure to surgical clinical cases combined with empirical observation are critical components to learn from experience and decrease any future potential surgical complications. However, in Ethiopia, there is a lack of information on surgical case reports that can serve as a reference for future improvement.

Therefore, the objectives of this study were as follows:

- ✓ To perform various surgical procedures/treatments
- ✓ To develop skills in different surgical procedures for domestic animals
- ✓ To identify postoperative complications in each case report

2. MATERIALS AND METHODS

2.1 Study Area

The study was conducted from April 1, 2023, to June 2024, in the town of Jimma, southwestern Ethiopia. Jimma town is located approximately 352 km from Addis Ababa, the capital city of Ethiopia. Geographically, it is located at 7°13′ and 8°56′N latitude and 35°52′ and 37°E longitude. The area has an altitude ranging between 880 and 3358 m above sea level. The annual rainfall ranges from 1200mm–2000mm, and the annual temperature of the area ranges from 7°C–30°C.

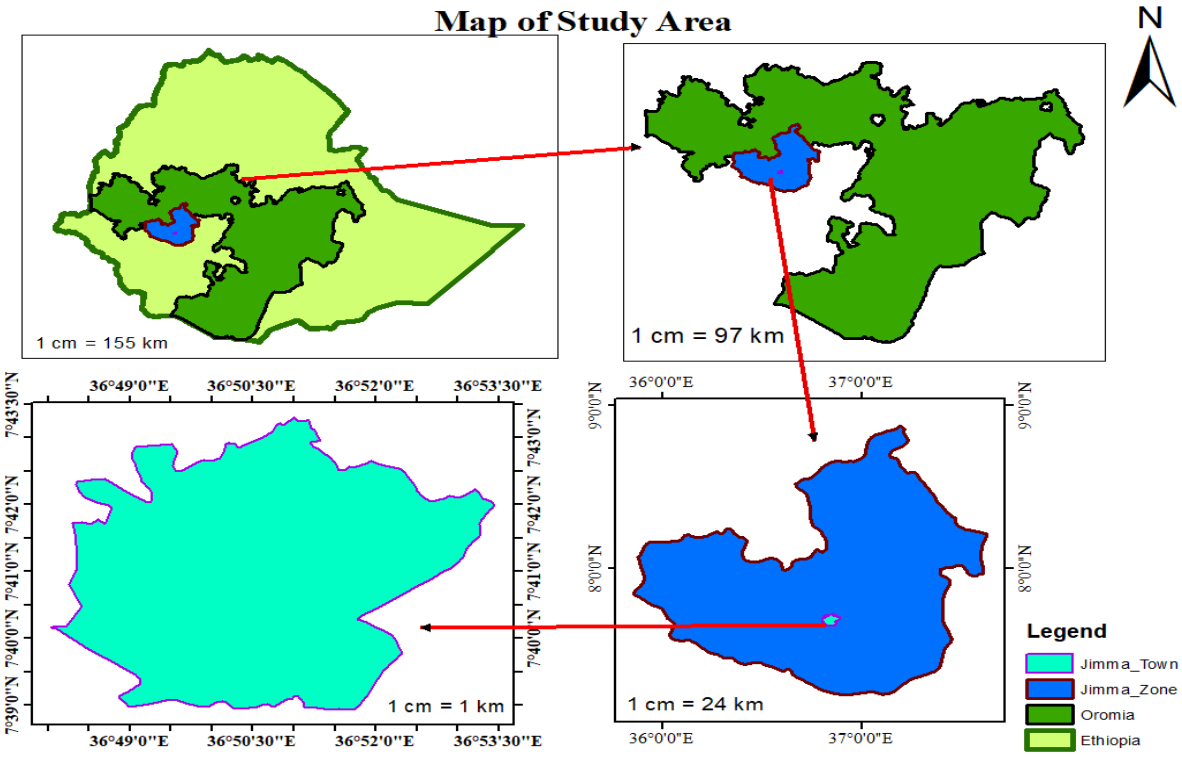

Figure 1: Map of the study area (Map created by ArcGIS® software Esri version 10.8).

2.2 Study Population

The study animals were small and large animals of different species, breeds, sexes, and ages of domestic animals originating from different management systems and admitted to Jimma University, College of Agriculture and Veterinary Medicine, in an open-air clinic for various surgical treatments or animals found on farms or on the owners' premises for which owners requested surgical treatment from around Jimma town. Local breed cattle, donkeys, and

shoats were kept under a semi-intensive husbandry system, and small animals such as dogs and cats were kept as companion animals. Surgical interventions were performed at the open-air clinic or in the field at the owners' premises. The different species used for surgical interventions included: ruminants (bovines and ovine's), dogs, cats, and donkeys.

2.3 Study Design

Descriptive study design was used to document cases and provides detailed clinical reports on an individual animal patient. Medical history, physical examination, preoperative animal preparation, surgical operation, postoperative care, and postoperative complications and outcomes of an individual case were included in each case report of surgically treated domestic animals.

2.4 Study Method

The different domestic animals were brought to respective JUCAVM open-air clinic and various surgical cases requiring minor or major surgical manipulations for either elective or emergency treatment were subjected to thorough medical evaluation. Accordingly, each patient was assessed, and evaluated, and findings on different clinical parameters such as patient signalment, medical history, physical examination, and laboratory diagnosis were recorded. In addition, the patient was pre-evaluated for anesthesia and surgical risk. Depending on the examinations and clinical findings, specific surgical manipulations and management were prescribed and performed under aseptic conditions and with a safe anesthetic protocol as per the presented cases' requirements. All animals that underwent the surgical treatments were also followed through phone call communication and physical presence in addition to peri, intra, and postoperative data for any discomfort or related complications. Later all the relevant data were compiled, and surgical case reports were prepared and reported according to the relative similarity of the procedure and presentations of the same or/and different animal species concerning the outcomes.

2.5 Clinical Parameters Recorded

Domestic animal patients were recorded by using an individual case recording sheet. The weights of the animals were estimated. The owner was asked about his/her complaints about the animal presented. The owner's complaints related to the case and all relevant information were recorded. The patient was subjected to a detailed clinical examination according to (Radostits *et al.,* 2006). Heart rate (beats/min), respiratory rate (breaths/min), rectal temperature (°C), and general body condition were recorded. In addition, the patient was pre-evaluated for anesthesia and surgical risk. After the compiled case history and clinical examination, surgical cases were judged as elective or emergency. Depending on the examinations and clinical findings, specific surgical manipulations and management were prescribed and performed under aseptic conditions and with a safe anesthetic protocol as per the presented patients' requirements. Postoperative care was given for each patient and postoperative outcomes were recorded for each patient if any. Additionally, after the end of postoperative care, follow-up of the outcome was performed through phone call communication with the patients' owners and at home visits.

3 COMPILED CASE REPORTS ON MINOR AND MAJOR SURGICAL CASES ON VARIOUS DOMESTIC ANIMAL SPECIES

3.1 Surgery of the Urogenital Organs

3.1.1 Open Castration in Donkeys

Abstract

Equine castration is done to reduce aggressive behavior in clear animals unsuitable for breeding, testicular trauma, neoplasia, or inguinal herniation. The two most common techniques are either closed or open through two scrotal incisions made on either side of the median raphe. In this case report, a donkey was presented with a history of difficulty in controlling due to aggression and frequent searching for mating female donkey. The donkey was found fit for surgical procedure and all parameters were within the normal range. The Palpation of both testicles was done, to assess the presence of cryptorchidism and asymmetric size of the testis, and decided to perform open castration to help manage the aggressive behavior. The operation involved two parallel skin incisions made parallel to the median raphe through the scrotal skin, tunica dartos, and scrotal fascia. The parietal tunic surrounding the testicle was freed of the scrotal fascia, and the parietal tunic of the cord was separated from the spermatic fascia. The spermatic cord was ligated using vicryl 2-0 and the testis was removed through the other incision. Postoperative care and complications included antibiotic injections, dressing the wound daily, and limiting exercise. The donkey was recovered without any additional complications. In conclusion, castration of male equine is a routine and common surgical procedure in veterinary clinical practice.

Keywords: *Aggressive behavior, castration, donkey, testes,*

Introduction

Equine castration is one of the most common male sterilization techniques performed in veterinary practice (Owens, 2020). The procedures were performed to reduce or prevent aggressive behavior in animals unsuitable for breeding, testicular trauma, neoplasia, or inguinal herniation(Kilcoyne, 2013). Several techniques have been described for castrations.

These procedures are performed with the donkey either standing, sedated, or under general anesthesia. The two most common techniques are either a closed or an open technique performed through two scrotal incisions made on either side of the median raphe (Owens, 2020). Once the testicles are removed, the incisions are manually enlarged to facilitate drainage and prevent seroma formation or excessive swelling. Postoperative complications may occur due to malpractice by equine practitioners. The majority of complications encountered after castration tend to be mild and resolve with minimal treatment, but more serious complications could be life-threatening (Kilcoyne, 2013). Complications that can arise following surgical castration include scrotal swelling or edema, excessive postoperative hemorrhage, infection, hydrocele, scirrhous cord, peritonitis, penile trauma, omental herniation, and eventration (Kilcoyne, 2013). Evisceration typically occurs within the first 4 hours of castration, although intestinal evisceration has been reported up to 6 days after surgery(Baldwin, 2023). Preoperative identification of risk factors for the development of complications can ensure that proper measures are taken to reduce these risks (Baldwin, 2023). Complications can be prevented by appropriate general health evaluations of the animal and proper surgical techniques, such as careful ligation of the spermatic cord, appropriate antibiotic therapy, and the recovery period, by limiting exercise and avoiding keeping the animal with the mare (Getman, 2009).

Case history and clinical examination

An adult male donkey was presented at the JUCAVM open-air clinic with a history of difficulty in control due to aggressive behavior (fighting with other neighboring donkeys) and frequent searching for mating female donkey, he asked us to resolve this problem. The donkey had good body condition and was sexually active as observed when we arrived in the field. All parameters were within the normal range. Palpation of both testicles was performed to assess the presence of cryptorchidism and the asymmetric size of the testis. Finally, depending on the examinations and clinical findings, the donkey was found to be fit for the procedure and a decision was made to perform open castration to help manage the aggressive behavior displayed by the donkey. The weight of the donkey was estimated at 200 kg.

Preoperative preparation

The status of the donkey was good and fit for the procedure, and the decision was made to proceed to castrate the donkey. The site of the incision in the scrotal area was shaved and prepared aseptically by washing with tap water, and the incision site was scrubbed with 2% povidone-iodine solution.

Anesthesia and Animal Control

The donkey was controlled and physically restrained with the aid of rope casting. The donkey was controlled in lateral recumbency with adequate visualization of both testicles by extending and tying the hind limb to the corresponding forelimb. Direct intratesticular injection of 2ml of 2% lidocaine hydrochloride (Lignocaine Injection HebeiYuanzheng pharmacy Co., Ltd. China) at a dose of 10 mg/kg body weight into each testis was used to block the spermatic nerve and minimize pain during surgery.

Surgical procedure and technique

The testicle was pushed to the tip by gently handling fingers (Fig.2A) to estimate the site and provide a sharp incision. Two parallel skin incisions were made parallel to the median raphe through the scrotal skin (Fig.2B), tunica dartos, and scrotal fascia, approximately 2 cm apart and 8 cm long. The parietal tunic region surrounding the testicle was freed of the scrotal fascia, and the parietal tunic region of the cord was separated from the spermatic fascia. The spermatic cord was ligated using vicryl 2-0(Fig.2D), the ligature emasculator was applied below, and the testis was removed. The second testis was removed through another incision, and a similar procedure was followed.

Figure 2: Open castration in donkey;

A) Grasping of testicle, B) Conducting of scrotal skin incision, C) Ligation of spermatic cord, D) The spermatic cord transfixation using silk, E) Checking of bleeding, and immediately after castration the donkey stood up.

Postoperative care and complications

Surgical site bleeding was observed for a while procaine penicillin powder was sprinkled into the wound to prevent infection and the surgical site was cleaned properly. Broad spectrum antibiotics (Penicillin G (24 mg/kg) and dihydrostreptomycin sulfate (30 mg/kg)) (Pro & Strep; HebeiYuanzheng Pharmaceutical Co., Ltd. China) at 1ml/ 25 kg for five consecutive days and meloxicam injection (5 mg/kg was administered for three consecutive days injected intramuscularly. The wound was dressed daily using a 2% povidone-iodine solution. The owner was advised to prevent the donkey from meeting the female donkey (Jenny) until the wound healed completely. Simple exercise was also recommended daily. Few postoperative complications were observed, and swelling at the surgical site and edema were subsequently observed, after which the swelling regressed. The patient was recovered completely without any additional complications.

Discussion

A donkey was placed in lateral recumbency. Each spermatic cord was desensitized by directly injecting 2% lidocaine hydrochloride and aseptic skin preparation was done. Castration was done by the standard procedure as suggested by(Schumacher and O'Brien, 2021). The most common reason for the castration of equines is to prevent aggressive behavior and stop the breeding of animals with inferior pedigrees (Riemersma *et al*., 2023). The reason for the castration of a male donkey in this case was aggressive behavioral problems. Equines are castrate in the field using either a closed or open castration technique that leaves the scrotal incision(s) open to heal by the second intention. Regardless of the chosen technique, the incidence of castration-related complications is generally regarded as low(Purohit *et al*., 2020). The procedure is reported to prevent evisceration in closed castration techniques, but does not reduce the risk of hemorrhage and even increases the risk of infection due to suture material being left in situ (Robert *et al.*, 2017). The most common complications following the castration of equines are excessive swelling, hemorrhage, incisional infection, scirrhous cord, and eventration (Marzok *et al.*, 2016). Postoperative swelling and edema of the prepuce and scrotal area are the most common complications of equine castration (Kilcoyne and Spier, 2021). Generally, in this case report, the minor postoperative complications observed were inflammation at the surgical site and discomfort that resolved after the fourth day. The incisional wound healed on the fifteenth postoperative day.

Conclusion and Recommendations

In conclusion, castration of male equines is a routine and common surgical procedure in veterinary clinical practice. It is common to cast a donkey so it becomes easier to manage. The owner was advised not to mix the animal with female donkeys or horses because sexual behavior usually remains quite some time after surgical removal of the testes in donkeys that are castrated after puberty and mounting may cause excess pressure on the abdomen which may lead to evisceration. Therefore, based on the above conclusions the following recommendations were forwarded: follow proper surgical techniques to minimize bleeding and ensure a successful outcome, monitor the donkey closely post-operatively for any signs of

infection or complications, consult with a veterinarian or experienced equine professional for guidance and assistance if needed.

3.1.2 Open Castrations in Dog and Tom

Abstract

Castration is the most commonly performed surgical procedure in veterinary practice. In small animals, it is performed to control stray dog and cat populations and prevent numerous undesirable behaviors, medical conditions, and diseases. This case report describes the open castration procedure and postoperative complications and outcomes in cats and dogs. The animals that were presented for castration were one-year-old cats and three-year-old dogs. The health parameters of both cases were in the normal range. Castration was performed through a scrotal skin incision. The dog was brought to the JUCAVM open-air clinic for castration, but, the castration of the cat was performed at the owner's house in Jimma town. After sedating and aseptically preparing the surgical site, a small incision of approximately 2-3 cm was made at the scrotal skin incision in both cases parallel to the median raphe, through which both testicles were exteriorized and the spermatic cords were severed. The spermatic cord was double-ligated using 2-0 catgut suture material. The wound was closed with two Layers of Subcuticular skin. For postoperative care, broad-spectrum antibiotics (Penicillin (24 mg/kg) and dihydrostreptomycin sulfate (30 mg/kg)) were administered intramuscularly for three consecutive days; analgesic drugs (tramadol 2 mg/kg) were administered for consecutive days for the management of pain. The surgical operation led to an uneventful recovery.

Keywords: *Dog, Open castration, Postoperative care, Surgical management, Tom*

Introduction

The Castrating of dogs and cats is the most common surgical procedure performed by veterinarians. Castration is an essential management procedure that is often performed for behavior modification, ease of handling, and treatment of diseases associated with sex hormones. Surgical castration involves the removal of the testes (testicles) and is commonly practiced on household pets to avoid unwanted animals (El-Wahed *et al*., 2014). It is also an

effective treatment and prevention for androgen-induced diseases, such as benign prostatic hyperplasia, perineal hernia, prostatitis, testicular tumors, and alopecia. In addition, castration reduces the risk of infectious diseases, trauma, and vascular diseases (Kwak and Lee, 2017).

Castrations in dogs and cats are performed under general anesthesia. Different protocols for injectable induction and maintenance with inhalant agents have been used (Paul, 2020). Surgical sterilization (elective gonadectomy) includes traditional castration, early-age gonadectomy, and vasectomy (Sobhy *et al.*, 2016b). Nonsurgical sterilization is induced by intratesticular injection of chemical substances such as calcium chloride and zinc gluconate which cause destruction of testicular cells and subsequent permanent infertility (Sobhy *et al*., 2016b). Many complications such as scrotal bruising, hemorrhage, swelling, and severe pain, were recorded after both surgical and chemical sterilization (Sobhy *et al*., 2016b). The approach for surgical castration is pre-scrotal in large dogs and scrotal in small dogs and cats (Bushby and White, 2020).

The prescrotal technique has been identified as the only acceptable method for canine castration. However, scrotal castration has gained popularity in recent years as a safe alternative to the pre-scrotal technique (Saraiva, 2019). This technique may offer the advantage of reducing surgical time while not increasing complication rates compared with the traditional pre-scrotal approach. The scrotal approach has advantages in that it decreases the incision length and subsequent surgical trauma, postoperative discomfort, self-trauma, and scrotal hematoma formation.

The scrotal technique has been described as an accepted method for young canine and feline castrations (Woodruff, 2013). Procedures that reduce anesthetic time and expedite the surgical procedure by even a few minutes can be of tremendous benefit (Woodruff *et al.*, 2015). Postoperative complications associated with surgical castration include hemorrhage, excessive swelling or edema, infection, and poor wound healing(Van Goethem, 2016c). In the present surgical case report; the surgical management of dog and cat castrations was described in detail.

Case 1: Dog castration

Case history and clinical examination

A three-year-old, local breed dog was brought to the JUCAVM open-air clinic for surgical sterilization. The dog was presented to the owner to sterilize the dog to prevent breeding and improve its behavior. The body weight of the dog was estimated to be 15 kg. On general physical examination, the dog was in good body condition, and the vital parameters measured for the dog were temperature, heart rate, and respiratory rate. The recorded heart rate was 90 beats/minute, the respiratory rate was 25 breaths/minute, and the temperature was 38.90°C, all of which are within normal limits. Before the surgical procedure, the dog was examined for any abnormalities or physiological derangements. The dog was healthy in all respects. Surgical castration under general anesthesia was subsequently performed to suppress the aggressive and mounting behavior of the dog that annoyed the owner.

Case 2: Tom castration

Case history and clinical examination

A two-year-old male cat weighing 1.5 kg was presented to the Jimma University, College of Agriculture and Veterinary Medicine, open-air clinic. The owner wanted to castrate the cat to reduce its aggressiveness and prevent reproduction. On general physical examination, the cat had good body condition and vital parameters were within normal limits with a recorded temperature of 39^0c, heart rate of 110 beats/minute, and respiratory rate of 23 breaths/minute. Then decision was made to perform surgical castration under general anesthesia to suppress the shouting behavior of the cat that annoyed the owner.

Preoperative preparation

The owner was advised to withhold case 1 and case 2 from feed and water for 12 hours before coming to the clinic for the next day's appointment. Upon arrival on the day of the appointment, the dog and cat were rechecked for vital health parameters. As the dog and cat were found to be healthy and fit for the procedure, the decisions were made to proceed and cast the two cases. Then, the two cases were sedated, and put on the surgical table in dorsal recumbence, and the scrotal hair from the area between the bases of the scrotum and the os-penis was shaved, washed with water and soap and scrubbed from center to peripheral by using 2% povidone-iodine solution.

Anesthesia and Animal Control

Both cases were premedicated using Atropine sulfate @ 0.04 mg/ kg was administered IM, sedated by using Xylazine Hydrochloride at 2 mg/kg for case 1, and Xylazine Hydrochloride at 0.3mg/kg for case 2, administered IM as pre-anesthetic. Then an induction dose of Ketamine at 5 mg/kg, IV, and the animals were transferred to a table for aseptic preparation When the anesthetics were effective an IV catheter was placed and connected to an IV fluid supply line containing lactated Ringer's solution (Manufactured by: Pharmacies Plc. Addis Ababa, Ethiopia) were administered at a surgical rate of 10 ml/kg/hr. and delivered at a calculated drop rate per second. Then an induction dose of 5% Ketamine Hydrochloride (Manufactured by: Neon Laboratories Ltd. India) @ 5 mg/kg was given through the IV line and the animals were transferred to a table for aseptic preparation. After aseptic preparation was completed, the dog was transferred to the surgical table. Both cases were maintained by using the same anesthetic agents, 5 mg/kg Ketamine given IV as needed throughout the surgical procedure.

Surgical procedure and technique

Cases were placed in dorsal recumbence, incisions were made on the midline in front of the scrotum, and the testis was pressed between the thumb and forefinger and moved toward the incision line. Then, subcutaneous tissue and fascia were cut to allow the testicle to protrude through the incision. The testicles were pushed through the incision, grabbed, and pulled with

the right hand using a gauze sponge while the left hand was held at the scrotum to stabilize and break the scrotal ligament which attaches the scrotum to the caudal pole of the testicles. The cords were clamped by using three hemostats and double ligated with vicryl l 2-0. Forceps were removed and spermatic cord stumps were released back after checking for bleeding. The second testes were removed through the same incision, similar procedures were followed, and skins were sutured subcuticularly using chromic catgut 2-0.

Figure 3 Open castration in a dog

A) a scrotal skin incision, B) Removing of testicle, C) Ligation of spermatic cord, D) suturing of skin, E) dressing of the wound using cyclo spray and F) the dog stood within one hour after operation

Figure 4: Open castration in tom;

A) cat in dorsal recumbency on surgical table, B) Draping with sterile drape exposing the surgical site, C) Small incision made on scrotal skin and tunica dartos muscle and testicle exteriorized, D) double ligating the spermatic cords with 2-0 Vicryl and removing the testicles, E) the scrotum was sutured in Subcuticular suture manner using 2-0 vicryl.

Postoperative care and complications

Daily dressings of the wound using 2% povidone-iodine were applied to the surgical wound. Parenteral antibiotics ((Penicillin (24 mg/kg) and dihydro-streptomycin sulfate (30 mg/kg)); and IM were administered for three consecutive days. Postoperative pain was managed using a rate of 2 mg/kg tramadol hydrochloride (Manufactured by: Human Well Pharmaceutical plc. Ethiopia) at 2 mg/kg administered intramuscularly for two consecutive days. The most common complication is self-inflicted trauma to the surgical site but this was prevented using a locally made Elisabeth collar. Postoperative swelling in the scrotal area, minor discomfort when urinating, surgical site irritation, and inflammation were observed as postoperative complications. This peak occurred on the 4^{th} day after surgery and resolved completely after 10–12 days.

Discussion

Surgical sterilization of dogs and cats is a method for rendering animals completely sterile. This procedure is commonly used as a method of contraception to aid in addressing pet overpopulation problems as well as to prevent diseases of the reproductive system and modify undesirable behaviors such as urine marking, intermale aggression, and mounting of other dogs *(Jadhav et al.,* 2022). The castration of dogs and cats is one of the strategies used to modify undesirable sexual behavior and aggression directed toward people and other dogs (Kriese *et al.,* 2022). Studies have shown that androgens, or male sex hormones, such as testosterone have several behavioral influences on adult males and are usually reduced or altered by castration(McGuire, 2019). A study showed that approximately 90% of dogs responded to castration with a rapid or gradual decline in roaming behavior whereas about 50 to 70% of castrated dogs showed a rapid or gradual decline in mounting, urine marking in the house, and intermale aggression (Goericke-Pesch, 2017). The same study demonstrated that approximately 90% of cats castrated for an observed problem of spraying, roaming, and fighting showed a rapid and/or gradual decline in these unwanted behaviors. The present case of the cat was castrated at 2 years of age and the dog at one year of age. Usually, it is recommended to perform castration between the age of six to nine months (El-Sherif, 2017). Reports show that castration earlier than 6 month can suppress the development of urogenital organs that may lead to very narrow urethra predisposing to urinary tract obstruction by uroliths and long-term susceptibility disease as a result of early-age gonadectomy (Yates and Leedham, 2019).

In an open castration technique, the tunic, the tough membranous covering of the testicle, and associated structures are incised and each structure is ligated separately (Hussen, 2018). This technique was used in the current surgical case management because, during closed castration of dogs, there is always some danger that the vessels may slip out of a knot. By ligation of the vascular pedicle and avascular parts of the cord, the vascular pedicle was replaced within the tunic and then into the scrotum once hemostasis was confirmed. This surgical technique was similarly used by the authors(Sobhy et al., 2016a). Generally, castration is an effective and recommended way of improving the undesirable behavior of dogs rather than euthanization and preventing reproduction.

Conclusion and recommendations

The results of this case report indicate that behavioral problems are among the most common reasons for castrating male dogs and cats. Castration reduced the incidence of aggression toward pet animals and other animals. Neutering decreased the percentage of dogs engaging in roaming, mounting, and excessive urine marking behaviors, and it diminished the dogs' overall activity levels. Thus, while castration can resolve many undesirable behaviors in male dogs, the arguments for and against neutering should always be considered on an individual basis. Therefore, based on the above conclusions the following recommendations were forwarded: Apart from brief toilet visits to the garden, for the next 10-14 days the dog should have gentle lead exercise only to prevent any tension on the wound which may inhibit healing, try to avoid energetic behavior e.g. jumping on a chair, a local collar has been was provided to prevent the dog and cat from licking their wound.

3.1.3 Surgical Management of Paraphimosis in Dogs

Abstract

Paraphimosis is the inability to withdraw the penis into the prepuce, a medical emergency that can be congenital or acquired. It usually occurs after an erection and can cause symptoms such as difficulty or pain during urination and painful erection. Factors such as breed, excessive amounts of parietal preputial epithelium, and lack of development of the caudal prepuce muscle can also contribute to paraphimosis. Paraphimosis is more common in dogs than in cats, pigs, and cattle. Diagnosis involves visual examination of the genitalia, which may require sedation or anesthesia due to the painful early stages. The penis of each dog was examined for swelling, edema, and tissue debris. The penis was gently manipulated back into the preputial orifice by pulling the prepuce forward over the exposed penis. A purse-string suture pattern was applied to prevent the recurrence of penis protrusion. Postoperative care involved administering 25 mg/kg pens trip to prevent secondary bacterial infections and 0.2 mg/kg body weight meloxicam to reduce swelling of the glans penis intramuscularly for 3 days. The animal recovered uneventfully without complications.

Keywords*: Dog, Inability, Paraphimosis, Penis*

Introduction

Paraphimosis is the inability to completely withdraw the penis into the prepuce (Kutzler, 2022). A constriction preventing the penis from being withdrawn into the prepuce can be congenital or acquired and is not uncommon in dogs and serous because gangrene may occur unless relief is afforded (Adeola and Enobong, 2016). In addition, breed, excessive amounts of parietal preputial epithelium, and the absence or lack of development of the caudal prepuce muscle are also predisposing factors for paraphimosis (Chakma, 2019). Inverted skin at the preputial opening traps the protruding penis and inhibits venous drainage. A narrow preputial hole, priapism, foreign objects surrounding the penis, a constricting band of hair at the preputial orifice, trauma, and other conditions can also cause paraphimosis (Chakma, 2019). Inverted skin at the preputial opening traps the protruding penis and inhibits venous drainage. A narrow preputial hole, priapism, foreign objects surrounding the penis, a constricting band of hair at the preputial orifice, trauma, and other conditions can also cause paraphimosis(Nevi *et al.,* 2015). Paraphimosis can arise due to several factors, such as trauma, a narrow or stenotic preputial orifice, restriction of preputial hair surrounding the penis, a hypoplastic prepuce, and inadequate preputial musculature. effectively retracts the penis into the prepuce, hypospadias, neurologic deficits in dogs with posterior paresis, balanoposthitis, large penile tumor, or priapism or may occur as an idiopathic event (Chakma, 2019).

This may be due to constriction of the penis behind the glans penis, making it impossible to draw the organ back through the naturally small preputial orifice (Chakma, 2019). These could be associated with different types of conditions, such as traumatic injury, neoplasia, swelling of the prepuce, and penile paralysis (Chakma, 2019). The symptoms may include redness, tenderness, inability to urinate, swelling of the end of the penis, dark blue or black tissue on the end of the penis, discomfort and pain (Chakma, 2019). Paraphimosis is more common in dogs than in cats, pigs, cattle, etc. The genitalia are visually examined to diagnose paraphimosis. It might be necessary to administer sedation or anesthetics to check the penis and prepuce because the early stages of paraphimosis are quite painful. It is important to evaluate the degree of mucosal damage as well as the risk of penile necrosis and urethral impairment (Chakma, 2019). Additionally, edema (swelling) will occur as a result of restriction of blood flow back from the head of the penis. This further prevents the glans from

retracting and restricts the proper flow of urine through the urethra, which leads to bladder enlargement and discomfort (Chakma, 2019). The cranium 1 to 3 cm from the prepuce protrudes forward from the skin, reflecting off the abdominal wall. The preputial orifice normally permits unimpeded extrusion and retraction of the penile shaft (Adeola and Enobong, 2016). If the penis is not immediately replaced, it will dry out and become painful; secondary to this self-trauma, ulceration, urethral obstruction, necrosis, and gangrene may occur (Chakma, 2019). There are several methods used for treating paraphimosis. Ice packs, penile wraps, and manual compression have been reported to be effective agents for reducing swelling (Fesseha, 2020).

Case history and Physical examination

A nine-year-old intact male dog with an estimated weight of approximately 15 kg was presented to the JUCAVM open-air clinic; this dog had a history of penis protrusion from the prepuce and penis licking, which made the animal restless. The penis was swollen and edematous, and tissue debris was present. On physical examination, the oral and conjunctival mucosa were normal. His rectal temperature was 38.5°C, his heart rate was 90 beats/min, his respiratory rate was 21/min, and his capillary refill time was approximately <2 sec. The penis was swollen and edematous, and tissue debris was present.

Preoperative Preparation of the Dog

The exposed penis was washed with saline water and soap. The swelling and edema were controlled by applying a sodium chloride salt solution (NaCl salt solution). The tissue debris was removed by using artery forceps, and the protruded penis was washed with water. Paraffin oil was applied over the protruded penis for lubrication. With the gloved and lubricated hand, the protruded penis was pushed through the prepuce by gentle pressure to regain its normal position.

Anesthesia and animal control

The animals were premedicated with atropine sulfate at 0.04 mg/kg I.M. to prevent the occurrence of bradycardia during anesthesia. Later, the dog was induced by the combination of xylazine at 2 mg/kg IM and Ketamine (ketamine hydrochloride, 5.5 mg/kg IV) and maintained by ketamine by a half dose of the first dose. Finally, the dog was kept on dorsal recumbence.

Surgical Procedure and Technique

The exposed penis was washed with normal saline to remove dirt and debris and then wrapped with gauze soaked in a cold 50% hypertonic solution of sodium chloride. The penis was gently manipulated back into the preputial orifice by pulling the prepuce forward over the exposed penis, thus replacing the penis into the preputial cavity. The recurrence of penis protrusion was prevented by applying a purse-string suture pattern with silk number 1 to the preputial orifice by letting a small hole for urination.

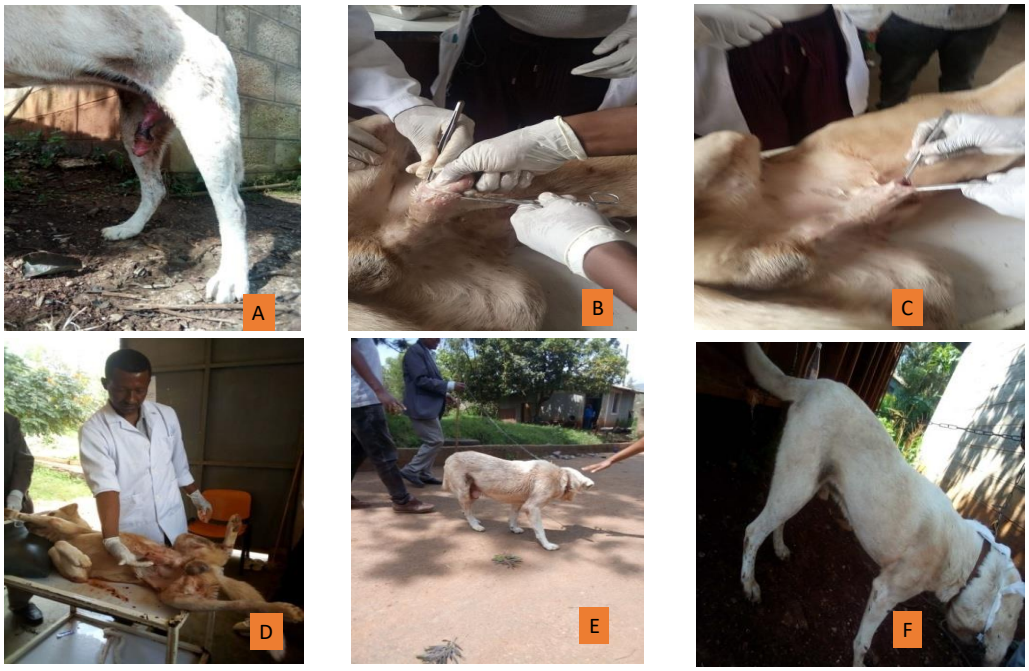

Figure 5: Surgical Management of Paraphimosis in Dog:

A) Protruded penis, B) manipulation of penis back into the preputial orifice, C) applying purse string suture, D) small hole for urination after applying purse string suture, E) Patient after postoperative care, F) patient after recovery.

Postoperative care and complications

Animals were administered with (Penicillin G (24 mg/kg) and dihydrostreptomycin sulfate (30 mg/kg)) at 1ml/25 mg/kg to prevent secondary bacterial infections and meloxicam @ 0.2 mg/kg body weight to reduce swelling of glans penis intramuscularly for three consecutive days. Purse-string suture was removed after the 12^{th} postoperative day, and the animal recovered uneventfully without any complications.

Discussion

Paraphimosis is considered an emergency. The immediate goal is to relocate the penis to its normal position within the prepuce. Once the penis returns to its normal position, the dog is usually isolated from any source of stimulation, such as heat or excitable activities (Chakma, 2019). The primary goal in treating paraphimosis is to reduce swelling and replace the prolapsed penis with the preputial cavity as soon as possible to protect it from further injuries (Chakma, 2019). Acquired paraphimosis is a result of trauma to the penis, which causes damage to the penis, leading to paralysis of the retractor penis muscles (Chutia *et al.*, 2020). Prolong paraphimosis can result in necrosis of the glans penis and obstruction of the urethra. Although usually associated with coitus or sexual excitement, paraphimosis can be precipitated by fractures of the penis (Kutzler, 2012) and pseudo hermaphroditism (Chakma, 2019). In the present case, the paraphimosis was due to trauma to the penis during the erection. According to the current case report, the protruding penis was washed with sodium chloride solution (salt) to minimize edema and remove dirt and dust, respectively. This finding is in line with a previous report (Adeola and Enobong, 2016). A temporary purse string suture can be placed to keep the penis inside the prepuce. With paraphimosis due to other causes or for a longer duration, sedation or general anesthesia can be required (Kizer and Mochal-King, 2021). In this reported case, paraphimosis was managed initially by reducing swelling, followed by retention in the preputial cavity via purse-string sutures and antibiotics, and anti-inflammatory agents were used to facilitate recovery and prevent

secondary bacterial infection. The tissue debris was removed by using artery forceps, and the protruded penis was washed with water. The protruded penis was pushed through the prepuce by gentle pressure to regain its normal position. The recurrence of penis protrusion was prevented by applying a purse-string suture pattern. This finding is in line with a previous report (Chakma, 2019).

Conclusion and recommendations

It is concluded that trauma during coitus or erection of the penis may cause paraphimosis, which should be considered an emergency urological condition because there is obstruction of urine flow and further damage or necrosis of the penis. It can be successfully managed by evacuating the accumulated urine and repositioning and retaining the penis into the preputial cavity as early as possible. Therefore, the client was advised to closely monitor the animal for any sign of straining and periodically assess the animal for penile coverage several times daily with friction-free movement of the prepuce over the penile shaft.

3.1.4 En Bloc Ovariohysterectomy in a Queen

Abstract

Dystocia is the inability of a dam to deliver a fetus through the birth canal without assistance during parturition. Dystocia may be caused by maternal or fetal factors and, in some cases, a combination of both. The process of parturition in animals is divided into three phases: the primary phase, the secondary phase, and the third stage. In present case, a local second parity queen was presented with a history of dystocia and was found to be difficult to deliver. Preoperative animal preparation involved sedating and placing the animal on a surgical table in dorsal recumbency. Anesthesia was administered using a combination of xylazine hydrochloride (2 mg/kg) and ketamine hydrochloride (5 mg/kg). The surgical incision was made in the caudal midline, the uterus was exteriorized, and the ovarian pedicles were double ligated with a 3-0 chromic catgut suture. The surgical site was inspected for evidence of bleeding, and the peritoneum and muscle layers were sutured with simple interrupted patterns. The subcutaneous layer was sutured with a lockstitch pattern using catgut # 3-0. The skin was then closed to a subcuticular suture pattern using chromic catgut # 3-0. Postoperative care and

complications included antibiotic pen strips at 25 mg/kg body weight for 5 days and tramadol 2 mg/kg for two consecutive days for pain management. Minor swelling at the surgical site and loss of appetite were observed up to the second day after surgery. The owner was advised to keep the queen in a clean area and apply a locally made Elizabethan collar, and the queen recovered fully 12 days after surgery.

Keywords: *Dystocia, Parity, Queens, Surgical site*

Introduction

Dystocia is the inability of a dam to deliver a fetus at parturition through the birth canal without assistance (Weldeyohanes and Fesseha, 2020). The incidence of dystocia in pets, such as bitches and queens, is quite low, but when it occurs, it can pose a serious life-threatening situation(Haben and Guesh, 2020). Dystocia occurs in approximately 5% of all parturitions in dogs and 3.3% to 5.8% of parturitions in queens (de Sousa Oliveira, Zambelli, 2012). Dystocia may be caused by maternal or fetal factors and, in some cases, a combination of both (Weldeyohanes and Fesseha, 2020, Batista-Arteaga *et al.*, 2011). Maternal factors include small pelvic size, abnormalities of the caudal reproductive system, primary or secondary uterine inertia, malnutrition, parasitism, and other abnormalities of the uterus (Hossain, 2022, Pretzer, 2008). Fetal causes include fetal monsters, fetal oversize in relation to the maternal pelvis, fetal abnormal positioning or posture, and fetal death (Jones *et al*., 2021).

The process of parturition in animals is divided into three phases. The primary phase is characterized by apparent uterine contractions and progressive dilation of the cervix. In the bitch, the duration is typically 6–12 hours, while in the queen, it may be slightly shorter (Deka *et al.,* 2021). The queen may vocalize; showing tachypnea and restlessness, and some will lie in the queening box and vibrating sound loudly. In some queens, the primary phase of labor can occur without any obvious clinical symptoms. The secondary phase of labor includes the process of fetal expulsion through a fully diluted cervix. The queen usually has her first kitten within 1 hour of the onset of stage two labor and subsequent kittens every 10–60 minutes, but this is quite variable. Parturitions of up to 10-12 hours have been reported in the queen (Pretzer, 2008). The third stage of labor encompasses the time at which fetal membranes are

expelled. Surgery may also be performed as an elective procedure in animals that have a history of dystocia or are predisposed to dystocia animals with pelvic fracture malunion or a narrow pelvic canal. It has been suggested that hysterectomy should not be performed to avoid additional stress to the dam or a longer anesthetic time. En bloc overiohystectomy is a safe and effective alternative technique that allows cesarean section and sterilization in cats and dogs with dystocia (Gendler *et al.*, 2007, Baltzer, 2023, Robbins and Mullen, 1994, Güner and İpek, 2020).

The queen's case history and Physical examination

A second parity local breed queen was presented with a history of dystocia to Jimma University College of Agriculture and Veterinary Medicine in an open-air clinic. The owner complained that the queen was difficult to deliver. On general physical examination, the animal was found to frequently lick its perineal area. There was vaginal discharge of the offensive odor. The queen was frequently ground and strained. A distended abdomen was also observed. Upon clinical evaluation, the rectal body temperature was subnormal (37.80° C) and the animal was dehydrated. On vaginal examination, the birth canal was found to be moist, with vaginal discharge that had a bad odor. Manual traction of the fetus that remained in the uterus was difficult due to the presence of an abscess. Then, the decision to perform emergency surgery via cesarean section was made under general anesthesia to save the life of the queen.

Preoperative animal preparation

The queen was sedated and put on the surgical table in dorsal recumbency, and when the pre-anesthetics took effect, an IV catheter was placed and connected to an IV fluid supply line containing lactated Ringer’s solution administered at a rate of 10 ml/kg/hr. and delivered rate calculated drop rate per second. The ventral midline abdominal area was shaved and washed with water and soap and then scrubbed using Savlon solution for aseptic surgery. Finally, the area was rubbed with 2% povidone iodine.

Anesthesia and Animal Control

Atropine sulfate (0.04 mg/kg) was administered IM as a premedicant, and general anesthesia was achieved by the combination of xylazine hydrochloride (2 mg/kg) and ketamine hydrochloride (5 mg/kg), both of which are drugs loaded into different syringes, and IM and IV were administered. When the anesthetics took effect, an IV catheter was placed and connected to an IV fluid supply line containing lactated Ringer's solution administered at a surgical rate of 10 ml/kg/hr. and delivered rate calculated drop rate per second. The patient was kept on the operation table, and the surgery was performed aseptically under general anesthesia using a half dose of ketamine hydrochloride.

Surgical procedure and technique

A surgical incision was made in the caudal midline approximately 2 cm behind the umbilicus (Fig.6D). An approximately 10-15 cm long caudal ventral midline incision was made on the skin. Bleeding from small cutaneous arteries was controlled by applying pressure using gauze and/or artery forceps. The subcutaneous tissues and fats were removed. Then, the linea alba and peritoneum were incised layer by layer to exteriorize the uterus, and the vascular pedicle containing the ovarian artery and vein was isolated by breaking the mesovarium. No clamps were placed on the vessels. This procedure was repeated for the other ovary, the uterus was exteriorized (Fig.6E), and the ovarian pedicles were double ligated with a 3-0 chromic catgut suture (Fig.6F). The broad ligament was broken down on both sides of the uterus to a point just cranial to the cervix. The cervix and vagina were palpated for the fetuses, which were gently manipulated into the body of the uterus. The ovaries and uterus were removed (Fig.6G) by dividing between the clamps and were given to a team of assistants, who immediately opened the uterus, and two dead emphysematous fetuses were appreciated. The surgical site was inspected for evidence of bleeding. The peritoneum and muscle layers were sutured in a simple interrupted pattern with chromic catgut # 3-0(Fig.6H). The subcutaneous layer was sutured with a lockstitch pattern using catgut # 3-0. The skin was then closed to a subcuticular suture pattern using chromic catgut # 3-0. The operation was successful. The abdomen was closed routinely. Subcuticular sutures were preferred over skin sutures because of the proximity of the suture line to the mammary glands.

Figure 6: En bloc Ovariohysterectomy in queen

A) presented case, B) preparation of surgical site, C) scrubbing of surgical site, D) skin incision on Caudal ventral midline, E) Exteriorization of gravid uterus, F) Transfixation of uterine horn, G) removing gravid uterus, H) Simple interrupted sutures placing on the peritoneum and Linea Alba and the skin was then closed Subcuticular suture pattern, I) After post-operative recovering of the cat was shown good progress condition, J) After recovery

Postoperative care and complications

A broad-spectrum antibiotic (Penicillin G (24 mg/kg) and dihydrostreptomycin sulfate (30 mg/kg)) (Pro & Strep; Hebei Yuanzheng Pharmaceutical Co., Ltd. China) at 1ml/ 25kg body weight was administered intramuscularly daily for 5 days and tramadol 2mg/kg was given for two consecutive days for pain management. Minor swelling at the surgical site loss of appetite, and long sleep were observed up to the second day of post-operative management. The owner was advised to keep the queen in a clean area and apply a locally-made Elizabethan collar. No additional complication was noted and the queen recovered fully after 12 days postoperative.

Discussion

En bloc Ovariohysterectomy is performed particularly in animals for which cesarean section is indicated because of the risk of difficult delivery (Gilson, 2015), In this case report, a technique similar to that of Ovariohysterectomy was performed while the fetuses were still in the uterus. En bloc Ovariohysterectomy may be performed whether the fetuses are alive or dead, and this method permanently blocks reproductive ability without the need for a second operation (Robbins and Mullen, 1994). The procedure was performed based on the interest of the owner. The survival rate of the newborn in dogs has been reported to be 75% for cesarean sections performed by the en bloc technique (Van Goethem, 2016b)and 92% for sections performed by the conventional method (Van Goethem, 2016a). The queen was at second parity facing difficulty in giving birth, and the owner requested that the queen be spaid because he needed no more kittens from his queen. In this case report, all fetuses died, possibly because the owner visited the assistant at the late stage of parturition. Reports have shown that Ovariohysterectomy at the time of dystocia has increased morbidity to the dam, so the use of en bloc Ovariohysterectomy in cats and dogs has advantages of minimal anesthetic time for the dam and minimal potential for peritoneal contamination with uterine contents, which may occur during hysterectomy(Howe *et al*.). En bloc Ovariohysterectomy also provides an opportunity to affect population control in pets of clients who may not be able to afford to return for a second surgical procedure (Ovariohysterectomy). En bloc Ovariohysterectomy does not compromise the health of the dam. This technique also seems to be safe for neonates, although further studies are necessary to confirm this finding.

Conclusion and Recommendation

It was concluded that for female cats with dystocia and the patient's stage two of labor, improved use of maternal and fetal monitoring systems, and use of anesthesia adapted to the dam and En-block overiohystectomy is a safe and effective alternative technique that allows cesarean and sterilization in cats and dogs with dystocia. Therefore, based on the above conclusions the following recommendations were forwarded: Advantages of en bloc Ovariohysterectomy include, Minimal anesthetic time for the dam, which may be debilitated before surgery, Minimal potential for peritoneal contamination with uterine contents, which

may occur during hysterotomy, En bloc Ovariohysterectomy also provides an opportunity to affect population control in pets of clients who may not be able to afford to return for a second surgical procedure (Ovariohysterectomy, En bloc Ovariohysterectomy does not compromise the health of the dam, En bloc Ovariohysterectomy technique also seems to be safe for the neonates, the technique also seems to be safe for the neonates

3.1.5 Ovariohysterectomy in a Bitch

Abstract

Ovariohysterectomy is a surgical technique used by veterinary practitioners to sterilize dogs and cats and is often performed as a contraception method or to treat reproductive system diseases. It can be performed by removing both the ovaries and the uterus or by removing the ovaries alone. In pets, it is most commonly accomplished by surgically removing the ovaries alone or together with the uterus (spaying). Surgical operations can be performed at 3-4 months of age to avoid increased risks, but some prefer waiting until the animal has passed through one heat period. Six to eight months of age is generally considered the best age. This case study describes a 4-year-old local breed bitch with a history of second parity that underwent an Ovariohysterectomy under general anesthesia to control unwanted puppies. The bitch was sedated using xylazine and an induction dose of ketamine, and the operation was successful. Postoperative care involved administering pen strips intramuscularly for three days, tramadol 2 mg/kg for two consecutive days, and placing an Elizabeth collar on the dog's neck to prevent self-inflicting trauma. Minor postoperative complications, such as pain when touched, inflammation at the surgical site, and loss of appetite, were encountered but regressed.

Keywords: *Bitch, Linea alba, Surgical site, Veterinary practitioners*

Introduction

Ovariohysterectomy (OHE) is a common surgical technique performed by veterinary practitioners for small animals (Dabrowski and Wawron, 2014). Surgical sterilization of dogs and cats is one of the most common procedures performed either as a method of contraception to prevent breeding or to treat diseases associated with the reproductive system, such as mammary neoplasia (Dugassa *et al.,* 2020, El-Wahed *et al.*, 2014). The sterilization of female dogs and cats can be accomplished by removing both the ovaries and uterus (Ovariohysterectomy) or by removing the ovaries alone (ovariectomy) (Omeran *et al*., 2014). In pets, this is most commonly accomplished by surgically removing the ovaries alone or together with the uterus (spaying) (Ladlow, 2015, Buote and Fransson, 2022). There are varieties of surgical techniques as well as nonsurgical methods of contraception used to prevent reproduction without removing the source of gonadal hormones(Kutzler and Wood, 2006). The advantages of OHE include decreasing the incidence of reproductive tract diseases, including pyrometer and mammary neoplasia, in bitches; decreasing pregnancy- and parturition-related disorders, including metritis, mastitis, and dystocia; decreasing hormone-associated disorders, such as vaginal prolapse, in bitches; and decreasing undesirable sexual behaviors(Kustritz, 2018, Thomson and Britt, 2022, Weedon *et al*., 2020). The disadvantages of OHE include surgical and aesthetic complications, increased risk of neoplasia of various organ systems, obesity and urinary incontinence in bitches(Saraiva, 2019, Kustritz, 2011). Surgical operations can be performed at 3–4 months of age to avoid an increased risk of urinary incontinence (Howe, 2015), but some prefer to wait until the animal has passed through one heat period. Six to eight months of age is generally considered the best age (Weedon *et al.*, 2020). Skin incisions are considerably smaller and located more cranially after ovariectomy than after Ovariohysterectomy (DeTora and McCarthy, 2011, Tallant *et al.*, 2016). The operative procedure, including treatment with Ovariohysterectomy, is described in this case.

Case history and Physical examination

A 4-year-old, approximately 12 kg, local breed bitch with a history of second parity was brought for birth control. As there was no birth control pill available, we decided to use

spaying as a birth control measure. On the patient's general physical examination, the patient was in good physical condition. All vital parameters were within normal limits. Then, the decision was made to perform an Ovariohysterectomy under general anesthesia to control unwanted puppies.

Preoperative preparation

The bitch was fasted overnight for 12 hours from feed and four (4) hours from water before coming to the clinic for the next day's appointment. Upon arrival on the day of the appointment, the bitch was rechecked for vital health parameters. As the bitch was found to be healthy and fit for the procedure, the decision was made to continue spaying the dog. Then, the bitch was sedated on the surgical table in dorsal recumbence, and the umbilical region was prepared for aseptic surgery by shaving the hair from the surgical site and cleaning the surgical field with tap water and soap, followed by a final scrub using 2% povidone-iodine solution.

Anesthesia and Animal Control

The bitch was sedated using xylazine and given IM at 2 mg/kg as anesthesia. Then, an induction dose of ketamine at 5 mg/kg was given through the IV line, and the animal was transferred to a table for aseptic preparation. The dog was maintained using ketamine at a half dose of 5 mg/kg given as needed throughout the surgical procedure.

Surgical procedure and technique

A ventral midline incision was made beginning approximately 3 cm caudal to the umbilicus (Fig.7B) and extended caudally to a length of 6-8 cm. After the skin incision, the subcutaneous connective tissue and fat were bluntly dissected using a pair of scissors to visualize the linea alba. The linea alba was grasped in the middle and tented up using toothed tissue forceps, and a stab incision was made on the linea alba with a scalpel blade and extended with scissors (Fig.7C). An index finger was passed to locate the uterine horn. The ovarian bursa was clamped through artery forceps. The ovary was grasped between the thumb and index finger and withdrawn to the incision. The suspensory ligament of the ovary was

ruptured by traction, and three artery forceps were applied to the ovarian pedicle for ligation. Double trans-fixation ligation was performed with a chromic catgut size of 2-0. The attachment between the ligature and the ovary was then severed. The severed stump was checked carefully for hemorrhage before returning to the abdomen. After removing one ovary, the other ovary was located and removed similarly. The body of the uterus was withdrawn from the abdomen. The uterine body, including the uterine artery, was ligated by double transfixation ligation. The uterus was severed just cranial to the ligature. The uterine stump was checked for hemorrhage, and the patient returned to the abdomen. The surgical site was closed in the following manner: the linea alba was sutured in a simple interrupted pattern using chromic catgut 2-0, the subcutaneous layer was closed with a lockstitch pattern (Fig.7F), and finally, the subcuticular suture was applied for skin closure with the same suture material. Then, the wound was sprayed with an antiseptic solution wound spray ox tetracycline. The surgical procedure was successful.

Figure 7: Ovariohysterectomy performed in a bitch;

(A) presented case, (B) Skin incision along ventral midline, (C) Linea alba incision, (D) The attachment between ligature and ovary severed and ovary together with uterus exteriorized, (E&F) The Linea alba closed by simple interrupted pattern, skin closed with Subcuticular suture technique followed by spray with antiseptic, (H) Elizabeth collar made from locally

available material applied to prevent self-trauma as part of post-operative care, (I) The bitch shown good progress.

Postoperative care and complications

A broad spectrum antibiotic (Penicillin G (24 mg/kg) and dihydrostreptomycin sulfate (30 mg/kg)) (Pro&Strep; HebeiYuanzheng Pharmaceutical Co., Ltd. China) at 1ml/ 25 kg was administered intramuscularly for three consecutive days and using pain management (tramadol hydrochloride 2 mg/kg) was injected for two consecutive days. An Elizabeth collar made from locally available plastic material was placed on the dogs' necks to avoid self-inflicting trauma (Fig.7H). The owner was advised to monitor the dog and keep the Elizabethan collar from dislodging. The owner was also advised to restrict exercise. Minor postoperative complications, such as pain when touched, inflammation at the surgical site, and loss of appetite, were encountered but regressed on their own.

Discussion

The selective sterilization of pet female animals is one of the most common procedures performed in veterinary practice. For routine spaying, the best age of spaying is before puberty or after any phase of the reproductive cycle, but it is best performed either before puberty during anestrus or after the animal has passed through one heat period (Pereira *et al.*, 2018). In this case report, the bitch was spayed at second parity to control unwanted puppies. The surgical operation was performed using injectable anesthetics. Xylazine was used as a preanaesthesia, and a combination of diazepam and ketamine mixed in the same syringe for induction and maintenance was commonly used(Lin, 2022). In the present case study, an Ovariohysterectomy was performed through a ventral midline skin incision (Barman, 2020). After complete recovery from anesthesia and the absence of any potential complications, such as bleeding from the surgical site, the bitch was sent to the owner's house to allow her to recuperate from her ailment. Currently, elective surgical procedures are performed under aseptic conditions with clean surgical instruments to avoid any risk of surgical contamination(Hussen, 2018).

Conclusion and Recommendations

Ovariohysterectomy is the only effective treatment for pyometra, and it is a radical treatment for postoestrus metritis when it recurs following medical treatment failure. For the procedure to have the best chances of success, it is important to perform it on a bitch in good general condition. By spaying, the suffering of these street or nonadopted dogs can be minimized. In conclusion, spaying can be considered a 100% safe birth control measure and is also a humane rather than a way to euthanize homeless dogs. Based on the above conclusions, the following recommendations are proposed: The government must create legislation requiring dog registration and certification. To manage the overpopulation of dogs and prevent zoonosis, ovarian hysterectomy in females should be regarded as essential.

3.1.6 Cesarean section in cows

Abstract

Dystocia is an abnormal and challenging birth where the first or second stage of parturition is prolonged and impossible for the dam to deliver without artificial aid. Causes can be maternal or fetal. The calf's physical factors, such as oversize or mal-presentation, contribute to a mismatch between the calf's size and the dam's birth canal. Hormonal imbalances may reduce oxytocin receptor expression, resulting in weak contractions and weak dilatation of soft tissues. The cow was found to be recumbent and restless, straining for over 15 hours without progress. Peri-vaginal examination revealed a lateral head deviation and two forelimbs in the birth canal. Manual traction of the fetus was difficult due to abnormal posture and narrow pelvis. The cow's history of straining for over 15 hours confirmed dystocia related to a narrow pelvic canal. Emergency surgery was decided to perform a cesarean section to save the dam's life. However, the fetus died due to the weakened uterine wall. The cow was administered antibiotics and anesthetized before the procedure. The cow underwent a skin incision, a linear incision, and a uterine incision closure. Postoperative care involved antibiotics, daily dressing, and topical antibiotics. The cow's post-operative complications included inflammation and swelling, which regressed after 5 days. The cesarean section is widely used as an emergency operative technique for cows affected by dystocia.

Keywords: *Caesarean section, Cow, Dystocia, crossbreed, uterine incision*

Introduction

The term “dystocia” refers to an abnormal and challenging birth in which the first or especially the second stage of parturition is markedly prolonged and subsequently found impossible for the dam to deliver without artificial aid (Benti and Zewdie, 2014, Sarder *et al*., 2015). The causes of dystocia are divided into maternal and fetal causes(Weldeyohanes and Fesseha, 2020, Juneja *et al*., 2023). Maternal causes of dystocia arise from maternal-related factors such as improper cervical dilation, failure of uterine expulsive contraction (uterine inertia), and neoplasms of the vagina, vulva, and uterus(Weldeyohanes and Fesseha, 2020). The most common fetal-related causes of dystocia are head deviation, forelimb flexion, breech presentation, dog sitting position, and fetal malformations (Khan, 2018, Ismail, 2017)as well as hydrocephalus, ascites, anasarca, and hydrothorax(Weldeyohanes and Fesseha, 2020). The pelvic size at birth is affected by the size of the fetus and the fatness of the dam, which might partially obstruct the birth canal (Kebede *et al.*, 2017, Simões and Stilwell, 2021). The physical factors of a calf, such as a calf that is too large or mal-present, contribute to a mismatch between the size of the calf and the birth canal of the dam. These morphological characteristics are also dependent on a number of other factors, such as the calf's age, breed, parity, and sire; twinning; the calf's weight and sex; and the calf's breed as well as the nutrition of the dam during gestation (Weldegebriall, 2015, Bila, 2019). A lack of uterine contractions (weak labor), incomplete dilation of the cervix and vagina due to stenosis (narrowing and stiffening of the tissue), and uterine torsion are other causes of dystocia (Abdela and Ahmed, 2016, Barrier, 2012). Hormonal imbalances may reduce the expression of oxytocin receptors in the uterus, resulting in weak uterine contractions and weak dilatation of soft tissues (Hossein-Zadeh, 2013). Dystocia can be relieved by different obstetric methods, including cesarean section and fetotomy. Currently, the cesarean operation is one of the most common surgical procedures performed by veterinarians and is considered a routine obstetric technique(Weldegebriall, 2015). It has high maternal and fetal survival rates and is often less exhausting, faster, and safer than fetotomy. Fetotomy should be considered only when the fetus is known to be dead. Fetotomy is performed using the embryotome or the fetotome, and forced extraction/traction at delivery may cause severe trauma to the dam and

the fetus(Ghuman, 2014, Mekonnen and Moges, 2016). There are three main goals in performing cesarean section: (1) survival of the dam, (2) survival of the fetus, and (3) maintenance of fertility. A prompt decision to perform a cesarean operation is important for optimum success. Ideally, it is carried out when a live calf cannot be delivered after 15-20 minutes of manipulation(Weldeyohanes and Fesseha, 2020, Ajeel *et al.*, 2019).

Case history and Physical examination

A 5-year-old exotic cow of Holstein breed was presented with a history of failure to give birth 15 hours from the onset of parturition. The owners' complaint indicated that the cow laid on the ground continuously straining for parturition but failed to expel the fetus. On general Physical examination when closely observed there is partial expulsion of both forelegs and dried leg indicating that it stayed for a long time. The patient's history revealed that she had given one birth before with no history of dystocia. On clinical examinations, the cow's respiratory rate was 30 breaths/minute, heart rate was 68 beats/minute and temperature was 38.5^{o}c all being within physiological ranges. Per vaginal examination revealed the complete opening of the cervix with the existence of the large-sized fetus, twisting of the neck of the fetus, and partial expulsion of two forelegs which was difficult to expel the fetus through the birth canal due to feto-pelvic disproportion. Based on the case judgment and the need for emergency surgery, the decision was made to perform a cesarean section to deliver the calf and save the dam. The weight of the cow was estimated at 400kg.

Preoperative animal preparation

Before preparation of the surgical site, the cow was administered with broad spectrum antibiotic Procaine penicillin (24 mg/kg) and dihydrostreptomycin sulfate (30 mg/kg) at 1ml/25kg injected intramuscularly as prophylactic. Then, the cow was positioned in the right lateral recumbency. The left paralumbar fossa and the surrounding area were shaved, washed with water and soap then scrubbed with 2% povidone-iodine solution from central to peripheral(Fig, 7A).

Anesthesia and Animal Control

The cow was administered epidural space anesthesia using 2% lidocaine hydrochloride @0.22mg/kg into sacrococcygeal space to prevent straining of the cow and local line infiltration at the site of operation surgical site was anesthetized by inverted L-block local analgesia using 2% lidocaine hydrochloride (Lignocaine Injection Bp; Sakar Healthcare Ltd. India) at a dose of 10 mg/kg body weight at lower left paralumbar fossa. Physical control by personnel was used to keep the cow in a standing position during the surgical procedure.

Surgical procedure and technique

The skin incision was made on the lower left flank ventro-laterally (Fig, 8B). Skin, muscles, and peritoneum were incised in the same direction. Part of the gravid uterus containing the fetus was exteriorized. The linear incision on the least vascular area of the uterus was performed and large oversized fetus was pulled out and the placenta was detached fully. The incision of the uterus was sutured first by the Cushing suture pattern and the second layer by the Lambert suture pattern (Fig, 8C). Muscles were sutured in two layers, peritoneum, and transverse abdominis muscle together, and the external sheath of the rectus abdominis muscle was sutured by a continuous ford interlocking suture pattern using 2-0 sized vicryl suture (Fig, 8E). Skin and subcutaneous tissue were closed in a simple interrupted suture by silk suture (Fig, 8G).

Figure 8: Cesarean section in cows

A) the presented case, B) the surgical area was shaving, C) schrubbing the surgical area, D) Muscles were suturing in two layers, E) all abdominal muscle were sutured, F) a fetus was pulled out, G) Skin incision on the lower left flank ventrally, H) a live fetus

Post-operative care and complications

In this case report, a cesarean section was performed on the farm and routinely administered antibiotic. So, an antibiotic combination of Procaine Penicillin G and dihydrostreptomycin sulfate @ 1/25 kg, 16 ml intramuscularly given for 5 consecutive days. A topical Antibiotic (tetracycline) was sprayed on the wound and daily dressing with an antiseptic povidone-iodine solution. Pain management was done using tramadol hydrochloride 2 mg/kg was administered for two consecutive days. Postoperatively minor swelling on and around the wound was observed up to the fourth day that regressed then after by itself. The suture was removed on the fifteenth-day post-operation after the surgical wound healed. The operation site was completely healed after one month. The skin suture was removed after 14 days

Discussion

Cesarean section is widely used as an emergency operative technique for the surgical delivery of cows affected by dystocia (Paul, 2018, Purohit *et al.*, 2013). Following cesarean section, the recorded survival rate of the dam ranged from 36-100%. The survival rate may reach 64.7-100% if the operation is performed within 24-26 hours of the onset of dystocia (Barua, 2020, Paul, 2018). In the present cases, surgery was performed within 15 hrs, and local breeders were operated on after natural delivery failed. Thus, the time of surgical intervention, which determines the chances of both dam and calf survival, is rare. Fetal dystocia due to an oversized fetus and abnormal presentation is common in up to 65.62% of cattle, whereas maternal causes constitute 34.38% of the total (Barua, 2020). Most of the cows affected by dystocia were in the first parity (32.3%), but nearly equal proportions (30.2%) of the cows were in the second parity(Purohit *et al.*, 2012). The left ventrolateral oblique approach under caudal epidural analgesia using 2% lidocaine hydrochloride was used previously (Kumar and Purohit, 2022, Hussen, 2018). This approach readily permits exteriorization of the uterus, making it suitable for the removal of a large emphysematous fetus. However, the upper left flank approach for exteriorization of the uterus is often difficult because the gravid uterus falls away from the incision, and wound closure is more difficult due to increased tension on the muscle layers. In both cases, cesarean sections were performed since the cows failed to expel the fetus. Common complications reported to be associated with C-sections include peritonitis, hemorrhage, and wound dehiscence (Barua, 2020, Paul, 2018). In the present case, such complications were not recorded except for local swelling and surgical site inflammation, which regressed within 4-5 days. However, the animal was successfully recovered without any complications.

Conclusion and recommendations

A 5-year-old cow with a full-term pregnancy was presented with dystocia in the current case report. The altered vital organs indicators were tachycardia and dyspnea, according to a field examination. However, the temperature of the rectum was within the biological range. There was also a ruptured water bag, straining, vulva edema, and abdominal distension. The case was identified as dystocia due to a constriction of the birth canal linked to the dam's

immaturity based on the history and vaginal inspection. After the failure of vaginal birth, C-Section was performed using normal techniques, with aseptic procedures and postoperative care being thoroughly monitored. The owner was advised not to mate or inseminate such animals or those who have a pelvis that is either tiny or too narrow.

3.1.7 Cesarean section in Doe

Abstract

Dystocia is a condition in which the fetus cannot progress from stage one to stage two or when thirty minutes are spent to start stage two. In small ruminant animals, dystocia occurs due to fetal-maternal disproportion, multiple fetuses within the pelvic canal, fetal malpositioning, incomplete dilation of the cervix, and uterine inertia. Cesarean delivery is the only method used for treating fetal-maternal dystocia, followed by systemic administration of antibiotics and nonsteroidal anti-inflammatory drugs. Cesarean section or C-section is less common in sheep and goats than in cattle due to the lower frequency of fetal-maternal disproportion, which is the basis of dystocia. The present case study involved a local breed of goat with a history of partial foreleg removal from the vulva for 48 hours. The animal was examined for signs of dystocia, and the doe was placed in right lateral recumbency, exposing the left flank. Anesthesia was administered, and the fetus was removed from the umbilical cord, and the nasals were cleared to facilitate proper respiration. The uterine incision was closed, and the skin and subcutaneous tissue were closed with cruciate sutures. The animal showed progressive dystocia after three weeks. This case report highlights the common surgical procedure of cesarean section to resolve dystocia caused by incomplete cervix dilation and a live fetus in the uterus. Effective pre- and postoperative management and antiseptic dressing are crucial for preventing bacterial contamination of the wound.

Keywords**:** *Cesarean, Dystocia, Fetal-Maternal, Small Ruminant*

Introduction

Dystocia is defined as the inability to progress from stage one to stage two labor or when thirty minutes are spent starting stage two of labor or parturition (Iqbal *et al.*, 2020, Sofi and

Zeebaree, 2022). The first stage of parturition (labor) is defined as the preparation for fetal expulsion and includes decreased appetite, preparation of a birthing area, isolation from the group, restlessness, and early uterine contractions (Anderson, 2014, Iqbal *et al*., 2020). Fetal expulsion or delivery of neonates is stage two of parturition. In small ruminants, dystocia occurs because of fetal-maternal disproportion, multiple fetuses within the pelvic canal, fetal malpositioning, incomplete dilation of the cervix, and uterine inertia(Iqbal *et al*., 2020, Patil *et al.*, 2014). Fetal-maternal disproportionation of dystocia occurs when a heavy male breed is mated with a small female breed. Under these conditions, the birth of a fetus does not occur through the birth canal because of the giant size of the fetus or newborn and the small size of the birth canal(Iqbal *et al*., 2020). Cesarean delivery is the only way to treat fetal-maternal dystocia, followed by systemic administration of antibiotics and nonsteroidal anti-inflammatory drugs. Single-layer cesarean section closure must be performed in two layers despite single-layer closure, as zero leakage is confirmed after uterine leakage is checked. Cesarean section or C-section is less common in sheep and goats than in cattle because of the lower frequency of fetal-maternal disproportion as the basis of dystocia, i.e., only 1 out of 5 compared with 1 out of 2 in cattle (Iqbal *et al.*, 2020).

Case history and Physical examination

A local breed of goat aged approximately 5 years with a 50 kg body weight and a history of partial foreleg removal from the vulva for 48 hours was obtained at the JUCAVM open-air clinic. The animal had been suffering from this condition for more than three hours. On clinical examination, her body temperature was 38.3°C, respiration and tachycardia were normal, and there was no injury or hemorrhage in the limb. The dehydration status of the animals was normal, as determined by a skin fold test, but the animals were restless. The fetus was alive as checked or had no bad smell. Therefore, we decided to perform a cesarean section.

Preoperative animal preparation

After proper restraining, the local breed of doe was placed on the right lateral recumbency, exposing the left flank. Shaving the hairs on the left paralumbar fossa and the surgical site were scrubbed with 2% povidone-iodine) as an antiseptic.

Anesthesia and animal control

The doe was placed in the right lateral recumbency with the aid of personnel rope casting, and the surgical site was anesthetized by inverted L-block local analgesia of 2% lidocaine hydrochloride at the lower left paralumbar fossa.

Surgical procedure and technique

A skin incision was made on the lower ventrolateral oblique of the left flank (Fig.9C). The skin, muscles, and peritoneum were incised in the same manner. Part of the gravid uterus containing the fetus was exteriorized (Fig.9D), and hysterotomy (incision in the uterus) was performed on the greater curvature of the gravid horn, and the fetus was removed from the uterine horn by grasping the posterior limb of the fetus with an intact umbilical cord (Fig.9E). The fetus was detached from the umbilical cord, and the nostrils were cleared from the fluid to facilitate proper respiration. The uterine incision was closed by Cushing sutures followed by the use of a Lambert pattern with catgut no.2-0 (Fig.9F). The muscles were sutured in two layers, the peritoneum, and transverse abdominis muscle, together, and the two external and internal oblique muscles were sutured by a continuous Ford interlocking suture pattern using a 2-0-sized catgut suture (Fig.9G). The skin and subcutaneous tissue were closed in cruciate (X cross) sutures using nonabsorbable suture silk (Fig.9H).

Figure 9: Cesarean section in doe;

A) the Local breed goat two forelimbs were observed, B) inverted L-block local analgesia Infiltration, C) Skin incision on the lower left flank ventrally, D) Part of the gravid uterus containing the fetus was exteriorized, E) a live fetus was pulled out, F) Uterine incision was closed, G&H) All abdominal muscle, subcutaneous tissue and Skin were closed in horizontal mattress suture, I) immediate after surgery the dam stood up with her lamp, J) Animal showed the progressive after three weeks.

Postoperative care and complications

The doe was administered antibiotic (Penicillin G (24 mg/kg) and dihydrostreptomycin sulfate (30 mg/kg)) at 1ml/8kg IM for five consecutive days with a daily dressing of the surgical wound and a topical Antibiotic (cyclo) was sprayed on the wound and was given ant pain (tramadol hydrochloride @ 2 mg/kg) IM for three consecutive days. Postoperative surgical site inflammation and swelling were minor complications encountered but regressed after 3 days. The skin suture was removed after two weeks, and follow-up was performed through a physical visit.

Discussion

Little information is available in the literature concerning postoperative complications, outcomes, and future fertility in small ruminants after dystocia, and success rates are much greater if surgery is performed early when the fetus is alive or freshly dead (Ismail, 2017, Jubara and Bakri, 2020). In the present case study, the ewe was strained for at least 24 hours, and surgery was not performed early. The survival probability of the fetus was nil (Zoller *et al*., 2015), and the survival of both the dam and newborn was significantly affected by the length of time delay between the start of labor and the time of surgical intervention (Ismail, 2017). It was reported that fetal and dam survival rates in sheep and goats undergoing cesarean section were 23% and 94%, respectively (Bhattacharyya *et al.*, 2015, Ismail, 2017). Cesarean section in small ruminants is usually performed while the animal is in right lateral recumbency under local analgesia, with or without sedation (Ismail, 2017, Ajeel *et al*., 2019). In the present case, surgery was performed while the animal was in right lateral recumbency under regional anesthesia using 2% lidocaine (5 mg/kg) anesthetizing an inverted L-block. The left oblique celiotomy approach used in the present study permits better exteriorization of the uterus(Kumar *et al*., 2013, Ismail, 2017). The small and large intestines were well retained by the rumen, and the uterus was easily accessible. Prolonged dystocia in sheep and goats and unnecessary and manual traction attempts for vaginal delivery seriously affect the case outcome. Early intervention via cesarean section can result in the delivery of live lambs, kids, and much healthier dams.

Conclusion

It was concluded from the present case report that cesarean section was a fairly common surgical procedure for resolving dystocia due to incomplete dilation of the cervix and a live fetus in the uterus. Double layer closure of the uterus with Cushing followed by the use of a Lambert suture pattern should be performed to prevent the leakage of fluid from the uterus and with stand the contraction of the uterus, and also result in normal healing for cesarean section. The effective pre- and postoperative management and anti-septic dressing of surgical wounds for animals undergoing C-sections are very important for preventing bacterial contamination of the wound.

3.1.8 Surgical Correction of Cervico Vaginal Prolapse in Dairy Cow

Abstract

Seven-year-old multiparous zebu dairy cows presented to the JUCAVM open-air clinic with a history of repeated prolapse for the last 2 days. Upon clinical examination, the patient was confirmed to have chronic postpartum cervicovaginal prolapse due to feed deficiency and poor management practices. After proper restraint with caudal epidural anesthesia, the dead and necrotized debris was removed, and the prolapsed mass was prepared aseptically by washing with a table salt solution and repositioned into the pelvic cavity. The cows were kept on fluid therapy (stat), anti-inflammatory agents, and antibiotics for five successive days. A modified Buhner's technique using local thread (Jimat) as a suture was used to maintain the prolapsed tissue in position to prevent recurrence, and the cow achieved uneventful recovery. The successful management of chronic cervicovaginal prolapse using modified Buhner's suture after cesarean section in a local zebu breed cow is discussed.

Keywords: *Modified Buhner's suture; Cervical-vaginal prolapse; Chronic; Jimat*

Introduction

Reproductive disorders negatively affect the reproductive performance of dairy cows (Diskin and Kenny, 2016). Vaginal prolapse alone or alongside the cervix is less common as a gestational complication in dairy animals. Cervicovaginal prolapse in cows typically occurs for the first time in the last trimester of gestation but may occasionally occur during the postpartum period. The etiological factors may include increased estrogen secretion from the placenta, heredity, mineral deficiency, increased intra-abdominal pressure, excessive relaxation, weakening and atony of the vaginal musculature, pelvic ligaments, and vulvar sphincter muscles, bacterial or fungal infections, the ingestion of phytoestrogens, and hormonal imbalance (Selvaraju *et al.*, 2023, Purohit and Eidan).

The severity and duration of vaginal prolapse were classified into four categories. Vaginal prolapse that involves only the vaginal floor and occurs only when the cow is recumbent is

classified as first-degree prolapse. In second-degree prolapse, the vagina and often the bladder continuously protrude through the vulva. Third-degree prolapse involves prolapse of the cervix as well as the vagina and bladder, and straining becomes constant. In fourth-degree prolapse, there is extensive tissue necrosis caused by chronic exposure of the vaginal and cervical mucosa. As prolapse becomes more severe or chronic, the likelihood of systemic problems such as peritonitis and adhesions increases, and the survival of the fetus becomes endangered (Haben Fesseha, 2020a, Momont, 2005).

The diagnosis of cervicovaginal prolapse is understandable; however, a rectal examination should be performed to determine fetal viability and the location of the urinary bladder. Ultrasonography can be used as an adjunct to palpation if the diagnosis of fetal viability or the location of the bladder is uncertain. The patient should be treated as soon as possible; otherwise, the prognosis will be poor (Selvaraju *et al.,* 2020). In managing Cervicovaginal prolapse, various surgical or nonsurgical techniques(Sarma *et al.*, 2017)and medicines (Reshma, 2018)have been used with varying degrees of success. This case report describes the approach and surgical management of chronic cervicovaginal prolapse in a crossbred Holstein Friesian dairy cow.

Patient history and Physical examination

A seven-year-old postpartum cow was admitted to the JUCAVM open-air clinic at Jimma University. The cows weighed 300 kg. The owner claimed that they had seen a mass coming out through the genital opening 2(two) days before. They held the mass by hand and kept it in its normal position. However, it recurred. On general physical examination, e.g., temperature, heart rate, and pulse rate. Then, I examined the hanging mass of the cow understanding the conditions, and confirmed it to be cervicovaginal prolapse. The prolapsed mass was swollen and edematous (Fig.10A). The cow exhibited signs of restlessness and difficulty passing through his urine due to prolapse, and at frequent intervals, she exhibited intermittent straining.

Preoperative preparation

The animal was allowed to standby mechanical support and restrained physically. First, the perineal region of each cow was washed with clean water (Fig.10B). All dirt and debris were removed, and the Cervicovaginal mass was washed with water and finally with a solution containing table salt (Fig.10C).

Anesthesia and animal control:

After the animal was controlled, low epidural anesthesia was applied at the 1st intercoccygeal space using a local anesthetic, 2% lidocaine hydrochloride (4 ml) to prevent straining, easy control of the tail and desensitization of the pelvic region, which facilitated easy manipulation of the cervix and vagina into its original position.

Surgical procedure and technique

After local anesthesia, the prolapsed mass was repositioned manually inside the pelvic cavity by gentle pushing with the fisted hand while simultaneously elevating the mass with the palm of the other hand. To prevent recurrence, a modified Buhner technique using sterile local thread (Jimat) as a suture material was applied parallel to the vulva apart from the vagina beneath the skin to maintain position (Fig.10D).

Figure 10: Surgical Correction of Cervico-Vaginal Prolapse in dairy cow:

A) Presentation of Cervico-vaginal prolapse in dairy cow, B) Cervico-vaginal mass was washing, C) Appearance of the prolapsed mass after aseptic preparation, D) Modified Buhner's technique using Jimat as suture.

Postoperative care and complications

The cow was kept on fluid therapy (0.9% sodium chloride solution, 1000 ml of stat, I.V.), antibiotics (ceftriaxone, 5 mg/kg, I.V.), and meloxicam (0.5 mg/kg, IM) for five successive days. After one month of follow-up, the wound healed without any complications, and the cow was in good health. The only complication that was observed was that the prolapsed mass was very hard and contaminated with a large amount of debris and was difficult to reposition via routine procedures.

Discussion

Cervicovaginal prolapse is a major reproductive disorder and an emergency condition in cattle that should be managed earlier before excessive edema, mucosal trauma, contamination, tear, and fatal hemorrhage occur(Bhattacharyya *et al*., 2012). In this study, third-degree cervicovaginal prolapse was observed and could be managed without temporary retaining sutures or a permanent fixation technique, as described by (Haben Fesseha, 2020a). This was in contrast with a previous report in which no temporary suture was applied. In the present study, the modified Buhner technique, which uses local thread (Jimat) as a suture material, was found to be very effective in preventing prolapse recurrence, particularly in developing countries where farmers cannot afford repeated costly livestock treatment. This finding is in agreement with and inconsistent with previous reports that used other suture materials, such as vetafil, umbilical tape, Finlayson thread, and nylon(Haben Fesseha, 2020a).

Conclusion

Hence, from the above findings, it can be concluded that modified Buhner's suture material can be effectively applied to control chronic cervicovaginal prolapse in cows without any complications or difficulties and is recommended as an alternative technique. This surgical protocol may be used as a preliminary strategy for managing third-degree vaginal prolapse

under field conditions. However, the owner was advised to cull the cow.

3.2 Surgical Management of the Gastrointestinal System

3.2.1 Surgical Management of Ruminal Impaction in a Cow

Abstract

Rumen surgery is a common procedure in cattle for treating various issues affecting the fore stomach, such as bloat, esophageal blockage, foreign body ingestion, and traumatic reticuloperitonitis. Peritonitis is a common complication following rumen surgery, and the type of rumenotomy performed can increase the risk of developing it. In a case involving an eight-year-old cow with chronic recurrent bloat, rumenotomy was decided due to the patient's history and clinical observation. Anesthesia was induced using lidocaine and drapes, and the inverted 'L' block nerves were infiltrated to desensitize the flank area. The surgical procedure for ruminal impaction in animals involves a long vertical skin incision, exposing the peritoneum and rumen, and removing hard and 41kgs of plastic materials were removed. The rumen is sutured using catgut # 2-0, and the surrounding area is rinsed with sterile saline solution. The peritoneum and transversal muscles are closed with interlocking continuous sutures. The subcutaneous fascia and skin are closed together using silk 2-0 with a cruciate suture pattern. The area is properly cleaned and dressed with antiseptics and tetracycline spray. After two weeks, the animal is recovered and the skin sutures are removed. Animal rearing in farming conditions with sufficient natural feedstuff is recommended as a preventive measure. The cow's owner is advised to give a balanced diet of feed to minimize the risk of ingesting foreign materials due to mineral deficiency.

Keywords: *Cow, Ruminal impaction, Rumen surgery, Rumenotomy, Surgical site*

Introduction

Rumen impaction is a condition that results from the accumulation of the indigestible materials in the rumen which interferes with the flow of ingestion leading to distension of the rumen and passing of scanty or no feces. The most common indigestible foreign body in the

rumen is plastic bag materials. Rumen impaction due to plastic materials is caused by the indiscriminate feeding of ruminants on indigestible plastic and other waste materials predisposing factors like urbanization, industrialization, type of grazing system, and mineral deficiencies play an important role in the ingestion of plastic waste materials (Kulesh *et al.*, 2022b).

In cattle, rumen surgery is frequently done to treat a range of problems affecting the fore stomach. The most common reasons for rumenotomy and rumenostomy procedures are the removal of foreign substances or the relief of ruminal tympany (bloat) (Hartnack *et al*., 2015). In a rumenotomy, the rumen is opened and closed in one surgical procedure. Bloat, esophageal blockage, foreign body ingestion, and traumatic reticuloperitonitis are among the conditions that need a rumenotomy(Lozier and Niehaus, 2016). A rumenotomy gives a surgeon direct access to the rumen, allowing the removal of foreign objects lodged in the distal region of the esophagus, penetrating hardware, and ingested foreign materials(Lozier and Niehaus, 2016). Rumen surgery is considered a clean-contaminated technique when performed under ideal conditions on healthy animals. However, rumen surgery can be different from clean-contaminated to dirty fields. Surgical procedures involving abdominal contamination with ruminal contents are instances of contaminated rumen procedures (Asrat and Velappa, 2016). Cases of traumatic reticuloperitonitis with severe peritonitis are among the cases of dirty rumen operations. One of the most common complications following rumen surgery is believed to be peritonitis. Rumen contaminations in the abdomen will probably cause peritonitis to develop. The degree of infection, the use of antimicrobial agents, and the health of the bovine all affect how severe the peritonitis is. The type of rumenotomy performed has also been associated with the risk of development of peritonitis(Neggasa, 2019). Cattle undergoing stay suture rumenotomy develop adhesions and abscesses more often than bovines undergoing rumen skin suturing fixation or rumen skin clamp fixation (Hartnack *et al*., 2015). Perioperative administration of antimicrobial drugs decreases the rate of infections after rumen surgery. In cattle, Prophylactic use of penicillin significantly decreased the incidence of abscess formation following rumenotomy(Hartnack *et al*., 2015).

Case History and Clinical Observation

Eight-year-old cows weighing 350 kg presented at the JUCAVM open-air clinic with a history of chronic recurrent tympany for the last 2 months reduced feed intake, progressive weight loss, recurrent bloat, and suspected dehydration. Routine clinical examination revealed a pale mucous membrane, complete cessation of rumination, ruminal impaction and atony, reduction of rumen motility, scanty feces, inappetence, and distended paralumbar fossa. On rectal examination, distended and heavily impacted rumens and constipated feces in the rectum were found. On clinical examination, the rectal temperature was measured to be subnormal, and the rumen from the left paralumbar fossa was palpated. Accordingly, based on the patient's medical history and clinical observations, the patient was diagnosed with recurrent bloat, so a rumenotomy was performed.

Preoperative preparation

The animal was stabilized with fluid therapy at a surgical rate of 10 ml/kg/hr. and electrolytes for imbalances preoperatively. The surgical site was prepared by washing with water and soap, followed by shaving the hairs of the animal at the left para-lumbar fossa. The shaved area was scrubbed with 2% povidone-iodine three times from the center to the periphery. The animal was draped by sterile draping. Then, the incision portion was prepared for aseptic surgery.

Anesthesia and Animal Control

The standing position was preferable to the recumbent position and was controlled physically (in crush). Finally, the desired surgical site was scrubbed three times with a 2% povidone-iodine solution to maintain asepsis. For rumenotomy, inverted 'L' nerve blocks were generated by the infiltration of 2% lidocaine and the use of 18-gauge syringes to desensitize the flank area; the nerves were allowed to rest for 10 minutes, followed by the application of plastic drapes.

Surgical procedure and technique

A long vertical skin incision starting approximately five centimeters below the transverse process of the lumbar vertebrae was made after blunt dissection of the skin from the

subcutaneous tissue and abdominal muscles (Fig.11B & C). Then, the peritoneum and rumen were exposed. The rumen was grasped by the hand, and rumenoplasty was applied to obtain an adequate surgical field and exposure to the rumen. After the incision of the rumen was made, exploration of the rumen was conducted. During surgery, approximately 41 kgs of hard materials and plastic materials were removed (Fig.11H). In addition, bleeding throughout the surgery was managed by applying sterile gauze and by using different straight and curved hemostatic forceps. The rumen and surrounding area were rinsed with sterile saline solution and closed by Cushing suture using sterile chromic catgut no.2-0, followed by continuous Lumbert suture after the replacement of the rumen in the abdomen to its normal position; the peritoneum and transverse muscles were closed by interlocking continuous suture using chromic catgut no.2-0. After that, the internal muscle and external muscles were closed together (Fig.11E). Then, the subcutaneous fascia and skin were closed together using silk 2-0 with a cruciate suture pattern (Fig.11F). Finally, the area was properly cleaned and dressed with antiseptics and tetracycline spray (cyclo) (Fig.11G).

Figure 11 Surgical Management of Ruminal Impaction in the cow;

A) standing and bloating, B) long vertical skin incision, C) entry into the abdominal cavity on progress, D) suturing of the rumen with catgut # 2-0, E) suturing of all layers of muscles, F*) closure of the subcutaneous region and skin*, G) proper cleaning and dressing of the area by

antiseptics and tetracycline spray (cyclo), H) removal of hard and plastic materials, I) removal of the rumen after two weeks of suture removal and recovery of the animal.

Post-operative care and complication

Postoperative treatment included Parenteral administration of (Penicillin G (24 mg/kg) and dihydrostreptomycin sulfate (30 mg/kg)) (Pro & Strep; HebeiYuanzheng Pharmaceutical Co., Ltd. China) @25mg/kg (1ml/ 25 kg) body weight IM and meloxicam @ 5 mg/kg body weight IM (5 ml/50 kg) for five and three days, respectively. Fluid therapy at a surgical rate of 10 ml/kg/hr and daily antiseptic dressing was applied with a cyclo spray on the incision site. The cow started taking roughage the next day, and without any complications, the skin sutures were removed on the 14^{th} postoperative (Fig.11I).

Discussion

Rumen impaction is among the most common cause of gastrointestinal disorders in ruminants (Singh *et al.,* 2020). This statement agrees with the current case management in which the cow ingests plastic materials leading to rumen impaction. Animals roaming the streets and eating from garbage bins (Kulesh *et al*., 2022a). Mostly in urban areas, there is no farming area for grazing the animals, so animals search for food at nonfeeding places also. Ingestion of the polythene bags/plastics accumulated in the rumen become large tight balls which ultimately leads to impaction where animal passes scanty or no faeces (Kulesh *et al.*, 2022a). Rumenotomy was advocated for the treatment of severe/long-standing cases of ruminal impaction which were unresponsive to conservative treatment (Singh *et al*., 2020). Rumenotomy provides direct access to the rumen, in that way allowing the removal of indigested foreign bodies, sharp penetrating objects, and foreign bodies lodged in the distal portion of the esophagus (Kulesh *et al.,* 2022a, Jennes *et al.,* 2023). At present, rumenotomy is one of the most widely used surgical techniques for both the diagnosis and treatment of ruminal impaction due to plastic materials in ruminants (ASA, 2016, Priyanka and Dey, 2018). Removal of indigestible foreign materials from the rumen revealed a positive effect on animal health (ASA, 2016, Kulesh *et al*., 2022a) Once the ruminal exploration is complete and 1/3 of the undigested feed is removed, the ruminal incision is closed in 2 layers(Martin *et al.,* 2021). This technique is in line with the current case management in which the ruminal

incision is closed by a double-layer inversional suture pattern to prevent leakage of rumen content and the risk of peritonitis. Closure of the laparotomy incision should be done layer by layer and should avoid leaving any dead space, especially between muscle layers (Vermunt, 2011).This method was in agreement with the present case in which abdominal layers were closed in three layers. The cow was kept on a restricted diet for two weeks to reduce suture tension and prevent further complications. This is in agreement with the reports of the authors (Hussen, 2018) that states following rumenotomy animal was allowed to access liquid diet from the third day and easily digestible feeds from the fourth day onwards gradually. Animal rearing in farming conditions with sufficient natural feedstuff is the preventive measure for this condition. No further complications were found after the fourteenth day post-operatively.

Conclusion and Recommendations

In conclusion, the current case report describes the successful surgical correction of rumen impaction in cows and concludes that rumenotomy is an effective method in relieving the various problems of the fore stomachs in ruminants. Therefore, based on the above conclusions the following recommendations were forwarded: A balanced diet of feed should be given to minimize the risk of ingesting foreign materials due to mineral deficiency. Besides, the movement of the animals was restricted to avoid the predisposition to hard materials (metal and bone) and plastics foreign bodies. The owner should understand the outcome of the disease. So, recommended that once the case occurred it was hard to bring the animals as early as possible before it is emaciated and immunologically compromised.

3.2.2 Surgical Management of Ruminal Acidosis in Female Goat

Abstract

Ruminal acidosis is a significant digestive disorder in goats that causes severe health issues and is potentially lethal in less than 24 hours. It is caused by the misfeeding of highly fermentable carbohydrates, underfeeding of effective fiber, poor management practices, or a combination of these factors. A four-year-old local indigenous female goat was obtained at Jimma University, College of Agriculture and Veterinary Medicine of Open-air Clinic. The goats were examined for symptoms such as diarrhea, abdominal distension, anorexia,

distension of the rumen, grinding of teeth, regurgitation of ruminal contents, reduced motility to atony of the rumen, a rectal temperature of 38.8°C, and normally colored oral, nasal, and conjunctival mucosae. Preoperative preparations included a large surgical field in the left paralumbar fossa, anesthesia, and a rumenotomy procedure. Postoperative care included antiseptic wash, antibiotics, and wound spray. The most common complications of rumen surgery include abscesses at the incision site and peritonitis. Treatment for ruminal acidosis in a goat is effective, and owners should closely monitor their goats and provide good nutrition to facilitate wound healing.

Keywords: Acidosis, *Goats, Incision, Nutrition, Ruminal acidosis*

Introduction

Acidosis also known as lactic acidosis, rumen acidosis or grain overload is a carbohydrate fermentation disorder of the rumen that can affect sheep and goats of all breeds. As the name implies, acidosis is the result of an acidic pH of the rumen (normal being 6.2-6.8). Acidosis is caused by the feeding of highly fermentable carbohydrates, feeding of a low-fiber diet, poor management practices, or a combination of these. The degree of acidosis varies from seriousness, a slight drop in feed intake (mild) to death (severe). An acute form of the disease in ruminants is characterized by indigestion, rumen stasis, dehydration, acidosis, toxemia, incoordination, collapse, and frequent death (Tufani *et al.,* 2013). It is one of the most important clinical emergencies in small ruminants (sheep and goats) and results in high mortality(Nagar *et al.,* 2023).

Ruminal acidosis is one of the most important digestive disorders in goats and, in some cases, is lethal in less than 24 hours (Morgante, 2004). Acidosis is a carbohydrate fermentation disorder of the rumen that can affect goats of all breeds and ages. Acidosis is caused by the misfeeding of highly fermentable carbohydrates, underfeeding of effective fiber, poor management practices, or a combination of the three. Goats are mostly reared under free-range systems and have a history of accidental ingestion of large amounts of highly fermentable carbohydrates, such as wheat grain, stale chapattis and roti, stale rice, mangoes, banana, vegetable waste, ceremonial waste, vegetable market waste, hotel waste, and feed

with excessive amounts of jowar (sorghum) grains, corn, and wheat flour, and these goats develop ruminal acidosis, resulting in heavy economic losses due to high morbidity and mortality. These conditions include lactic acidosis, toxic indigestion, grain engorgement, grain overload, and D-lactic acidosis. It occurs by accidental ingestion of highly fermentable carbohydrates such as corn, which leads to increased lactic acid production in the rumen(Cunha and Shirley, 2012). The production of a large quantity of lactic acid in the rumen initiates profound changes in the biochemical profile of the rumen liquor and blood (Brahma *et al.*, 2020). Lactic acidosis is associated with hematological changes, such as significant elevations in erythrocytes, leukocytes, hemoglobin concentration, and packed cell volume (Brahma *et al.*, 2020). Biochemical changes, such as decreased total protein, hyperglycemia, hyponatremia, hyperkalemia, and hypocalcemia, and increased aspartate aminotransferase (AST), alanine transaminase (ALT), urea nitrogen, creatinine, and serum lactic acid levels (Bermúdez *et al*., 2020).

Case History and Clinical Observation

A four-year-old local indigenous female goat with brown and white coloring that was large and weighed 60 kg was obtained from Jimma University, College of Agriculture and Veterinary Medicine of the Open-Air Clinic. The main complaint was diarrhea and anorexia after eating different vegetables. On clinical examination, the goat was observed to be standing and lethargic, with low head carriage, symptoms of diarrhea, abdominal distension, anorexia, distension of the rumen, grinding of teeth, regurgitation of ruminal contents, reduced motility to atony of the rumen, a rectal temperature of 38.8°C, and normally colored oral, nasal, and conjunctival (bilaterally) mucosae.

Preoperative preparation

Once the animal was controlled by physical restraint, a large surgical field was prepared in the left paralumbar fossa, and the area was shaved to avoid contamination with hair, especially in the case of longhaired goats. The animal was in a standing position, and this technique seems more comfortable not only for the surgeon but also for the animal and it is recommended to avoid postoperative complications (adhesions, infections, etc.). Once the entire surgical field

was free of hair, it was washed with alcohol and povidone-iodine, and 2% lidocaine was used for the inverted L-block technique. Surgical drapes were also used to prevent contamination.

Anesthesia and Animal Control

The animal was controlled in physical restrain and the surgical site was anesthetized by inverted L-block by using 2% lidocaine hydrochloride (Lignocaine Injection HebeiYuanzheng Pharmaceutical Co., Ltd. China) at a dose of 5mg/kg body weight at upper left paralumbar fossa. A surgical drape was also used to prevent contamination.

Surgical procedure and technique

A vertical incision was made just behind the last rib, approximately three centimeters from the transverse lumbar process. Surgery begins with the incision of the skin and the subcutaneous layer. Next, the oblique abdominal muscles (external, internal, and transverse) are approached, and then the peritoneum is located. Once the peritoneum was opened, the rumen was exteriorized and fixed to the skin. Once the rumen was fixed, a vertical incision was made in the rumen wall. After removing the foreign bodies and completing the ruminal examination, the organ was closed with 2 layers of sutures. The first layer was sutured while the rumen was still attached to the skin. Size #2/0 USP absorbable suture material was used for this purpose. The inverted Cushing suture pattern was followed by the inverted Lambert suture pattern. After being thoroughly washed, the rumen was released from the skin and sewn back in an inverted pattern using absorbable suture #2 USP. Once the rumen is closed, it is thoroughly washed again and cleaned of any debris before it is released and allowed to return to the abdomen. The flank incision was closed in 3 layers with #2 USP absorbable suture materials that closed the peritoneum and transverse abdominal muscle together and the external and internal abdominal oblique muscles together using an interlocking suture pattern. The skin was closed with a nonabsorbable #2/0 USP suture in a cruciate suture pattern.

Figure 12: Surgical Management of Ruminal Acidosis in Female Goat;

(A) Case Presented, (B, C) shaving and preparing the surgical site, (D) Rumen was grasped, (E) Removed many cereals, (G, H) after surgery and two weeks the goat was recovered.

Post-operative care and complication

Postoperatively, slight skin bleeding was noticed, but it was normal and helped to heal the wound unless it continued for a long period. Antiseptic washing of the incised area was performed on the second and third postoperative days for up to fourteen days until the incision completely healed. Parenteral administration broad spectrum antibiotics (Penicillin G (24 mg/kg) and dihydrostreptomycin sulfate (30 mg/kg)) (Pro & Strep; HebeiYuanzheng Pharmaceutical Co., Ltd. China) 25mg/k (1ml/ 25kg) body weight IM, and Meloxicam (2ml/33kg, IM) for five consecutive days. The suture was removed after 14 days. A tetracycline wound spray was also applied around the wound.

Discussion

A rumenotomy is performed immediately after an exploratory laparotomy (Martin *et al.*, 2021). The different surgical techniques differ according to the method used to fasten the rumen, either to the body wall or to the skin (Martin *et al.*, 2021). Surgery begins with the

incision of the skin. The subcutaneous layer, which may vary in thickness depending on the age and amount of adipose tissue, is then cut. Next, the oblique abdominal muscles (external, internal, and transverse) are approached, and then the peritoneum is located (Niehaus and Mora, 2022, Martin *et al.*, 2021). Once the rumen is fixed, a vertical incision (approximately 15 cm) is made in the rumen wall while attempting to avoid vascularized areas. To avoid interfering with the sutures in place, a 3 cm margin was left on the dorsal and ventral aspects (Martin *et al.*, 2021). The incision must be large enough not only to allow entry of the surgeon's hand and forearm but also to be able to remove material from within the rumen. The surgical wound must be cleaned daily with povidone-iodine, and the sutures are removed on the 10th day (Hussen, 2018) states following rumenotomy animal was allowed to access liquid diet from the third day and easily digestible feeds from the fourth day onwards gradually.

The surgical wound must be cleaned daily with povidone-iodine and the sutures are removed on the 10th day (Martin *et al.*, 2021). The most common complications of rumen surgery include abscesses at the incision site and peritonitis. Another potential complication is the formation of abscesses between the muscle and the skin, which is attributed to the dehiscence of the sutures placed between the muscle and the rumen to provide additional anchoring after suturing the rumen to the skin.

Conclusion and Recommendations

Acidosis is caused by improper feeding practices. It is suggested that animals rear under intensive farming for proper care and management and avoid unnecessary or accidental feeding of immature leaves, grain paddies, cabbage, leafy vegetables, boiled rice, or ceremonial waste. Moreover, the respective treatment employed for ruminal acidosis in goats is very effective. The owner was also advised to closely monitor the goats and to provide good nutrition to facilitate wound healing. At 20 days post-operation, the wound had healed completely, and after two months of follow-up, the goats were in good health.

3.2.3 Surgical Management of Left Abomasal Displacement in Crossbred Cows

Abstract

Abomasal displacement is a significant metabolic disorder in dairy cattle, particularly in high-producing cows. The feeding of high-concentrate diets during early lactation can increase the susceptibility of cows to abomasal displacement, leading to gas accumulation and distension. In cows with abomasal displacement, the abomasum becomes partially or completely displaced between the left abdominal wall and rumen, causing caudodorsal distension. Diagnosis is crucial for diagnosis, and ultrasound has been reported to be a helpful diagnostic technique for abomasal displacement in dairy cattle. The present case study involved a Holstein-Friesian cross-bred cow with anorexia, recurrent tympany, abdominal distension, and decreased milk production. The cow was diagnosed with abomasal displacement, and abomasopexy was performed. Preoperative preparation included fluid therapy, electrolyte administration, and preparation of the surgical site. Anesthesia and animal control were maintained by standing and using lidocaine in inverted 'L' blocks. The operation procedure involved laparotomy in the standing animal, decompression of the displaced abomasum, Ford interlocking suture, ventral abomasopexy, and suturing of the peritoneum, muscle layers, and skin layer. The animals were managed with intravenous fluids, antibiotics, and anti-inflammatory drugs for 5 and 3 days, respectively. The skin sutures were removed on the 14th postoperative day, and the animal recovered uneventfully with no postoperative complications.

Keywords: *Abomasopexy, Dairy cow, Ford interlocking suture, Left displacement of the abomasum*

Introduction

Abomasal displacement is one of the most important metabolic disorders of cattle worldwide (Ismael *et al.*, 2018). Feeding high-concentrate diets in early lactation, particularly in high-producing cows, increases susceptibility to LDA (Haq, 2016). Feeding a large amount of concentrates or corn silage to dairy cows in the early postpartum period inhibits abomasal motility, resulting in gas accumulation followed by dilation and atony and causing displacement of the abomasum. Once the abomasum is displaced, gas production continues to cause distension and further displacement (Ismael *et al.*, 2018). Genetic predispositions, intra-abdominal organ changes (especially in late pregnancy), metabolic abnormalities (hypocalcemia and ketosis), concomitant diseases (mastitis, metritis, retained placenta, or

subclinical milk fever), and other variables also contribute to a decrease in abomasal motility(Rizwan *et al.*, 2023).

In cows with LDA, the abomasum becomes partially or completely displaced between the left abdominal wall and rumen, with caudodorsal distension due to the accumulation of gas (Abdelaal, 2014). In such cases, double auscultation of the rumen, percussion, and swinging auscultation over the left abdominal ribs are crucial for diagnosis (Ismael *et al*., 2018). It is generally easy for a skilled practitioner to diagnose a left displaced abomasum. A "ping" can be heard on auscultation because the liquid/gas interface is confined within a compartment. The left displaced abomasum "ping" can be heard between the 10th and 13th left rib spaces, along a line from the elbow to the ilium. In some instances, the left 13th rib will be slightly "sprung"; this occurs due to rib displacement by the abomasum (Niehaus and Anderson, 2016).

Ultrasonography has recently been reported to be a helpful diagnostic technique for LDA in dairy cattle (Li *et al.*, 2018). Although various studies have investigated the effect of abomasal displacement on several biochemical profiles, particularly those that may reflect the nutritional status of dairy cows during the post-parturient period, few studies have assessed oxidant-antioxidant status in left displaced abomasum cows. Among the operations that food animal surgeons perform on cattle, the most common is the surgical repair of abomasal displacement (Niehaus, 2016).

Case History and Physical Examination

One Holstein-Friesian (HF) crossbred cow, weighing 450 kg, was presented to the JUCAVM open-air clinic, with a history of grain-fed dairy food for one month after calving, anorexia, recurrent tympany, abdominal distension, and the passage of scanty black-colored feces from the last 10 days. The cows experienced a marked decrease in milk production within the last few days. Clinical examination revealed a ping sound over the area of the 11^{th} intercostal space to the upper portion of the left paralumbar fossa. Auscultation of lung fields revealed no abnormalities; however, a high-pitched "ping" could be heard along the dorsal thorax of the left side, between the 10^{th} and 13^{th} rib spaces. The heart rate, breathing rate, rectal

temperature, and clinical hydration level were all within normal ranges. With LDA, the rumen pushed the left body wall out, and the abomasum also pushed the rumen toward the centerline. Accordingly, based on the patient's medical history and clinical observation, the patient was diagnosed with left abomasal displacement (LDA), so abomasopexy was performed.

Preoperative preparation

The animal was stabilized with fluid therapy at a surgical rate of 10 ml/kg/hr and electrolytes for imbalances preoperatively. The surgical site was prepared by washing with water and soap, followed by shaving the hairs of the animal at the left para-lumbar fossa. The shaved area was scrubbed with 2% povidone-iodine three times from the center to the periphery. The animal was draped by sterile draping. Then, the incision portion was prepared for aseptic surgery.

Anesthesia and Animal Control

The standing position was preferable to the recumbent position and was controlled physically (in crush). Finally, the desired surgical site was scrubbed three times with a 2% povidone-iodine solution to maintain asepsis. For rumenotomy, inverted 'L' nerve blocks were generated by the infiltration of 2% lidocaine and the use of 18-gauge syringes to desensitize the flank area; the nerves were allowed to rest for 10 minutes, followed by the application of plastic drapes.

Surgical procedure and technique

Laparotomy was performed on the left flank of the standing animal. The displaced abomasum was easily identified in the surgical field between the body wall and the rumen. A seromuscular Ford interlocking suture using nonabsorbable material was applied to the abomasal body. Both sutures perforated the ventral abdominal wall at a distance of approximately 4 to 5 cm from each other from the inside and were tied outside the abdominal wall by an assistant. The sutures were tied to each other to create the pexy. In our clinic, this technique is routinely used for advanced lactating cows. The abomasum was decompressed,

and ventral abomasopexy was performed using nonabsorbable suture material (silk No. 2). The peritoneum, muscle layers, and skin layer were sutured as per standard procedures.

Figure 13: Surgical Management of LDA in Dairy Cows,

A) The surgical site was prepared; B) laparotomy was done; C) the abomasum was identified; D) Ford interlocking suture was applied; E) The abomasum was decompressed, and ventral abomasopexy was performed; F) after surgery; G) after a week, the animal looked like.

Postoperative care and complications

The animals were managed with intravenous fluids, antibiotics (Penicillin G (24 mg/kg) and dihydrostreptomycin sulfate (30 mg/kg)) (Pro & Strep; HebeiYuanzheng Pharmaceutical Co., Ltd. China) at 1ml/ 25kg), and anti-inflammatory drugs (tramadol hydrochloride injection (Manufactured by: Human Well Pharmaceutical plc.Ethiopia) at 2 mg/kg) for 5 and 3 consecutive days respectively. The abomasum was decompressed, and ventral abomasopexy was performed; respectively. Three liters of Ringer Lactate and calcium borogluconate in one bottle (500 ml) solution were added. Antiseptic dressing of the wound was done with 2% povidone-iodine daily and oxytetracycline wound spray. Animals started taking feed from next day after surgery. Skin sutures were removed on the 14th postoperative day and the animal was recovered uneventfully with no post-operative complication.

Discussion

Displaced cow abomasum can cause economic losses in dairy cattle due to production losses, treatment costs, and premature culling. High levels of abomasal displacement frequently occur during early lactation(Song *et al.,* 2020, Ismael *et al.,* 2018). Cases with displaced abomasum mostly occurred within 4 to 6 weeks after calving, which was previously confirmed (Ismael *et al.,* 2018)to be related to feeding behavior. In late pregnancy, the animal diet consists mainly of roughage, while after birth, the ration is rich in concentrates or corn silage, and a large amount of feed inhibits abomasal motility with subsequent gas accumulation followed by dilatation and atony ended by displaced abomasum (Ismael *et al.,* 2018).

When the diagnosis of left abomasal displacement is not obvious, an ultrasonographic examination can be helpful. In LDA cases, the abomasum is located between the rumen and abdominal wall (Saikumar *et al.,* Li *et al.,* 2018). In the present study, auscultation pings, the Liptak test, and ultrasonography all supported left abomasal displacement. Several surgical procedures for treating LDA, including right paralumbar adenopexy, left paralumbar fossa abomasopexy, right paracostal abomasopexy, and right paramedian abomasopexy, have been reported (Saikumar *et al.*). Among the various techniques, left flank abomasopexy is the technique of choice compared to other techniques (Saikumar *et al*.). In the present case report, left flank abomasopexy was performed, and the animal showed uneventful recovery on the 7th postoperative day with no recurrence. The feeding of concentrate should be restricted to prevent this type of abdominal effect.

Conclusion and Recommendations

The present case report concluded that displaced abomasums were one of the most common reasons for surgery on dairy farms. The left displaced abomasum was most commonly observed in the first month after calving, and by ensuring appropriate feeding during this period, it is possible to reduce their chances of occurring. LDA of the left flank abomasopexy was performed, and the animal achieved an uneventful recovery on the 7th postoperative day

with no recurrence and successfully managed surgically. The owner was advised to restrict the feeding of concentrated feed to prevent this type of abdominal affection.

3.2.4 Surgical Correction of Umbilical Hernia in Female Calf

Abstract

A hernia is a condition where a portion of the pelvic or abdominal organ protrudes through a weak opening, either naturally occurring or caused by disease. The most common cause is failure of normal development and closure of the umbilicus, infection at the site of the umbilicus, manual breakage of the umbilicus, clamping, or ligation of the umbilical cord, and potentially excessive straining. The diagnosis of umbilical hernia can be performed using external digital palpation, clinical observation, or ultrasonography. Correction methods include ligation of the hernia sac, suturing of the hernia ring, use of clamps, and surgical correction. A two-month-old Holstein Friesian crossbred calf was brought to the Veterinary Clinic, College of Agriculture and Veterinary Medicine, Jimma University, with a history of swelling in the umbilical region from birth but an increase in size for the last few weeks. The surgical site (umbilical area) was aseptically prepared by clipping, shaving, scrubbing, and washing with water and Savlon. The hernia ring was blocked by the local anesthetic 2% lidocaine (Lidocaine hydrochloride 2%) ring block technique. An elliptical skin incision was made, and the hernial ring was exposed. The hernia ring was closed using an overlapping mattress pattern with nonabsorbable suture material. Two milliliters of pen strip (20 mg/kg) broad-spectrum antibiotic was applied intramuscularly for three days. The pain management analgesic drug tramadol 2 mg/kg was used for consecutive days along with regular antiseptic dressing using povidone iodine until wound healing. After proper diagnosis, timely operation and good postoperative care are needed for the correction of umbilical hernia.

Keywords: *Calf, Hernia, Hernial ring, Umbilical hernia*

Introduction

A hernia is a condition in which a portion of the pelvic or abdominal organ protrudes through a weak opening, either naturally occurring or caused by disease, and either displaces or retains

the intact peritoneal layer in the thoracic or abdominal cavity containing it with intact skin (Doijode and Beerappa, 2019). The most prevalent type of congenital hernia in calves is the umbilical hernia. However, many umbilical hernias are secondary to umbilical sepsis (Haben Fesseha, 2020b). Umbilical hernia can be divided into 3 categories including uncomplicated umbilical hernia, umbilical hernia with subcutaneous infections (abscess), and umbilical hernia with umbilical remnant infection. The most common causes are failure of normal development and closure of the umbilicus, infection at the site of the umbilicus, manual breakage of the umbilicus, clamping, or ligation of the umbilical cord, and potentially excessive straining (Haben Fesseha, 2020b). The umbilicus in newborns consists of a tube-like structure that connects the fetal bladder to the placental sac known as the urachus and remnants of umbilical vessels that transport blood from the fetus to its mother (Niwas *et al.*, 2020). Immediately after birth, this structure gets atrophied and remnants of urachus remain in the abdomen. The wound is healed by cicatrization and is represented in the umbilicus in the later part of life (Doijode, 2019). The part of the body where these parts are present remains open causing protrusion of organs through the opening due to faulty closure of the umbilical opening at birth or hypoplasia of the abdomen muscles resulting in the formation of a ring in the mid-ventral part of the abdomen (Doijode, 2019). Hernia may be congenital or acquired. In the calf, an umbilical hernia is commonly present due to failure of the normal closure of the umbilical ring (Haben Fesseha, 2020b). From such incomplete closure of the umbilical ring the abdominal contents like the intestine and omentum come out. Acquired cause of umbilical hernia includes a weak abdominal wall (imperfect occlusion of the umbilicus), deep wound, abscess, increased intra-abdominal pressure due to straining, constipation or diarrhea, violent exercise, etc (Dhurba and Ranjana, 2021). Some hernias are reducible, which means hernial mass can be returned to its normal location through hernial ring while non-reducible type of hernia cannot push back.

This condition can be diagnosed by external digital palpation, clinical observation, or ultrasonography. There are different methods for the correction of umbilical hernia such as ligation of hernia sac, suturing of hernia ring, use of clamps, and surgical correction. But if the hernia is greater than 5 cm then the surgical correction (herniorrhaphy) is the treatment of choice for the correction of umbilical hernia (Dhurba and Ranjana, 2021).

Case history and Physical examination

A two-month-old Holstein Friesian crossbred calf weighing 45 kg was brought to the Veterinary Clinic, College of Agriculture and Veterinary Medicine, Jimma University, with a history of swelling in the umbilical region from birth, but the calf has increased in size for the last few weeks. Clinical examinations revealed reducible swelling that dangled around the umbilicus. The size of the hernial ring was three fingers in breadth. The clinical parameters, with her rectal temperature, heart rate, and respiratory rate were within the normal range, and her body condition was good. Based on clinical examination, the patient was diagnosed with an umbilical hernia.

Preoperative animal preparation

The calf was restrained physically and positioned in dorsal recumbency. Then, the surgical site (umbilical area) was aseptically prepared by clipping, shaving, scrubbing, and washing with water and Savlon(Fig.14A, B).

Anesthesia and animal control

The calf was restrained, and the area of the hernial ring was blocked by the local anesthetic two percent lidocaine (Lidocaine hydrochloride 2%) ring block technique at a dose rate of 1 ml/cm to desensitize the abdominal muscle and alleviate pain during the surgical procedure.

Surgical procedure and technique

Following proper physical restraint and aseptic preparation of the surgical site, the calf was kept in the appropriate direction for the next surgical procedure. An elliptical skin incision was made (Fig.14C), and the hernial ring was exposed. The omentum was appreciated as the organ herniated. Then, the herniated organ was checked for adhesions, and no adhesion of the organ was encountered during the operation, so the omentum was repositioned. The hernial ring was closed using an overlapping mattress pattern with nonabsorbable suture material (Fig.14E). The excess skin of the sac was removed, and the subcutaneous tissue and skin were closed with an interrupted X- cross mattress using 2-0 silk sieves. The surgical site was

properly cleaned and dressed with a 2% povidone-iodine solution, and the patient was admitted home. The operation was performed without any complications. The calf showed good progress after 3 days (Fig.14G), and the wound healed completely after 15 days.

Figure 14: Surgical Correction of umbilical hernia in female calf**;**

A) Clinical Presentation of Umbilical Hernia in Calf; B) the Area Was Scrubbed with Povidone Iodine, (C $ D) An Elliptical Skin Incision Was Performed and Hernial Ring Was Exposed; E). The subcutaneous tissue and skin were closed with an interrupted X- cross mattress, f) post-operative dressing by wound spray, G) Post-Surgical Presentation of the Herniorrhaphy

Postoperative care and complications

After the operation the calf was administered, Broad-spectrum antibiotics (Penicillin G (24 mg/kg) and dihydrostreptomycin sulfate (30 mg/kg)) (Pro & Strep; HebeiYuanzheng Pharmaceutical Co., Ltd. China) at 1ml/ 25 kg for five consecutive days. The pain management analgesic drug tramadol 2 mg/kg was used for consecutive days along with regular antiseptic dressing using povidone iodine until wound healing. A tetracycline wound spray was also applied over the wound area (Fig.14F). The owner was advised to keep the calf

in a clean environment, and the owner was additionally advised to reduce the amount of feed intake for one week. The calf recovered completely without reoccurrence within 14 days, and the skin sutures were removed.

Discussion

Hernias have different congenital and acquired causes that have several deleterious effects, such as lowering the productivity and reproductively of the affected animals(Amare and Haben, 2020). Umbilical hernias are quite commonly observed in young calves (Haben Fesseha, 2020b). Similarly, in the current case report, an umbilical hernia is seen in the two-month-old calf. Besides, the incidence of congenital defects in cattle is 0.2-3%; with 40-50% born dead and such defects are commonly visible externally(Haben Fesseha, 2020b). Congenital defects including umbilical hernia reduce the value of affected calves and should be managed using surgical operation. The condition is very common in dairy cattle, especially in Holstein Friesian breeds. It may be inherited by a dominant character within complete penetrance, or be conditioned by environmental factors (Haben Fesseha, 2020b, Mahmud, 2022). According to the current case report; a congenital umbilical hernia is presented in a Holstein Frisian cross young calf with a three-finger breadth. This is similar to the previous reports which stated that congenital umbilical hernias are common in Holstein's calf and are mostly associated with heritability(Haben Fesseha, 2020b). Hernias are made up of hernia sac, and peritoneum, and may contain peritoneal fluid and viscera. The most common viscera involved in umbilical hernias in cattle were the abomasums with or without omentum. Hernias may be small at birth and enlarge with age and should be differentiated from umbilical sepsis(Shah *et al*., 2016). The umbilical opening in the calf should be closed after birth in a few days. Failure of this opening to close properly results in an umbilical hernia and its cause might be either congenital or acquired factors that hamper this closure, such as omphalitis or abscesses (Mahmud, 2022). Umbilical hernia can be managed using different treatment options depending on the size of the hernial ring. In the case of smaller hernial rings, it can be easily managed through the application of bandages, clamps, or ligatures. Herniorrhaphy is the only remedy that is commonly done under local block in calves. Besides this should be applied in case of large hernial opening (more than 1 finger in size or if it

persists for more than 3 to 4-weeks) but extensive umbilical hernia warrants hernioplasty (Haben Fesseha, 2020b, Mahmud, 2022).

The goal of surgical repair was to obliterate the hernia sac and repair the defect in the abdominal wall(Butler *et al.*, 2013). Absorbable sutures can be used in cases where the size of the hernial ring is no more than 4 fingers or if the hernia is less than 8 months old (Amare and Haben, 2020). Similarly, herniorrhaphy was performed under proper anesthesia (regional nerve block) to manage the current case of umbilical hernia using absorbable suture material. Complications may develop in congenital umbilical hernias, which can significantly increase the complexity and expense to repair. This could be simple (or uncomplicated) hernias that is easily reducible while in case of complicated hernias (incarcerated viscera usually without strangulation, or concurrent infection of umbilical structures) cannot be completely reduced. Uncomplicated congenital umbilical hernias that have persisted until 5-6 months of age, gradually enlarged over time, or failed to respond to conservative therapy(Shah *et al.*, 2016). Similarly, in this case report, slight adhesion was seen during the procedure between the hernial sac and content.

Conclusion and Recommendation

In a female Holstein heifer's crossbred calf, the umbilical hernia was corrected successfully with herniorrhaphy using an overlapping mattress suture technique and non-absorbable (silk 2-0) as suture material and recommended as an alternative technique. After proper diagnosis, timely operation, and good post-operative care are the major for the correction of umbilical hernia.

3.2.5 Surgical Correction of Atresia Ani in a Female Calf

Abstract

Congenital deformities, such as imperforate anus or atresia ani, can present at birth due to defects in genetics, environmental factors, or a combination of both. Anal atresia ani is a congenital defect of the rectum and anus resulting from arrested embryonic development. It affects both males and females at equal frequencies. Various surgical techniques have been

used to correct atresia ani in domestic animals. A three-day-old female local breed calf was brought to the JUCAVM open-air clinic with a history of inability to pass feces, abdominal pain, and recurrent inclination to evacuate the bowels. Upon physical examination, it was found that the calf did not have an anal opening and had soft subcutaneous swelling below the ischial arch. Preoperative preparations included restraint, washing, and shaving of the perineal region. Anesthesia was administered using lidocaine hydrochloride, and the calf was anesthetized. The surgical procedure involved excising a circular piece of skin over the natural site of the anal opening, releasing hard meconium, and creating a permanent anal orifice. The calf stood up with minimal tenesmus immediately after surgery, and the owner was advised to give the calf free access to clean water. The suture was removed on the 10th postoperative day, and the calf was successfully recovered and showed a good prognosis.

Keywords: *Anal opening, Atresia ani, Calf, Female calf*

Introduction

Congenital deformities associated with abnormalities in structure and function can occasionally present at birth (Mashuda *et al*., 2014, Hossain *et al.*, 2014, Vala *et al*., 2017). Congenital malformations can result from defective genetics, environmental factors, or a combination of both (Gangwar *et al.*, 2014), Environmental factors include the consumption of toxic plants by dams and maternal-fetal viral infections during early gestation *(Gangwar et al., 2014, Dutt et al*., 2021). Failure of the anal membrane to break down during development gives rise to the condition termed the imperforate anus, which is sometimes termed atresia ani (Ubah *et al*., 2019). Atresia ani (anal atresia) is a congenital defect of the rectum and anus that generally results from arrested embryonic development (Ubah *et al*., 2019). This is due to the faulty lying of chromatin materials during embryonic development of the fetus or the abnormal retention of the anal portion of the cloaca membrane. Atresia ani is a congenital embryological anomaly in which the hindgut fails to communicate with the perineum and may appear alone or in combination with rectovaginal or rectovestibular fistula (RVF) (Ubah *et al.*, 2019, Raut *et al.*, 2017), Atresia coli infection is a lethal congenital abnormality in calves and other animals. This condition is caused by incomplete development of the digestive tract when part of the colon is missing (Yildiz *et al*., 2018). Anal atresia affects males and females

at equal frequencies (Samad, 2021). Perineal inspection revealed the absence of an anus. Various surgical techniques have been used to correct atresia ani in domestic animals (Rahman and Alam, 2022). This patient was diagnosed with atresia ani based on the typical clinical signs, and a surgical correction decision was made. This report describes a case of atresia ani in a female calf treated by surgical intervention.

Calf case history and Physical examination

Three-day-old female local breed calves were brought to the JUCAVM open-air clinic with a history of inability to pass through feces, signs of abdominal pain, and recurrent inclination to evacuate the bowels. A detailed examination of the calf revealed the absence of a tail or anal opening and no signs of urinary incontinence (Fig.15A). There was no evidence of the presence of a tail, and the posterior sacral margin was blunt. Both the dam and sire of the calf were reported to have a normal tail. Gross and physical examination confirmed that the patient had atresia ani with taillessness congenital abnormality. On clinical observation, it was found that the calf did not have an anal opening. There was soft subcutaneous swelling below the ischial arch with distension of the abdomen. Symptoms of tenesmus and abdominal pain were observed.

Preoperative animal preparation

The calf was restrained to right-lateral recumbence on the table, and the perineal region was washed with water and soap, shaved, and scrubbed using a 2% povidone-iodine solution.

Anesthesia and animal control

The calf was anesthetized using 2ml of 2% lidocaine hydrochloride injected by the infiltration technique and infiltrated in a circular fashion around the protruded mass in the anal region.

Surgical procedure and technique

A circular piece of skin was excised from the natural site of the anal opening by grasping the skin at the bulge of the anus using rat tooth forceps. Hard Meconium came out immediately (Fig.15B). To drain the meconium, warm water was inserted through a plastic pipe according

to the size of the rectal lumen. After sufficient evacuation of the bowel, the rectal wall is opposed to the skin by the application of interrupted sutures with silk No. 2 to make a permanent anal orifice. The calf stood up with a minimum of tenesmus (Fig.15C). The calf was active during the home visit (Fig.15D). The operation was completed.

Figure 15: Correction of atresia ani in a female calf not having an anal opening;

A)not having an anal opening, B)the yellow arrow shows hard Muconium came out immediately, C) after correction of atresia ani, the calf stood up immediately, D) During home visit the calf was active D).

Conclusion and Recommendations

It was concluded from the present case report that, like many other congenital abnormalities in calves, atresia ani with anury (absence of tail) can be treated by anal reconstructive surgery to save the life of the animal. The owner was advised that the softened food allowed the calf to still heal the wound and wash the anal area of the calf.

Discussion

Tail abnormalities are sometimes associated with rectal adhesions and excretion difficulties (Vala *et al.,* 2017). The taillessness condition is known to have a hereditary or congenital origin(Anwar and Purohit, 2012, Vala *et al*., 2017). In cattle, most tail defects are considered to have genetic origins, (Anwar and Purohit, 2012, Vala *et al*., 2017)and these abnormalities mostly appear in the process of crossing different breeds(Vala *et al.*, 2017). Atresia ani is a life-threatening condition in male calves; surgical intervention is performed to provide new anal and these abnormalities mostly appear in the process of crossing different breeds In some female calves, due to fecal pressure, the rectum breaks through the vagina, resulting in a

rectovaginal fistula that allows the passage of feces via the vulva(Muhammad *et al.*, 2015). Atresia ani is a congenital and hereditary anomaly during the embryonic period resulting from an autosomal recessive gene (Hussen, 2018, Fesseha). Although other factors, such as environmental teratogens, plant toxins (Fesseha), and viral infections, (Kamalakar *et al.*, 2015)were identified as causative factors of atresia anemia in calves, in the present case, the reason could not be ascertained, and unspecific and uneventful recoveries were reported by (Kamalakar *et al.*, 2015). The calf showed marked improvement in defecation with minimal tenesmus and was in good general body condition 3 days postsurgery and had an uneventful recovery on day 15 postsurgery. The present case of atresia ani with its simple form of agenesis (without involving other parts) and uneventful recovery after surgical intervention in calves have been reported(Ubah *et al.*, 2019, Ali, 2018). Most affected calves initially stand and suck normally after birth, and the time for onset of clinical signs of atresia may vary from 1 to 3 days (Ubah *et al.*, 2019). History revealed that the client was not observant enough to notice if the calf suckled after birth; however, the clinical sign of inability to defecate or not passing through meconium was noticed within 2 days. Other clinical signs of atresia ani include intermittent straining and bulging of the anal region whenever calf strains are observed(Ubah *et al*., 2019). A history from the owners and certain clinical signs, such as abdominal distention, anorexia, depression, and failure of meconium to pass, suggested gastrointestinal obstruction(Kheirandish and Tajik, 2017, Muhammad *et al.*, 2017). Surgical correction of atresia ani is the only successful treatment for calves born with this abnormality. The prognosis of surgical correction was also good. The diagnosis of atresia can be made easily by visual inspection of the perineal region under the base of the tail or by gentle digital palpation if a vestigial anal opening is present. Surgical intervention is the only technique of choice for the treatment of acute abdominal discomfort; surgical intervention was attempted successfully, and the recovery was uneventful.

Conclusion and Recommendation

It was concluded from the present case report that, like many other congenital abnormalities in calves, atresia ani with anury (absence of tail) can be treated by anal reconstructive surgery to save the life of the animal. The owner was advised that the softened food allowed the calf to still heal the wound and wash the anal area of the calf.

3.3 Surgery of the Head Region

3.3.1 Unilateral Surgical Amputation of Horn in Cow

Abstract

Horns are pairs of hard, bonelike, permanent growth projecting from the head of cattle. Dehorning, or disbudding, is a procedure used to remove or stop the growth of horns and horn-producing tissues once they have formed from the bud. Injection of a local anesthetic around the cornual nerve as it traverses the frontal crest and desensitizes the area. If dehorning is not properly done with the removal of the whole corium, horns can start re-growing, and if the horns grow toward the eye, it can traumatize the eye. Dehorning of adult ruminants is more invasive and associated with increased risks of sinusitis, bleeding, prolonged wound healing, and infection. Postoperative care for horn amputation may cause bleeding, bacterial infections, and fly contamination unless closely monitored. The cow was properly immobilized with a combination of physical and chemical methods, and the horn was removed with the corium. Post-operative care and outcome included sporadic bleeding, which is normal and helps clean the wound unless continued for a long period. The horn was reattached to the normal horn and the area was properly bandaged.

Keywords: *Cornual, Dehorning, Horn, Horn amputation*

Introduction

Horns are pairs of hard, bonelike, permanent growth projects projecting from the head of cattle. At the base of the horn, they originate from a special region of skin cells. At approximately two months of age, horns become attached to the frontal bone of the skull (Irrgang, 2013, Baco *et al.*, 2020). Beneath the horn bud in the skull is a sinus. This frontal sinus joins into the portion of the horn as it develops and attaches to the skull (Cattle, Zhou, and Chinamasa). The procedure of dehorning, also known as disbudding, involves the use of various techniques that can be matched to the animal's age and horn size for maximum efficacy. The goal is to remove or stop the growth of horns and horn-producing tissues once the horns have formed from the bud (Udeh, 2021). Dehorning cattle primarily serves to

reduce the possibility of harm coming to other animals in the herd or to those who work with the cattle. Introducing a horned animal in a polled herd is poor judgment, and cows with horns often sell at reduced prices (Jesse *et al.,* 2016). The horns of cattle are special adaptations of the skin. The horn-generating cells are located between the junction of horns and skin, known as the corium, which is the site for horn growth (Jesse *et al*., 2016). Typically, horns start as buds under the poll's skin. The horn buds attach to the periosteum of the frontal bone that covers the frontal sinus at approximately two months of age. As the horns grow, the cornual diverticulum of the caudal portion of the frontal sinus extends into the most proximal portion of the horn(Rousseau, 2022, Sogebi *et al.,* 2016). The cornual nerve, a branch of the trigeminal nerve (cranial nerve V), provides sensation to the skin of the horn/horn bud region. A local anesthetic is injected around the cornual nerve as it traverses the frontal crest and desensitizes the area(Sánchez Rosell, 2018, Sogebi *et al*., 2016).

If dehorning is not properly performed with the removal of the whole corium, then the horns can start regrowing (Jesse *et al.,* 2016). If the horns grow toward the eye, it can traumatize the eye. This condition is diagnosed by physical examination of the horn and detection of the horn's growth toward the skull or eye (Sogebi *et al*., 2016). The management of an in-growing horn is by dehorning. The physical methods used for dehorning include the use of an embryotomy wire, a dehorning knife or saw, and an electric bone cutter. The presence of the cornual diverticulum of the frontal sinus makes surgical dehorning of adult ruminants more invasive. The deterioration of adult ruminants is associated with increased risks of sinusitis, bleeding, prolonged wound healing, and infection (Sogebi *et al.*, 2016).

Normally, the wounds heal well with due care of postoperative treatment following dehorning. However, the procedure may cause several postoperative complications, including bleeding, bacterial infections, and fly contamination, unless closely monitored. Operative animals require 30-60 minutes for bleeding observation after dehorning, but bleeding can be controlled through tourniquets, clamps, or electric cauterizing. Not only these but also fly repellents should be provided for the prevention of fly contamination for 10-14 days(Health and Welfare, 2012). In addition, sinusitis is a complication of dehorning and an exclusive risk in older calves. In cattle, the frontal or maxillary sinuses are usually affected by sinusitis. Frontal sinusitis is generally associated with dehorning and maxillary sinusitis with infected

teeth(Jesse *et al.*, 2016). This case report describes the surgical management of horns in cows in which the horns grow toward the eye through the use of an embryotomy wire (a dehorning wire).

Patient history and physical examination

A seven-year-old female cow was presented to the College of Agriculture and Veterinary Medicine, Jimma University, with a history of unilateral horn misdirected at the base of the horn. The horn of the cow gradually grew toward the eyes as the owner complained. There was blackish discoloration and paste of the nearby bodies of the misdirected horn due to local friction by the horn, and the diagnosis of this condition was made by physical examination of the horn and detection of the horn's growth toward the skull or eye. Further close examination revealed that vital organ parameters such as body temperature, heart rate, and respiratory rate were 38°C, 64 beats/minute, and 28 breaths/minute, respectively. Finally, based on the patient's medical history and clinical observations, the patient was diagnosed with a misdirected horn and managed through cosmetic surgical unilateral horn amputation.

Preoperative Preparation of the Cow

The cow was restrained adequately, and the circumferential skin surface of the base of the right horn was prepared aseptically by washing with soap and water(Fig.16B). Then, the hair was shaved with a blade and cleansed thoroughly with a diluted 2% povidone-iodine solution. Finally, the area was scrubbed with iodine solution and dried before being readied for dehorning.

Anesthesia and Animal Control

The cow was properly immobilized with a physical and mechanical restraint. Physically, the cow was handled with a rope assisted by personnel and kept in lateral recumbency with the affected horn facing upward, which adequately restrained the cow. The cow was regionally anesthetized with two percent lidocaine (2% lidocaine hydrochloride, loaded in a syringe with an 18-gauge, 1-1.5-inch needle; 10 ml/side was injected halfway between the lateral canthus of the orbit on the upper third and base of the horn just under the shaft of the frontal crest to block the cornual nerve and left for 5minutes) (Fig.16D).

Surgical procedure and technique

After securing, managing, and keeping the cow in the appropriate direction, elliptical skin incisions with a distance of ~1 cm wide around the base of the left horn were made for the successful removal of the corium (Fig.16E). Then, active bleeding was occluded by tamponade and ligation of major vessels (Fig.16H). Furthermore, the skin was bluntly and gently detached from the bone by scissors and retracted rostrally to obtain the skin flap (Fig.16F), which made it easy to see the horn with a dehorning wire. After the proximal part of the bone and horn base were adequately exposed, the base of the horn below the corium was cut with a dehorning wire(Fig.16G), and the subcutaneous tissues hanging the detached horn were cut surgically and removed with the corium. The flapped skin was sutured by using 2–0 silk pieces in a horizontally interrupted mattress (Fig.16I). The area was properly bandaged with gauze bandages and soaked in a weak iodine solution as a primary layer (Fig.16J). The area was properly secured to the normal horn, and the patient was admitted to the hospital.

Figure 16: Unilateral Surgical Amputation of Horn in Cow**,**

A) The animal was presented; B) the hair was shaved from the base of the horn, C) the area was scrubbed with iodine solution, D) the cornual nerve block, E) elliptical skin incisions, F)

the skin flap, G) the horn was sawed, H) the horn was removed with the corium, I) the skin was sutured by horizontal interrupted mattress, J) The area was properly bandaged.

Postoperative Care and Outcomes

Sporadic bleeding was noticed following the horn amputation, but it was normal and helped to clean the wound unless it continued for a long period. As it was difficult to oppose the skin flap completely following horn amputation, it was properly bandaged with gauze bandages and dressed regularly. The dressing of the wound was applied at three, five, and seven days up to fourteen days until healing. A 25 mg/kg pen strip was also administered I.M. for five days postoperation at the owner's home, and the animal was kept on the door. The owner was also advised to avoid leaving the cow in the yard after dehorning but was advised to provide good nutrition to facilitate wound healing. After two months, the wound healed completely, and at four months of follow-up, the body weight of the cows improved.

Discussion

According to this report, horn overgrowth appears to be a common feature in the study area, especially in WAD bucks (Sogebi *et al.,* 2016). The underlying tissues and skin around the base of the horn were undermined, and the horn was cut to the base to make a skin flap over the horn bud after removing the horn. Complete healing following dehorning may not occur, as was recorded in this report. The skin flap did not oppose well enough, resulting in a suture breakdown, and the base of the horn was opened. Therefore, autogenous skin grafts have been adopted for the management of complications (Sogebi *et al.,* 2016). In the wound preparation and skin grafting procedure, a wound bed of granulation tissue (pink–red healing tissue) created by the wound edge at the base of the dehorned horns provides the ideal bed for a successful graft (Sogebi *et al.,* 2016). Dehorning is a delicate procedure that requires professional skill and expertise because poor technique and management of wounds may result in numerous complications that can lead to septicemia and death of the animal in addition to delayed healing(Lopez and Martinson, 2017). Several dehorning methods, such as the use of chemical agents, including sodium hydroxide and calcium hydroxide, are commonly used to burn corium (Jesse *et al.,* 2016).In addition, sinusitis is a complication of dehorning and an exclusive risk in older calves. Sinusitis in cattle typically involves the frontal or maxillary sinus. Frontal sinusitis is generally associated with dehorning and

maxillary sinusitis with infected teeth(Jesse *et al.*, 2016). This case report describes the surgical management of horns in cows because the horns grow toward the eye through the use of an embryotomy wire (a dehorning wire), and the wound healed without any complications.

Conclusion and Recommendations

Dehorning is a delicate procedure that requires professional skill and expertise. It should be performed early within the first month. Poor management of wounds may also result in severe complications that can lead to septicemia and death. Proper wound management and medication will improve the patient's prognosis. The owner was also advised to avoid leaving the cow in the yard after dehorning but was advised to provide good nutrition to facilitate wound healing.

3.3.2 Enucleation of the Eye Ball in Cow

Abstract

Enucleation is the removal of the globe, leaving behind muscle and adipose tissue. Indications for enucleation include irreparable ocular trauma and septic panophthalmitis. Extirpation is often performed by removing everything within the orbit, including the globe, muscle, adipose tissue, and lacrimal gland. Eye removal is indicated when the eye is painful and cannot return to sight. Transpalpebral and transconjunctival surgical approaches are used to treat painful ocular diseases and prevent ocular neoplasia progression. A 7-year-old lactating cow was diagnosed with a loss of unilateral sight and a damaged eyeball. The condition began with eye inflammation and swelling and progressed over several weeks. The cow was in moderate body condition and easily excited due to pain and loss of sight. Preoperative preparation included cleaning, clipping, shaving, and disinfecting the area. Anesthesia was administered, and the animal received an Auriculopalpebral nerve block and a four-point retrobulbar nerve block. The eyelids were closed using a simple continuous suture pattern, and an elliptical incision was made on the skin. The orbit was removed, and the dead space was packed with a gauze sponge soaked in tincture iodine. The eyelids were sutured using a simple continuous suture pattern. Postoperative care included penicillin-streptomycin (pen strips) and meloxicam. The animal developed a severe infection in the operated eye, which

persisted after repeated gauze pack changes and antiseptic dressing. A second round of systemic antibiotics was administered, and the infection resolved after a week of surgery. The animals healed properly without weight loss, decreased milk production, or any complications.

Keywords: *Enucleation, Eyeball, Eye removal, Transpalpebral*

Introduction

Enucleation technically refers to the removal of the globe, leaving behind muscle and adipose tissue (Potter *et al.,* 2012). Indications for enucleation include irreparable ocular trauma (with or without the loss of globe contents) and septic panophthalmitis. Frequently, what is performed is extirpation, which involves the removal of everything within the orbit, such as the globe, muscle, adipose tissue, and lacrimal gland (Potter, 2007). The most frequent indication for extirpation in cattle is neoplasia (usually squamous cell carcinoma) of the cornea and the upper, lower, or third eyelid. In cases of ocular neoplasm, surgery is not indicated where there is involvement of the bony orbit or where there is evidence of metastatic spread (Potter *et al.,* 2012).

In such cases, the removal of the eye is indicated in animals when it has reached a point where it has no chance of being capable of returning sight and it is very painful to the patient (Dhar, 2019). Trauma to the eye, such as an infected scratch injury or puncture to the eye by fighting with other animals or hitting the eye with a sharp object), tumors of the eye, and glaucoma (increased pressure inside the eye), are considered to be the most common causes of painful, blinded eyes (Singh *et al.,* 2013). There are two potential methods of local anesthesia for enucleation: the retrobulbar block and the Peterson block. For both techniques, adequate head restraint with a halter or nose grip is required (Weaver *et al.,* 2018).

The four-point retrobulbar block is performed by injecting through the eyelids, both dorsally and ventrally (at the 6 and 12 o'clock positions) and at the lateral and medial canthi. The aim is to deposit approximately 60 ml (divided between the four points) of local anesthetic at the apex of the orbit where the nerves emerge from the foramen orbitorotundum (Potter *et al.,* 2012). The major landmarks are the supraorbital process cranially, the zygomatic arch ventrally, and the coronoid process of the mandible caudally; at this point, a notch can be

identified. Petterson nerve block involves the accumulation of local anesthetic through this notch behind the eyeball (Niehaus and Anderson, 2016).

Transpalpebral and transconjunctival surgical approaches have been described, and the most common approach used in bovines is the transpalpebral technique. The first is preferred if infection or neoplasia is present to prevent orbital contamination(Albanese *et al.,* 2014). Enucleation and exenteration are indicated for the treatment of painful ocular diseases such as trauma to the eye with loss of globe content, septic panophthalmitis and phthisisbulbi, and infectious keratoconjunctivitis with secondary globe perforation and to prevent the progression of ocular neoplasia, such as ocular squamous cell carcinoma (OSCC) and retrobulbar lymph sarcoma(Labelle, 2017). Previous retrospective studies identified OSCC as the most frequent indication for enucleation or exenteration (Thiry *et al.,* 2022).

There are several complications associated with local anesthesia. Retrobulbar anesthesia has been associated with orbital hemorrhage, penetration of the globe, optic nerve injury, and acute death following injection into the optic nerve meninges. Accidental injection of anesthetic into the ethmoid turbinate has been observed during the performance of the Peterson eye block(Edwin and Mwangi). Complications associated with enucleation in animals include rupture of the globe during surgical manipulation with subsequent contamination of the surgical site, excessive orbital hemorrhage, excessive trauma to the remaining tissue leading to swelling or hemorrhage, discharge from the excision site due to orbital infection, retention of the lacrimal duct or nictitans tissue, and periorbital cellulitis (Ali *et al.,* 2015). Enucleation remains a feasible, simple, inexpensive treatment option for many types of severe ocular pathology. It has the potential to resolve chronic pain, infection, and neoplastic disease(Ali *et al.,* 2015).

Case history and Physical examination

A seven-year-old lactating cow was presented to the JUCAVM in an open-air clinic for unilateral eye loss and eyeball damage. The owner complained that the condition started as inflammation of the eye and swelling and progressed into the then situation over several weeks. On physical examination**,** the right eyeball was completely necrotized, and the necrotized tissue was severely infected by foul-smelling purulent discharge (Fig.17A). The

temperature, pulse, and respiration are within the normal range. The animal was in moderate body condition, and it was easily excited due to the pain and loss of sight on one side.

Preoperative preparation

The space around the affected eye was cleaned, clipped, shaved, and disinfected before the administration of local anesthetic. The hair surrounding the eyes was trimmed, and 2% povidone-iodine was used to clean the area.

Anesthesia and animal control:

The animal was given an Auriculopalpebral nerve block and was subcutaneously injected with 5 ml of 2% lidocaine HCl on the dorsal aspect of the zygomatic arch (Fig.17B). A four-point retrobulbar nerve block was applied around the eye at the lateral and medial canthi and the middle point on the upper and lower eyelid of the eye. A palpebral nerve block was also applied to complement the retrobulbar nerve block because the incision was at least 2cm from the eyelid margins. This nerve block is performed by infiltrating approximately 10 ml of 2% lidocaine into the eyelid subcutaneously and intramuscularly and then constrained with the affected side up in lateral recumbency.

Surgical Procedure and technique

The eyelids are closed using a simple continuous suture pattern, allowing easier manipulation during surgery. An elliptical incision was then made in the skin approximately 2 cm from the margins of the eyelid (Fig.17C). The incision was continued through the subcutaneous tissue and down to the orbital muscle. Care was taken to avoid incision into the conjunctiva, as the conjunctival sac is a source of potential contamination for the surgical field. Blunt dissection is continued for 360° around the orbit until the eyeball and conjunctival sac are loosened from their muscular attachments. Since all the contents of the orbit are necrotized and all muscles are infected, adipose tissue, the lacrimal gland, and fascia are removed along with the eyeball and the margins of the eyelid to ensure that all sources of infection and dead tissue are removed. After the removal of the eyeball, there was not much bleeding, as all the retrobulbar contents were long dead, although considerable dead space was left within the orbit. The orbit was thoroughly cleaned with normal saline, and blood clots and pieces of necrotic tissue were

removed. Then, the dead space is packed with a gauze sponge soaked in tincture iodine (Fig.17D). The eye lids are sutured using a simple continuous suture pattern using silk 2=0, leaving space at the medial canthus to remove and change the gauze pack later (Fig.17E).

Figure 17: Enucleation of the eye ball in cow,

(A**)** Affected eye before surgery, **(**B**)** Infiltration of local anesthesia, **(**C**)** An elliptical skin incision, **(**D**)** After removal of the eyeball, **(**E**)** The eye lids are sutured, **(**F**)** After postoperative care the animal was stood up

Postoperative care and complications

Penicillin-streptomycin (pen strips) (1 ml/25 kg) and IM were administered postoperatively for five days. Meloxicam at a dose of 5 mg/kg body weight once daily for 5 days was used as part of the postoperative treatment. The gauze was changed every day for three days. The animal developed a severe infection in the operated eye. The infection persisted after repeated changes in the gauze pack and antiseptic dressing. A second round of systemic antibiotic treatment was administered, and the cavity was flushed repeatedly with tincture iodine. Sutures were removed on the 14th postoperative day, and the animal healed properly with no weight loss or decreased milk production noted and without any complications.

Discussion

Enucleation is the most common orbital surgical procedure performed by veterinary ophthalmologists and general practitioners and is generally indicated for patients with blind, painful eyes or patients with nonresectable intraocular tumors (Dhar, 2019). The three most commonly described enucleation techniques are the subconjunctival, lateral, and transpalpebral approaches. The main objectives of the subconjunctival technique are to remove the globe, nictitating membrane, and eyelid margins while preserving as much soft tissue as possible to minimize subsequent orbital depression(Oel *et al.*, 2014, Swinger *et al.*, 2009). The lateral approach removes the tissues in a similar order but first involves partially excising the eyelids for better surgical exposure (Singh *et al.*, 2013). The transpalpebral technique is often used in patients with associated ocular surface infections or neoplasia. This method involves suturing the palpebral fissure closed and removing the globe, nictitating membrane, and conjunctiva as one encased unit to prevent contact between the remaining ocular surface and orbital content(Singh *et al.*, 2013). However, in the present clinical case, a modification to the routine subconjunctival enucleation technique (Singh *et al.*, 2013)involves removing the eyelids and nictitating membrane before excising the globe. This method offers good visibility and better access to the globe and extraocular muscles. After eyelid margin and nictitating membrane removal, the globe is easily visualized and manipulated. The attachments of the extraocular muscles can be easily followed, and the globe can be positioned to visualize the optic nerve before the transaction. Clamping the optic nerve with hemostats or ligating the associated vasculature before optic nerve transection is routinely practiced in this technique(Swinger *et al.*, 2009, Singh *et al.*, 2013). Where possible, the optic nerve and ciliary blood vessels are tied with a ligature. The purpose of this ligature is both to reduce hemorrhage and to close the nerve sheath, which directly communicates with the central nervous system, preventing reflux of blood or leakage of cerebrospinal fluid. Extra special care must be taken to avoid traction of the optic nerve, as this force is transmitted to the optic chiasm and may damage the contralateral optic nerve, resulting in blinding of the contralateral eye, which shows a fixed dilated pupil after surgery (Singh *et al.*, 2013). The optic chiasm can be damaged if excessive traction is placed on the globe, resulting in possible blindness in the contralateral eye after enucleation (Dhar, 2019, Swinger *et al.*, 2009). This

technique is not indicated for patients with corneal ulcers or ocular infections. In the presented cases, the transpalpebral technique was more appropriate. In our patient, this method was not associated with any adverse complications. The most common postoperative complication is hemorrhage within the first few hours after surgery. However, in this patient, no complications were found in the follow-up history.

Conclusion

Enucleation remains a feasible, simple, inexpensive option of treatment for many types of severe ocular pathology. It has the potential to resolve chronic pain, infection, and neoplastic disease. Enucleation can be performed with routine restraint and surgical equipment at minimal cost to the client. Post-operative infection of the operative site is common, but most cases require minimal medical therapy. Retention within the herd is based largely on owner preference.

3.3.3 Aural Hematoma in Dogs

Abstract

Aural hematoma is the most common injury to the pinna and requires surgical intervention in addition to removing the predisposing cause. The present case report describes the surgical management and outcomes of a five-year-old dog that presented to the Jimma University College of Agriculture and Veterinary Medicine, an open-air clinic with a history of scratching the left ear for two weeks; the dog was filled with abnormal blood in a space under the skin of the ear flap and was swollen. There was no history of external trauma, but intense headshaking and an abrupt increase in the size of the ear flap were observed. On physical examination, her oral and conjunctival mucosa was normal, her rectal temperature was 38.5°C, her heart rate was 90 beats/min, her respiratory rate was 21 breaths/min, and her capillary refill time was approximately <2 s. The swollen right ear was warm to the touch, and her pet was feeling pain upon palpation. The examinations revealed that the dog had aural hematoma. The animal was managed surgically and recovered completely from the problem.

Keywords: *Aural Hematoma, Dog, Surgical Management*

Introduction

An aural hematoma is a collection of blood that is either fresh or clotted within the pinna (ear flap), resulting in a very thick and spongy appearance over the entire pinna or localized area (O'Neill *et al*., 2021). The pinna (ear flap) is composed of a layer of skin on each side of a layer of cartilage that provides the shape of the ear flap. Blood vessels travel from one side to the other by passing through the cartilage (Ghibaudo, 2022). Aural hematoma or othematoma in dogs is a traumatic condition located at the ear pinna and is clinically characterized by the presence of fluctuating hematogenous collections on the external (convex) face that occur following a tear or cut-off of the blood vessels located between the cartilage and the cutis ear (Beteg *et al*., 2011, Eyarefe *et al*., 2013). Most of the time, it occurs when pets vigorously shake their heads or scratch their ears, which may result in trauma to the small blood vessels of the ears followed by rupture of the blood vessels and capillaries in the pinna (Englar, 2017). In addition to trauma due to scratching and shaking, the heads of dogs with long, floppy ears are also at greater risk for developing ear hematomas. Additionally, pets with clotting or bleeding disorders may develop hematomas, with or without a history of trauma, which ultimately causes pools of blood to collect in the space between the skin and cartilage, creating a hematoma. This condition is usually unilateral, but it can also be bilateral(Patil *et al.*, 2021, Maruthi *et al.*, 2016). Hematoma can pose health problems to affected dogs in addition to interfering with hearing(Jain *et al.*, 2013). It is best to remove hematomas as soon as possible. If they are left untreated, fibrin formation can occur, leading to fibrosis, contraction, and thickening, potentially leaving the ear with a deformed cauliflower-like appearance (MacPhail, 2016). If medication is delayed, surgical intervention is more difficult and increases the likelihood of scarring. There are various methods of treating aural hematoma, including simple aspiration, which is the most conservative treatment for relieving acute pain, but recurrence is common with this technique. The best method is surgical drainage, as it may reduce recurrence, unlike the former method, in addition to preserving the cosmetic and aesthetic aspects of the ear if performed in a timely and proper manner (Barbry *et al*., 2021). This case report describes the surgical procedure and technique and the outcomes of a single patient with aural hematoma who was treated surgically.

Patient history and clinical examination:

A five-year-old dog with an estimated body weight of 15 kg was admitted to the JUCAVM open-air clinic with a history of scratching the left ear for two weeks; the dog was filled with abnormal blood in the space under the skin of the ear flap and was swollen (Fig.18A). There was no history of external trauma, but intense headshaking and an abrupt increase in the size of the ear flap were noticed by the owner of the dog. On physical examination, the oral and conjunctival mucosa were normal. Her rectal temperature was 38.5°C, her heart rate was 90 beats/min, her respiratory rate was 21/min, and her capillary refill time was approximately <2 sec. The swollen right ear was warm to the touch, and the pet was feeling pain upon palpation. Based on the above parameters, the patient was diagnosed with aural hematoma of the left ear pinna without other health concerns, and surgical intervention was used to treat the patient.

Preoperative preparation of the dog:

The dog was withheld from feed and water for 12 hrs and 6 hrs, respectively, before surgical treatment. The Pinnae of the affected ear was aseptically prepared by clipping both sides (convex and concave) of the ear and shaving the hair after moistening the region well with antiseptic soap and sedating the patient. The inner surface of the pinna was prepared for surgery via a standard aseptic method, and an aperture drape was applied to expose only the surface of the inner pinna. Sterilized gauze was plugged at the entrance to the external ear canal to prevent hematoma fluid from draining into the external ear (Fig.18B). An iodine solution was applied to the pinna, which was then wiped with a sterile swab to dry the surgical site, and the excess solution and foreign materials were removed.

Anesthesia and animal control:

The animals were premedicated with atropine sulfate at 0.04 mg/kg I.M. to prevent the occurrence of bradycardia during anesthesia. Later, the dog was induced by the combination of xylazine at 2 mg/kg IM and ketamine (ketamine hydrochloride, 5.5 mg/kg IV) and maintained by ketamine by a half dose of the first dose. Finally, the dog was kept on right lateral recumbence with the affected ear uppermost.

Surgical procedure and technique

After the surgical site was aseptically prepared and the animal was stabilized, a longitudinal incision was made on the concave (internal) surface of the skin along the length of the auricular hematoma. An incision was made over the hematoma with the scalpel blade. Drainage of the auricular hematoma was performed after opening the incision (Fig.18C). An adequate length of incision was made, followed by digital compression from the exterior for complete drainage of the content. After removal of all the debris from the auricular hematoma, clots, and tissue fluids were removed from the cavity wall, and the cavity was lavaged with saline and diluted iodine solution. Then, a vertical mattress suture penetrating all layers from the concave to the convex surface of the ear was applied to decrease the dead space and preserve the normal appearance of the ear using silk #3-0. Suture lines were applied parallel to the axis of the pinna and major vessels. Adequate horizontal mattress sutures with an approximate distance of 1cm between two adjacent points were applied to avoid pocket formation and fluid accumulation (Fig.18D). After surgery, a pressure bandage was applied over the pinna to minimize exudate accumulation and hematoma recurrence to promote healing. In addition to surgical management, the animal was administered anti-inflammatory agents and antibiotics as described under postoperative care to treat the underlying cause, which in many cases is an infection or allergy. The patient in the present case was managed surgically.

Figure 18: Surgical Management of Aural hematoma in dog**;**

A) Aural hematoma in dogs, B) the patient was prepared aseptically for surgical intervention, C) Surgical incision pattern and removal of blood clots by compression, D) Placement of stitches after evacuation,

Postoperative care and outcomes:

The animal was administered antibiotics (Penicillin G (24 mg/kg) and dihydrostreptomycin sulfate (30 mg/kg)) at a rate of 1ml/25 kg I.M for three consecutive days post-operation. After successful completion of the surgical procedure, the affected ear was bandaged. The bandage was checked periodically to ensure that it was not too tight. A collar was used to prevent the patient from damaging the surgical site or bandage. In addition, the owner was advised to check the bandage at home at least twice daily to ensure that it remained loose and was not soiled and to return the animal to the hospital to change the bandage every three days or when it became soiled. Bandaging was continued until granulation tissue was present at the surgical sites. Accordingly, drainage was minimal, and the patient no longer shook his head for a few days. The owner was also informed about how to keep the incision clean and free of clots and debris. Tramadol (Tramadol hydrochloride) was also administered at 4 mg/kg I.M. for two days. Finally, the dog completely recovered one month after the operation and was observed after two months of follow-up.

Discussion

Aural hematoma is the accumulation of blood in the ear, especially between the cartilage and the skin (Jithil and Amrutha, 2023, Katsoulos and Dedousi, 2021). Surgical treatment of hematoma aims to remove blood and fibrin debris, prevent infection, eliminate dead space at the cavity of the hematoma, and inhibit recurrence (Hussen, 2018, Gotthelf, 2019). Aural hematomas can be managed by conservative or surgical methods and/or in combination with a squeezing sponge (Győrffy and Szijártó, 2014). Among all management approaches, surgical treatment of ear hematoma is preferred due to its effectiveness in restoring normal anatomical structure and appearance as early as possible. The same surgical protocol and techniques were applied for surgical management of aural hematomas in some studies (Itoh *et al.,* 2022)that reported healing within two weeks without recurrence, unlike in untreated patients. Although surgical management is the best option, it requires a longer time to heal completely in large aural hematomas (Uddin *et al*., 2017). There was no postoperative surgical infection or other complications regarding wound dehiscence. However, with this surgical procedure, the prognosis is excellent and swift, and this finding concurs with the fact that healing after

surgical treatment of aural hematoma is rapid and usually requires 2-3 weeks. During surgical management of the aural hematoma, the suture material was removed at 14 days postoperation, and the bandages were left for a few days to reduce the extent of mutilation. This is what was recommended in a case report (Nelissen and White, 2014)in which opined sutures could be removed 9-10 days postoperatively while bandaging should continue for one more week for positive outcomes. Most operative techniques use nonabsorbable sutures such as nylon, which must be removed 9–12 days after the operation (Cechner *et al.*). However, in this case study, a nonabsorbable suture material, silk 3-0, was used because of the lack of need to return the patient to the JUCAVM open-air clinic for the removal of the stitches. With silk 3-0 nonabsorption sutures after 14 days, the animal is not expected to feel any discomfort from the stitches. This means less stress for the dogs. All the auricle layers were penetrated, and vertical mattress sutures were tied to prevent deformity of the ear. Multiple parallel rows of several lines of stitches, placed and fixed on the auricle, are important for limiting the probability of recurrence. A frequent complication of aural hematoma without adequate treatment is cauliflower-like shrinkage of the auricle (Győrffy and Szijártó, 2014). In the present case, complications were avoided by careful placement and knotting of suture lines via an operative technique that avoided wrinkling. The surgical technique is a viable and better option for the surgical treatment of aural hematoma in dogs. The surgical technique used for the treatment of aural hematoma in the current case was well described in several texts, and surgeons who are practicing successfully are advised to apply this technique. The use of nonabsorbable multifilament sutures may provide an advantage over other suture materials, such as nylon, which has been used as an established standard. Thus, the use of silk requires further evaluation in a larger number of patients for potentially fewer postoperative complications and for wrinkling of the ear pinna.

Conclusion and recommendations

Dogs are the most common pet animals in Jimma city and are usually local dogs. Aural hematomas are a common problem in local dogs that reappears if they are managed properly and the underlying disease is treated efficiently. The best way to avoid the development of an aural hematoma is to pay attention to any condition that causes ear irritation. In positive cases, surgical management is the best way to control aural hematomas. Proper incision, complete

drainage, correct suture pexy, and postoperative regular dressing ensured successful management of the aural hematoma. The owner was advised to place a local collar on the dog to prevent it from disturbing the ear or the bandage.

4 SUMMARY OF COMPILED CASES AND THEIR COMPLICATIONS

In this study, surgery was performed on a total of seventeen different species of animals at the veterinary open-air clinic at the College of Agriculture and Veterinary Medicine and in and around Jimma town, and different surgical procedures were performed on bovine, Caprine, canine, feline and equine species of animals. Cesarean section, rumenotomy, and open castration were the most common surgical procedures performed during the study period in 7(41.17%) patients, followed by Ovariohysterectomy in 2 (11.76%), atresia ani without a tail in 1(5.88%), dehorning in 1(5.88%), hernia repair in 1(5.88%), paraphimosis in 1(5.88%), eye enucleation in 1 (5.88%), left abomasal displacement in 1(5.88%) and Cervicovaginal prolapse in 1(5.88%) patients. Surgical site swelling was commonly observed in 5 (29.41%) patients, followed by postoperative seroma in 1 (5.88%) patient. During the study period, 1 patient (5.88%) died after surgical intervention (Table 1). Out of seventeen patients who presented during the study period, only one animal death was encountered due to lack of management, uncooperation with the animal, and open castration of the cat by the owner, who presented the animal early for surgical intervention. In the remaining 16 animals, satisfactory outcomes were observed after surgical treatment.

Table 1: Type of operation performed, complications and surgical outcomes

Species	Type of cases	Number of cases	%	Complications	Number of cases
	C- section	1	5.88	Minor swelling	
Cattle	Rumenotomy	1	5.88	Swelling at the surgical site	1
	Eye Enucleation	1	5.88	------	-----
	Amputation of horn	1	5.88	head shaking, rubbing	1
	Cervicovaginal prolapse	1	5.88	------	------
	Atresia ani	1	5.88	Discomfort while defecating	1
	Umbilical hernia	1	5.88	Swelling	1
	Left abomasum displacement	1	5.88	----------	
Small	C-section	1	5.88	Minor swelling	1
rumina	Rumenotomy	1	5.88	Minor swelling	1
nts					
Small	Ovariohysterectomy	2	11.76	----------	
animals	Paraphimosis	1	5.88	----------	
	Open castration	2	11.76	1 was died,	1
	Aural hematoma	1	5.88	Reoccurrence	1
Equines	Open castration	1	5.88	Minor swelling	1
Total cases		**17**	**100**		

5 CONCLUSION AND RECOMMENDATIONS

In this case-report thesis, several surgical treatment approaches have been used for different domestic animals. The most frequently performed surgical treatment was castration. Postoperative complications are common after surgical treatment and are associated with low mortality. Many complications may be controlled, and the survival rates of animals after surgery can be significantly improved by careful management of postoperative care regimens, including pain relief, administration of antibiotics, and dressing of the incision site with antiseptics. Furthermore, preoperative management, sound surgical techniques, and owner care for the animal, as advised, are invaluable. Although several postoperative complications are noted, the overall outcomes of surgical treatment appear to be promising for patients for whom other options have failed or for whom surgery is indicated.

Based on the above conclusions, the following recommendations are drawn:

- ✓ Enhance veterinary surgical training: There is a need to invest in training programs for veterinary professionals to improve their surgical skills and knowledge, especially in rural areas where access to specialized training may be limited.
- ✓ Increase access to surgical facilities and equipment: Ensuring that veterinary clinics and hospitals have the necessary equipment and facilities to perform a wide range of surgical procedures is essential for providing quality care to animals in need.
- ✓ Owners should be made aware of the common complications and provide care for the animal as advised
- ✓ Collaborate with local communities: Building strong partnerships with local communities can help raise awareness about the importance of veterinary care and encourage early intervention for surgical cases.
- ✓ Conduct further research: More research is needed to better understand the prevalence of surgical conditions in different animal species in the region and to identify effective treatment strategies. Collaborating with research institutions and organizations can help facilitate this process**.**

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7 ANNEXES

Annex 1: Clinical parameters of some domestic animals

Animal	Temperatures(^{o}c)	HR(Beats/Min)	RR(Breaths/Min)	CRT/skin tenting
Cattle	37.5-38.5	60-70	30	Less than 2sec
Sheep	39.1	60-70	19	Less than 2sec
Dog	38.9	80-90	14-22	Less than 2sec
Cat	38.5	100-130	20-30	Less than 2sec
Donkey	36.7-38.3	28-44	8-16	Less than 2sec
Pig	39	60-70	10-12	Less than 2sec
Goat	38.5-39.7	70-80	12-20	Less than 2sec
Horse	37.2-38.2	28-40	10-14	Less than 2sec

Source: (Muir *et al*., 2000)

Annex 2: Some useful anesthetic combinations

Animal	Drug combination	Dose
Dog	Diazepam	0.5 to 1mg/kg IV
	Ketamine	5 to 10mg/kg IV
	Xylazine	2mg/kg IM
	Ketamine	5mg/kg IV
Cat	Xylazine	0.3 to 1mg/kg IM
	Atropine	0.3mg/kg IM
	Ketamine	5mg/kg IV

Source:(Yohannes *et al.*, 2018)

Annex 3: Case history recording sheet

Date _____

Case number_____ Species_____ Breed _____ Age _____

Sex_____Color_____Estimated body weight _____

Casehistory_____

Clinical findings:

Body temperature_____ Respiratory rate _____

Heart rate _____Mucous membrane color_____

Abnormalities _____

Diagnosis_____

Samples taken _____

Laboratory result _____

Type of treatment _____

Complications after treatment

_____

Care after treatment _____

Advice given to the owner_____

Follow-up appointment _____

Outcome of treatment_____

Annex 4: Consent Form for Anesthetic and Operation

Owner's name: ----------, contact number: ----------, address/kebele----------
Species: ---------- Breed: ---------- Age: ---------- Color: ----- Sex: -----
Weight: ---------, Vaccination status: ----------.patient's local name----------
Operation/procedure: ----------, Pre-anaesthetic: Yes/no, ---------- -------. Pre-anesthetic blood sample: Yes /no, IV fluids: Yes/no (----------) current medication: ----------:

I hereby permit the above animal to be admitted for inpatient tests, treatment, observation, and any other procedures that may prove necessary. I understand that while very care and attention will be given to ----------, the Practice cannot be held responsible for any untoward events that may occur.

I also understand that while every effort will be made to contact me in the event of unplanned procedures being necessary, the Practice must be permitted to perform any procedures they feel necessary to maintain the well-being of ----------. In extreme cases, this may include euthanasia if undue suffering is occurring and the chances of recovery are thought to be poor. I understand that the full fee will be payable on the release of the animal.

Signature: ---------- (Owner/authorized agent)

Date: ----------

Veterinarian ----------, signature---------- assistant name----------