



JIMMA UNIVERSITY
COLLEGE OF AGRICULTURE AND VETERINARY MEDICINE
SCHOOL OF VETERINARY MEDICINE

**VETERINARY SURGICAL CASE REPORTS ON VARIOUS DOMESTIC ANIMAL
PATIENTS IN AND AROUND JIMMA TOWN, OROMIA, ETHIOPIA**

MVSc THESIS

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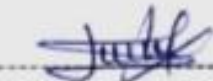
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TABLE OF CONTENTS	PAGES
STATEMENT OF THE AUTHOR.....	II
ACKNOWLEDGEMENT.....	IV
LIST OF TABLES	VI
LIST OF FIGURES	VII
LIST OF ABBREVIATIONS AND ACRONYMS	VIII
LIST OF ANNEXES	IX
ABSTRACT.....	X
1. INTRODUCTION.....	1
2. MATERIALS AND METHODS	3
2.1. The Study Area.....	3
2.2. Study Population	4
2.3. Study Design	4
3. VETERINARY SURGICAL CASE REPORTS ON VARIOUS DOMESTIC ANIMAL PATIENTS IN AND AROUND JIMMA TOWN	6
3.1. Case Reports on Cattle	6
3.1.1. Rumenotomy Due to Indigestible Foreign Bodies in a Cross-HF Heifer.....	6
3.1.2. Clinical Management of Postpartum Cervicovaginal Prolapse in Local Breed Cow..	12
3.1.3. Caeserean Section Due to Breech Presentation in a Local Breed Heifer	17
3.1.4. Repair of Metacarpal Fracture in a Cross-HF Calf.....	23
3.1.5. Surgical Correction of Umbilical Hernia in a Cross-HF Calf	28
3.1.6. Clinical Management of Uterine Prolapse in a Cross-HF Cow.....	33
3.2. Case Reports on Small Ruminants	38
3.2.1. Caeserean Section Due to Feto-Pelvic Disproportion in a Doe.....	38
3.2.2. Extirpation of Eye Due to Penetrating Traumatic Injury in a Doe.....	43
3.2.3. Surgical Correction of Ventrolateral Hernia in an Ewe	49
3.3. Case Reports on Small Animals.....	54
3.3.1. Mastectomy in an Intact Local Breed Bitch	54
3.3.2. Tail Amputation Due to Tail Injury in a Local Breed Dog	60
3.3.3. Open Castration in a Local Breed Dog.....	66

3.3.4. Ovariohysterectomy in a Local Breed Bitch	72
3.3.5. Ear Cropping Due to Unilateral Cauliflower Ear in a Local Breed Dog.....	78
3.3.6. Ovariohysterectomy Due to Open-Cervix Pyometra in a Queen	84
3.3.7. Open Castration in a Tomcat	89
4. POST-OPERATIVE COMPLICATIONS AND SURGICAL OUTCOMES	95
5. CONCLUSION AND RECOMMENDATIONS.....	97
6. REFERENCES.....	98
7. LIST OF ANNEXES.....	112

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LIST OF TABLES

PAGES

Table 1. Cases developed postoperative complications and surgical outcomes	95
Table 2. Types of cases and postoperative complications	96

LIST OF FIGURES

PAGES

Figure 1. Geographical location of the study area	3
Figure 2. Rumenotomy in a cross-HF heifer.....	10
Figure 3. Clinical management of cervicovaginal prolapse in a local breed cow	15
Figure 4. Caesarean section in a local breed heifer.....	21
Figure 5. Repair of metacarpal fracture in a cross-HF calf by POP cast	26
Figure 6. Herniorrhaphy in a cross-HF calf	31
Figure 7. Clinical management of uterine prolapse in a cross-HF cow	36
Figure 8. Caesarean section in a doe.....	41
Figure 9. Extirpation of eyes in a doe	47
Figure 10. Herniorrhaphy in an ewe	52
Figure 11. Mastectomy in an intact local breed bitch	58
Figure 12. Tail amputation in a local breed dog	64
Figure 13. Orchiectomy in a local breed dog.....	70
Figure 14. Ovariohysterectomy in a local breed bitch	76
Figure 15. Ear cropping in a local breed dog.....	82
Figure 16. Ovariohysterectomy in a queen	87
Figure 17. Orchiectomy in a tomcat.....	92

LIST OF ABBREVIATIONS AND ACRONYMS

BID	Two Times a Day
CRT	Capillary Refill Time
HCL	Hydrochloride
HF	Holstein Friesian
HQHVS	High-Quality High-Volume Spay Neuter
HR	Heart Rate
JUCAVM	Jimma University College of Agriculture and Veterinary Medicine
MASL	Meters Above Sea Level
OVH/OHE	Ovariohysterectomy
POP	Plaster of Paris
PVC	Polyvinyl Chloride
RR	Respiratory Rate
SID	Once Daily

LIST OF ANNEXES	PAGES
Annex 1. Patient Card.....	113
Annex 2. Consent Form for Anesthetic and Operation	115
Annex 3. Clinical Parameters of Some Domestic Animals.....	115
Annex 4. Some Useful Anesthetic Combinations	116
Annex 5. Recommended Dosage for Analgesics	116
Annex 6. Imprint Cytology Techniques	117

ABSTRACT

Surgery-related illnesses pose a serious risk to our economy and failure of surgical intervention provides no alternatives except for culling or the eventual loss of a productive or valuable animal through death. Therefore, this study aims to conduct various surgical treatments and document surgical cases. The case study was conducted from September 2023 to April 2024 at Jimma University College of Agriculture and Veterinary Medicine (JUCAVM) an open-air clinic and on the farms, in Jimma, Ethiopia. Sixteen surgical case reports were compiled based on a scientific surgical case report publishing format: case history, clinical examination, surgical management, postoperative care, postoperative complications, and surgical outcomes of the cases were recorded. Accordingly, the findings of each case were discussed with the findings of other literature. The sixteen compiled case reports include six cases on cattle (ruminal impaction, postpartum cervicovaginal prolapse, dystocia, fracture of metacarpus, umbilical hernia, and uterine prolapse), three cases on small ruminants (dystocia, penetrating traumatic eye injury, and ventrolateral hernia), seven cases on small animals (mammary tumor, tail injury, surgical sterilization (two dogs and one cat), unilateral cauliflower ear, and pyometra). From the total handled cases, postoperative complications were encountered (37.5%, 6/16), patients recovered (87.5%, 14/16), and (12.5%, 2/16) patients died. The occurrence of these postoperative complications might be due to a lack of owner commitment to care for animals as advised, the lack of patient intensive care rooms, and the absence of dressing the wound site with antiseptics. Eliminating post-operative complications can be accomplished through employing ideal aseptic surgical techniques as well as giving good post-operative care.

Keywords: *Case reports, Complications, Domestic animals, Jimma, Outcomes*

1. INTRODUCTION

Livestock plays vital roles in generating income for farmers, creating job opportunities, ensuring food security, providing services, contributing to an asset, social, cultural, and environmental values, and sustaining livelihood (Shibru and Sodo, 2017). Ethiopia has the largest livestock population in Africa, with 65 million cattle, 40 million sheep, 51 million goats, 8 million camels, and 49 million chickens in 2020 (CSA, 2020). Despite the huge livestock resource, the contribution to the economic aspect of the country is still the lowest. Low economic returns from these resources are associated with several factors such as poor management, the low genetic potential of indigenous breeds, and diseases (Benti and Zewdie, 2014).

Livestock diseases have impacts that include loss of livestock and farm productivity, reduction of market opportunity, disturbance of human health, and impairment of human welfare. Moreover, disease control activities may have negative impacts on the improper use of chemicals and drugs (Desta, 2015). The current delivery of animal health services is inadequate both in coverage and in quality. Only 45% of the country is served by animal health delivery systems (Kassie *et al.*, 2021). This low service coverage is attributed to a lack of personnel, shortage of drugs and equipment, poor mobility, and highland-oriented animal health service delivery (Jilo *et al.*, 2016).

In Ethiopia, the treatment of individual sick animals has gotten less attention until recent years as the policy and manpower resources give more attention to preventive medicine. Recently there has been an increase in demand for better veterinary services due to the increasing awareness of the importance of the treatment of individual animals by both rural and urban communities. A growing trend of keeping pure or crossbred animals as companion pets, especially dogs, in urban areas also contributed to the increased demand for the veterinary care of individual animals (Tiruneh *et al.*, 2014). In many of the cases, diseases are treated with medicine only; while few cases need surgical intervention in clinical veterinary practice. The occurrence of surgical affections fluctuates with the species, ages, sex of the animals, and season of the year.

Surgical disorders are a major threat to our economy, and failure of surgical intervention provides no alternatives except for culling or the eventual loss of a productive or valuable animal through death. Veterinary surgery plays a crucial role in the diagnosis, treatment, and

management of surgical conditions in animals. It is a rapidly advancing field that embraces new technologies, techniques, and evidence-based practices. The surgical procedures fall into three broad categories: orthopedics, soft tissue surgery, and neurosurgery (Hoda *et al.*, 2018).

Surgery is a skill and equipment-based specialty that uses sutures, incisions, excision, manipulation, or other invasive procedures as well as local, regional, or general anesthesia for patient management (Hussen, 2018). However, it has its own risk associated with anesthesia and the surgical procedure conducted in species could be a potential cause for different kinds of surgical complications during and after surgical operation. Lack of trained personnel and equipment is also a potential cause of surgical complications in Ethiopia. Documentation and publications of individual surgical cases help in understanding the cases, knowing common cases that are encountered, and complications that come along. However, there is a shortage of published works in Ethiopia, particularly in Jimma, regarding veterinary surgery to serve as a reference for future improvement.

Therefore, the objectives of this study were:

- ✓ To conduct various surgical treatments in different domestic species of animal patients.
- ✓ To document and report a variety of veterinary surgical procedures performed on domestic animal patients in Jimma Town and its surrounding areas.
- ✓ To contribute to the existing knowledge base on veterinary surgical practices and treatment outcomes in Ethiopia, particularly in and around Jimma Town.

2. MATERIALS AND METHODS

2.1. The Study Area

The study was conducted from September 2023 to April 2024 at JUCAVM an open-air clinic and on the farms, in Jimma, Ethiopia. Jimma is located in Oromia Regional State lying at a distance of 325km south-west of Addis Ababa, the capital city of Ethiopia. Geographically it is stretched between latitudes 7°15′ N and 8°45′ S, and longitudes 36° 00′ E and 37°40′ E. The elevation of the zone ranges from 880 to 3360 m. a. s. l. The annual rainfall of the area is estimated to be 1500 mm per annum with annual temperatures ranging from a minimum of 11.8°C and a maximum of 26.8°C. The main rainy season extends from May to September and the small rainy season takes place from February to April. The temperature of the zone varies between 8 to 28°C with an annual average of 20°C. It has a sub-humid, warm-to-hot climate.

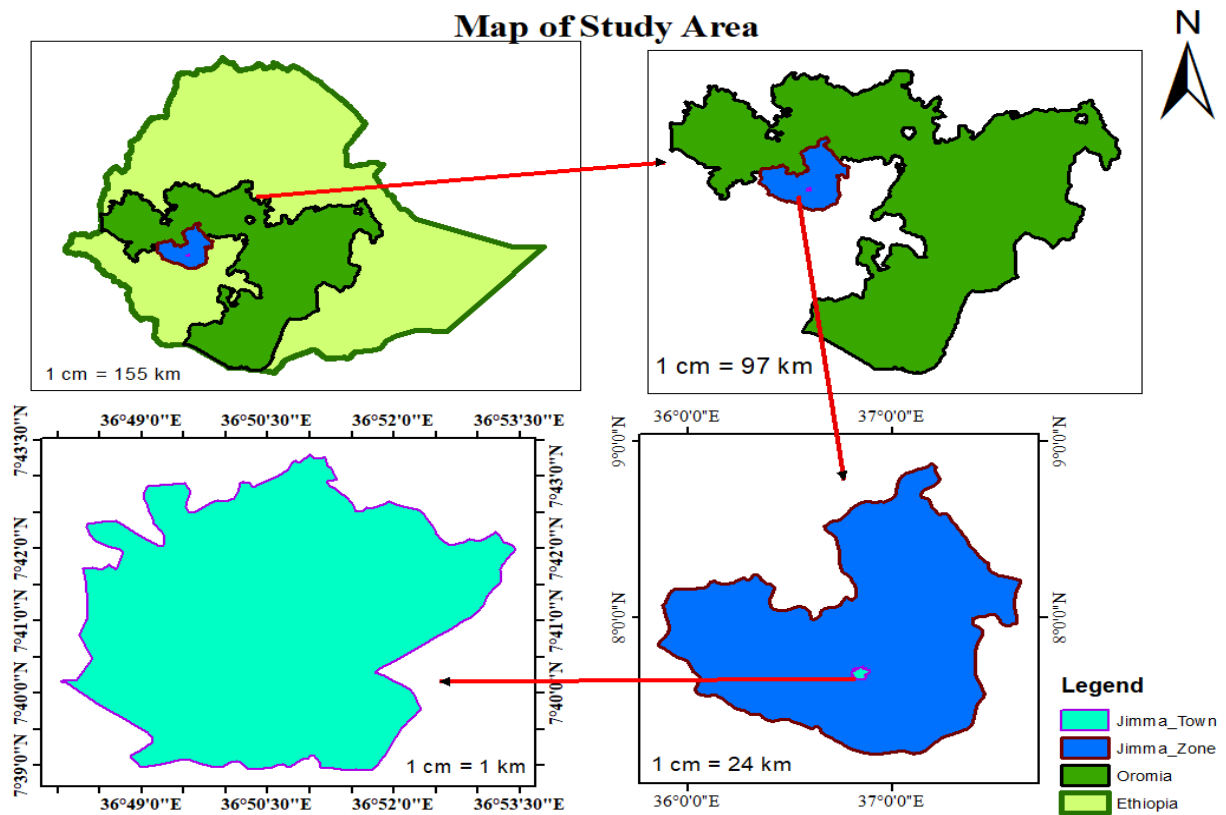


Figure 1. Geographical location of the study area

Source: Jimma town municipal office, 2023

2.2. Study Population

The study animals were from different origins, breeds, species, ages, and sexes of domestic animals that were presented to JUCAVM in an open-air clinic, and on the farms from different management systems. Totally sixteen cases were routinely handled at an open-air clinic even though some cases were done on farm calls. Animals suffering from various disorders requiring surgical interventions were included in this study. Both cross-HF and local breed animals were included in this study. The species that were presented for different kinds of surgical interventions included ruminants (six bovines, one ovine, and two caprine), and small animals (five canines, and two felines). The weight of the animals was taken by estimation and ranged from 4 to 350kg. Patients were categorized based on the types of species: cattle, small ruminants (ovine and caprine), and small animals (canine and feline).

2.3. Study Design

The study design was a descriptive clinical case report on common surgical cases with regards to procedures, techniques, and outcomes in domestic animals.

2.4. Study Methods

The different domestic animals brought to JUCAVM an open-air clinic and on the farms with various surgical cases requiring minor or major surgical manipulations either for elective or emergency treatment were subjected to thorough medical evaluation. Each case was assessed, and evaluated and findings about different clinical parameters such as patient signalment, history, physical, and clinical examination were recorded. In addition, the patient was pre-evaluated for anesthesia and surgical risk. Based on the examinations and clinical findings, specific surgical manipulations and management were prescribed and performed under proper aseptic conditions and a safe anaesthetic protocol as per the presented case requirements after the owner agreed and signed the consent form. All animals underwent the surgical treatments, which were also followed through phone call communication and physical presence in addition to peri-, intra-, and post-operation for any discomfort and related complications.

Finally, all the relevant data were compiled, and the surgical case reports were prepared and reported according to animal species with respective outcomes. Some of the records for the case report include the following.

2.4.1. Patient Signalment Recorded

The origin, breed, species, sex, age, clinical findings, and general body conditions were recorded during presentations to JUCAVM an open-air clinic and on the farms.

2.4.2. Case History

All significant past and immediate histories about the cases were systematically and chronologically inquired. Comprehensive and vital details about the patient, including the length of the illness, how the case is progressing, the history of prior conditions and medications, the course of the pregnancy, the medication's route and result, the management system, the incidence of the case, and feeding system were registered. Additionally, systemic clinical findings and various clinical signs were assessed and recorded.

2.4.3. Clinical Examination

Before any surgical procedures, particularly those involving the administration of general anesthesia, the examination of accessible vital organs and systemic physiological parameters were visualized, examined, and recorded. These vital parameters include Respiratory rate, Heart rate, Rectal temperature, Color of visible mucus membranes, hydration status of animals, rumen motility (Ruminants), and palpation of superficial lymph nodes. Additionally, every case underwent a thorough inspection, visualization, and examination to look for any functional or structural abnormalities in the affected region or regions. Furthermore, the affected parts and or regions were manipulated to detect their nature, consistency, size, attachment, and tenderness.

3. VETERINARY SURGICAL CASE REPORTS ON VARIOUS DOMESTIC ANIMAL PATIENTS IN AND AROUND JIMMA TOWN

3.1. Case Reports on Cattle

3.1.1. Rumenotomy Due to Indigestible Foreign Bodies in a Cross-HF Heifer

3.1.1.1. Abstract

Ruminal impaction is a prevalent gastrointestinal disorder in cattle, causing indigestion due to the consumption of non-metallic foreign bodies. A 2-year-old cross-HF heifer with an estimated weight of around 115 kg was presented to the JUCAVM, an open-air clinic, with a complaint of reduced feed intake, small and dry feces, loss of body weight, retarded growth, and an enlarged abdomen. On clinical examination, a pale mucous membrane was observed, and palpation of the left paralumbar fossa revealed a severely impacted rumen. Therefore, the case was tentatively diagnosed as ruminal impaction, and the surgical site was aseptically prepared. The 2% lidocaine hydrochloride was infiltrated through the inverted L-block method, and the rumenotomy was performed under proper aseptic conditions. Post-operatively, a combination of procaine penicillin G, and dihydrostreptomycin sulphate, and tramadol hydrochloride were administered intramuscularly for 5 and 3 consecutive days, respectively, while an oxytetracycline HCL spray was applied to the wound. After 14 days of surgery, the skin suture was removed, and the heifer was successfully healed after a month. Ruminal impaction seriously harms the health of free-grazing ruminants and the owners should provide their animals with nutritious foods and perform appropriate solid waste disposal.

Keywords: *Cross holstein friesian heifer, Indigestible foreign bodies, Rumenotomy*

3.1.1.2. Introduction

Disorders of the forestomach were frequently found in cattle (Asrat and Velappa, 2016). The ingestion of foreign bodies in cattle has been reported to be of great economic importance, causing severe loss of production and high mortality rates (Akinrinmade and Akinrinde, 2013). When non-metallic foreign items like plastic, rope, or leather fragments are consumed, the rumen's ability to ferment and mix its contents is hampered, which causes indigestion (Asrat *et al.*, 2015).

A variety of study reports indicated that plastic bags were the most frequently found item, followed by clothing, metallic nails, hairballs, and stones in cattle forestomach. Although the exact origin of pica is difficult to pinpoint, a lack of long fiber and phosphorus in the feed of cattle are the main contributors to the intake of indigestible foreign objects (Emelianenko *et al.*, 2021). On the other hand, a key predisposing factor for the presence of an indigestible foreign body in the rumen of cattle appeared to be the absence of an adequate waste disposal system as well as animals being allowed to graze freely in highly waste-polluted areas (Desalegn Jebessa *et al.*, 2018).

The incidence of ruminal impaction with plastics in cattle ranged from 3.72% to 5.96% in several investigations (Kamalakar *et al.*, 2021). Clinical signs of rumen impaction caused by indigestible foreign bodies included pale mucous membranes, decreased milk production, a total halt of ruminating, recurrent bloating, weight loss, an impacted rumen, atony, reduced rumen motility, sparse feces, and inappetence (Hussein *et al.*, 2021).

Clinicians have a difficult time diagnosing ruminal impaction caused by plastic materials since the clinical symptoms in animals with the condition are nonspecific. In the manufacturing of plastics and polyethylene, several chemicals such as bisphenols, polyvinyl chloride, cadmium, lead, and acrylamide are being used. There is still a lot of work to be done before these chemicals may be used for diagnostic purposes, even though only a few studies have attempted to detect the compounds leached from these plastic materials in ruminal fluid and milk samples. Conservative methods of treating plastic foreign body syndrome, such as the use of anti-bloat medications or purgatives, are ineffective (Priyanka and Dey, 2018). Therefore, rumenotomy has become the standard of care for diagnosing and treating ruminal impaction caused by plastic materials in animals (Nazmun Naher, 2021).

Rumenotomy techniques have been described in both cattle and small ruminants, including rumen skin clamp fixation, rumen stay suture fixation, and ring fixation (Weingarth's ring) (Martin *et al.*, 2021). Therefore, in the present case, successful rumenotomy was described to treat rumen impaction caused by an indigestible foreign body in a cross-HF heifer.

3.1.1.3. Case history and clinical examination

A 2-year-old cross-HF heifer with an estimated weight of around 115kg was presented to the JUCAVM an open-air clinic with a complaint of reduced feed intake, small and dry dung, loss of body weight, retarded growth, and an enlarged abdomen. The heifer's history revealed that she was allowed to graze freely throughout the villages, and occasionally observed while the heifer was trying to swallow plastic bags. On clinical examination, a pale mucous membrane was observed and palpation of the left paralumbar fossa revealed a severely impacted rumen. When vital signs were recorded, temperature (38.5⁰C), and breathing (30 breaths/minute) (Annex. 2). All were found within normal ranges. Therefore, the case was tentatively diagnosed as ruminal impaction due to indigestible foreign bodies, and a rumenotomy was decided to address the case.

3.1.1.4. Pre-operative preparation and animal control

The heifer was kept without feed and water for 24 and 12 hours respectively. On the day of the operation, the heifer was manually restrained in a standing position. Since rumenotomy was a clean-contaminated surgery, prophylactic antibiotics, a combination of procaine, penicillin G (200,000iu), and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg was injected intramuscularly. The left paralumbar fossa was washed with water and soap. The hair was shaved and rinsed (Fig. 2A), and the skin was scrubbed with 2% iodine tincture. Through the inverted L-block method, 2% lidocaine hydrochloride (which is manufactured by: Lincoln Pharmaceuticals Ltd, Gujarat, India) was infiltrated @ 2ml/cm area, and plastic was used as a surgical drape (Fig. 2B).

3.1.1.5. Intra-operative surgical procedure

The mid-upper laparotomy approach was employed. Ringer lactate solution (which is manufactured by: Pharmacure Plc. Addis Ababa, Ethiopia) was secured through a jugular vein with an 18-gauge IV cannula @ 10ml/kg/hr as calculated @ 1 drop/second before the surgery was started. The skin was incised vertically around 20–25cm using scalpel blade number 23 at a distance of roughly 3-5cm below the transverse process of the lumbar vertebrae and caudal to the last rib (Fig. 2B). Bleeding was stopped by twisting the vessels with kelly forceps while mopping with gauze mop. While concurrently controlling the bleeding, the subcutaneous fascia and

abdominal muscles were incised in the same direction. The rumen was exteriorized and fixed by the skin-suture-fixation method using polyglactin 910 (Vicryl) number 2 with a continuous Connell suture pattern. Then, after the rumen was incised, different foreign materials such as plastic bags, pieces of clothes, plastic threads, and ropes were removed (Fig. 2C). Approximately the removed materials were 80% plastic bags and 20% were pieces of clothes, plastic threads, and ropes (Fig. 2E). The skin suture used for fixing the rumen was removed and the edge of the rumen was washed with 0.9% normal saline solution. The rumen was sutured by double-row Cushing followed by a lambert including the removed skin-suture-fixation site with the same suture material. The rumen was replaced into its normal position. After changing the pair of gloves and equipment, the abdominal muscle edges were washed with 0.9% normal saline solution. The transverse abdominis muscle and peritoneum were closed by a simple continuous pattern. The two abdominal oblique muscles were closed together by continuous lock stitch patterns. The skin and subcutaneous fascia were sutured in a horizontal mattress pattern by using silk number 1 (Fig. 2D).



Figure 2. Rumenotomy in a cross-HF heifer

Presented heifer for rumenotomy with a prepared surgical site (A), plastic used as a drape and incision of skin and abdominal muscles (B), removal of indigestible foreign bodies (C), sutured skin with horizontal mattress and applied an oxytetracycline HCL spray to the wound after surgery (D), the removed indigestible foreign bodies after properly washed (plastic bags, plastic threads, pieces of clothes, and ropes) (E), successfully healed heifer after a month (F).

3.1.1.6. Post-operative care and outcomes

Post-operatively, intramuscular injection of an antibiotic's combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is Manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg and tramadol hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg for 5 and 3 consecutive days, respectively. An

oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied to the wound (Fig. 2D). The owner was advised to feed concentrate feed for six days. The progress was checked under supervision. After 14 days of post-operation, the skin suture was removed. After a month, the heifer was healed successfully (Fig. 2F).

3.1.1.7. Discussion

The animal's indiscriminate eating behavior combined with the owner's inadequate feeding practices is causing the animal to consume indigestible foreign substances (Reddy *et al.*, 2014). In the present case, 2% lidocaine hydrochloride was filtrated in the L-block method, and the heifer was restrained manually whereas Kavin *et al.* (2021) used standing ketamine stun with the administration of Xylazine, Injection of Butorphanol, and Ketamine intravenously and local analgesia with a left paravertebral nerve block and inverted 'L' block was performed with 2% lignocaine in cows. The preference for anaesthesia depends on its availability, the types of procedures to be performed, the species of animals, and their untoward effects. Even if manual restraining throughout the procedure was difficult for the personnel, the untoward effect of local anaesthesia was minimal compared to general anaesthesia.

Gireeshkumar *et al.* (2017) secured the rumen to the skin by staying sutures in two cases to avoid contamination due to spillage of ruminal contents into the abdominal cavity whereas in the present case, the rumen skin fixation suture technique was used. Even if, in both cases, the prognosis was good, in the case at hand, there was a good overlap of rumen on the skin without leakage of ingesta into the peritoneum due to a continuous suture pattern, which has fewer postoperative complications than other techniques.

In this case report rumenotomy was done due to indigestible foreign bodies including plastic bags, plastic threads, pieces of clothes, and ropes which were removed. Similar to the present case, Khose *et al.* (2010) also recorded a successful case of ruminal impaction due to indigestible foreign bodies in cows with observed material like polythene bags, cloths, and leather seat covers. Some stone granules, metal rings, and small metal nails were also removed.

In the current case, the rumen was sutured with double-row Cushing followed by a lambert using polyglactin 910 (vicryl) number 2 after being properly washed with 0.9% saline solution and

replaced into its normal position, which disagrees with Nayak *et al.* (2014); in which the rumen wall was closed by only Cushing patterns using number 2 chromic catgut. Even if the prognosis of both cases was good, closing the rumen with two rows was essential with synthetic absorbable suture materials to prevent leakage of ruminal content to the abdominal cavity and to reduce tissue reaction respectively. The laparotomy incision was closed as per the standard technique which showed a good and complication-free healing outcome which is in line with (Behera *et al.*, 2013). This may have been caused by the procedure's excellent aseptic state and effective post-operative care.

3.1.1.8. Conclusion

Foreign body impaction in ruminants should likely be treated surgically. Moreover, if proper action is not taken, polluting the environment with plastic materials and other indigestible items could seriously harm the health of free-grazing ruminants. Therefore, appropriate solid waste disposal should be implemented, and the owners should feed their animals with nutritious feed. In the present case, a successful rumenotomy was performed due to ruminal impaction caused by an indigestible foreign bodies in the cross-HF heifer.

3.1.2. Clinical Management of Postpartum Cervicovaginal Prolapse in Local Breed Cow

3.1.2.1. Abstract

Cervicovaginal prolapse is a common reproductive disorder in large ruminants and is considered an emergency condition that must be treated immediately to avoid complications. A 9-year-old local breed cow with an estimated weight of about 180kg was presented to JUCAVM an open-air clinic with a complaint of protrusion of mass through the vulva after 8 hours of parturition. On clinical examination, the prolapsed mass was soiled, edematous, and reddish. The cow was restrained in a standing position manually and caudal epidural anesthesia with 2% lidocaine hydrochloride was injected and clinical management was performed under proper aseptic conditions. Post-operative care involved, intramuscular injections of the combination of procaine penicillin G and dihydrostreptomycin sulphate, and tramadol hydrochloride for 5 and 3 consecutive days respectively and an oxytetracycline HCL spray around the vaginal suture. The suture material was removed after 7 days, and the cow was successfully recovered without complications. Cervicovaginal prolapse requires prompt surgical intervention due to its impact

on their ability to produce and function during the peripartum period or early postpartum hours. The owners should provide proper health care and nutritious food for their animals to prevent its occurrence.

Keywords: *Caudal epidural, Cervico-vaginal prolapse, Clinical management, Local breed cow,*

3.1.2.2. Introduction

Reproductive efficiency is one of the critical factors for the success of dairy operations (Hossein-Zadeh, 2013), while reproductive inefficiency resulted in inconsiderable economic losses for smallholder dairy farms and the dairy industry due to prolonged calving interval, early culling of potentially used cows, reduced milk yield, and overall production lifetime, and increased cost due to veterinary services (Bereded *et al.*, 2022). Among the major reproductive problems that have a direct impact on the reproductive performance of dairy cows, are retained fetal membrane (RFM), repeated breeding (RB), abortion, anestrus, dystocia, uterine discharge, prolapse (uterine and vaginal), mastitis, and stillbirth have been reported to be the most common economic problems (Abdisa, 2018).

Among all prolapse, uterine and vaginal prolapse are frequently observed in the reproductive tract of cows (Islam, 2020). Vaginal and cervical eversions usually occur before calving and uterine eversions after calving (Peter and King, 2021). In cervicovaginal prolapse, there is eversion of the vagina and cervix over caudal attachment, then from the vulvar commissure protrudes outside and finally the inside layer remains out (Parikh *et al.*, 2018). The exact cause of this disorder is not fully known as it can occur due to various factors. The most common causes are; an increase in intra-abdominal pressure during pregnancy, hypocalcemia, hormonal imbalance, and excess peri-vaginal fat (Kumar, 2023). Cervicovaginal prolapse is commonly observed in large ruminants like cows, buffaloes, and sheep (Singh *et al.*, 2007).

In cattle depending upon the severity of prolapse, genital and other tissues involvement, vaginal prolapse has been graded as Grade-I to Grade-IV. In Grade-I the vagina prolapses intermittently when the animal lies down. When the prolapse continues with or without retroflexion of the urinary bladder, it is termed Grade II, and when the external os of the cervix is involved in it is termed Grade III. Trauma, infection necrosis, or chronic prolapse with fibrosis of Grade-II or Grade-III prolapse which cannot be replaced is considered Grade IV (Vinayak *et al.*, 2021).

The diagnosis of cervicovaginal prolapse is obvious; however, a rectal examination should be performed to determine fetal viability and the location of the urinary bladder (Haben Fesseha, 2020b). The management and correction of a prolapsed cervicovaginal usually involves disinfection and washing the prolapsed organ, reduction in the size of edematous with glycerol, replacement of organ, and application of stay sutures such as Buhner's sutures (Kitessa and Terefe, 2021).

Prompt treatment is needed to manage such cases as delay may make the condition of the mass more fragile and grave prognosis (Pandey *et al.*, 2020). Therefore, this paper describes the clinical management of postpartum cervicovaginal prolapse in a local breed cow.

3.1.2.3. Case history and clinical examination

A 9-year-old local breed cow with an estimated weight of about 180kg was presented to JUCAVM an open-air clinic with a complaint of protrusion of mass through the vulva after 8 hours of parturition. According to the patient's history, the cow delivered a live calf and the placenta was left in the cow, and the cow was continued to strain for a considerable amount of time after giving birth. The placenta was dropped by itself after 5 hours of parturition. On general examination the animal shows signs of continuous straining, and a prolapse mass hanging outside the vulva (Fig. 3A). The animal was anorectic, with increased body temperature (39.8°C) (Annex. 2). Visual inspection of the prolapsed mass revealed a soiled, edematous, and reddish. Based on clinical examination, the case was diagnosed with postpartum cervicovaginal prolapse, and clinical management was decided.

3.1.2.4. Pre-operative preparation and animal control

The cow was restrained in a standing position manually and caudal epidural anesthesia was performed using 2% lidocaine hydrochloride (which is manufactured by: Lincoln Pharmaceuticals Ltd, Gujarat, India) @ 0.22mg/kg in the intercoccygeal space to prevent straining (Fig. 3B).

3.1.2.5. Intra-operative surgical procedure

After the perineal area was fully desensitized the prolapsed mass was cleaned and washed with lukewarm water (Fig. 3C) followed by 0.9% normal saline solution to remove the debris. To

reduce swelling or edema, salt powder was sprinkled on all parts of the prolapsed part. After the size was decreased the prolapsed cervix and vagina were washed with saline solution and repositioned to the pelvic cavity manually (Fig. 3D). Re-occurrence of prolapse was prevented by applying a horizontal mattress vaginal suture by using locally prepared bilateral configuring of sterilized slightly elliptical synthetic plastic material after boiling and cutting to the appropriate size using nylon number 1 (Fig. 3E).



Figure 3. Clinical management of cervicovaginal prolapse in a local breed cow

Presented cow with cervicovaginal prolapse (A), injection of caudal epidural anesthesia (B), washing the prolapsed mass with lukewarm water (C), replacing the prolapsed mass manually (D), applying horizontal mattress stay suture by using locally prepared sterile plastic material

(E), stand cow after properly washed vaginal area with soap and water and removed applied stay suture (F).

3.1.2.6. *Post-operative care and outcomes*

Antibiotic combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25 kg and tramadol hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg intramuscularly for 5 and 3 consecutive days, respectively. Finally, an oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied around the vaginal suture. After 7 days the stay suture was removed and the cow was recovered successfully without any complications (Fig. 3F).

3.1.2.7. *Discussion*

Cervicovaginal prolapse is a major reproductive disorder and an emergency condition in cattle that should be managed earlier than excessive edema, mucosal trauma, contamination, tear, and fatal (Borakhatariya *et al.*, 2017). The predisposing factors responsible for genital prolapse are hormonal imbalance, higher estrogen concentration in blood, hypocalcemia, excessive relaxation of ligaments, twin pregnancies, vaginal infection especially fungal and urinary tract infection, confinement for longer duration in the slopy floor, and increasing intra-abdominal pressure in last trimester of pregnancy (Gupta and Reena, 2021). The reason for the postpartum prolapse of the vagina and cervix in the current case may be due to continuous straining after parturition to remove the retained placenta.

In the present case, the cow was first anesthetized with 2% lidocaine hydrochloride between inter-coccygeal space, and the prolapsed mass was cleaned and washed with lukewarm water followed by 0.9% normal saline solution to remove the debris. To reduce swelling or edema, salt powder was sprinkled on all parts of the prolapsed part. After the size was decreased the prolapsed cervix and vagina were washed with saline solution and repositioned to the pelvic cavity manually which disagrees with Rasool *et al.* (2022); in which the prolapsed mass was cleaned with potassium permanganate solution and washed with saline solution to reduce the

mass. Even if the prognosis of both cases was good, Potassium permanganate solution is a mild antiseptic solution used to reduce the number of microorganisms, and also saline solution is a mixture of water and salt (sodium chloride) used for cleaning. So better to sprinkle salt or sugar on the prolapsed mass to reduce swelling.

The aim is to replace the organ with a method that can hold it in a fixed position. A retention suture was applied to prevent the reoccurrence of prolapse till the edema and swelling subsided and the reproductive tract was restored to its normal state. Buhner's buried purse string suture has been successful in the retention of cervicovaginal prolapse (Kapadiya *et al.*, 2015). The present case records the successful repositioning and stabilizing of cervicovaginal prolapse in a local breed cow which was retained in its normal anatomical position by applying horizontal mattress vaginal suture by using locally prepared bilateral configuring of sterilized slightly elliptical synthetic plastic material after boiling and cutting to the appropriate size which in line with Kitessa and Terefe (2021).

3.1.2.8. Conclusion

Cervicovaginal prolapse is a reproductive emergency affecting cows, requiring prompt surgical intervention due to its impact on their ability to produce and function during the peripartum period or early postpartum hours. The severity depends on the size of the prolapsed mass and the contamination level. Proper health care and nutrition can prevent its occurrence. In the present case, successful clinical management of postpartum cervicovaginal prolapse was performed in a local breed cow.

3.1.3. Caesarean section in a Local Breed Heifer

3.1.3.1. Abstract

Dystocia is one of the reproductive problems in cattle and may be defined as the inability of the dam to deliver its young through its efforts. The owner of a 3-year-old local breed heifer informed us through phone call communication that his full-term pregnant heifer started straining 10 hours ago. Upon arrival at the owner's house, the calf's tail was seen hanging outside. The diagnosis of dystocia due to breech presentation was made as evidenced by the presence of the tail of the foetus in the birth canal. After the left mid-upper paralumbar fossa was aseptically prepared, regional analgesia was achieved with 2% lidocaine hydrochloride in the L-block

method, and a caudal epidural was injected. A caesarean section was performed under proper aseptic conditions. Post-operatively, an antibiotic combination of procaine penicillin G, and dihydrostreptomycin sulphate, and tramadol hydrochloride were administered for 5 and 3 consecutive days, respectively, followed by an oxytetracycline HCL spray and daily suture line dressing with 2% iodine tincture. After 14 days of operation, the skin suture was removed, the cow and calf were in good condition, and after a month, the cow was healed without complications. The owners must get training on how to manage dystocia and know when more assistance is required. Delays in assisting might result in the cow becoming injured or possibly losing the calf.

Keywords: *Breech presentation, Caesarian section, Dystocia, Local breed heifer*

3.1.3.2. Introduction

Dystocia as one of the reproductive problems may be defined as the inability of the dam to deliver its young through its effort (Abera, 2017). The main causes of dystocia originate either from fetal, maternal or it is feto-maternal causes. Several authors counted the causes of dystocia and they concluded that the fetal causes were mainly due to oversized fetuses, abnormal presentation, position or posture, and monsters. Whereas maternal causes are generally associated with failure of cervical dilatation (ring womb), narrow pelvis, and uterine inertia. Fetopelvic disproportion can be considered as both fetal (oversized fetus) and maternal (inadequate birth canal and/or pelvic size) causes (Zeebaree and Sofi, 2022). The occurrence of dystocia appears to be highest in cattle and buffalo in comparison to other domestic animals (Shankare Gowda *et al.*, 2019).

Dystocia cases can be treated surgically or medically (Abdullah *et al.*, 2015). Medical management is an option when the dam and the fetus remain stable where there is proper fetal position, presentation, and posture with no obstruction (Faez Firdaus *et al.*, 2015). In this case, oxytocin can be administered intramuscularly with or without Calcium Boro gluconate to assist in the contraction of the uterus. Surgical management or caesarean section is needed in obstructive dystocia, dystocia accompanied by shock or systemic illness, uterine inertia, prolonged active labor, or failure in medical management (Al-Amin, 2018). There are different surgical approaches for caesarean section in cows with variable degrees of advantages and

disadvantages. These include standing left and right paralumbar celiotomy, recumbent left and right paralumbar celiotomy, recumbent ventral midline celiotomy, ventral paramedian celiotomy, ventrolateral celiotomy, and standing left oblique celiotomy. The selection of an appropriate approach depends on the type of dystocia, the health status of the cow, environmental conditions, the availability of assistants, and the surgeon's preference (Adugna *et al.*, 2022).

A successful prognosis depends on several factors, such as the skill and speed of the surgeon, the duration of dystocia, the physical condition of the dam, the surgical environment, concurrent disease, and the presence of a live calf (Ajeel *et al.*, 2019). When a live calf cannot be delivered after 15-20 minutes of manipulation, it is ideal to perform it (Vermunt, 2008). The diagnosis and surgical management of dystocia in a local breed heifer due to breech presentation was documented in the current surgical case report.

3.1.3.3. Case history and clinical examination

The owner of a 3-year-old local breed heifer informed us through phone call communication that his full-term pregnant heifer had started straining 10 hours ago. Upon arrival, the calf's tail was seen hanging outside. On clinical examination the heifer's respiratory rate was 30 breaths/minute, heart rate was 68 beats/minute, and the temperature was 38.5°C all were found within normal physiological ranges (Annex. 2). Per-vaginal examination was carried out and diagnosis of dystocia due to breech presentation was made as evidenced by the presence of tail of the fetus in the birth canal. The case tried to be corrected manually, but it was difficult to manage manually due to the absence of space for correction since the heifer was found in sternal recumbency. Therefore, a caesarean section was decided to correct the case.

3.1.3.4. Pre-operative preparation and animal control

In the present case, the patient was restrained in the sternal recumbent position. The left paralumbar fossa was washed with water and soap then the hair was shaved (Fig. 4A). Local anesthesia 2% lidocaine hydrochloride (which is manufactured by: Lincoln Pharmaceuticals Ltd, Gujarat, India) was injected @ 2ml/cm area in L-block method and a caudal epidural @ 0.22mg/kg was injected. The surgical site was scrubbed with 2% iodine tincture.

3.1.3.5. Intra-operative surgical procedure

The surgical procedure was a mid-upper laparotomy approach. The incision started from an equal distance of approximately 3-5cm below the transverse process of lumbar vertebrae and caudal to the last rib to vertically extend around 40cm on the skin using a scalpel blade number 23 sufficient for the removal of the fetus (Fig. 4A). Bleeding was arrested by the twisting of vessels with kelly forceps while mopping with gauze mop. Again, subcutaneous fascia and abdominal muscles were incised in the same direction while control of bleeding was performed simultaneously. Lastly, the peritoneum was held up with plain thumb forceps and incised in the same manner with care not to incise the rumen. After the rumen was pushed to the cranial, the gravid uterus was exteriorized by catching the forelegs of the calf in an intact uterus to the incision site. The uterus was incised with care not to injure the caruncles. The live calf was removed manually with the help of assistance (Fig. 4B). The placenta was removed manually and the uterine incision site was washed with a 0.9% normal saline solution. The uterus was sutured with double row Cushing followed by lambert using polyglactin 910 (vicryl) number 2 (Fig. 4D). The uterus was replaced to its normal position. The peritoneum and transverse muscle were sutured together with a simple continuous pattern with the same suture material (Fig. 4E). Internal and external abdominal oblique muscles were sutured with ford interlocking patterns. Skin and subcutaneous fascia were sutured together with a simple interrupted suture pattern using multifilament silk number 1. After a few minutes, the cow was stood (Fig. 4F).

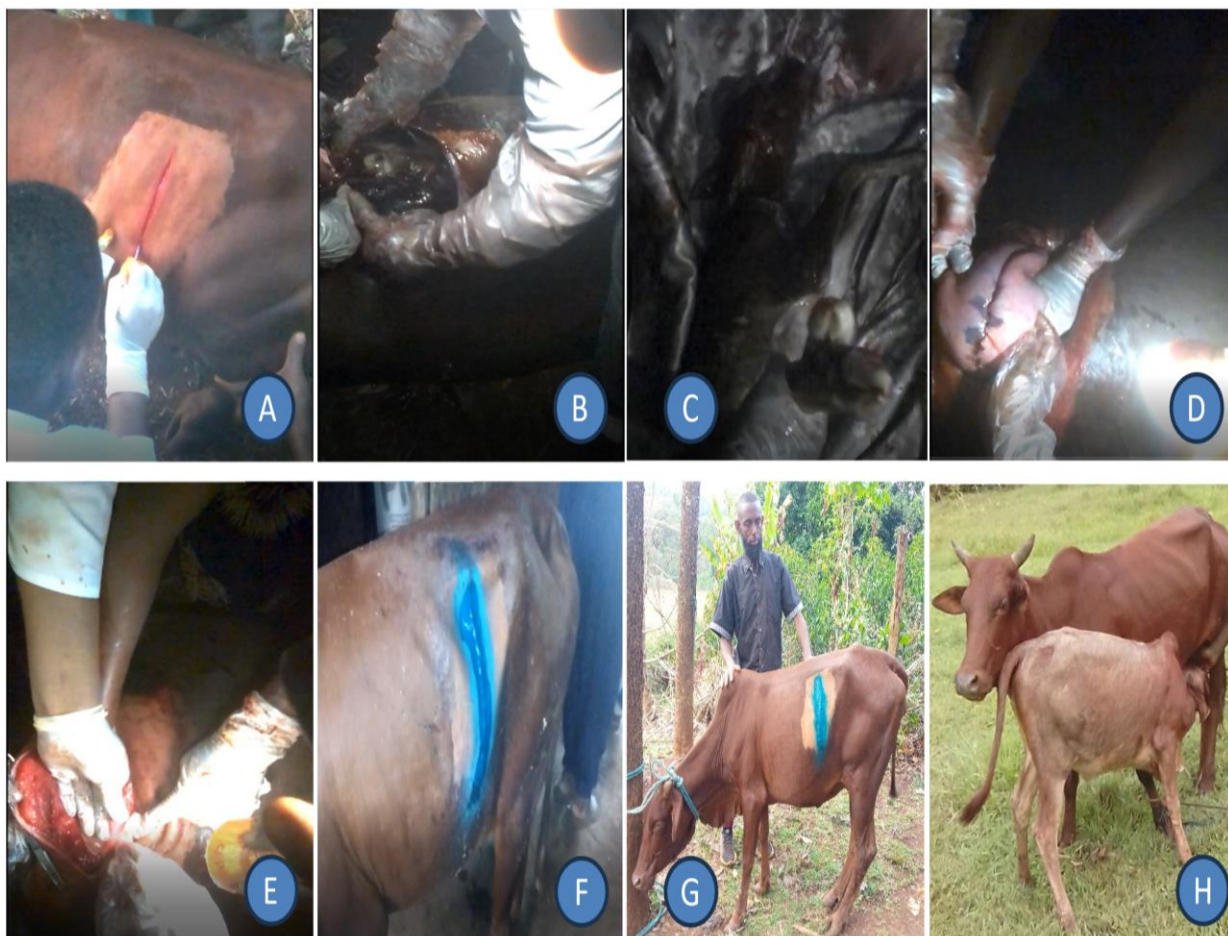


Figure 4. Caesarean section in a local breed heifer

Skin incision (A), removal of the fetus (B), live female calf on the towel (C), sutured uterus with double row (D), suturing of peritoneum with transverse muscles together (E), stand cow after surgery (F), after skin suture was removed on 14th - day of post-operation (G), stand cows with its calf after 5-month post-operation (H).

3.1.3.6. Post-operative care and outcomes

Antibiotic combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg and tramadol hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg were injected IM, and SID for 5 and 3 consecutive days, respectively. An oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet

Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied to the wound (Fig. 4F). Dressing of the suture line daily with 2% iodine tincture was also carried out. The progress was checked by telephone. After 14 days of post-operation, the skin suture was removed (Fig. 4G). The cow and calf were in good condition. After a month the cow was healed without any complications (Fig. 4H).

3.1.3.7. Discussion

Dystocia frequently occurs in first-calf heifers in both types of cattle production (Funnell and Hilton, 2016). The bulk of dystocia cases in the field are fetal in origin. One of these is dystocia brought on by breech presentation, which is exceedingly challenging to treat with obstetric procedures if there isn't enough room in the uterus (Odedara, 2017). In the present case, the calf was presented with breech presentation, and a left paralumbar laparotomy approach was used for caesarean section in a recumbent heifer to deliver a calf under an inverted L-block and caudal epidural anesthesia which agrees with Alexander (2013). The left paralumbar laparotomy procedure has difficulty in exteriorizing the gravid uterus to the incision site in a recumbent (Barua, 2020). However, in the current case; it was successfully applied with the help of an assistant.

In the present case, after the incision of skin and abdominal muscles, the peritoneum was held up with plain thumb forceps and incised in the same manner with care not to incise the rumen. The gravid uterus was exteriorized by catching the forelegs of the calf in an intact uterus to the incision site. The uterus was incised with care not to injure the caruncles. The live calf was removed manually with the help of assistance. The placenta was removed manually and the uterine incision site was washed with a 0.9% normal saline solution. The uterus was sutured with double row Cushing followed by lambert by using polyglactin 910 (vicryl) number 2. The uterus was replaced to its normal position and the peritoneum and transverse muscle were sutured together with a simple continuous pattern with the same suture material. Internal and external abdominal oblique muscles were sutured with Ford interlocking patterns. Skin and subcutaneous fascia were sutured together with a simple interrupted suture pattern using multifilament silk number 1 which is in line with Shah *et al.* (2017).

In the current case, the progress was checked by telephone. After 14 days of operation, the skin suture was removed and the cow and calf were in good condition. After a month the cow healed without any complications which disagrees with Dogra *et al.* (2017); in which the cow was delivered a dead calf, the suture was removed on day 10 and the wound healed perfectly without complication.

3.1.3.8. Conclusion

The majority of cattle cases of dystocia are frequently caused by fetal factors, primarily as a result of oversized fetuses or abnormal presentation, position, or posture. The caesarean section aims to preserve the cow and calf and improve future reproductive effectiveness. Factors like case selection, surgical technique, calf viability, exteriorizing the uterus, patient and surgeon preparation, gentle tissue handling, appropriate suture materials, in-folding of the incision, and antibiotics can all impact the outcome. In the present case, a successful caesarian section was performed in a local breed heifer due to breech presentation.

3.1.4. Repair of Metacarpal Fracture in a Cross-HF Calf

3.1.4.1. Abstract

Metacarpal fractures are common in cattle and can cause mechanical instability and compromised locomotor function. The owner of a 3-month-old cross-HF calf, with an estimated weight of about 50kg, informed us through phone call communication about his calf's lameness of its left forelimbs. Upon arrival at the owner's house, the calf's metacarpal bone was broken, and there was no open wound. The clinical examination revealed all physiological parameters were within normal ranges, and the calf was diagnosed with a closed fracture of the distal third diaphysis of the metacarpal bone. After the calf was injected with diazepam intravenously and sedated, repair of closed fractures with a POP cast was performed. The patient underwent post-operative care, including intramuscular tramadol hydrochloride injections for 3 consecutive days, maintaining the calf separately, providing support, maintaining cleanliness, avoiding any moisture, and providing adequate feed and water. After six weeks, the calf healed and the cast was removed. Proper anatomical reduction and preservation of blood supply are the main factors for a good prognosis.

Keywords: *Closed fracture, Cross holstein friesian calf, Metacarpus*

3.1.4.2. Introduction

A bone fracture is a complete or incomplete break in the anatomic continuity of bone, which leads to mechanical instability of the bone. A fracture is accompanied by various degrees of injury to the surrounding soft tissues, including blood supply, and in most instances results in compromised function of the locomotor system (Bigham-Sadeh and Oryan, 2015). Extremity fractures are more common than other fractures (skull, spine, pelvis, sacrum, etc.) in cattle (Akin, 2017).

Metacarpal fractures rank first in order of frequency of long-bone fractures in calves. The most common cause of metacarpal fractures in calves is excessive traction during delivery. Excessive traction on the forelimbs of a calf in the anterior presentation may result in metacarpal fractures if a lever action is applied to the forelimbs. Trauma due to falling on a concrete floor or hitting other animals or moving objects are some other causes that may lead to metacarpal fractures (Belge *et al.*, 2016). Metacarpus fractures constitute approximately half (50%) of all extremity fractures in calves (Aydin *et al.*, 2022).

Metacarpal and metatarsal fractures can be classified in the following manner: distal physeal or nonphyseal (distal metaphyseal, diaphyseal, or proximal metaphyseal); comminuted or non-comminuted; and open or closed. Open fractures may be classified as first through third-degree according to established criteria (Tulleners, 1996). Although simple fractures of the metacarpal/metatarsal bones may be accurately diagnosed with physical examination and manipulation of the affected limb alone, radiographs provide useful information for determining if and what type of surgical intervention is indicated (Pentecost *et al.*, 2016).

External and internal methods could be employed to reduce and stabilize the broken bone. In farm animals, the bandage technique supported by materials such as polyvinyl chloride (PVC) and aluminum, alone or in combination with a bandage such as Thomas Splint, has been frequently used as a treatment option for external fixation of closed fractures (Za *et al.*, 2007). Internal fixation techniques require general anesthesia, expertise, special tools, and equipment (Prieur, 2013). In addition, some issues such as nonunion, angular deformity, and osteomyelitis in comminuted, open, or infected fractures reduce the likelihood of success (Zuluaga *et al.*,

2023). Therefore, this paper describes the repair of metacarpal fracture in cross-HF calf by POP cast.

3.1.4.3. Case history and clinical examination

The owner of a 3-month-old cross-HF breed calf, with an estimated weight of about 50kg, informed us through phone call communication about his calf's lameness on the calf's left forelimbs. The patient's history shows that, while the calf was laid on the ground, its dam was stepped on the calf's forelimb. Upon arrival, at the owner's house, the calf was found with improper wooden splints with insufficient bandaging tape applied around the metacarpus bone (Fig. 5A) and all were removed slowly. The calf's metacarpal bone was broken and there was no open wound. Surrounding the fractured bone, there was swelling and pain during palpation with a crepitating sound (Fig. 5B). On clinical examination of vital parameters, the calf was found within normal physiological ranges. The case was diagnosed as a closed fracture of the distal third diaphysis of the metacarpal bone. Therefore, the repair of closed fractures with a POP cast was decided to correct the case.

3.1.4.4. Pre-operative preparation and animal control

The calf was injected with 0.5% diazepam (which is manufactured by: Farbe Firma Pvt. Ltd. Gujarat, India) intravenously @ 0.2mg/kg and restrained in the right lateral recumbent position with the help of personnel, with the fractured limb uppermost.

3.1.4.5. Intra-operative surgical procedure

The fractured limb was tied above the third phalange with rope pulled straight horizontally by personnel and kept in place throughout the procedure. The fractured limb was rolled with two layers of cotton including the fetlock and the carpal joint with the interdigital space was padded with a piece of cotton. The gauze was rolled over the cotton accordingly (Fig. 5C) and a PVC splint was applied over the rolled gauze and tied at three sites with thread over it. The plaster of Paris (POP) was taken from its pack and submerged in lukewarm water at 38⁰C. After the bubble got out, it was squeezed gently and applied six layers over it, and each layer was smoothed and the leg was kept straight until the POP became hard. After around 20 minutes, the cast became hard, the traction rope was released slowly, and the calf stood up with the help of an assistant (Fig. 5D).



Figure 5. Repair of metacarpal fracture in a cross-HF calf by POP cast

The presented calf with improper splints which were applied traditionally (A), after the improper splint was removed and bent closed fracture of metacarpal bone (B), rolling of gauze over rolled cotton (C), stand calf after POP became hard (D), removal of POP after 6 weeks (E), completely healed calf after 6 weeks (F).

3.1.4.6. Post-operative care and outcomes

Post-operatively tramadol hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg was injected intramuscularly for three consecutive days. The owner was advised to support the calf while lying down and standing up. To keep the

area clean and dry with adequate giving of feed and water is also emphasized. Follow-up by telephone was conducted. After six weeks the calf was successfully healed (Fig. 5F) and the POP cast was removed (Fig. 5E).

3.1.4.7. Discussion

Metacarpus or metatarsus bones seem quite vulnerable to fractures because of their exposed location. Such fractures are caused by various types of trauma: kicks from other animals, automobile accidents, and breaking injuries (Semieka and Ahmed, 2010). The bones were frequently broken in young animals when clumsy mothers stepped on their offspring. Metacarpus fractures in calves can be in the form of open or closed fractures (Palsania *et al.*, 2023). Metacarpus fractures in calves occur most frequently in the distal epiphysis and metaphysis (Yurtal *et al.*, 2020). In the present case, the metacarpus fractures occurred due to trauma. The cow stepped on its calf limbs while the calf was lying on the ground, which resulted in a closed fracture on the distal third diaphysis of the metacarpal bone.

In the present case, the calf was sedated with an intravenous injection of diazepam and the fractured limb was tied above the third phalange with a rope pulled straight horizontally by personnel and kept in place throughout the procedure. The limb was rolled with cotton, the interdigital space was padded with a piece of cotton, and the gauze was rolled over the cotton. A PVC splint was applied and tied at three sites. Plaster of Paris (POP) was submerged in lukewarm water at 38 °C. Six layers of POP were applied, smoothed, and left to harden. After 20 minutes, the cast became hard, and the calf was assisted in standing up, which agrees with Ayaz (2000); however, the animal was only restrained manually by personnel, and a special shoe was fabricated with iron bars and rings on both ends to counter the weight of the animal and facilitate getting up and sitting down. In the current case, diazepam is used as a sedative to keep the calf from becoming fractious during the repair of fractured bones. This may help to maintain the proper alignment of the bone until the POP becomes hard.

The outcome of fracture healing depends on several factors, such as trauma severity, the age of the animal, the quality of fracture reduction (realignment), fracture fixation technique, and the presence of comorbid diseases (Ramanauskaitė *et al.*, 2017). In the present case, the fracture was successfully healed after six weeks. This might be due to the proper alignment of the fractured

bone and the calf's young age, which increases the number of stem cells and enhances their capacity for proliferation and differentiation.

3.1.4.8. Conclusion

Restoring limb function is the main objective of treatment for any kind of limb fracture. When it comes to the metacarpal/metatarsal region, maintaining the patient's ability to place their foot appropriately on the ground and creating a solid limb for load transmission was often more important than attaining perfect reduction and healing in any one bone. Determining fracture stability and optimizing the use of splints or casts requires an understanding of anatomy and the potential deforming stresses of the intrinsic arm muscles. In the present case, a successful repair of a closed metacarpal fracture was performed in a cross-HF calf.

3.1.5. Surgical Correction of Umbilical Hernia in a Cross-HF Calf

3.1.5.1. Abstract

An umbilical hernia is the most common form of congenital hernia in calves. However, many umbilical hernias are secondary to umbilical sepsis and hereditary due to multiple births and reduced gestation length. A two-month-old cross-HF calf with an estimated weight of about 30 kg was presented to JUCAVM, an open-air clinic, with a history of swelling at the umbilicus from birth and increasing in size in the last few weeks. The clinical examination revealed reducible swelling that was found on the umbilicus. All physiological parameters were found within normal ranges, and the case was diagnosed with umbilical hernia. Diazepam was injected intravenously, and the surgical site was aseptically prepared. Ring block anaesthesia was achieved with 2% lidocaine hydrochloride, and herniorrhaphy was performed under aseptic conditions. Post-operatively, the combination of procaine penicillin G, and dihydrostreptomycin sulphate, and tramadol hydrochloride were injected intramuscularly for 5 and 3 consecutive days, respectively. An oxytetracycline HCL spray was applied to the wound, and daily suture line dressing was performed. On the fourth day following the operation, the calf became anorexic and exhibited forced breathing. As a result, ceftriaxone was injected intravenously. After ten hours of treatment, the calf died. The owners should take care while they support normal delivery at home, not injure the umbilicus, and keep the area clean from contamination.

Keywords: *Cross holstein friesian calf, Herniorrhaphy, Overlapping suture, Umbilical hernia*

3.1.5.2. Introduction

Hernia is a bulge of skin containing material from a body cavity that passes through a weak spot of the body wall (Farman *et al.*, 2018). This may occur by accident or due to normal anatomical opening, which does not completely fulfill its physiological function. Anatomically Hernia consists of three parts, the Hernial Ring, the Hernial Sac, and the Contents (Kadapatti *et al.*, 2019). The contents of a hernia are usually fat, omentum, and, in some larger hernias, segments of small intestines, parts of the liver, and sometimes the uterus and bladder (Doijode, 2019). The hernia can be reducible (manually or automatically return the hernial contents into the abdominal cavity) or irreducible (the hernial contents cannot be returned into the abdominal cavity) (East and de Beaux, 2023). According to their anatomical placements, the many hernia types in small and large animals are divided into umbilical, inguinal, scrotal, femoral, perineal, and ventral (or abdominal) hernias (Das, 2022).

Eighty-one percent of the hernia cases were in ovine species, 15.6% were in caprine, and bovine constituted only 3.4% of the cases. A high incidence of hernias was recorded in females; the sex distribution was 72.4% females and 27.6% males (Yasin, 2017). Epidemiologically genetic and traumatic factors, surgical intervention, certain drugs, and chemicals may be involved in some hernias like congenital umbilical hernias and inguinal hernias are often apparent at birth (Hassen *et al.*, 2017). An umbilical hernia is the most common form of congenital hernia in calves. However, many umbilical hernias are secondary to umbilical sepsis and hereditary due to multiple births and reduced gestation length (Sutradhar *et al.*, 2023)

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 cause is the 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. Umbilical hernias constituted 44.8% of all hernias, followed, in reducing the frequency, by ventral (31%), scrotal (13.8%), and inguinal hernias (10.4%) (Amare and Haben, 2020).

It is difficult to generalize about the diagnosis of herniation, but observation and palpation are important in most cases. Specific diagnostic features of the various types of hernia are done in

different ways (Hassen *et al.*, 2017). Umbilical hernia can be treated in a variety of ways, both conservative and surgical. Only minor reducible hernias are suitable for conservative therapies. The hernial ring can be closed using conservative treatments such as belly bandages/ abdominal bandages, injections, or the application of irritants around the hernial ring. When the hernia is big and irreducible, radical surgery is required (George *et al.*, 2021).

Umbilical hernia can be surgically corrected mainly through two techniques, namely hernioplasty (repair by mesh) and herniorrhaphy. However, recurrence is common after herniorrhaphy and is seen throughout the year. Emergency surgery is performed in the presence of complications such as obstruction, strangulation, and evisceration (Mishra *et al.*, 2020). Therefore, the present case report describes herniorrhaphy in cross-HF calf due to congenital origin.

3.1.5.3. Case history and clinical examination

A two-month-old cross-HF calf with an estimated weight of about 30kg was presented to JUCAVM an open-air clinic with a history of swelling at the umbilicus from birth with increasing in size in the last few weeks. The clinical examination revealed reducible swelling that was found on the umbilicus (Fig. 6A). The patient's heart rate (120 beats/minutes), respiration rate (25 breaths/minutes), and rectal temperature (39.1⁰C) (Annex. 2) all were found within normal physiological limits. A clinical examination led to the diagnosis of an umbilical hernia and herniorrhaphy was decided to address the case.

3.1.5.4. Pre-operative preparation and animal control

Food and water were withheld for 12 and 6 hours respectively. Up on arrival all physiological parameters were checked and found within normal limits. The calf was injected with an intravenous administration of 0.5% diazepam (which is manufactured by: Farbe Firma Pvt. Ltd. Gujarat, India) @ 0.2mg/kg. After proper sedation, the calf was positioned in dorsal recumbency. The umbilical area was washed with water and soap and the hair was shaved (Fig. 6B). Ring block anesthesia was achieved with local anesthetic of 2% lidocaine hydrochloride (which is manufactured by: Lincoln Pharmaceuticals Ltd, Gujarat, India) @ 10mg/kg to desensitize the abdominal muscles. The area was scrubbed with 2% iodine tincture.

3.1.5.5. Intra-operative surgical procedure

After proper analgesia, an elliptical incision was made exactly on the surrounding swelling avoiding blood vessels (Fig. 6B). By blunt dissection muscles and peritoneum were separated. After the hernial sac was incised with scalpel number 23 (Fig. 6D), the omentum was found in hernial sac. After the herniated organ was replaced in the abdominal cavity, the hernial ring was closed by overlapping horizontal mattress patterns using nylon number 1 (Fig. 6E). The subcutaneous fascia was closed with simple continuous using polyglactin 910 (vicryl) number 1, and the skin was closed interrupted horizontal mattress using nylon number 1. Finally, the wound was covered by a piece of sterile gauze and temporarily sutured to the skin at three sites to avoid



Figure 6. Herniorrhaphy in a cross-HF calf

Presented calf for herniorrhaphy (A), prepared surgical site (B), an elliptical incision of skin (C), hernial ring and hernial content (omentum) (D), horizontal overlapping matters suture (E) after the skin was closed, covered wound with gauze and sprayed with iodine and temporarily sutured to the skin (F).

3.1.5.6. Post-operative care and outcomes

An antibiotic combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg and tramadol hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg were injected IM, SID for 5 and 3 consecutive days, respectively. An oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied to the wound. Dressing of the suture line daily with 2% iodine tincture was also carried out. On the fourth day of post-operation, the calf became anorexic and exhibited forced breathing. As a result, an intravenous injection of 1g ceftriaxone (which is manufactured by: Inject Care Parenterals Pvt. Ltd. India) @ 20mg/kg was carried out. After ten hours of treatment, the calf died.

3.1.5.7. Discussion

The umbilical opening should close within a few days after birth. The failure of this opening to close properly is termed an umbilical hernia. In addition to heredity, the etiology of an umbilical hernia may be an umbilical infection or abscess. Umbilical hernias are fairly commonly observed in young calves (Al-Sobayil and Ahmed, 2007a). Umbilical hernias are the most common birth defects in calves, especially in Holstein-Friesians (Sutradhar *et al.*, 2009). Regarding breeding systems, some authors have shown a higher prevalence among intensively reared animals than in other management systems. In the present case, the calf was raised in an intensive farm system and was from the cross-HF breed, which might be a congenital type, as this was seen from its birth time and no evidence of any injury was present.

In the current case, the calf was sedated with an intravenous administration of diazepam, and ring block anesthesia was achieved by a local anesthetic of 2% lidocaine hydrochloride to desensitize the abdominal muscle, which agrees with Akter (2023). In the current case, up to the

fourth day of post-operation, complications were not observed. However, on the fourth day of post-operation, the calf became anorexic and exhibited forced breathing. As a result, ceftriaxone was injected intravenously. However, the calf died after ten hours post-treatment. This may be the consequence of coexisting illnesses that became worse as a result of surgery-related stress.

3.1.5.8. Conclusion

Most cases of umbilical hernia were seen in calves between the ages of one and three months. Compared to male calves, female calves are more likely to get an umbilical hernia. Compared to native calves, cross-bred calves have a higher prevalence of umbilical hernias. In the present case, the calf died on the fourth day of post-operation.

3.1.6. Clinical Management of Uterine Prolapse in a Cross-HF Cow

3.1.6.1. Abstract

Uterine prolapse is a common condition in dairy cattle, which includes a partial or complete prolapse of the uterus, vagina, and cervix. The owner of an 8-year-old cross-HF cow, with an estimated weight of about 350kg, informed us through phone call communication that her cow was seen with a protrusion of mass through the vulva after 16 hours of parturition. On arrival at the owner's house, a large and longer, contaminated with dung, soil, and dust, prolapsed mass was seen. The case was diagnosed as uterine prolapse and the cow was restrained in a standing position manually. Injection of caudal epidural anesthesia with 2% lidocaine hydrochloride was performed and clinical management was performed. Post-clinical management, the cow was infused with 450 ml of Calcium Boro gluconate intravenously. A combination of procaine penicillin G, and dihydrostreptomycin sulphate, and tramadol hydrochloride were administered intramuscularly for 5 and 3 consecutive days, respectively, and followed by an oxytetracycline HCL spray around the vaginal suture. On the second day of post-clinical management, the cow became anorexic, and depressed and then treated with metronidazole. However, the cow died on the fourth day of post-clinical management. The owners should present the case as early as possible and proper health care with nutritious feed can prevent uterine prolapse.

Keywords: *Cross holstein friesian cow, Horizontal mattress vaginal suture, Uterine prolapse*

3.1.6.2. Introduction

Prolapse is the falling or slipping of a body part from its usual position (Sharma *et al.*, 2017). Prolapse of genitalia is a common reproductive problem that adversely affects the overall performance of the affected animals by affecting the length of the postpartum return to estrus, conception rate, and intercalving period (Vinayak *et al.*, 2021). Among all prolapse, uterine and vaginal prolapse are frequently observed in the reproductive tract of cows. Vaginal prolapse mostly happened in cross-breed cattle before calving, usually in the last trimester of pregnancy (Hasan *et al.*, 2017). It is regarded as an emergency condition and should be managed before excessive edema, mucosal trauma, contamination, and fatal hemorrhage lead to a grave prognosis (Miesner and Anderson, 2008).

Uterine prolapse is a common condition in dairy cattle, which includes a partial or complete prolapse of the uterus, vagina, and cervix (Ashur, 2021). It occurs commonly within 2-24 hours of calving, yet it rarely occurs up to 72 hours of calving (Dutt *et al.*, 2023). The etiology of uterine prolapse is unknown (Towers, 2004). The syndrome is predisposed by several factors, including as low serum calcium levels (hypocalcemia), forceful fetal traction, the birth of a large fetus, placenta retention, and protracted dystocia (Juneja *et al.*, 2022).

The clinical signs of uterine prolapse are dramatic standing with the uterus hanging up to the hock joint (Islam, 2020). In the period immediately after the prolapse occurs, the tissues appear almost normal, but within a few hours, they become enlarged and edematous. Urine may be retained in such cases (Potter, 2008).

Some animals may appear healthy, but most animals will exhibit signs of varying degrees of hypocalcemia: weakness, depression, subnormal temperature, anxiety, struggling, prostration, and coma. An uncomplicated case of uterine prolapse usually has a good prognosis if corrected in time; hence it should be always treated as a veterinary emergency. The correction of a prolapsed uterus, usually involves, disinfection and washing the organ, reduction in the size of the organ if edematous with glycerol, returning the organ, and applying stay sutures (Buhner's sutures) (Chakma, 2021). Therefore, this case report presents the clinical management of uterine prolapse in a cross-HF cow.

3.1.6.3. Case history and clinical examination

The owner of an 8-year-old cross-HF cow, with an estimated weight of about 350kg, informed us through phone call communication about her cow was seen with a protrusion of mass through the vulva after 16 hours of parturition. According to the patient's history, the placenta was left in the cow, stopped feeding, and lied down on the ground. Also, the owner said that the cow continued to strain for a considerable amount of time after giving birth. Upon arrival at the owner's house, the cow was found in a sternal recumbent position. The prolapsed mass was lying on the ground and it contained dung, soil, and dust. Upon clinical examination, the physiological parameters (rectal temperature, respiration rate, and heart rate) were slightly elevated. Moreover, the prolapsed mass was found swollen, and edematous with a mild laceration in the exposed part. The cow exhibited intermittent straining and the prolapsed mass was larger and longer hanging down to the hocks, and deep red attached to the placenta (Fig. 7A). Therefore, the case was diagnosed as uterine prolapse, and clinical management was decided to address the case.

3.1.6.4. Pre-operative preparation and animal control

In the present case, the patient was restrained in a standing position with the help of personnel. Caudal epidural anesthesia was achieved by infiltration of 2% lidocaine hydrochloride (which is manufactured by: Lincoln Pharmaceuticals Ltd, Gujarat, India) @ 0.22mg/kg between intercoccygeal space to desensitize the tail, anus, perineum, vulva and vagina.

3.1.6.5. Intra-operative surgical procedure

The still attached placenta was carefully separated, avoiding damage to maternal caruncles (Fig. 7B). Following the removal of the placenta, the uterine surface was cleaned and washed with lukewarm water (Fig. 7C) followed by the 0.9% normal saline solution. Urination was facilitated by the elevation of the uterus during cleaning. To reduce swelling or edema, salt powder was sprinkled on all parts of the prolapsed part. After the size was decreased the prolapsed mass was washed with saline solution and pushed inward manually to regain its normal position (Fig. 7D). After the uterus was repositioned re-occurrence of the prolapse was prevented by applying a horizontal mattress vaginal suture by using locally prepared bilateral configuring of sterilized slightly elliptical synthetic plastic material after boiling and cutting to the appropriate size using nylon number 1 (Fig. 7E).



Figure 7. Clinical management of uterine prolapse in a cross-HF cow

Cow presented with uterine prolapse (A), manual removal of placenta (B), washing of the uterus with lukewarm water (C), manual repositioning of the prolapsed uterus (D), vaginal suturing by using locally prepared synthetic plastic material (E), stand cow after clinical management (F).

3.1.6.6. Post-operative care and outcomes

Calcium Boro gluconate 23% 450ml (which is manufactured by: pharma swede-Egypt) was infused intravenously. Antibiotic combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg and tramadol hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg were injected intramuscularly for 5 and 3 consecutive days respectively. Finally, an oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied around the

vaginal suture (Fig. 7F). On the second day of post-clinical management, the cow became anorexic and depressed then treated with 0.5% metronidazole (which is manufactured by: Aculife Healthcare Pvt. Ltd. Gujarat, India) @ 50mg/kg intravenously, BID. However, the cow died on the fourth day of post-clinical management.

3.1.6.7. Discussion

The ruminants are predisposed to postpartum uterine prolapse due to the long myometrium contractions, violent straining, low plane of nutrition, hypocalcemia, relaxed atonic flaccid uterus, lack of exercise and extreme laxity of the perineum and vulvar lips, etc. (Ahuja *et al.*, 2016). In the present case, caudal epidural anesthesia was achieved by infiltration of 2% lidocaine hydrochloride between intercoccygeal space to desensitize the tail, anus, perineum, vulva, and vagina which agrees with Shanmuganathan *et al.* (2021).

The everted uterus was washed with clean water and potash solution. A sugar solution was introduced to the uterine surface to reduce the volume of the prolapsed uterus. The uterus was washed with a normal saline solution. The everted uterus was pushed through the vagina by manual pressure to regain its normal position. Following replacement temporary closure of the vulva with quil suture was performed by Hassan *et al.* (2010). However, in the present case, the uterus was cleaned and washed with lukewarm water followed by the 0.9% normal saline solution. To reduce swelling or edema, salt powder was sprinkled on all parts of the prolapsed part. After the size was decreased the prolapsed uterus was washed with saline solution and repositioned to the pelvic cavity manually. Re-occurrence of the prolapse was prevented by applying a horizontal mattress vaginal suture by using locally prepared bilateral configurations of sterilized slightly elliptical synthetic plastic material after boiling and cutting to the appropriate size using nylon, which agrees with Kitessa and Terefe (2021).

After repositioning the prolapsed mass Calcium Boro gluconate 23% 450ml was infused intravenously to recover the muscular tonicity of the uterus and the surrounding structures which agrees with Borah *et al.* (2019). However, in the present instance, the cow died on the fourth day of post-clinical management. This may be due to the delayed presentation of the case which became contaminated with dirt and may develop septicemia.

3.1.6.8. Conclusion

Uterine prolapse mostly appears in the post-parturient period. Diagnosis and treatment of uterine prolapse should be managed and corrected as early as possible. Delays in correction may cause some critical conditions such as edema, fibrosis, necrosis, septicemia, and death. So, farmers and veterinarians should be careful about the early recovery from the condition which will save the cow from a life-threatening condition. Proper health care and supply of nutritious feed can avoid the incidence of uterine prolapse. However, in the present case, the cow died on the fourth day of post-clinical management.

3.2. Case Reports on Small Ruminants

3.2.1. Caesarean Section Due to Feto-Pelvic Disproportion in a Doe

3.2.1.1. Abstract

Dystocia is a common condition in small ruminants resulting in huge economic losses to the farmers either due to the death of a newborn or dam or adversely affecting the fertility of the dam. A one-year-old doe, with an estimated weight of about 20kg in a full-term pregnancy, was presented to JUCAVM an open-air clinic with a history of prolonged strain for 15 hours. The vaginal examination showed a fully dilated cervix and an oversized fetus head was felt. All physiological parameters were found within normal ranges. After the mid-upper flank area was aseptically prepared and local anesthesia of 2% lidocaine hydrochloride was infiltrated in an inverted L-block method. A caesarean section was performed under aseptic conditions. Post-operatively, a broad-spectrum antibiotic combination of procaine penicillin G, and dihydrostreptomycin sulphate, and tramadol hydrochloride were injected intramuscularly for 5 and 3 consecutive days, respectively, and an oxytetracycline HCL spray was applied to the wound. The wound was lavaged using a 2% iodine tincture. Skin suture was removed after 14 days of post-operation and the doe successfully healed after a month. The owners should present the case promptly because early intervention can result in the delivery of live kids and much healthier dams.

Keywords: *Caesarian section, Doe, Dystocia, Feto-pelvic disproportion*

3.2.1.2. Introduction

Dystocia or difficult birth is a common condition in small ruminants resulting in huge economic losses to the farmers either due to the death of a newborn or dam or adversely affecting the fertility of the dam (Sharma *et al.*, 2014). Although the causes of dystocia can be classified according to maternal and fetal origin, however, most reports depict that fetal mal-disposition (especially lateral deviation of the head), feto-pelvic disproportion, fetal abnormalities, uterine inertia, uterine deviation, uterine torsion and obstruction of the birth canal (especially failure of cervix to dilate) are most common causes of dystocia in sheep. Nearly similar findings were recorded in goats (Purohit, 2006).

The normal process of parturition is divided into three stages; The first stage involves cervical dilation occurring due to uterine contractions that force the cervix to dilate. This stage lasts up to 12 hours in primiparous animals and comparatively less duration in multiparous animals. The second stage involves severe straining resulting in the expulsion of the fetus and is completed when the last fetus is expelled. This stage lasts for 2 hours or less. The third stage of parturition involves the expulsion of the placenta which normally occurs within 4 hours (Mota-Rojas *et al.*, 2020). The incidence of dystocia is higher in goats compared to ewes. It is about 7% of goats (Hussain and Zaid, 2010).

Dystocia cases can either be handled medically or surgically (Abdullah *et al.*, 2015). Medical management is an option when the dam and the fetus remain stable where there is proper fetal position, presentation, and posture with no obstruction. In this case, oxytocin can be administered intramuscularly with or without Calcium Boro gluconate to assist in the contraction of the uterus (Al-Amin, 2018). Surgical management or caesarean section is needed in obstructive dystocia, dystocia accompanied by shock or systemic illness, uterine inertia, prolonged active labor, or failure in medical management (Khan, 2018).

In small ruminants, due to the small diameter of the pelvis, only limited manual manipulation of the fetus to relieve dystocia is possible. Caesarean section in small ruminants is easier to perform when compared to large ruminants (Wood, 2019). Different approaches are used for performing a caesarean section, including the left flank, ventral midline, and ventral paramedian approach. The site and technique of caesarean section in small ruminants are similar to that of large

ruminants (Sharun and Erdoğan, 2019). Therefore, this paper describes a case of dystocia due to fetopelvic disproportion and its surgical management in a doe.

3.2.1.3. Case history and clinical examination

A one-year-old doe with an estimated weight of about 20 kg in a full-term pregnancy was presented to JUCAVM, an open-air clinic, with a history of prolonged straining for 15 hours. On general inspection, the animal was found depressed and exhausted due to prolonged labour. On clinical examination, all physiological parameters were found within normal limits. Vulval lips were edematous and congested (Fig. 8A). Per-vaginal examination, there was a fully dilated cervix and the oversized head of the fetus was felt by fingers. In the present case, manual obstetrical manipulation and vaginal delivery could not be performed, due to the narrow pelvis of the doe. For immediate relief, caesarean section was decided.

3.2.1.4. Pre-operative preparation and animal control

In the present case, the patient was restrained in the right lateral recumbent position with the help of personnel. The left paralumbar fossa was washed with water and soap then the hair was shaved. Local anesthesia 2% lidocaine hydrochloride (which is manufactured by: Lincoln Pharmaceuticals Ltd, Gujarat, India) @ 1ml/cm area was infiltrated in an inverted L-block method and a caudal epidural @ 0.5mg/kg was injected between intercoccygeal space to prevent straining. After the doe was positioned in the right lateral recumbency, both fore and hind legs were tied together separately with a rope and secured cranially and caudally to the surgical table respectively. The surgical site was scrubbed with 2% iodine tincture.

3.2.1.5. Intra-operative surgical procedure

A skin incision of around 8cm was made on the mid-upper flank between the last rib cranially and tuber-coxae caudally and transverse process of lumbar vertebrae dorsally, around 3-5cm from both last rib and transverse process of lumbar vertebrae extending vertically with a scalpel blade number 23 (Fig. 8B). Bleeding was controlled through twisting the vessels with forceps while mopped with a gauze mop. Abdominal muscles were incised in the same direction, the parietal peritoneal layer was held raised with plain thumb forceps, and a stab incision was performed with a scalpel blade and extended along the incision line with a blunt-blunt straight Metzenbaum scissor. The gravid uterus was identified and lifted towards the incision site. The

uterus was incised and the dead fetus was removed. The uterus was washed with 0.9% normal saline solution and closed with double row Cushing, followed by lambert using chromic catgut number 2-0 (Fig. 8D), and repositioned to the pelvic cavity. The peritoneum and transverse muscle were closed with a simple continuous pattern using the same suture material. External and internal abdominal muscles were sutured together with a Ford interlocking suture pattern. The skin and subcutaneous fascia were closed with cross-matters using nylon number 1 (Fig. 8E).



Figure 8. Caesarean section in a Doe

Doe presented for caesarean section (A), skin incision (B), removal of the dead fetus (C), sutured uterus with inverted double row (D), closing of peritoneum and transverse muscle together (E), closing of skin and subcutaneous fascia together (F), removed dead fetus (G), successfully healed doe after a month (H).

3.2.1.6. Post-operative care and outcomes

Broad-spectrum antibiotic combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg with tramadol hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg were injected intramuscularly for 5 and 3 consecutive days, respectively. An oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied to the wound. The progress was checked by telephone, and after 14 days post-operation, the skin suture was removed. The doe was recovered uneventfully after a month (Fig. 8F).

3.2.1.7. Discussion

Dystocia due to feto-maternal disproportion in small ruminants is a common clinical case due to different-sized mix breed herding at the same place that has been successfully managed by caesarean followed by using broad spectrum antibiotic and non-steroidal anti-inflammatory drugs (Iqbal *et al.*, 2020). In the present case, only 2% lidocaine hydrochloride was infiltrated in an inverted L-block method, with caudal epidural anesthesia injected between the intercoccygeal space, and the doe was restrained by rope casting throughout the procedure which disagrees with Ogbu *et al.* (2011); in which sedation of the doe was performed with an intramuscular injection of Xylazine @ 0.2 mg/kg and restrained in right lateral recumbency, with the left para-lumbar fossa area shaved, disinfected, and prepared for an aseptic caeserotomy. The incision site was desensitized with a line infiltration of 2% lignocaine hydrochloride with a lumbosacral epidural block. However, in the present case, using local anaesthesia with manual restraining was employed successfully.

Katiyar *et al.* (2020) used a ventrolateral oblique approach in which one dead female fetus was along with another fetus that also died within a few minutes after the removal. However, in the present case, a mid-upper laparotomy was performed to remove one dead fetus. Even though the ventrolateral oblique was advised for dead fetuses, the mid-upper flank was employed in this instance. Emphysema or edoema was not observed because the foetus died recently, so it is better to use a mid-upper-flank approach to reduce post-operative wound contamination.

In the current case, the uterus was closed with double row Cushing, followed by lambert using chromic catgut number 2-0, and repositioned to the pelvic cavity, which is in line with Das *et al.* (2020). The duration of dystocia directly affects the survival of the fetus and dam. Small ruminant dams should be referred for obstetrical help within 2 hours from the onset of stage-2 labor if no progress in delivery is made (Bhattacharyya *et al.*, 2015). In the present case, the fetus was dead which may be attributed to the delay in presentation of the case. This was in agreement with Ahmed *et al.* (2019).

3.2.1.8. Conclusion

Prolonged dystocia in goats with unnecessary and prolonged attempts for vaginal delivery seriously affects the case outcome. Early intervention by performing caesarean section can result in the delivery of live kids and much healthier dams. However, in the present instance, due to the delayed presentation of the case to veterinary clinics, the fetus was dead, and only the doe was saved.

3.2.2. Extirpation of Eye Due to Penetrating Traumatic Injury in a Doe

3.2.2.1. Abstract

Traumatic eye injuries in animals often result in painful, blinded eyes, necessitating eye removal when the eye cannot return to normalcy and is extremely painful to the patient. A 2-year-old doe, with an estimated weight of about 25kg, was brought to JUCAVM an open-air clinic with a complaint of right blinded eyes due to a penetrating traumatic injury while grazing on the roadside. Physical examination revealed that aqueous humour protruded out through the penetrating wound on the cornea and all measured parameters were found within normal ranges. After the surgical area was prepared aseptically, auriculopalpebral and Peterson nerve blocks with line infiltration on the upper eyelid with 2% lidocaine hydrochloride were performed. The extirpation of the eye was performed with tarsorrhaphy under proper aseptic conditions. Post-operatively, a combination of procaine penicillin G, and dihydrostreptomycin sulphate, and tramadol hydrochloride were administered intramuscularly for 5 and 3 consecutive days respectively, followed by an oxytetracycline HCL spray was applied to the wound. The sterile gauze which was impregnated with 2% iodine tincture packed in the orbital cavity was changed within 48 hours for three rounds with decreasing its size. Skin sutures were removed

after 14 days and the doe showed an uneventful recovery without complications after three weeks post-operation. If an animal acquires blindness and reaches a point where recovery is not possible, the best course of action is to remove the affected eyes to prevent further complications.

Keywords: *Doe, Extirpation of eyes, Tarsorrhaphy, Traumatic eye injury*

3.2.2.2. Introduction

Trauma to the eye such as an infected scratch injury or puncture to the eye by fighting with other animal or hitting the eye with sharp objects like nails, wires, etc., tumors of the eye, glaucoma (increased pressure inside the eye) are considered to be most common causes for the creation of a painful, blinded eye (Singh *et al.*, 2013). Acquired ocular disease occurs at a higher incidence than congenital disease. Lacerations are the most common traumatic injury to the eyelids but are infrequent in food animals. Orbital injuries may occur due to direct or indirect trauma. The degree of injury may vary from a simple contusion or an abrasion of skin in the orbital region to a fracture of the orbit (Das *et al.*, 2016).

Corneal edema is a common clinical sign of corneal ulceration, keratitis, anterior uveitis, and many systemic diseases, and precludes the direct visualization of intraocular structures by ophthalmoscopy (Haveli, 2014). In many instances, medical management is sufficient for the resolution and amelioration of clinical signs. In selected cases, surgical intervention is required. Removal of the eye is indicated in animals in such cases when it has reached a point where it has no chance of being capable of returning to normalcy and it is very painful to the patient (Ali *et al.*, 2015)

Several surgical approaches, such as evisceration, enucleation, and extirpation, have been described in the literature for the removal of the globe, depending on the amount of tissue required to be excised. Evisceration is the removal of the contents of the globe while leaving the sclera and extraocular muscles intact. Enucleation is the removal of the eye from the orbit while preserving all the other orbital structures, and extirpation is the removal of the globe as well as the soft tissues of the orbit (connective tissue, fat, and muscles) (Gelatt and Whitley, 2011).

The retrobulbar and Peterson eye blocks are two regularly used blocks for surgery on the eye (Potter, 2007). Auriculopalpebral and line block procedures, however, are additionally employed, either with or without sedatives (Carpenter and Byron, 2015). Each anesthetic technique has its advantages and disadvantages. The selection of the best technique is based on the type of surgery and the surgeon's preferences. Therefore, the present case report deals with the successful extirpation of an eyeball that had ruptured due to a penetrated injury to the cornea in a doe.

3.2.2.3. Case history and clinical examination

A 2-year-old doe with an estimated weight of about 25kg was brought to JUCAVM an open-air clinic with a history of the protruded of ocular contents of the right eye due to traumatic injury while grazing on the roadside. Physical examination revealed that aqueous humour eviscerated out through the penetrating wound on the cornea (Fig. 9A). On clinical examination the body temperature was 39.2⁰C, respiration was 20 breaths/minute, and heart rate was 80 beats/minute (Annex. 2). All the measured parameters were found within the normal ranges, and clinical indicators led to the emergency decision to extirpate the injured eyeball and perform tarsorrhaphy.

3.2.2.4. Pre-operative preparation and animal control

The patient was restrained in left lateral recumbency and the surgical site was prepared by washing with soap and water. The hair in the orbital region was shaved and the eyelashes were trimmed and eviscerated ocular content was cleaned with 0.9% normal saline solution. Auriculopalpebral and Peterson nerve blocks were employed with line infiltration on the upper eyelid with 2% lidocaine hydrochloride (which is manufactured by: Lincoln Pharmaceuticals Ltd, Gujarat, India). The area was scrubbed with 2% iodine tincture.

3.2.2.5. Intra-operative surgical procedure

The doe was secured on a surgical table and after the attainment of numbness was checked the upper and lower eyelids were sutured together with continuous suture using nylon number 1 (Fig. 9B). To grasp and provide traction during the surgical procedure, the two sutures ends, which were about 15-20 cm long, were left on both sides and tied together at their tips. An

elliptical incision around the eyelids was made approximately 1cm away from the palpebral border (Fig. 9C) by holding the temporary tarsorrhaphy suture ends with scalpel blade number 23. The incision was extended around the entire circumference of the lid margins between the orbital rim and eyeball. By blunt dissection with blunt-blunt curved mayo scissors, taking care that the conjunctiva was not punctured and simultaneously hemorrhage was controlled by ligation with chromic catgut number 2-0 and twisted the vessels with curved artery forceps.

The conjunctiva from the lid back to its attachment to the orbit was separated leaving its attachment to the border of the lids. All the muscles of the eye attached to the orbital rim were separated by blunt dissection, and after ligation, they were excised with scissors at their base. Once the eyeball was lifted from its base the optic cord was isolated and optic vessels were palpated. The whole optic cord along with optic vessels was grasped with the help of curved artery forceps and then ligated with the same suture material below the artery forceps covering the whole optic cord to control the hemorrhage. After ligation was applied, the eyeball was severed from its base, just above the artery forceps (Fig. 9D).

Once the eyeball was removed the hemorrhage in the cavity was controlled with forceps while mopped with a gauze mop. After the hemorrhage was controlled the blood clots from the cavity were mopped with a gauze mop and an orbital cavity was packed with a sterile gauze impregnated with 2% iodine tincture, leaving the small end towards the medial canthus. The skin was sutured with an interrupted pattern using nylon number 1 with care not to include the impregnated gauze within it (Fig. 9E).



Figure 9. Extirpation of eyes in a doe

Doe presented for the extirpation of eyes with eviscerated aqueous humour (A), suturing of temporary tarsorrhaphy (B), elliptical incision of the eyelid by holding ends of temporary tarsorrhaphy suture ends (C), extirpated eyes with temporary tarsorrhaphy (D), after surgery an oxytetracycline HCL spray was applied to the wound (E), successfully recovered doe following a three weeks post-operation (F).

3.2.2.6. Post-operative care and outcomes

Post-operatively the doe was injected intramuscularly with an antibiotic combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg and tramadol hydrochloride (which is manufactured by: Humanwell

Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg for 5 and 3 consecutive days, respectively. An oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied to the wounds. Daily observation of the surgical site, antiseptic dressing, and assessment of general well-being were performed. Sterile gauze impregnated with 2% iodine tincture, was changed within 48 hours for three rounds with a decrease in its size. The skin suture was removed after 14 days. The doe showed uneventful recovery without complications after three weeks post-operation (Fig. 9F).

3.2.2.7. Discussion

Irreparable injuries of an eye or severe orbital and eyeball injuries, neoplastic growth in small ruminants need enucleation or extirpation of the eye along with tarsorrhaphy depending upon the nature of malady and surgeon's choice (Prakash *et al.*, 2016). In the current case, the extent of the injury was only protruding of aqueous humour through traumatic injury of corneal penetration, and all muscles were viable with immediately received surgical treatment, which disagrees with Sharma *et al.* (2023); which, on manipulation, resulted in severe bleeding due to protrusion of the iris through the corneal wound. This is due to the depth of the wound during the injury.

In the current case, auriculopalpebral and Peterson nerve blocks were employed with line infiltration on the upper eyelid with 2% lidocaine hydrochloride which disagrees with Haveli (2014); in which extirpation of the eyeball with tarsorrhaphy was undertaken after a retro bulbar nerve block with 2% lignocaine. However, the retrobulbar nerve block was only used to desensitize the internal muscles of the eye, and to desensitize the eyelids additional nerve block methods were needed. In the current case, auriculopalpebral and line infiltration of the upper eyelid with 2% lidocaine hydrochloride were used to desensitize the lower and upper eyelids respectively.

In the current case, an elliptical incision around the eyelids was made approximately 1cm away from the palpebral border by holding the temporary tarsorrhaphy suture ends with a scalpel blade. The incision was extended around the entire circumference of the lid margins between the orbital rim and eyeball. Once the eyeball was removed the hemorrhage in the cavity was

controlled with forceps while mopped with a gauze mop. After the hemorrhage was controlled the blood clots from the cavity were mopped with a gauze mop and an orbital cavity was packed with a sterile gauze impregnated with 2% iodine tincture, leaving the small end towards the medial canthus. The skin was sutured with an interrupted pattern using nylon number 1 and the iodine-impregnated gauze was changed within 48 hours for three rounds with a decrease in its size. Skin suture was removed after 14 days of post-operation and the doe recovered uneventfully which agrees with Haveli (2014).

3.2.2.8. Conclusion

The majority of eye injuries are brought on by foreign things such as thorns, plants, stings, and other pointed objects such as nails, cables, etc. Because an open wound is more likely to attract dust and flies and to develop various types of infection, it is best to have surgery as soon as possible to avoid any complications. In the present case, a successful extirpation of the eye was performed in doe.

3.2.3. Surgical Correction of Ventrolateral Hernia in an Ewe

3.2.3.1. Abstract

A Vento-lateral hernia is defined as a hernia through any part of the abdominal wall other than a natural orifice and is common in sheep. A 3-year-old ewe with an estimated weight of about 25kg was brought to the JUCAVM an open-air clinic with a complaint of a swelled mass at the right side of the abdomen. The clinical examination revealed a reducible ovoid-shaped mass covered by skin, accompanied by voluminous swelling at the right side of the abdominal region. The case was diagnosed as a right ventrolateral abdominal hernia, and diazepam was injected intravenously. The surgical site was prepared aseptically and regional anesthesia through a ring block method was applied using 2% lidocaine hydrochloride. Herniorrhaphy was performed under proper aseptic conditions. Post-operatively, an antibiotic combination of procaine penicillin G, and dihydrostreptomycin sulphate, and tramadol hydrochloride were administered intramuscularly for 5 and 3 consecutive days respectively, followed by an oxytetracycline HCL spray to the wound. The surgical site was lavaged with a 2% iodine tincture solution and after 14 days of surgery, the skin suture was removed then after a month, the ewe was successfully

healed. Trauma due to horning from other animals appeared to be the most common cause of abdominal hernias, and small ruminants shouldn't be kept with horny cattle.

Keywords: *Ewe, Herniorrhaphy, Overlapping mattress suture, Ventrolateral hernia*

3.2.3.2. Introduction

A hernia is defined as a protrusion of internal organs or tissues through a natural or acquired opening resulting in swelling of this area, the organ or tissues such as the intestine, or other abdominal cavity content (Zedan *et al.*, 2022). Anatomically, a hernia consists of three parts that include hernial ring, hernial sac, and hernial content. The contents of the hernia are the organs or tissues that have moved to the abnormal location. The nature of the contents can usually be predicted from the site of herniation although mobile structures such as omentum and parts of the intestine can be involved in most sites (Amare and Haben, 2020).

Hernia can be divided according to the site/location into abdominal, umbilical, scrotal, inguinal, femoral, perineal, and diaphragmatic or according to the etiology to congenital and acquired or clinically into reducible or irreducible. It can affect both small and large animals and consequently interfere with the reproduction, production, and productivity of the animals (Kitessa *et al.*, 2021). A ventral hernia or Vento-lateral is defined as a hernia through any part of the abdominal wall other than a natural orifice and the hernia is ventral to the stifle skin fold (Fesseha and Kidanemariam, 2020).

A lateral abdominal hernia or ventrolateral is mainly caused by trauma due to horn thrust, animal kicks, blunt objects, jumping, falling, external force, automobile accidents, abscess in the abdominal wall, and weakening of the musculatures (Munif *et al.*, 2022).

Complications of the hernia include strangulation, incarceration of the contents, adhesions, and infection in addition to the effect on the general appearance of the animal. In ventral or lateral abdominal hernia, the hernial swelling is very prominent. Systemic symptoms are usually absent. The contents of the hernia are usually omentum or intestines or both. The hernia may be reducible or irreducible, and strangulation is rare (Amare and Haben, 2020).

Hernias are diagnosed with detailed clinical examination (inspection, palpation, etc.) and imaging technique (CT, X-ray, Ultrasonography, etc.). Differential diagnoses may include

localized cysts, abscesses, tumors, neoplastic growth, and various inflammatory swellings (Munif *et al.*, 2022).

There are several ways to surgical treatment of hernia which depend on the size of the hernial ring at the site, primary repair (Herniorrhaphy) surgical treatment of a simple hernia completed with sutures sited in a straight line in the abdomen. Besides, mesh repair (Hernioplasty) surgical repair of large and complex hernia by using networks and a laparoscope (Farman *et al.*, 2018). Therefore, this case report aims to describe the surgical management of ventrolateral hernia in the ewe with herniorrhaphy.

3.2.3.3. Case history and clinical examination

A 3-year-old ewe with an estimated weight of about 25kg was brought to the JUCAVM an open-air clinic with the complaint of an almost round and projected type swelling in the right side of the abdomen for two months. However, increasing the size of the hernia has been observed for the last months and the owner does not know the exact cause of the case. Clinical examination revealed an ovoid-shaped protruding mass covered by the skin on manual palpation with voluminous and reducible swelling along with the feeling of bulging out abdominal contents due to muscular rupture at the right side of the abdominal region below the costal arch (Fig. 10A). Based on these clinical details, the case was eventually diagnosed as a right ventrolateral abdominal hernia and herniorrhaphy was decided to address the case. The ewe was appointed for the next day to fast from food and water for 24 and 12 hours respectively.

3.2.3.4. Pre-operative preparation and animal control

Up on arrival, all parameters were checked and all were found within normal limits. The ewe was sedated with an intravenous administration of 0.5% diazepam (Manufactured by: Farbe Firma Pvt. Ltd. Gujarat, India) @ 0.1mg/kg and kept in the left lateral recumbency. The surgical site was washed with soap and water and the hair was shaved (Fig. 10B). Following proper physical and chemical restraining and aseptic preparation of the surgical site, regional anesthesia was done through a ring block method by using 2% lidocaine hydrochloride (Manufactured by: Lincoln Pharmaceuticals Ltd, Gujarat, India) @ 1ml/cm area to desensitize the abdominal muscle.

3.2.3.5. Intra-operative surgical procedure

A gentle and enough linear incision was made over the hernial sac and the herniated organs were the intestine and omentum upon insertion of a finger, there was no adhesion between the herniated organ and hernial sac (Fig. 10C). The intestine and omentum were properly replaced in the abdominal cavity. Herniorrhaphy was done by overlapping interrupted mattress pattern using synthetic sterile non-absorbable suture materials nylon number 1 (Fig. 10D). The subcutaneous tissue was closed with a simple continuous pattern using polyglactin 910 (vicryl) number 1-0. An intentional elliptical incision was made on the edge of the skin and sutured with an interrupted horizontal mattress using nylon number 1 (Fig. 10E).



Figure 10. Herniorrhaphy in an ewe

Presented ewe for herniorrhaphy (A), prepared surgical site (B), exposing the hernial ring and intestine covered with omentum (C), herniorrhaphy with interrupted overlapping mattress (D), stood ewe after surgery (E), successfully healed ewe after a month (F).

3.2.3.6. *Post-operative care and outcomes*

Post-operatively an antibiotic combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg and tramadol hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg were injected intramuscularly for 5 and 3 consecutive days respectively. An oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied to the wound (Fig. 10E). The surgical site was dressed with a 2% iodine tincture solution. The owner was advised to closely monitor the ewe to allow some exercise and to be supplied with good nutrition. After 14 days of post-operation, the skin suture was removed. After a month, the ewe was successfully healed (Fig. 10F).

3.2.3.7. *Discussion*

The ventrolateral hernia was common in sheep. Trauma due to horning from other animals appeared to be the most common cause of abdominal hernias (Al-Sobayil and Ahmed, 2007b). The exact cause in the present case could not be ascertained, it might be due to the weakening of abdominal muscles or violent trauma with a blunt object or horn thrust. Duhu *et al.* (2022), studies showed that abdominal hernia had the highest incidence in both sheep (68.2%) and goats (71.43%). Female animals had a higher incidence (37%) compared to males (21%) (Hassen *et al.*, 2017). This may be due to postpartum weakness and separation of muscle fibers following repeated deliveries.

In the current case, the ewe was sedated with an intravenous administration of diazepam and the surgical site was washed with soap and water and the hair was shaved. Following proper physical and chemical restraining and aseptic preparation of the surgical site, regional anesthesia was done through a ring block made by using 2% lidocaine hydrochloride to desensitize the abdominal muscles which agrees with Kitessa *et al.* (2021).

In the current case, herniorrhaphy was done by overlapping interrupted mattress patterns using synthetic sterile non-absorbable suture materials, nylon, which disagrees with Fesseha and Kidanemariam (2020); in which herniorrhaphy was done by overlapping mattress sutures using synthetic sterile absorbable polyglycolic acid suture materials, size. 2. Even if both cases showed a good prognosis, in ventrolateral hernia, the hernial ring is better to close with synthetic, non-absorbable suture material to withstand the pressure of abdominal contents. After 14 days of surgery, the skin suture was removed, and the ewe was successfully healed after a month.

3.2.3.8. Conclusion

Sheep were known to be frequently affected by hernial problems due to traumatic hernia, which seems to happen in most cases due to horn punctures and falling on sharp materials. Small ruminants shouldn't be kept with horny cattle, and if the case has already occurred, the case should be presented as soon as possible. In the present case, successful herniorrhaphy was performed in the ewe.

3.3. Case Reports on Small Animals

3.3.1. Mastectomy in an Intact Local Breed Bitch

3.3.1.1. Abstract

Canine mammary gland tumors are the second most frequently encountered spontaneous neoplasms following those derived from the skin. A 10-year local breed intact bitch was presented to JUCAVM an open-air clinic with a swelled mass on the right side of the teat which started a year ago. On clinical examination and palpation, the mass appeared superficial on the skin and hard painless, pendulous, and ulcerated at the distal part. All physiological parameters were found within normal ranges and the case was diagnosed as a mammary tumor. After the bitch was withheld food and water, atropine sulphate and diazepam were injected intramuscularly and intravenously as pre-anesthetics respectively. Ketamine hydrochloride was injected intravenously, as induction. The surgical site was aseptically prepared and ring block analgesia was achieved through injection of 2% lidocaine hydrochloride. A mastectomy was performed under proper aseptic conditions. Post-operatively, a combination of procaine penicillin G, dihydrostreptomycin sulphate, and tramadol hydrochloride were administered

intramuscularly for 5 and 3 consecutive days. A locally prepared Elizabethan collar was lodged to the bitch neck, an oxytetracycline HCL spray was applied to the wound, and the wound was lavaged once daily with 2% iodine tincture. On the sixth day of post-operation, dehiscence of the wound was observed at the site of the left inguinal lymph node was excised and managed as an open wound. The rest of the skin suture was removed on the 14th day of post-operation and the bitch was successfully healed after a month. As mammary tumors are hormone-dependent neoplasms, ovariohysterectomy at an early age is crucial to prevent its occurrence.

Keywords: *Local breed bitch, Mammary gland tumor, Mastectomy*

3.3.1.2. Introduction

A tumor is an abnormal mass of tissue resulting from autonomous, progressive, excessive proliferation of body cells not integrated into normal tissue and exhibiting varying degrees of fidelity to their precursors (Fesseha, 2020). Tumors can be divided into two, namely malignant tumors and non-malignant (benign) tumors. Benign tumors are usually small, well-circumscribed, firm on palpation, and they grow slowly, while malignant tumors are locally invasive, fixed to the overlying skin or deep tissues, may be ulcerated and hemorrhagic, and grow rapidly (Benavente *et al.*, 2016). Common sites of metastases are regional lymph nodes and lungs, although abdominal organs, bones, and the brain can be also affected. The incidence of malignant tumors in individuals greatly threatens their survival, for example in the case of hemangiosarcoma spleen dogs. Meanwhile, non-malignant tumors can cause death if the tumor blocks or interferes with important body functions, but these tumors do not directly cause death, for example, papilloma tumors in dogs (Akhmad *et al.*, 2021). Specific types of benign tumors can turn into malignant tumors (Patel, 2020).

Mammary tumors arise from the glandular epithelium of the mammary glands. Various histological forms are described. Other non-epithelial neoplasms can arise in the mammary region (Polton, 2009). In canine mammary tumors are the second most frequently encountered spontaneous neoplasms following those derived from the skin (Suryawanshi, 2021). Approximately 50% of canine mammary tumors are malignant, and most are classified as adenocarcinomas (Petrov *et al.*, 2014). The etiology of canine mammary tumors is still unknown, but important risk factors like hormonal, nutritional, and genetic factors are described

(Kaszak *et al.*, 2022). However, the majority are sex hormone-dependent. Estrogen and progesterone receptors are found in 50% of malignant and 70% of benign canine mammary tumors (Kumar *et al.*, 2021).

The last two sets of glands (4th and 5th glands) are most commonly affected and the tumors can be firm or soft, well-defined lumps or diffuse swellings. Tumors can be attached to underlying tissues or moveable, skin-covered, or ulcerated (Kamble *et al.*, 2021a). The critical age for mammary tumors in females is the 8th year of life and the risk increases with each subsequent year (Al-Akraa *et al.*, 2015). The risk of mammary tumor dogs spayed before their first estrus is 0.05%. The risk increased to 8% after one estrus cycle and 26% after the second estrus (Burrai *et al.*, 2020).

Diagnostic imaging modalities such as radiography, ultrasonography, and computed tomography (CT) are useful, non-invasive diagnostic tools for evaluating and staging canine mammary gland tumors. Radiography and CT are used to evaluate pulmonary metastasis and calcification. Ultrasonography provides information about the size, shape, margins, internal structure, and vascularity of the mammary gland tumor (Park *et al.*, 2019). Adjuvant therapies are used for inoperable tumors and in inflammatory carcinoma—radiation therapy, and chemotherapy (MacEwen and Withrow, 2001).

Mammary tumors are treated surgically, although there is no consensus as to the best procedure. Removal of the tumor alone (lumpectomy), simple mastectomy (removal of the affected gland only), modified radical mastectomy (removal of the affected gland and those that share lymphatic drainage and associated lymph nodes), and radical mastectomy (removal of the entire mammary chain and associated lymph nodes) all have their proponents (Pieczewska *et al.*, 2021). Removal should be with wide margins to prevent a recurrence, taking the whole mammary gland if necessary (Al-Akraa *et al.*, 2015). Excised mammary tumors were fixed in neutral-buffered 10% formalin and processed employing standard histologic techniques (Petryk *et al.*, 2013). Therefore, the present case report describes the successful mastectomy in a local breed bitch.

3.3.1.3. Case history and clinical examination

A 10-year local breed intact bitch with an estimated weight of about 20kg was presented to the JUCAVM an open-air clinic with a history of large swelling on the right side of the teat which

started a year ago. According to the owner, the swelled part increased over time and there were no clinical symptoms observed. On clinical examination and palpation, the mass appeared superficial on the skin and hard painless, pendulous, and ulcerated at the distal part where it touches the ground on the right fifth caudal mammary gland (Fig. 11A). Grossly, it appeared as a single nodule and the left caudal fifth teat was also found on the dorsal part of a tumour due to ventrally overstretched skin by the tumor load. All the measured parameters were found within the normal physiological ranges with a recorded heart rate was 90 beats/minute, respiratory rate of 25 breaths/minute, and temperature of 38.9 °C (Annex. 2). Based on history and clinical indicators the case was diagnosed as a mammary tumor. Mastectomy was decided and the bitch was appointed for the next day to fast from food and water for 12 and 6 hours respectively.

3.3.1.4. Pre-operative preparation and animal control

Upon arrival, all parameters were checked and they were found within normal limits. Atropine sulphate 0.1% (which is manufactured by: Ciron Drugs & pharmaceuticals Pvt, Ltd. India) @ 0.04mg/kg was injected intramuscularly and diazepam 0.5% (which is manufactured by: Farbe Firma Pvt. Ltd. Gujarat, India) @ 0.5mg/kg was injected intravenously as pre-anesthetics. Ketamine hydrochloride 5% (which is manufactured by: Neon Laboratories Ltd. India) @ 5.5mg/kg was injected intravenously as induction. As the bitch became calm, surgical site preparation was taken. The bitch was restrained in left lateral recumbency. The tumor and its surroundings were washed with water and soap then the hair was shaved. Ring block analgesia was achieved through injection of 2% lidocaine hydrochloride (which is manufactured by: Lincoln Pharmaceuticals Ltd, Gujarat, India) surrounding the tumor subcutaneously. The surgical site was scrubbed with 2% iodine tincture.

3.3.1.5. Intra-operative surgical procedure

After the patient was secured in the left lateral position chemically and manually, an elliptical incision was made through the skin around 2cm away from the tumor with scalpel blade number 23 (Fig. 11B). A blunt subcutaneous tissue dissection and transection were continued all around the tumor attachment using a blunt-blunt straight mayo scissor. Any bleeding vessels were ligated using 2-0 polyglactin 910 (vicryl). All minor and major blood vessels were ligated and dissection between the external abdominal fascial sheath and the right and left mammary glands

with both inguinal lymph nodes were made cranially, medially, caudally, and laterally. To remove the tumor at the base both the right and left mammary glands were removed with both inguinal lymph nodes (Fig. 11C). The surgery was maintained with a half-dose of ketamine. The subcutaneous fascia was sutured with a simple continuous pattern using the same suture material and the skin was closed with a cross-mattress using silk number 1 (Fig. 11D). Cytological examination was performed through imprint technique by a pathologist and, a piece of excised mammary tumor was fixed in neutral-buffered 10% formalin submitted to the hospital for histopathologic examination. Unfortunately, the machine used for the histopathological technique was not functional at Jimma University and Sebeta Regional Veterinary Laboratory. Based on the bitch history, the tumour grew slowly and did not diffuse throughout the entire mammary gland in a year, and cytologically, the tumor's cells were observed on the slide to be nearly identical in size and shape (Fig. 11E). Depending on that, the tumour was most likely a benign mammary gland adenoma.

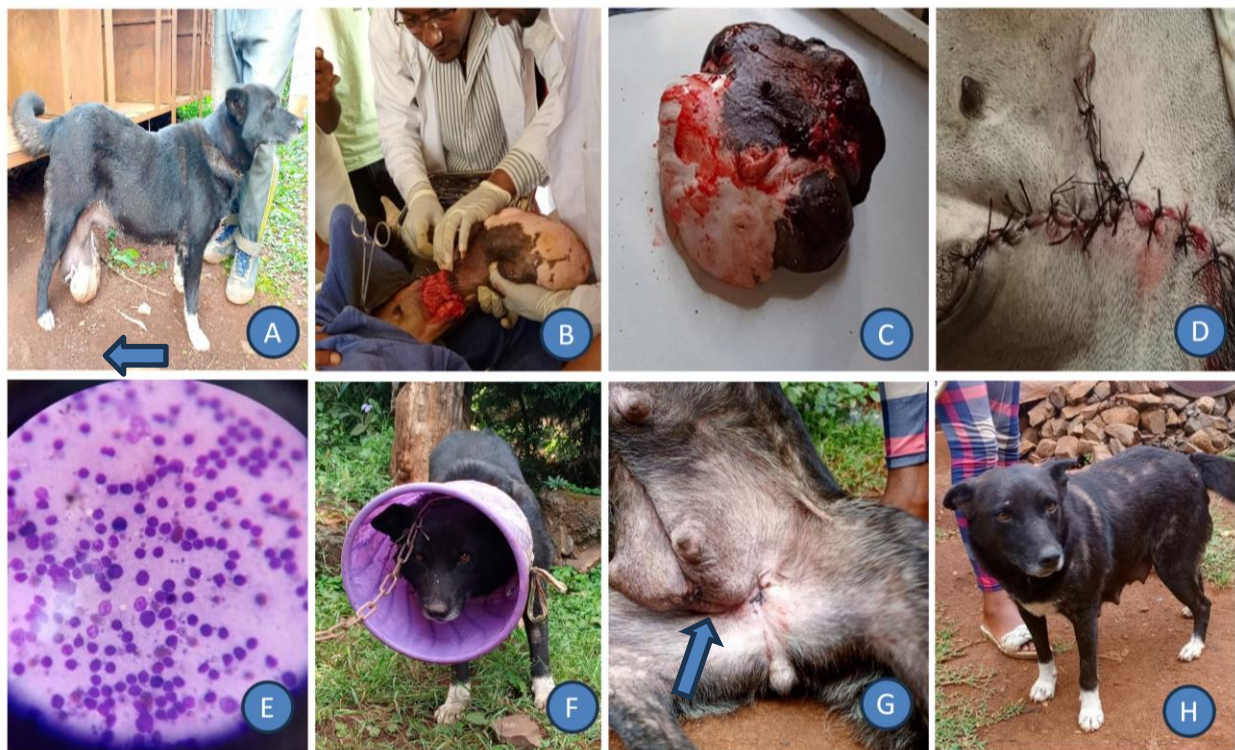


Figure 11. Mastectomy in an intact local breed bitch

Presented bitch for mastectomy (A), elliptical skin incision (B), removed mammary tumor (C), closed skin with a cross-mattress pattern (D), the cytological appearance of tumor cell (E),

applied a locally prepared Elizabethan collar to the bitch's neck (F), after skin suture was removed on 14th day of post-operation (G), successfully healed bitch after a month (H).

3.3.1.6. Post-operative care and outcomes

Broad-spectrum antibiotic combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg and tramadol hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg were injected intramuscularly for 5 and 3 consecutive days, respectively. An oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied to the wound. A locally prepared Elizabethan collar was applied to the bitch neck to control self-inflicted trauma (Fig.11F). The owner was advised to control an Elizabethan collar so it did not dislodge, and lavage of the wound once daily with 2% iodine tincture was carried out. Dehiscence of the wound was encountered on the 6th day of post-operation at the place where the left inguinal lymph node was removed by self-inflicted trauma due to the locally prepared applied Elizabethan collar being dislodged from the bitch neck. However, the dehiscent wound was managed as an open wound and after 14th days of post-operation, the skin suture non-dehiscent area was removed (Fig.11G). The bitch was successfully healed after a month (Fig. 11H). Based on clinical signs and cytological examination, the tumor was tentatively diagnosed as a benign tumor mammary gland adenoma.

3.3.1.7. Discussion

Mammary gland tumors are common in female dogs, accounting for up to 42% of all tumors in the bitch (Maiti *et al.*, 2014). They occur most often in bitches 10–11 years old and are very rare in dogs less than 5 years of age. Anatomically, about 70% of all mammary tumors develop in glands 4 or 5 (Han *et al.*, 2016). In the present case, the bitch was premedicated with atropine sulphate and diazepam intramuscularly and intravenously as pre-anesthetics, respectively. Ketamine hydrochloride was injected intravenously as induction and ring block analgesia was achieved through the injection of 2% lidocaine surrounding the tumor subcutaneously. The surgery was maintained with a half-dose of ketamine whereas atropine sulphate and xylazine

were administered by the intramuscular route and were used as premedicants and Lignocaine was applied subcutaneously around the incision site and pentobarbital sodium was injected intravenously as a general anesthesia by Enem *et al.* (2011).

Since xylazine is a sedative, a muscle relaxant, and has an analgesic effect, it is better to use it with local anaesthesia, but in the present case, to obtain such effects, we used combination anaesthesia with the ring block method with 2% lidocaine.

In the current case, after the tumor was excised the subcutaneous fascia was sutured with simple continuous sutures using 2-0 polyglactin 910 (vicryl), and the skin was closed with a cross-mattress pattern using silk number 1 which is in line with (Hossain, 2023). In the present case, based on the bitch history, the tumour grew slowly and did not invade the entire mammary gland in a year, and cytologically, the tumour's cells were observed on the slide to be nearly identical in size and shape. Depending on that, the tumour was most likely a benign mammary gland adenoma, whereas Fesseha (2020); was confirmed histologically, that the mammary gland tumours showed malignancy-free tissue, composed of a higher nuclear to cytoplasm ratio, cellular pleomorphism, and prominent nucleoli with increased numbers of mitotic figures. Due to the lack of functional machines used for histopathological techniques, we conclude tentatively based on the cytology and lack of invasion of the tumour.

3.3.1.8. Conclusion

Tumors of the mammary gland are the most commonly affect unspayed female dogs after skin tumors. Mastectomy, lumpectomy, and chemotherapy are treatments for mammary tumors. As mammary tumors are hormone-dependent neoplasms, ovariohysterectomy at an early age is crucial to prevent its occurrence. In the present case, a successful mastectomy was performed in an intact local breed bitch.

3.3.2. Tail Amputation Due to Tail Injury in a Local Breed Dog

3.3.2.1. Abstract

Tail amputation is most commonly performed for the treatment of traumatic skin loss, ischemia, or denervation. A 3-year-old male local breed dog with an estimated weight of about 15kg was presented to the JUCAVM an open-air clinic after being bitten by another dog. The injured area

of the tail was covered with fresh clotted blood and contaminated with debris. All physiological parameters were found within normal ranges. The dog was appointed for the next day to fast from food and water. Upon arrival, atropine sulphate and diazepam were injected intramuscularly and intravenously as pre-anesthetics, respectively. Ketamine hydrochloride was administered intravenously as induction and a lumbosacral epidural nerve block was done with 2% lidocaine hydrochloride. The surgical site was aseptically prepared and tail amputation was performed under proper aseptic conditions. Post-operatively, a broad-spectrum antibiotic combination of procaine penicillin G, dihydrostreptomycin sulphate, and tramadol hydrochloride were injected intramuscularly for 5 and 3 days, respectively. An oxytetracycline HCL spray was applied to the wound and a locally prepared Elizabethan collar was lodged to the dog's neck. The suture was removed on the 10th-day post-operation, and the dog was healed uneventfully after 3 weeks post-operation. Dogs usually wag their tails and hit solid objects, which can hurt them and hinder their ability to recover from tail injuries. So amputation of the tail is the most successful course of treatment since a shorter, wagging tail reduces the risk of damage, even though it changes the dog's appearance.

Keywords: *Local breed dog, Tail amputation, Tail injury*

3.3.2.2. Introduction

The function of the tail in dogs and cats is primarily related to behavior and balance. Tail gestures play a role in intra- and interspecies communication and also allow scent dispersal from the sebaceous and serous glands located along the length of the tail and the circumanal glands and glands of the anal sacs. The tail is also used as a counterbalance during activities such as walking, running, and swimming (Simons *et al.*, 2014).

Tail docking is the amputation of a dog's tail at varying lengths to suit the recommendations of a breed standard (Sinmez *et al.*, 2017). The docking of dogs' tails remains controversial and centers on whether non-therapeutic docking reduces the risk of a tail injury sufficiently to justify the ethical concerns of prophylactic intervention (Diesel *et al.*, 2010). The procedure has been banned in the United Kingdom with exceptional provisions made for therapeutic and prophylactic tail docking in certified working dogs. Cosmetic tail docking is gradually becoming an issue in Africa with South Africa leading in the ban against the procedure while other African

countries are yet to have a legislative position on the procedure (Oghenemega and Oguntoye, 2016).

Tail docking in puppies is usually performed between days three to five of life or at 3 months under general anesthesia by surgical amputation with a scalpel. Some breeders, however, perform tail docking without anesthesia by the application of tight rubber rings around the tail which serves to occlude vessels caudal to the rubber ring, resulting in ischemic necrosis and sloughing of the tail. Complications from routine docking of neonatal puppies include infection, necrosis, changes in behavior, self-mutilation, and extreme cases, death (Eyarefe and Oguntoye, 2016).

Amputation of the tail is indicated in cases of infection, ischemic necrosis, injury, neoplasm, gangrene, and for cosmetic purposes. Tail amputation should only be performed on those dogs whose tail, or associated structures have been injured or where there is occult pathology of this appendage (Olatunji-Akioye *et al.*, 2010). Therapeutic docking of older dogs may lead to complications such as scarring, dehiscence, fistula recurrence, self-mutilation, and anal sphincter or rectal trauma, but, if performed correctly, the procedure can have a satisfactory outcome (Wells, 2013). In mature dogs, tail amputation is most commonly performed for the treatment of traumatic skin loss, ischemia, or denervation. Combined with other therapies, tail amputation may also improve outcomes (Haben Fesseha, 2020a). Therefore, this case report describes a successful tail amputation in a local breed dog that suffered from a tail injury.

3.3.2.3. Case history and clinical examination

A 3-year-old male local breed dog with an estimated weight of about 15kg was presented to the JUCAVM an open-air clinic with a complaint of tail injuries due to being bitten by other dogs while they were fighting. Upon physical examination, the tail of the dog was injured with bleeding from the injured part (Fig. 12A). The injured area of the tail was covered with fresh clotted blood and contaminated with debris. The dog was diagnosed with different clinical parameters, like heart rate, and respiration rate, and the temperature all were found within normal limits (Annex. 2). Finally, the amputation of the dog's tail was decided and the dog was appointed for the next day to fast from food and water for 12 and 6 hours respectively.

3.3.2.4. Pre-operative preparation and animal control

Up on arrival, all parameters were checked and they were found within normal limits. Atropine sulphate 0.1% (which is manufactured by: Ciron Drugs & pharmaceuticals Pvt, Ltd. India) @ 0.04mg/kg was injected intramuscularly and diazepam 0.5% (which is manufactured by: Farbe Firma Pvt. Ltd. Gujarat, India) @ 0.5mg/kg was injected intravenously as pre-anesthetics. Ketamine hydrochloride 5% (which is manufactured by: Neon Laboratories Ltd. India) @ 5.5mg/kg was injected intravenously as induction. A cranial epidural nerve block was injected between the lumbar and sacral bone with 2% lidocaine hydrochloride (which is manufactured by: Lincoln Pharmaceuticals Ltd, Gujarat, India) @ 1ml/6kg. After proper sedation, the dog was positioned in lateral recumbency, and the area around the injured tail was washed with water and soap. The hair was shaved and the surgical site was scrubbed with 2% iodine tincture. The dog was kept on fluid therapy with 5% dextrose solution (which is manufactured by: Sansheng Pharmaceutical Plc. Oromia region, Ethiopia) 1000 ml stat IV @ 10ml/kg/hr as calculated rate 1 drop/second. A tourniquet was applied above the surgical site using sterile gauze (Fig. 12B).

3.3.2.5. Intra-operative surgical procedure

After piercing the tail with a sterile treatment needle to locate the intercoccygeal space (Fig. 12B) a V-shaped skin incision was made around 1-2cm caudal to the joint space at the proposed amputation site, at the base of the tail (Fig. 12C). The coccygeal muscles were transected and the coccygeal vertebrae disarticulated both dorsally and ventrally with scalpel blade number 23. The surgery was maintained with a half dose of ketamine. The dorsal and ventral skin flaps were pulled cranially to provide a tension-free closure using a scalpel blade. The skin and coccygeal fascia were closed together with a simple interrupted using nylon number 1 (Fig. 12D).



Figure 12. Tail amputation in a local breed dog

Presented dog with injured tail (A), applied tourniquet above surgical site and piercing the tail with a sterile treatment needle to locate the intercoccygeal space (B), incised skin in V-shaped (C), sutured skin and coccygeal fascia together with simple interrupted suture pattern (D), the stump tail rolled with gauze and fixed with plaster (E), successfully healed dog after three weeks of post-operation (F).

3.3.2.6. *Post-operative care and outcomes*

Broad-spectrum antibiotic combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg and tramadol

hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg were injected intramuscularly for 5 and 3 consecutive days, respectively. An oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied to the wound. Finally, the stump was rolled with sterile gauze and fixed with plaster (Fig. 12E). A locally prepared Elizabethan collar was lodged to the dog's neck to control self-inflicted trauma. The owner was advised to control an Elizabethan collar so it did not dislodge, and lavage of the wound once daily with 2% iodine tincture was carried out. The skin suture was removed on the 10th day post-operation and the dog was healed uneventfully after 3 weeks (Fig. 12F).

3.3.2.7. Discussion

Dogs suffer tail injuries from a variety of causes, including attacks, during work or exercise, from having their tail caught in a gate or door, and even from docking. Injuries can affect the skin, bone, musculature, or a combination of these (Wells, 2013). In the present case, atropine sulphate and diazepam were injected intramuscularly and intravenously as pre-anesthetics, respectively. Ketamine was injected intravenously as induction and a lumbosacral epidural nerve block was done with 2% lidocaine. The surgery was maintained with a half dose of ketamine which disagrees with Haben Fesseha (2020a); in which the dog was premedicated with xylazine HCl intramuscularly and lumbosacral epidural nerve block was done with 2% lidocaine to reduce hemorrhage. This is due to xylazine has the actions of sedation, analgesia, and muscle relaxation. But in the case at hand, to fulfill all those effects, we used an atropine, diazepam, and ketamine anesthetic protocol with 2% lidocaine to block the cranial epidural nerve.

In the current case, a V-shaped skin incision was made around 1-2cm caudal to the joint space at the proposed amputation site, at the base of the tail. The coccygeal muscles were transected and the coccygeal vertebrae disarticulated both dorsally and ventrally with scalpel blade number 23. The dorsal and ventral skin flaps were pulled cranially to provide a tension-free closure using a scalpel blade. The skin and coccygeal fascia were closed together with a simple interrupted pattern using nylon number 1 which is in line with Haben Fesseha (2020a). The suture was removed on the 10th day post-operation and the dog was healed uneventfully after 3 weeks.

3.3.2.8. Conclusion

Overall, there is evidence to support that tail docking in dogs is a painful procedure that should not be permitted as it causes acute and chronic detrimental effects on dog welfare. Dogs usually wag their tails, hitting them repeatedly against solid objects and causing injury, so the tail injury will not heal. The best solution is surgical shortening of the tail. Although this changes the dog's appearance, a shorter, wagging tail is less likely to cause injury. In the present case, a successful tail amputation was performed due to a tail injury in a local breed dog.

3.3.3. Open Castration in a Local Breed Dog

3.3.3.1. Abstract

Surgical sterilization of dogs and cats is a well-accepted measure for population control in some countries but is considered unethical as an elective surgery in other countries. A four-year-old local breed dog, with an estimated weight of about 15kg, was brought to JUCAVM an open-air clinic for neutering. All physiological parameters were found within normal ranges. The dog was appointed for the next day to fast from food and water. Up on arrival, all parameters were checked and all were found within normal limits. During scrotal palpation, both testicles descended from the abdominal cavity, and atropine sulphate and diazepam were injected intramuscularly and intravenously as pre-anesthetics, respectively. Ketamine hydrochloride was administered intravenously as induction. After the surgical site was aseptically prepared open castration was performed under proper aseptic conditions. Post-operative care involved intramuscular injections of an antibiotic combination of procaine penicillin G, and dihydrostreptomycin sulphate, and tramadol hydrochloride for 5 and 3 consecutive days respectively. A locally prepared Elizabethan collar was applied to the dog's neck and the wound daily was lavaged with 2% iodine tincture. The dog was successfully healed after a month. Neutered animals may be more susceptible to obesity. Proper nutritional management can help avoid this higher weight gain.

Keywords: *Local breed dog, Orchiectomy, Pre-scrotal*

3.3.3.2. Introduction

Dogs and cats are multiparous animals with short gestation time, with the potential to produce numerous offspring that can reach sexual maturity at 6 months of age (Vendramini *et al.*, 2020). These factors associated with pet owners' lack of responsibility contribute to the abandonment and uncontrolled growth of the dog and cat population (Mota-Rojas *et al.*, 2021). In general, there are two types of dog and cat population control methods used worldwide: surgical sterilization and chemical sterilization (Stafford, 2006). Surgical sterilization of dogs and cats is a well-accepted measure for population control in some countries but is considered unethical as an elective surgery in other countries (Root Kustritz, 2012). The most common indication for orchiectomy is surgical sterilization (neutering). Other indications are the reduction of androgen-related disorders (anxiety and aggressiveness), the tendency to roam, undesirable urination, prostatic disease, perianal adenomas, perineal hernias, and the prevention of hereditary diseases, testicular abnormalities, scrotal urethrostomy, inguinal-scrotal herniorrhaphy, and endocrine abnormalities (Yiapanis *et al.*, 2021).

Castrations in dogs and cats are performed under general anesthesia (Huuskonen *et al.*, 2013). Different protocols of injectable induction and maintenance with inhalant agents were illustrated. Post-pubertal castration is performed between the ages of six to nine months. Prepubertal castration also called juvenile neutering in cats less than five months of age. Juvenile castration in cats aged between six to sixteen weeks was reported as an acceptable age (El-Sherif, 2017). Feline castrations are performed scrotally, whereas canine castrations may be performed pre-scrotally or scrotally. Scrotal castration is the preferred technique in the puppy (Bushby and White, 2020). In adult dogs, pre-scrotal castration is the traditional technique that has been taught for many years, while scrotal castration is gaining popularity among high-quality high-volume-spay-neuter (HQHVSN) veterinarians (Woodruff *et al.*, 2015).

Canine and feline castration can be performed with a closed technique, not incising the parietal vaginal tunics, or with an open technique in which the parietal vaginal tunics are incised (Tear, 2016). Advantages of a closed castration include not entering the peritoneal cavity and that the ligature remains external to the inguinal canal, making it possible to retrieve it without entering the abdomen should bleeding occur intra- or post-operatively (Kutzler, 2010).

An advantage of an open castration is the ease of exteriorizing the testicle since the fibrous attachments of the vaginal tunic need not be broken down (Bennett, 2021). Some research has shown a greater risk of scrotal complications, including swelling, bruising, and pain, with the use of open castration in dogs (Kristoffersson, 2022).

Complications of castration include scrotal swelling, hemorrhage, bruising, and infection (Kilcoyne *et al.*, 2013). In the dog, swelling and bruising of the scrotum are more commonly seen after open castration (Van Goethem, 2016b). Severe hemorrhage after castration may be serious and may result in scrotal hematoma or intra-abdominal hemorrhage. Serious hemorrhage may require intensive supportive care and an abdominal approach to locate and ligate the spermatic cord. Scrotal hematoma, if severe, may necessitate scrotal ablation (Howe, 2006). Most complications associated with orchiectomy can be prevented by using good surgical techniques, including gentle tissue handling, good hemostasis, and an aseptic technique (Koenraadt *et al.*, 2014). Therefore, this case report describes the elective surgical sterilization of a local breed dog with a closed technique through a pre-scrotal approach.

3.3.3.3. Case history and clinical examination

A four-year-old local breed dog with an estimated weight of about 15kg was brought to JUCAVM an open-air clinic for neutering. The owner wanted to sterilize the dog to prevent breeding and reduce its aggressive behaviour. On clinical examination, the recorded heart rate was 90 beats/minute, respiratory rate 25 breaths/minute, and temperature 38.9⁰C (Annex. 2), all were found within normal physiological limits. The dog was in good body condition (Fig. 13A), during scrotal palpation, both testicles already descended from the abdominal cavity and the decision was made to perform an orchiectomy under general anesthesia. The dog was appointed for the next day to fast from food and water for 12 and 6 hours respectively.

3.3.3.4. Pre-operative preparation and animal control

Upon arrival, all parameters were checked and they were found within normal ranges. Atropine sulphate 0.1% (which is manufactured by: Ciron Drugs & pharmaceuticals Pvt, Ltd. India) @ 0.04mg/kg was given intramuscularly and diazepam 0.5% (which is manufactured by: Farbe Firma Pvt. Ltd. Gujarat, India) @ 0.5mg/kg was given intravenously as pre-anesthetics. Ketamine hydrochloride 5% (which is manufactured by: Neon Laboratories Ltd. India) @

5.5mg/kg was injected intravenously as induction. As the dog became calm, surgical site preparation was taken. The scrotal area between the base of the scrotum and the os penis was washed with water and soap and the hair was shaved. The surgical site was scrubbed with 2% iodine tincture. The dog was positioned in dorsal recumbency with its front and hind legs tied in a forward and backward direction respectively to the surgical table, and the tail was also deviated from the surgical field.

3.3.3.5. Intra-operative surgical procedure

After the patient was secured in the appropriate position, the testis was grasped and pushed cranial to a pre-scrotal area with the left hand, and around 2–3cm long incision was made on the skin and subcutaneous fascia with scalpel blade number 23 (Fig. 13B). The cranial pole of the testis was pushed up to the incision. By squeezing below the testis while cutting incompletely incised subcutaneous fascia, let the testicle come out through the incision line. Then the testis that popped out through the incision line was grasped and pulled with the right hand, while the left hand was used to hold at the scrotum stabilizer and break the scrotal ligament, which attaches the scrotum to the caudal pole of the testis. The spermatic cord was first clamped using three hemostats (Fig. 13C); double ligated using polyglycolic acid (PGA) number 2-0. The spermatic cord was then severed between the middle hemostat and the hemostat near the testis and removed. After the stump was checked for bleeding, held with thumb forceps, and released (Fig. 13D). The surgery was maintained with a half-dose of ketamine. The same procedure was followed for the second testis, and the incision was closed in two layers. The subcutaneous fascia was sutured with a simple continuous suture pattern and the skin was closed with a buried, continuous horizontal subcuticular with the same type of suture material (Fig. 13E).



Figure 13. Orchiectomy in a local breed dog

Presented dog for orchiectomy (A), pre-scrotal skin incision (B), application of hemostatic forceps on the spermatic cord (C), check bleeding from the stump (D), sutured skin with a buried, continuous horizontal subcuticular pattern (E), successfully healed dog after a month (F).

3.3.3.6. Post-operative care and outcomes

Broad-spectrum antibiotic combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg and tramadol

hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg were injected intramuscularly for 5 and 3 consecutive days, respectively. An oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied to the wound. The Elizabethan collar was prepared from local material and applied to the dog's neck to control self-inflicted trauma. The owner was advised to control an Elizabethan collar so it did not dislodge, and lavage of the wound once daily with 2% iodine tincture was carried out. The owner was also advised to subjectively assess pain, inflammation at the surgical site, defecation and urination behaviors, and to restrict exercise. After twenty days later the dog was healed effectively.

3.3.3.7. Discussion

Canine castration is one of the most common procedures performed in veterinary medicine and the pre-scrotal surgical approach has traditionally been the most commonly taught method (Stevens *et al.*, 2013). Intact male dogs often mount other animals (including people), have urine marks, display aggressive tendencies, have increased inter-male aggression, and have a higher drive to roam. Castration has been shown to effectively decrease such unwanted behaviors as urine marking, mounting, and roaming (Kriese *et al.*, 2022). The preference for pre-scrotal access may be due to the cosmetic finish of a closed skin incision yielding minimal discharge, as this is generally considered to be more acceptable to pet owners since patients recover from surgery in the home (Brunn, 2022). In the present case, the testis was pushed to a pre-scrotal area, and around 2-3cm long incision was made on the skin and subcutaneous fascia. The testicle was then pulled out through the incision line, while the scrotal ligament was broken. The spermatic cord was clamped using three hemostats, double ligated with polyglycolic acid (PGA) number 2-0, and severed between the middle hemostat and the hemostat near the testis. The stump was checked for bleeding, held with thumb forceps, and released. The second testis was done accordingly. The incision was closed in two layers, with the subcutaneous fascia sutured with simple continuous and the skin was closed with a buried, continuous horizontal subcuticular pattern.

Complications in dogs following pre-scrotal castration commonly involve scrotal inflammation and swelling, scrotal hematoma, incisional swelling or discharge, urethral trauma, and excessive patient attention to the surgical site (Bushby, 2012). In the current case, the dog was

successfully recovered without complication. This may maybe due to appropriate surgical site preparation, proper surgical procedures, meticulous attention to aseptic technique, and good post-operative management.

3.3.3.8. Conclusion

Neutering prevents unwanted pregnancies, and androgen-related behaviors, reduces neoplasia risk, and extends dog and cat lifespans. However, neutered animals may be more susceptible to obesity. Proper nutritional management can help avoid this higher weight gain. In this case, a successful orchiectomy was done in a local breed dog to prevent breeding and for behavioral modification.

3.3.4. Ovariohysterectomy in a Local Breed Bitch

3.3.4.1. Abstract

Ovariohysterectomy, in which the uterus and ovaries are surgically removed, is the most often performed surgical procedure on the female reproductive system in veterinary medicine. A 3-year-old local breed bitch was presented to the JUCAVM an open-air clinic for spaying. All physiological parameters were found within normal ranges. The bitch was appointed the next day to fast from food and water. Up on arrival, all parameters were checked and they were found within normal limits. Atropine sulphate and diazepam were injected intramuscularly and intravenously as pre-anesthetics, respectively. Ketamine hydrochloride was injected intravenously as induction. After the surgical site was aseptically prepared an ovariohysterectomy was performed under proper aseptic conditions. Post-operatively, a broad-spectrum antibiotic combination of procaine penicillin G, dihydrostreptomycin sulphate, and tramadol hydrochloride were injected intramuscularly for 5 and 3 consecutive days, respectively, and an oxytetracycline HCL spray was applied to the wound. Elizabethan's collar was prepared from local material and lodged in the bitch's neck, and the skin suture was taken out on the 10th day of post-operation. After twenty days, the bitch was successfully healed. Through OVH, it is possible to significantly lower the number of stray dogs and zoonotic diseases like rabies and the only treatment for pyometra following ineffective medical intervention.

Keywords: *Bitch, Ovariohysterectomy, Ventral midline*

3.3.4.2. Introduction

The presence of roaming dogs can bring a range of problems, including disease risks, nuisance behaviors, and welfare problems, not least through road traffic accidents (Hiby and Hiby, 2017). In general, there are two types of dog population control methods used worldwide: surgical sterilization (midline ovariohysterectomy, lateral flank ovariohysterectomy, castration, early age gonadectomy, laparoscopic ovariohysterectomy, ovariectomy, and vasectomy) and non-surgical sterilization (immune-sterilization, hormonal control, isolation, and intrauterine device) (Urfer and Kaeberlein, 2019). Ovariohysterectomy (OHV), one of the most often performed surgical procedures on the female reproductive system in veterinary medicine, is carried out while the patient is under general anesthesia (Farghali *et al.*, 2020). An ovarian hysterectomy involves the removal of the ovaries, uterine horns, and uterine body (Kutzler, 2020)

The majority of uterine diseases are best treated with OVH in addition to elective sterilization. Various conditions, such as congenital abnormalities, pyometra, localized or diffuse cystic endometrial hyperplasia (CEH), uterine torsion, uterine prolapse, uterine rupture, and uterine neoplasia (Van Goethem *et al.*, 2006). OVH surgery carries many of the same dangers as celiotomy surgery, including anesthetic problems, hemorrhages, incisional hernias, slow healing, abscesses, infections, and mortality. Examples of short-term problems include bleeding of the ovarian or uterine pedicle, the onset of pseudocyesis, bloody vulvar discharge, and more. Long-term consequences include intestine and peritoneal adhesions, ovarian or uterine granulomas with or without fistulation, recurrent estrus, vaginal hemorrhage, urine incontinence, and ovarian residual syndrome (Adin, 2011)

The incidence of surgical complications following canine OVH varies between 6.1 and 27.0%, according to publications, and is unrelated to the patient's age, the surgeon's expertise, or the presence of a reproductive disorder (Palestrini *et al.*, 2021). The most common cause of death following OVH is intra-abdominal hemorrhage, which is more common when dogs are sterilized when they are in heat due to the influence of estrogen (Benavides Melo *et al.*, 2018). Therefore, this case report describes an elective ovariohysterectomy in a bitch that was performed through a midline celiotomy.

3.3.4.3. Case history and clinical examination

A 3-year-old local breed bitch with an estimated weight of about 15kg was presented to the JUCAVM an open-air clinic for spaying. The owner wants to stop his bitch from breeding, and the patient's history revealed that the bitch had whelped two rounds. The bitch got a full general physical assessment (Fig. 14A). All physiological measurements, including heart rate (84 beats/minute), body temperature (38.8°C), and respiration rate (20 breaths/minute) (Annex. 2), were found within normal ranges. The bitch was determined to be seemingly healthy enough to have an ovariohysterectomy and appointed for the next day to fast from food and water for 12 and 6 hours, respectively.

3.3.4.4. Pre-operative preparation and animal control

Up on arrival, all parameters were checked and they were found within normal limits. Atropine sulphate 0.1% (which is manufactured by: Ciron Drugs & pharmaceuticals Pvt, Ltd. India) @ 0.04mg/kg was injected intramuscularly and diazepam 0.5% (which is manufactured by: Farbe Firma Pvt. Ltd. Gujarat, India) @ 0.5mg/kg was injected intravenously as pre-anesthetics. Ketamine hydrochloride 5% (which is manufactured by: Neon Laboratories Ltd. India) @ 5.5mg/kg was injected intravenously as induction. After the bitch became calm the umbilical region was prepared for aseptic surgery by washing the surgical field with tap water and soap and the hair was shaved. The bitch was positioned in dorsal recumbency with her front and hind legs tied in a forward and backward direction respectively to the surgical table, and the tail also deviated from the surgical field. The skin was scrubbed with a 2% iodine tincture solution.

3.3.4.5. Intra-operative surgical procedure

For simple exteriorization of the ovaries and uterus, a midline incision around 4cm was performed around 2-3cm below the umbilicus and extended to the pubis using a surgical blade number 15 (Fig. 14B), the abdominal contents were exposed by cutting through the three layers (skin, linealba, and peritoneum). The subcutaneous fat was sliced after the skin and subcutaneous fascia were incised to visualize the linealba. The external rectus sheath's dazzling white fibers were revealed after removing the loose fascia and fat that covered held by using plain Adson tissue forceps and extending it by snipping it off with a blunt-blunt curved Metzenbaum scissor. Rat-toothed thumb forceps was used to grasp the linealba and hold it tented up to make a stab

incision. Then the peritoneum was grasped with plain adson tissue forceps to pull it up so as not to injure internal organs. Then, after incising the grasped peritoneum in the upward direction of the blade, put the index fingers through the incised hole to search the uterine horn.

The ovary and uterus were grasped between the thumb and index finger and withdrawn for ligation (Fig. 14C). The suspensory ligament of the ovary was ruptured by traction, and three artery forceps were applied for the ligation of the ovarian pedicle. Trans fixation of double ligation was done with catgut number 2-0 at the ovarian pedicle and severed between the second and the third forceps. The severed stump was checked carefully for hemorrhage before being released. The surgery was maintained with a half-dose of ketamine. The second ovary was done accordingly and the uterine body was exteriorized. The uterine body, including the uterine artery, was ligated by double trans fixation ligation above the cervix, and the uterus was severed just cranial to the ligature. The uterine stump was checked for hemorrhage and released. Linea alba and peritoneum were sutured together with a simple continuous suture pattern using the same suture material. Subcutaneous fascia was closed with a subcuticular pattern and the skin was sutured with cross-mattress using silk number 1 (Fig. 14D).

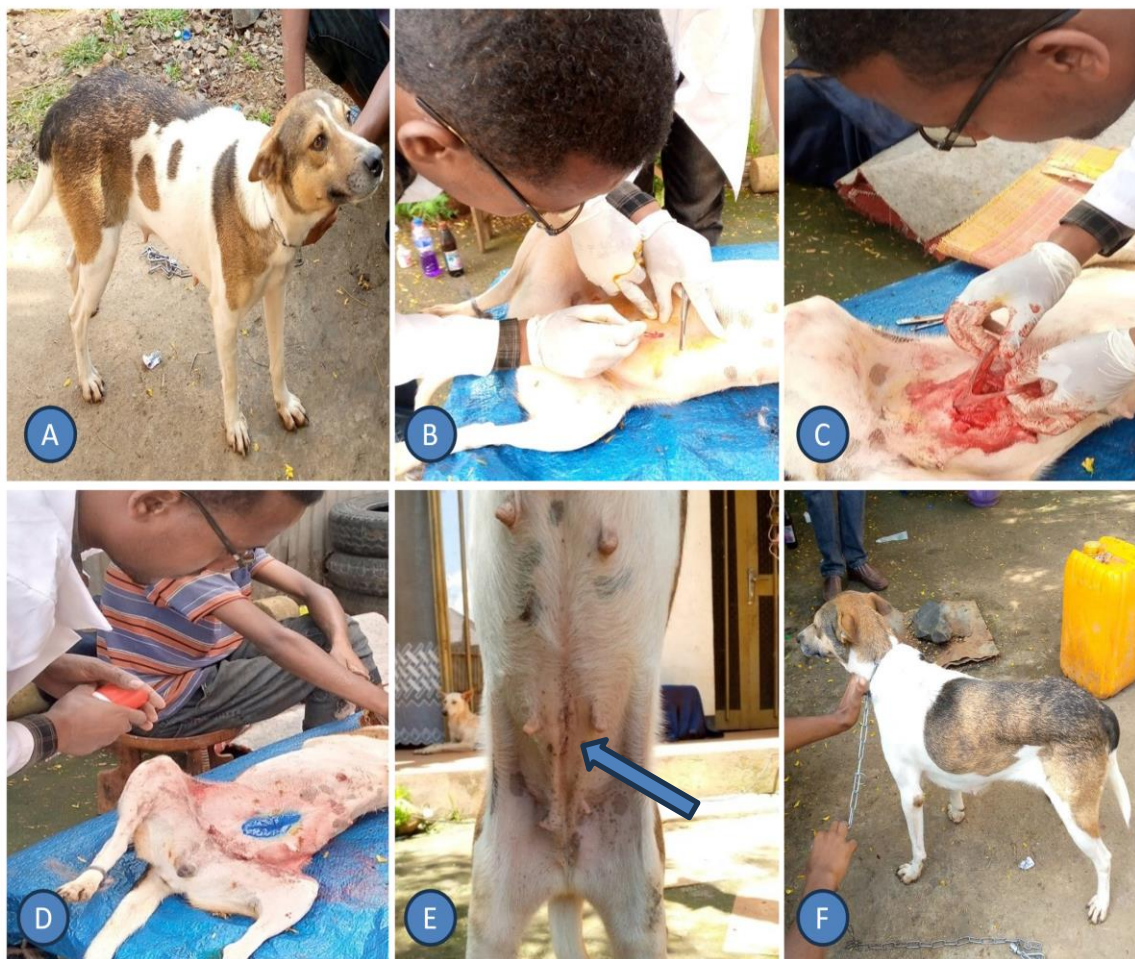


Figure 14. Ovariohysterectomy in a local breed bitch

Bitch Presented for OVH (A), skin incision (B), exteriorization of uterine horns and uterus (C), after surgery an oxytetracycline HCL spray was applied to the wound (D), healed surgical site after the skin suture was taken out on 10th day of post-operation (E). stand bitch after successfully recovered on the 20th day of post-operation (F)

3.3.4.6. Post-operative care and outcomes

Post-operatively, a broad-spectrum antibiotic combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg and tramadol hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg were injected intramuscularly for 5 and 3 consecutive days,

respectively. An oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provect Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied to the wound. Elizabethan's collar was prepared from local material and applied to the bitch neck to control self-inflicted trauma. The owner was advised to control an Elizabethan collar so it did not dislodge and lavage the wound once daily with a 2% iodine tincture was carried out. The owner was also advised to subjectively assess pain, inflammation at the surgical site, defecation, and urination behaviors, and to restrict exercise. Post-operatively, decreased appetite, hypothermia, and slight wound inflammation were observed, and after a few days, they disappeared and the bitch became normal. The skin suture was taken out on the 10th-day post-operation (Fig. 14E), and twenty days later the bitch was successfully healed (Fig. 14F).

3.3.4.7. Discussion

Spaying refers to an ovariohysterectomy, in which the uterus and ovaries are surgically removed (DeTora and McCarthy, 2011). Ovariohysterectomy is typically carried out by a tiny ventral midline incision in canines and felines (Howe, 2006). In the present case, atropine sulphate and diazepam were injected intramuscularly and intravenously as pre-anesthetics, respectively. Ketamine hydrochloride was injected intravenously as induction and the surgery was maintained with a half-dose of ketamine throughout the procedure whereas Islam *et al.* (2019); used atropine sulphate intramuscularly as pre-anesthetic and diazepam and ketamine as induction. Anesthesia was maintained subsequently with ketamine and diazepam in bitch presented for both caesarean sections with surgical sterilization. It is possible to use both anesthetic protocols.

In the current case, a midline incision was made around 4cm below the umbilicus and extended to the pubis, exposing the abdominal contents. The ovaries and uterus were withdrawn for ligation, and the suspensory ligament was ruptured. The ovarian pedicle was ligated using three artery forceps. Transfixation double ligation was done with catgut number 2-0 at the ovarian pedicle and severed between the second and the third forceps. The stump was released after being checked for hemorrhage. The second ovary was done accordingly, and the uterine body was withdrawn. 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 released. Linea alba and peritoneum were sutured together with a

simple continuous pattern, while subcutaneous fascia was sutured with a subcuticular pattern and the skin was closed using silk number 1 which is in line with Azizunnesa *et al.* (2017).

Post-operatively, no complication was noted in the above case and the bitch recovered uneventfully. On the 14th day post-operation, the suture was removed and it was noticed that the surgical site was healed completely whereas in the current case, decreased appetite, hypothermia, and slight wound inflammation were observed, and after a few days, they disappeared and the bitch became normal. The skin suture was taken out on the 10th day post-operation, and twenty days later the bitch was successfully healed. This may be due to untoward effects of anesthesia and poor post-operative care of the owner.

3.3.4.8. Conclusion

OVH is the best method for surgical sterilization. Through OVH, it is possible to significantly lower the number of stray dogs and zoonotic diseases like rabies and the only treatment for pyometra following ineffective medical intervention. In the present case, a successful ovariohysterectomy was done in a local breed bitch to prevent breeding.

3.3.5. Ear Cropping Due to Unilateral Cauliflower Ear in a Local Breed Dog

3.3.5.1. Abstract

Ear cropping is the surgical removal of the ear flaps, cutting through the cartilage, skin, blood vessels, and very sensitive nerve endings. A 2-year-old male local breed dog with an estimated weight of about 12kg was presented to the JUCAVM an open-air clinic with a complaint of a swollen and hanged downward right ear. The patient's history revealed that two weeks ago, the dog suffered from an aural hematoma and the fluid was aspirated with a syringe by the local veterinarian. The dog's ear was not erected after treatment and the dog was scratched itself repeatedly. On clinical examination, all physiological parameters were found within normal ranges and the case was diagnosed as a unilateral cauliflower ear. The dog was appointed for the next day to fast from food and water. Upon arrival, all parameters were checked and found within normal physiological limits. Atropine sulphate and diazepam were injected intramuscularly and intravenously as pre-anesthetics, respectively. Ketamine hydrochloride was injected intravenously as induction. After the surgical site was aseptically prepared ear cropping

was performed under proper aseptic conditions. The dog underwent post-operative injection with a broad-spectrum antibiotic combination of procaine penicillin G, and dihydrostreptomycin sulphate, and tramadol hydrochloride intramuscularly for 5 and 3 consecutive days, respectively, followed by application of an oxytetracycline HCL spray to the wound. A locally prepared Elizabethan collar was lodged to the dog's neck and after a month the dog was healed successfully. Ear cropping is the most effective surgical treatment option for cauliflower ears caused by misdiagnosis of aural hematoma.

Keywords: *Aural hematoma, Cauliflower ear, Dog, Ear-cropping*

3.3.5.2. Introduction

Convenience surgery is the definition of a set of surgical interventions in pets that are not justified from a veterinary medical perspective. These interventions include tail-docking, ear-cropping, de-clawing and de-barking. Ear cropping and tail docking in domestic dogs are complex societal issues involving economic, aesthetic, welfare, and moral aspects (Sinmez *et al.*, 2017). Increasing concern about animals and their welfare has led many to question the practices of ear cropping and tail docking. Many countries have introduced legislation that restricts, and in some cases even bans these practices. For example, the European Union Convention for the Protection of Pet Animals prohibits surgical operations including tail docking and ear cropping for non-curative purposes. However, ear cropping is still permitted in some countries and basically, it is permitted upon the choice of the animals' owner (Mills *et al.*, 2016).

Ear cropping is the surgical removal of the ear flaps, cutting through the cartilage, skin, blood vessels, and very sensitive nerve endings (Packová and Takáčová, 2020). Ear cropping in the past had been practiced mainly to prevent ear damage during fighting and hunting. Some advocates also suggest that it reduces susceptibility to otitis and improves hearing, though supporting evidence is lacking (Norris *et al.*, 2023). The ear canal is lined with both apocrine (ceruminous) and sebaceous glands which, in healthy animals, produce a protective coating of earwax (cerumen). Dogs with long, floppy ears may be at a higher risk of developing otitis media. Breeds with floppy ears are more prone, since air flow is limited and a warm, moist environment builds up, and it is ideal for yeast and bacteria to flourish and spread. Some bacteria

(e.g., *Staphylococcus* spp., *Bacillus* spp.) and yeasts may occur in small amounts also in healthy dogs (Packová and Takáčová, 2020).

Ear cropping is a surgical procedure that is performed in some countries in puppies aged 7 to 12 weeks. In large breed puppies it is performed up to six weeks of age and in small breeds up to a maximum of nine weeks under general anesthesia by surgical intervention. The portion to be removed is determined according to the type of cut you choose. It could be a long crop, a show crop (medium), a short crop, or a battle crop. As for any incision, cropped ears may become infected. Cropped ears may also fail to stand or have a distorted shape or position potentially leading to subsequent operations (Williams and Lascelles, 2020). Therefore, the present case report describes a successful optional cosmetic ear cropping due to cauliflower ear in a local breed dog.

3.3.5.3. Case history and clinical examination

A 2-year-old male local breed dog with an estimated weight of about 12kg was presented to the JUCAVM an open-air clinic with a complaint of swelled and hanged downward right ear. The patient's history revealed that two weeks ago, the dog suffered from an aural hematoma and the fluid was aspirated with a syringe by the local veterinarian. After two weeks of treatment, the bent ear was not erected, and the swollen part of the ear did not come to its normal size. According to the owner, the dog had shaken its head and scratched its ear repeatedly with its hind legs. Physical examination revealed that the right ear shape was changed (wrinkled)) and flopped, and swelled (Fig. 15A) and there was a small wound on the convex side. During aspiration with the treatment needle, there was no fluid. All the measured parameters were found within the normal physiological ranges with a recorded heart rate was 90 beats/minute, respiratory rate of 25 breaths/minute, and temperature of 38.9⁰C (Annex. 2). Based on history and clinical indicators the case was diagnosed as cauliflower ear and ear cropping was decided as an option. The dog was appointed for the next day to fast from food and water for 12 and 6 hours respectively.

3.3.5.4. Pre-operative preparation and animal control

Upon arrival, all parameters were checked and they were found within normal limits. Atropine sulphate 0.1% (which is manufactured by: Ciron Drugs & pharmaceuticals Pvt, Ltd. India) @

0.04mg/kg was injected intramuscularly and diazepam 0.5% (which is manufactured by: Farbe Firma Pvt. Ltd. Gujarat, India) @ 0.5mg/kg was injected intravenously as pre-anesthetics. Ketamine hydrochloride 5% (which is manufactured by: Neon Laboratories Ltd. India) @ 5.5mg/kg was injected intravenously as induction. As the dog became calm, surgical site preparation was taken. The dog was positioned in left lateral recumbency with an affected ear upward position. Both ears were plugged with a piece of cotton. The aural area was washed with water and soap and the hair was shaved. Linear infiltration of 2% lidocaine hydrochloride (which is manufactured by: Lincoln Pharmaceuticals Ltd, Gujarat, India) on convex parts of ears was performed between skin and aural cartilage. The surgical site was scrubbed with 2% iodine tincture.

3.3.5.5. Intra-operative surgical procedure

After the patient was secured in the left lateral position chemically and manually, twisting of aural blood vessels was carried out with two large forceps in opposite directions dorso-ventrally and ventro-dorsally which touched each other at the center. The infected flopped part of the ear was resected with scalpel blade number 23 and the wound edges were sutured with a simple interrupted pattern by using chromic catgut number 2-0 (Fig. 15B). Surgery was maintained with a half-dose of ketamine. After measuring the healthy ear with the excised tip of the infected ear to locate the exact site of excision (Fig. 15C), the healthy ear was severed with the same procedure to equalize their shape (Fig.15D).



Figure 15. Ear cropping in a local breed dog

Presented dog for ear cropping due to cauliflower ear (A), skin suturing after the ear was cropped (B), measuring the healthy ear with the excised tip of the infected ear to locate the exact site of excision (C), the cropped healthy ear (D), after surgery (E), successfully healed dog after a month (F).

3.3.5.6. Post-operative care and outcomes

Broad-spectrum antibiotic combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg and tramadol hydrochloride (Manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg were injected intramuscularly for 5 and 3 consecutive days, respectively. An

oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied to the wound. The Elizabethan collar was prepared from local material and applied to the dog's neck to control self-inflicted trauma. The owner was advised to control the Elizabethan collar so it did not dislodge, and lavage of the wound once daily with 2% iodine tincture was carried out. The dog was healed successfully after a month (Fig. 15F).

3.3.5.7. Discussion

An aural hematoma is a blood-filled subcutaneous fluctuant swelling on the pinna formed when traumatic rupture of the capillaries and separation of the auricular cartilage and skin occurs. It may be unilateral or bilateral and can affect both dogs and cats, although cats are much less frequently affected. Pruritus or non-pruritic mechanical trauma to the ear pinna may result in the formation of an aural hematoma in dogs and cats. Additionally, an underlying immunologic disease has been proposed as a potential cause (Hewitt and Bajwa, 2020). In the present case report, the dog suffered from an aural hematoma on the right ear, and the fluid was aspirated with a treatment syringe by the local veterinarian two weeks ago.

Chronic organization of the hematoma can lead to fibrosis, contraction, and thickening of the pinna, potentially giving a deformed irregular appearance to the affected pinna ('cauliflower ear'), especially when conservative management is adopted (O'Neill *et al.*, 2021). In the current case, the dog was presented after two weeks of local treatment. Ear cropping should never be performed on a dog that is more than nine weeks of age, as the ear cartilage sets by the time the dog reaches four months of age. Thus, crops done after 9 weeks of age may never stand up properly (O'Rourke, 2000). In the present case, ear cropping was done due to the fluid being aspirated early in the formation of an aural hematoma by a local veterinarian, and during healing, the incompletely removed fluid resorbs and fibrosis occurs; contraction of the fibrotic tissue results in malformation of the pinna which agrees with Hewitt and Bajwa (2020). To the best of my knowledge, there is a dearth of reports on ear cropping in dogs due to therapeutic reasons. However, in the present case, a successful ear cropping in adult dogs has been conducted.

3.3.5.8. Conclusion

An aural hematoma is multi-etiological and causes severe damage to the ear in dogs if it is not managed properly at an earlier stage. In the present case, misdiagnosis of aural hematoma resulted in a unilateral cauliflower ear, and successful ear cropping was done as a cosmetic option.

3.3.6. Ovariohysterectomy Due to Open-Cervix Pyometra in a Queen

3.3.6.1. Abstract

Pyometra is a hormone-mediated pathological process secondary to bacterial infection, which produces an accumulation of purulent contents in the uterine lumen. An eleven-year-old queen, with an estimated weight of about 4kg, was presented to the JUCAVM an open-air clinic with a history of loss of appetite, swollen abdomen, inactive, and offensive vulvar discharge. On physical examination, the queen was noted to have abdominal distension and appeared moderately uncomfortable on palpation, and yellow color pus was leaked from the vulva. The case was diagnosed as an open-cervix pyometra and atropine sulphate was injected intramuscularly as pre-anesthetic. Ketamine hydrochloride was injected intramuscularly as induction. The surgical site was prepared aseptically and OVH was performed under proper aseptic conditions. Dextrose 5% solution was intravenously infused. The patient underwent post-operative intramuscular injections of a combination of procaine Penicillin G, and dihydrostreptomycin sulphate, and tramadol hydrochloride for 5 and 3 consecutive days respectively, followed by an oxytetracycline HCL spray applied to the wound with a daily dressing with a 2% iodine tincture. Post-operative complications decreased appetite, hypothermia, and slight wound inflammation disappeared after a few days, and the skin suture was taken out on the 14th day of post-operation. The queen was healed completely after a month. In conclusion, OVH is the most reliable method for the prevention and treatment of pyometra.

Keywords: *Open-cervix pyometra, Ovariohysterectomy, Queen*

3.3.6.2. Introduction

Pyometra is a hormone-mediated pathological process secondary to bacterial infection, which produces an accumulation of purulent contents in the uterine lumen (Rautela and Katiyar, 2019).

Following estrus (heat), progesterone levels remain elevated for several weeks, stimulating the uterine lining to thicken in preparation for pregnancy. If pregnancy does not occur for several estrus cycles, the lining increases in thickness until cysts form in the uterus. This condition is called cystic endometrial hyperplasia. The thickened cystic lining secretes fluids, creating an ideal environment where bacteria can grow (Ortega-Pacheco *et al.*, 2012). Predominantly Gram-negative bacteria such as *Escherichia coli* are generally present with inflammation and accumulation of pus in the uterus others like *Staphylococcus aureus*, *Pseudomonas sp.*, and *Streptococcus sp.* are the most frequently isolated uterine bacteria that can become opportunistic contaminants (Mustapha *et al.*, 2020). In cats, pyometra is not commonly encountered and depends on less progesterone dominance due to seasonality and induced ovulation (Hagman, 2018). Queen being an induced ovulatory, ovulation occurs 30-50 hours post-mating and starts to produce progesterone 24-48 hours post-ovulation. Pyometra most commonly occurs in cats that have had a heat cycle in the past 4 weeks (Misk and EL-sherry, 2020).

There are two types of pyometra; open-cervix pyometra and closed-cervix pyometra, depending on the condition of the cervix (Chatdarong *et al.*, 2014). In the case of a closed pyometra, a delay in surgical approach may result in potential uterine rupture, peritonitis, and sepsis which may lead to an increased risk for the animal's life (Enginler *et al.*, 2014). The clinical appearance of pyometra in cats and dogs is similar (Hagman *et al.*, 2014). A blood-stained, purulent vaginal discharge may be the only clinical symptom of 'open-cervix pyometra.' Animals with 'closed-cervix pyometra' may not have vaginal discharge and are more likely to become systemically unwell (Hasan *et al.*, 2021). Closed cervix pyometra is comparatively serious because of the absorption of toxins from the accumulated pus and the consequent development of toxemia (Kamble *et al.*, 2021b). Non-specific clinical indicators include anorexia, vomiting, lethargy, weight loss, and an untidy look. The most effective diagnostic tool in a pyometra case is abdominal ultrasonography (Islam, 2022).

Pyometra can be treated surgically or medically. However, the decision depends on several factors such as open or closed cervix pyometra, the health status of the animal, and whether the animal is intended for future breeding (McCallin *et al.*, 2021).

In medical treatment, prostaglandin F2 α (PGF2 α) and/or aglepristone can be administered to queens with open cervix pyometra (OCP) (Tohumcu *et al.*, 2022). However, there is a possibility

of disease recurrence with medical treatment. Because of this possibility, the surgical procedure of OHE is preferred. In addition, treatment should be supplemented with fluid therapy because of the possibility of developing endotoxemia (Tohumcu *et al.*, 2022). Therefore, this case report details the surgical treatment of an open-cervix pyometra in a queen.

3.3.6.3. Case history and clinical examination

An eleven-year-old queen with an estimated weight of about 4kg was presented to the JUCAVM an open-air clinic with a history of loss of appetite, swollen abdomen, inactive, and offensive vulvar discharge. The queen had a history of mating 35 days ago. On physical examination, the queen was noted to have abdominal distension and appeared moderately uncomfortable on palpation (Fig.16A). On clinical examination, the queen had a rectal temperature of 37.2 °C (Annex.2), which was hypothermic, and a pale mucous membrane. Other physiological parameters including respiration and heart rate were found within the normal limits. Hence it was diagnosed as a case of open-cervix pyometra and OVH was decided to address the case.

3.3.6.4. Pre-operative preparation and animal control

Atropine sulphate 0.1% (which is manufactured by: Ciron Drugs & pharmaceuticals Pvt, Ltd. India) was administered @ 0.04mg/kg intramuscularly as pre-anesthetic. Ketamine hydrochloride 5% (which is manufactured by: Neon Laboratories Ltd. India) @ 10mg/kg was also injected intramuscularly as induction. The surgical area was washed with water and soap from below the xiphoid process to the pubis and the hair was shaved. The surgical site was scrubbed with a 2% iodine tincture. Dextrose 5% solution (Which is manufactured by: Sansheng Pharmaceutical Plc. Oromia region, Ethiopia) was intravenously infused @ 10ml/kg/hr calculated as 1 drop/second.

3.3.6.5. Intra-operative surgical procedure

An incision was made in the middle of the underside along the length of the abdomen below the umbilicus (Fig. 16B). After exposing the uterus and uterine horns through celiotomy (Fig. 16C), the uterine and ovarian blood vessels were properly secured and the ovaries, uterine horns, and uterus were completely removed after double ligated with catgut number 1-0 (Fig. 16D). The surgery was maintained with half dose of ketamine. The peritoneum and linealba were closed

together with simple continuous using the same suture material and the skin and subcutaneous fascia were closed together with a cross-mattress suture pattern using silk number 1.



Figure 16. Ovariohysterectomy in a queen

Queen presented for OVH due to pyometra (A), skin incision (B), exteriorized uterine horns, and uterus with full of pus (C), successfully removed the uterus and its horns with full of pus (D), after removal of skin suture on the 14th day of post-operation (E), successfully healed queen after a month (F).

3.3.6.6. Post-operative care and outcomes

A combination of procaine Penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg and tramadol hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @

2mg/kg were injected IM for 5 and 3 consecutive days, respectively. An oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied to the wound. The wound was dressed once daily with a 2% iodine tincture. Post-operatively, decreased appetite, hypothermia, and slight wound inflammation were observed, and after a few days, they disappeared and the queen became normal. The skin suture was taken out on the 14th day of post-operation (Fig. 16E), and the surgical site healed completely after a month (Fig. 16F).

3.3.6.7. Discussion

Pyometra is a common disease in queens older than three years and other queens older than five years with no relationship to the number of parturitions (Agudelo, 2005). In the present case as a premedication drug atropine sulphate was injected intramuscularly. Ketamine hydrochloride was also injected intramuscularly as induction. During the operation, half of the ketamine initial dose was given as maintenance which disagrees with Nair *et al.* (2021); in which the anesthesia was induced with a combination of injection of ketamine and diazepam intramuscularly. Anaesthesia was maintained with isoflurane 1%- 2% in oxygen with a face mask. Gaseous anaesthetics have the best results in terms of quick recovery after surgery compared to injectable general anaesthesia, so due to the lack of availability in the current case, we maintained the surgery with ketamine.

In the case at hand, an incision was made in the middle of the underside along the length of the abdomen below the umbilicus. After exposing the uterus and uterine horns through celiotomy, the uterine and ovarian blood vessels were properly secured and the ovaries, uterine horns, and uterus were completely removed after double ligated with catgut number 1-0. The abdominal wall was closed with simple continuous with the same suture material and the skin was closed with a cross-mattress suture pattern using silk number 1 which is in line with Hasan *et al.* (2021).

On the 7th day post-operation, stitches were removed and the cat was successfully healed without any complications as recorded by Esen *et al.* (2020). However, in the current case decreased appetite, hypothermia, and slight wound inflammation were observed, and after a few days, they disappeared and the queen became normal. The skin suture was taken out on the 14th day of post-

operation, and the surgical site healed completely after a month. This may be due to the untoward effects of anesthesia and the owner's poor post-operative care.

3.3.6.8. Conclusion

In conclusion, OVH is the most reliable method for the prevention and treatment of pyometra to avoid its re-occurrence. In the present case, a successful OVH was performed as a surgical management option for open-cervix pyometra in a queen.

3.3.7. Open Castration in a Tomcat

3.3.7.1. Abstract

Surgical sterilization is used for population control and the reduction of androgen-related behaviours. A 4-year-old tomcat was presented to the JUCAVM an open-air clinic for neutering. The owner wanted to prevent breeding and reduce its aggressiveness. All physiological parameters were found within normal physiological ranges. The tomcat was withheld from food and water and upon arrival, all parameters were checked and they were found within normal limits. Atropine sulphate was injected intramuscularly as pre-anesthetic and ketamine hydrochloride was also injected intramuscularly as induction. The surgical site was aseptically prepared and orchiectomy was performed under proper aseptic conditions. The patient underwent post-operative treatment with an antibiotic combination of procaine penicillin G, and dihydrostreptomycin sulphate, and tramadol hydrochloride, followed by application of an oxytetracycline HCL spray to the wound and daily lavage with 2% iodine tincture. Post-operatively, decreased appetite, hypothermia, and slight wound inflammation were observed, and after a few days, they disappeared. The tomcat was successfully healed after a month. Neutered animals can be more susceptible to obesity, and this can be prevented with good dietary management.

Keywords: *Cat population, Scrotal, Surgical sterilization, Tomcat*

3.3.7.2. Introduction

Dogs and cats are multiparous animals with short gestation time, with the potential for producing numerous offspring that can reach sexual maturity at 6 months of age. These factors associated

with pet owners' lack of responsibility contribute to the abandonment and uncontrolled growth of the dog and cat population (Vendramini *et al.*, 2020). In general, there are two types of dog and cat population control methods used worldwide: surgical sterilization and chemical sterilization. Surgical sterilization of dogs and cats is a well-accepted measure for population control in some countries but is considered unethical as an elective surgery in other countries (Root Kustritz, 2012). The most common indication for orchiectomy is surgical sterilization (neutering). Other indications are the reduction of androgen-related disorders (anxiety and aggressiveness), the tendency to roam, undesirable urination, prostatic disease, perianal adenomas, perineal hernias, and the prevention of hereditary diseases, testicular abnormalities, scrotal urethrostomy, inguinal-scrotal herniorrhaphy, and endocrine abnormalities (Yiapanis *et al.*, 2021).

Castrations in dogs and cats are performed under general anesthesia. Different protocols of injectable induction and maintenance with inhalant agents were illustrated (Vasetska, 2020). Post-pubertal castration is performed between the ages of six to nine months. Prepubertal castration also called juvenile neutering in cats less than five months of age. Juvenile castration in cats aged between six to sixteen weeks was reported as an acceptable age (El-Sherif, 2017).

Feline castrations are performed scrotally, whereas canine castrations may be performed pre-scrotally or scrotally. Scrotal castration is the preferred technique in the puppy. In adult dogs, pre-scrotal castration is the traditional technique that has been taught for many years, while scrotal castration is gaining popularity among high-quality high-volume-spay-neuter (HQHVSN) veterinarians. Canine and feline castration can be performed with a closed technique, not incising the parietal vaginal tunics, or with an open technique in which the parietal vaginal tunics are incised (Bushby and White, 2020).

Complications of castration include scrotal swelling, hemorrhage, bruising, and infection. In dogs, swelling and bruising of the scrotum are more commonly seen after open castration (Howe, 2006). Severe hemorrhage after castration may be serious and may result in scrotal hematoma or intra-abdominal hemorrhage (Kutzler, 2010).

Serious hemorrhage may require intensive supportive care and an abdominal approach to locate and ligate the spermatic cord. Scrotal hematoma, if severe, may necessitate scrotal ablation

(Howe, 2006). Most complications associated with orchiectomy can be prevented by using good surgical techniques, including gentle tissue handling, good hemostasis, and aseptic technique (Van Goethem, 2016a). Therefore, this case report aimed to describe elective surgical sterilization in a tomcat.

3.3.7.3. Case history and clinical examination

A 4-year-old tomcat with an estimated weight of about 5kg was presented to the JUCAVM an open-air clinic for neutering. The owner wanted to prevent breeding and reduce its aggressiveness. On general physical examination, the cat was in good body condition (Fig. 17A), and vital parameters were found within normal limits, with a recorded temperature of 39⁰C, heart rate of 110 beats/minute, and respiratory rate of 23 breaths/minute (Annex. 2). The presence of both testicles in the scrotum of the cat was checked. The tomcat was appointed for the next day to fast from food and water for 12 and 6 hours respectively.

3.3.7.4. Pre-operative preparation and animal control

Up on arrival, all parameters were checked and they were found within normal limits. Atropine sulphate 0.1% (which is manufactured by: Ciron Drugs & pharmaceuticals Pvt, Ltd. India) @ 0.03mg/kg was injected intramuscularly as pre-anesthetic. Ketamine hydrochloride 5% (which is manufactured by: Neon Laboratories Ltd. India) @ 10mg/kg was also injected intramuscularly as induction. As the cat became calm, surgical site preparation was taken. The scrotal area between the base of the scrotum and the perineal area was washed with water and soap. The hair was shaved. The cat was laid in dorsal recumbency on the operation table, its four limbs held together manually by personnel and the tail was deviated out of the surgical field. The surgical area was draped and the surgical site was scrubbed with a 2% iodine tincture solution.

3.3.7.5. Intra-operative surgical procedure

The castration was done by the closed uncovered method. The testis was grasped and pushed towards the tip of the scrotum. Around 1.5cm incision was made over the scrotum and subcutaneous (Fig. 17B), and the testicle was squeezed and popped out. The spermatic cord was exposed (Fig. 17C), and artery forceps were applied to the spermatic cord, as close as possible to the opening of the inguinal canal. The surgery was maintained with half a dose of ketamine. The

spermatic cord was ligated, with trans fixation ligation with catgut number 2-0 below the artery forceps. Another artery forceps was applied below the ligation. Then the spermatic cord was severed with a scalpel blade number 23 below the ligature. The stump was released after being checked for hemorrhage holding with thumb forceps (Fig. 17D). The second testis was also done in the same way. The blood was soaked by a gauze mop and the scrotal skin was left open.

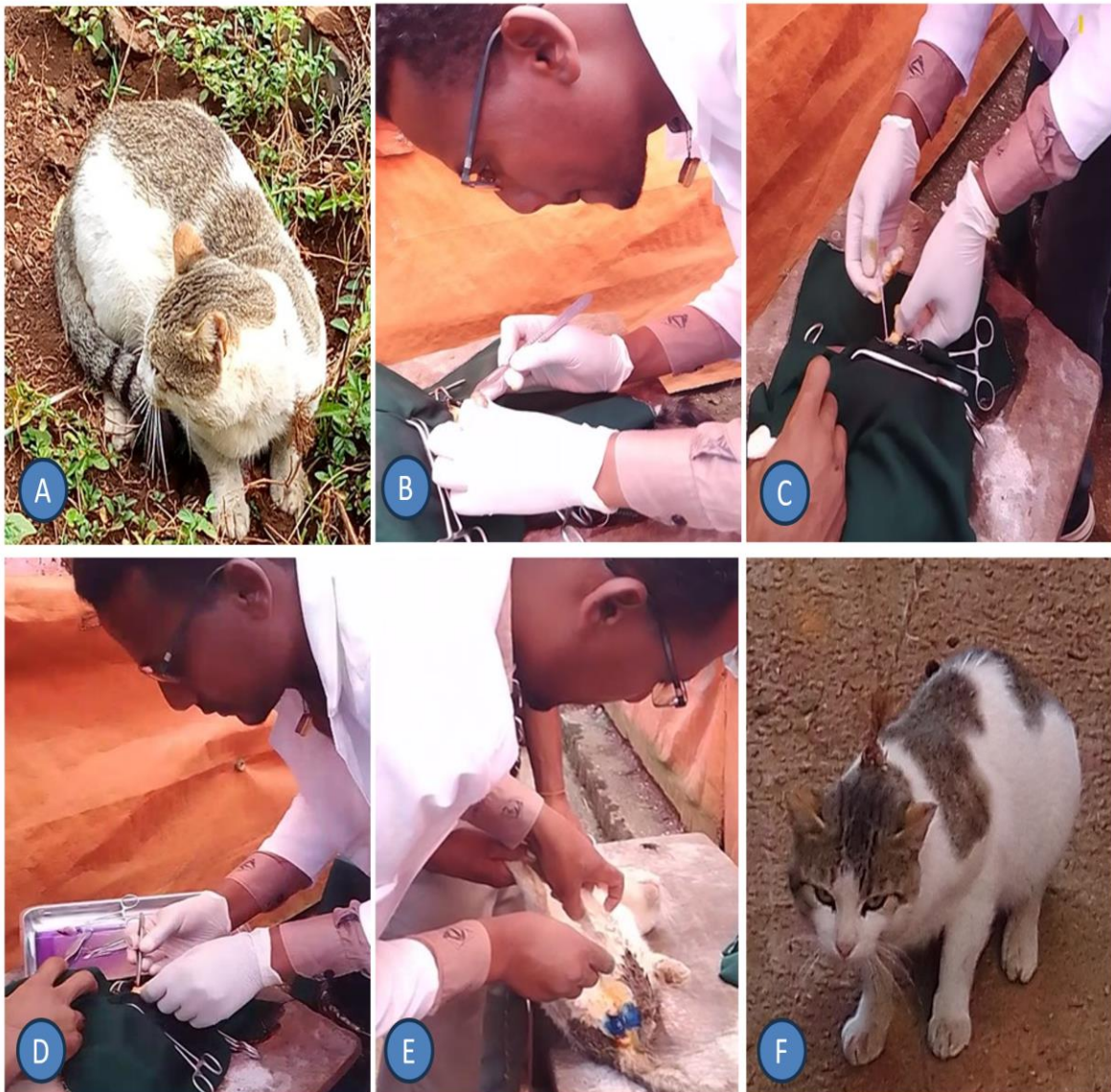


Figure 17. Orchiectomy in a tomcat

Tomcat presented for orchiectomy (A), scrotal skin incision (B), exteriorization of the spermatic cord (C), checkup bleeding from the stump after the spermatic cord was transected (D), after

surgery injection of antibiotic and with applied an oxytetracycline HCL spray (E), successfully healed tomcat after a month (F).

3.3.7.6. Post-operative care and outcomes

Broad-spectrum antibiotic combination of procaine penicillin G (200,000iu) and dihydrostreptomycin sulphate (200mg/ml) (H-Penstrepto 20/20 which is manufactured by: Habei Hope Harmony Pharmaceutical Co., Ltd. Hebei Province, China) @ 1ml/25kg and tramadol hydrochloride (which is manufactured by: Humanwell Pharmaceutical Plc. Amhara region, Ethiopia) @ 2mg/kg were injected intramuscularly for 5 and 3 consecutive days, respectively. An oxytetracycline HCL spray (Oxy Viocid 3.58% (w/w) which is manufactured by: Provet Veterinary Products industry, and Tic. Inc. Ankara, Turkey) was applied to the wound (Fig. 17E). The wound was lavaged once daily with 2% iodine tincture and the owner was also advised to subjectively assess pain, inflammation at the surgical site, defecation, and urination behaviors, and to restrict exercise. Post-operatively, decreased appetite, hypothermia, and slight wound inflammation were observed, and after a few days, they disappeared and the tomcat became normal. Twenty days later the tomcat was effectively healed (Fig. 17F).

3.3.7.7. Discussion

Castration is a common procedure in male cats recommended to reduce the population of unwanted cats and reduce aggressive behavior (Paul, 2020). Neutered males may be less likely to exhibit risk behaviors such as roaming and fighting, thus reducing the risk of involvement in road traffic collisions (RTCs) and other accidents (Yates and Leedham, 2019). In the present case, atropine sulphate was injected intramuscularly as a pre-anesthetic. Ketamine hydrochloride was injected also intramuscularly as induction. The surgery was maintained with half a dose of ketamine which disagrees with Brahmbhatt *et al.* (2020); in which the tomcat was pre-medicated with atropine sulphate and xylazine intramuscularly. With aseptic precautions and under intravenous anesthesia xylazine and Ketamine. Even though atropine and ketamine combination anaesthesia worked well in the present case to complete the surgery, xylazine, and ketamine combination anaesthesia also produced a better anaesthetic effect since xylazine used as sedative, analgesic and muscle relaxant.

In the current case, the castration was done by the closed uncovered method. The testis was grasped and pushed towards the tip of the scrotum. Around 1.5cm incision was made over the scrotum and subcutaneous, and the testicle was squeezed and popped out. The spermatic cord was exposed, and artery forceps were applied to the spermatic cord, as close as possible to the opening of the inguinal canal. The spermatic cord was ligated, with transfixation ligation with catgut number 2-0 below the artery forceps. Another artery forceps was applied below the ligation. Then the spermatic cord was severed with a scalpel blade number 23 below the ligature. The stump was released after being checked for hemorrhage holding with thumb forceps. The second testis was also done in the same way. The blood was soaked by a gauze mop and the scrotal skin was left open which is in line with Paul (2020).

In the case at hand, post-operatively, decreased appetite, hypothermia, and slight wound inflammation were observed, and after a few days, they disappeared and the tomcat became normal. Twenty days later the tomcat was effectively healed. This may be due to untoward effects of anesthesia and poor post-operative care of the owner.

3.3.7.8. Conclusion

Benefits of neutering include preventing unwanted pregnancies, avoiding hormonal-induced behavior, lowering the risk of neoplasia, and lengthening the life span of both dogs and cats. On the other hand, neutered animals can be more prone to obesity. Proper nutritional management can help avoid this higher weight gain. In the present case, a successful orchiectomy was performed in a tomcat to prevent breeding and reduce its aggressiveness.

4. POST-OPERATIVE COMPLICATIONS AND SURGICAL OUTCOMES

During the study period, surgical treatments were given to sixteen patients presented to JUCAVM an open-air clinic, and on the farms. Different surgical cases were performed in bovine, ovine, caprine, canine, and feline, species of domestic animals. Caesarian section 2(12.5%), orchiectomy 2(12.5%), ovariohysterectomy 2(12.5%), herniorrhaphy 2(12.5%), and clinical management of prolapse 2(12.5%) were the more commonly performed surgical procedure and clinical management during the study period and followed by ear cropping 1(6.25%), mastectomy 1(6.25%), fracture repair 1(6.25%), rumenotomy 1(6.25%), tail amputation 1(6.25%), and extirpation of eye 1(6.25%). Decreased appetite, slight wound inflammation, and hypothermia were commonly observed in 3(18.75%) patients followed by wound dehiscence in 1(6.25%) patient, and 2 patients (12.5%) died after surgical intervention. Totally 6(37.5%) patients developed post-operation complications 2(12.5%) of them died on the fourth day of post-operation and the rest of 14(87.5%) patients were successfully healed. Gentle tissue handling, meticulous hemostasis, preservation of blood supply, strict aseptic technique, minimum tension on tissues, accurate tissue apposition, and obliteration of dead space were the roots of success in this study. Postoperative care including the administration of pain relief and antibiotics with dressing incision site with antiseptics was given to reduce postoperative complications. Moreover, each owner was advised to take necessary care after surgery.

Table 1. Cases developed postoperative complications and surgical outcomes

Species	No. of cases	Complication	Recovered	Died
Cattle	6	2	4	2
Small ruminants	3	-	3	-
Small animals	7	4	7	-
Total	16	6	14	2

Table 2. Types of cases and postoperative complications

Type of cases	No. of cases Presented	Types of Complication	No. of cases Develop Complication
Rumenotomy	1	-	-
Caesarean section	2	-	-
Repair of metacarpal fracture	1	-	-
Herniorrhaphy	2	Death	1
Clinical management of prolapse	2	Death	1
Extirpation of eyes	1	-	-
Mastectomy	1	Wound dehiscence	1
Tail amputation	1	-	-
Ear cropping	1	-	-
Orchiectomy	2	Decreased appetite, slight wound inflammation, and hypothermia	1
Ovariectomy	2	Decreased appetite, slight wound inflammation, and Hypothermia	2
Total	16	-	6

5. CONCLUSION AND RECOMMENDATIONS

Despite the country's vast livestock resources, their economic contribution was limited due to poor management, low local breed genetic potential, diseases, and surgery-related illnesses. The present surgical case reports were various surgical cases that have undergone surgical treatments and clinical management with different procedures and techniques at the JUCAVM an open-air clinic and on the farms. Even if these surgical procedures were performed and were almost successful in the study areas, there was no ideal place, especially concerning the basic surgical equipment, instruments, lack of diagnostic imaging instruments, lack of functional machines used for the histopathological technique, and accessibility of anaesthetic drugs. Therefore, depending on the above conclusion, the following recommendations were forwarded:

- ✓ All surgical instruments, equipment, anaesthetics, and diagnostic imaging tools should be fulfilled in veterinary clinics.
- ✓ Awareness should be created among the general public about the use of surgical treatment.
- ✓ Early intervention should be more emphasized to get a favourable prognosis.
- ✓ Appropriate surgical techniques and post-operative management are critical for avoiding or reducing complications.
- ✓ More research should be conducted, and case reports should be properly documented.
- ✓ Patient intensive care rooms should be constructed.
- ✓ The JUCAVM pathology laboratory should be equipped with a machine used for the histopathological technique.
- ✓ The government should focus on producing confident, competent, and innovative veterinarians and veterinary surgeons.
- ✓ Veterinary services with different animal hospitals and clinics with the required instruments, equipment, medicines, and anesthetics should be covered throughout the country.

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7. LIST OF ANNEXES

Annex 1. Patient Card

Date. _____

Case No. _____

Name of the Hospital/ Clinics: _____

Animal Detail

Species: Bovine ☐ Ovine ☐ Caprine ☐ Feline ☐ Canine ☐ Swine ☐ Avian ☐ Equine ☐

Breed _____ Sex Male ☐ Female ☐ Age _____

Animal identification _____ Name /if any/ _____

Owner detail

Owners' Name _____ Address Town _____ Kebele _____ House No. _____

Occupation _____ Phone No _____

Case history

Clinical findings

Body Temp _____ °C Respiration rate _____ Breaths/min Heart rate _____ Beat/min

Ruminal Motility _____ Gut sound/min _____ VMM: Normal _____ pale _____ Congested _____ Jaundice

_____ Cyanotic CRT: _____ Body Condition: _____ Superficial Ln: PF _____ PS _____ MND _____

RPH _____ OTHER _____

Description of Case

Organ or system affected: Nervous ☐ Musculoskeletal ☐ Respiratory ☐ Circulatory ☐

Digestive ☐ Urogenital ☐ Integument ☐ Other (specify) _____

Sample Taken

Feaces ☐ Blood ☐ skin scraping ☐ Nasal swab ☐ vaginal swab ☐ Ruminal content ☐

Urine ☐ Other _____

Tentative Diagnosis: _____

Differential Diagnosis List: _____

Laboratory Result: _____

Definitive Diagnosis: _____

Prognosis: _____

Observation and treatment

CLINICAL WORK TO BE PERFORMED: Surgical ☐ Medical ☐ Gynecology/Obstetric ☐

Follow-up/Quarantine ☐

Medical treatment administered

Student in Charge: _____ Signature _____

Name of Staff in Charge: _____ Signature _____

Annex 2. Consent Form for Anesthetic and Operation

Owner's name: -----, contact number: -----, address/kebele-----

Species: ----- Breed: ----- Age: ----- Colour: ----- 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 every 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 upon the release of the animal.

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

Date: -----

Veterinary Surgeon -----, signature----- Assistant name-----

Annex 3. Clinical Parameters of Some Domestic Animals

Animal	Temperature(°C)	HR(Beats/Min)	RR(Breaths/Min)	CRT/ skin tenting
Cattle	37.5-38.5	60-70	30	Less than 2 sec
Sheep	39.1	60-70	19	Less than 2 sec
Dog	38.9	80-90	14-22	Less than 2 sec
Cat	38.5	100-130	20-30	Less than 2 sec
Donkey	36.7-38.3	28-44	8-16	Less than 2 sec
Pig	39	60-70	10-12	Less than 2 sec

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

Annex 4. 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	5.5mg/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 5.** Recommended Dosage for Analgesics

Species	Analgesics	Dose	Route
Dog	Meloxicam	0.1 - 0.2 mg/kg	IV/IM
Food animals and equines		0.5 - 2 mg/kg	IV/IM
Cat		0.05 - 0.1 mg/kg	IV/IM
Small animals and small ruminants	Tramadol	2 – 5 mg/kg	IM
ruminants, small animals,			
Equines and swine	Lidocaine	0.5 - 5mg/kg	IM

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

Annex 6. Imprint Cytology Techniques

1. Sample taken from freshly excised surfaces to reduce contamination
2. Blotted the cut /incised surface with absorbent paper to reduce blood
3. Touched the slide gently to the specimen, removed, and quickly air-dried
4. Fixed the blood film for 3-5 minutes in methyl alcohol and air-dried
5. Prepared working solution by adding 1ml of Giemsa stain to 9 ml neutral distilled water (PH 6.8)
6. Placed the blood film in a Coplin jar having diluted stain for 30-45 minutes
7. Wash the film with neutral water, then drain, dry, and examine.

Ethical clearance Certificate

Ethical clearance reference number A23/Jan/2023 This ethical clearance certificate is issued by the College of Agriculture and veterinary medicine, Jimma University Animal Research Ethics Committee in respect of the research project outlined below on the recommendations of the Department /school of Veterinary Medicine /Department of Veterinary Surgery and Diagnostic Imaging.

Title of Research: Veterinary Surgical Case Reports on Various Domestic Animal Patients in and Around Jimma Town, Oromia, Ethiopia

Principal Researcher: BY: Ashagre Bezabih Ijiga

Host Department and Faculty: School of Veterinary Medicine/Department of Veterinary Surgery and Diagnostic Imaging

Supervisor (For Student Research)

Major Advisor: Dr. Dese Kefyalew (DVM, MVSc Ass. Prof. of Veterinary Surgery and Diagnostic Imaging)

Co-Advisor: Co- Advisor: Dr. Zerihun Mulatu (DVM, MVSc, Ass. Prof. of Veterinary Surgery and Diagnostic Imaging)

The clearance is given on the following conditions:

- Any significant changes in the conditions or undertaking or outline in the approved research proposal must be communicated to the AREC.
- Any breach of ethical undertaking or practices that have an impact on ethical conduct of research must be reported to the college AREC.
- Principal researcher must report through his/her supervisor and Department AREC issues of ethical compliance at the end of the research project.
- The college AREC retains the right to withdraw or amend the ethical clearance if any breach of ethical practices as outlined in the AREC policy and Guidelines is detected or suspected.

Chairperson of School of Veterinary Medicine, AREC _____

Signatures _____ **Date** March 13, 2023

Dr. Multa (Dr. Abraham)
Head, School of Veterinary
Medicine