

Thesis Ref. No. _____

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



**COMPILED CASE REPORTS OF DIFFERENT SURGICAL AFFECTIONS AND
THEIR SURGICAL MANAGERMENTS ON DIFFERENT DOMESTIC ANIMALS
IN AND AROUND BISHOFTU TOWN, EAST SHOA ZONE, OROMIA,
ETHIOPIA**

MVSC THESIS

BY

ZERIHUN MULATU TUJI

**JUNE, 2021
BISHOFTU, ETHIOPIA**

**ADDIS ABABA UNIVERSITY
COLLEGE OF VETERINARY MEDICINE AND AGRICULTURE**



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ETHIOPIA**

**A Thesis Submitted to the College of Veterinary Medicine and Agriculture of Addis
Ababa University in partial fulfillment of the requirements for the degree of Master
of Veterinary Science in Veterinary Surgery**

BY

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DEPARTMENT OF CLINICAL STUDIES
POST GRADUATE PROGRAM IN MASTERS OF VETERINARY SURGERY**

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**JUNE, 2021
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AKNOWLEDGEMENTS

First of all, thanks and praise to Almighty God, the Compassionate, and the Most Merciful for giving me healthy and blessing me with indomitable willpower, courage, strength and stamina to accomplish this arduous task.

Next I would like to express my sincere gratitude and deepest appreciation to my advisor Dr. Jiregna Dugasa one who directs the path of progress. Words are inadequate to express my deep sense of indebtedness for his continuous constructive comments and tireless scientific guidance.

"Where emotions are involved, words cease to exist". I admit my inability to put into words, the depth of gratitude and respect. I owe a lot to my grandmother, W/ro Dinke Werku and my entire aunt for the sacrifices made by them at the cost of their comfort and happiness to bring me up to this stage.

I am extremely delighted in extending my thanks to Jimma University College of agriculture and veterinary medicine for facilitating the chance of learning the MSc program and sponsoring me and Addis Ababa University college of veterinary medicine and agriculture for facilitating internet access, the overall coordination and financial support of this study.

It is also my pleasure to acknowledge Dr. Mehari, Dr. Tewdros, Mr. Dereje Gudeta, Mr. Getahun Tesfaye, Miss. Nanoshe Taye and Dr. Tilaye Demissie for their kind supporting during case handling. In addition am also grate full to acknowledge Dr. Cheiru Telila, Dr. Dessie Habte, Dr. Waktole Yadeta, Dr. Bethel Befikadu and Dr. Sheferaw Moltumo who took part by giving information and assisting during surgical procedures.

Lastly but not least my heartfelt gratitude goes to my wife madam Mestawot Anbesu for her supporting me and motivational guidance in this all path of progress.

LIST OF ABBREVIATIONS

CMN	Canine Mammary Neoplastic
DPM	Dog population management
FAO	Food and Agricultural Organization
GDP	Growth Domestic Product
GIT	Gastrointestinal Tract
HF	Holstein Friesian
IFB	Indigestible Foreign Body
IM	Intramuscular
IU	International Units
IV	Intravenous
Kg	Kilogram
ml	Milliliter
NSAID	Non-steroidal Anti-inflammatory Drugs
OVH	Ovario-hysterectomy
PH	Perianal hernia
SPANNA	Society for Protection of Animals Abroad
UTI	Urinary Tract Infections
VTH	Veterinary Teaching Hospital

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ABSTRACT

Ethiopia is endowed with various livestock potential that contributes for socioeconomic developments and values to sustain millions of livelihoods. However, limited coverage of veterinary services especially in relation to veterinary surgical managements and corrections of different deformities and injuries that can save the life of animals is the one of bottle neck factor that affects the effective and efficient utilization of this valuable subsector. Therefore, the objectives of this case study was to compile and document the various surgical cases and and their managements, and develop all rounded practical skills on different domestic animals in and around Bishoftu town from October 2020 to April 2021 at Veterinary Teaching Hospital and Donkey Sanctuary Clinic. During the study period, out of total of 24 different domestic animals 45.83% (11/24), 20.83% (5/24), 8.33% (2/24), 20.83% (/24) and 4.17% (1/24) of cattle, sheep, goats, dogs and donkey were handled at the stated veterinary cervices centres and had undergone different surgical corrections and managements. Before admission to any surgical treatment and managements, each and every case has undergone diagnosis thorough history, general physical and laboratory examinations. Surgical sites were aseptically prepared for surgical operation; the patients were anesthetized with suitable anesthetic protocols for the presented case and controlled in appropriate position depending on animal species and type of surgical intervention going to be performed. During the study period, surgical managements such as horn amputation, herniorrhaphy, cesarean sections, ovario-hysterectomy, exploratory ruminotomy, wound management, tumor excision, urethrostomy, eye enucleation, open castrations and correction of vaginal prolapse were performed. Of all the animals that undrgone surgical intervention, 95.83% (23/24) were cured and recovered; whereas, 4.17% (1/24) was died. Postoperative complication such as swelling at surgical site, frontal sinusitis development, abscessation, urethral stricture and death were occurred, despite all possible efforts made to minimize them. Thus, in addition to implementation of principles of surgical asepsis and other surgical adjuncts to minimize post-operative complications, anticipation of complication and proper management is crucial for good prognosis and outcome.

Key words: *Bishoftu town; Domestic animals; Ethiopia; Surgical treatment*

1. INTRODUCTION

Ethiopia has a conducive environment for various livestock production and also owning the largest livestock population in Africa (FAO, 2019 and Shapiro *et al.*, 2017). In the country, the population of livestock is expected to be 70 million cattle, 42.9 million sheep and 52.5 million goats, 8.1 million camels, 2.15 million horses, 10.80 million donkeys, 0.38 millions mules and 57 million chickens which would yield 4.96 and 2.43 billion liters of cow and camel milk, respectively, 1.1 million tons of meat and 369 million of eggs for the total national annual product (CSA, 2021). From the total populations of the livestock, almost 97.4% of the cattle and 78.85% of the poultry are indigenous breeds and the remaining percent are hybrid and exotic breeds and almost 100% of the shoats, equines and camels are indigenous breeds (CSA, 2021). In Ethiopia, the population of pig is estimated to be 28 thousand (FAO, 2019) but there is no well-documented data on dog and cat populations in Ethiopia since more of the emphasis is on food animals. However, in Addis Ababa dog population is estimated to be 250,000 to 350,000 (Gebremedhin *et al.*, 2020)

According to FAO's (2019) reports, agriculture is a corner stone of national economy in the country contributing about 35 percent to GDP and 68.2 percent to employment, and 90 percent of export value. From the total percent of agricultural contribution to national GDP, the livestock subsector contributes about 16.5% of the national gross domestic product and 45% of the agricultural GDP. Further, it has 15% of export earnings and 30% of agricultural employment contribution (Behnke, 2010). Notwithstanding the reality that the livelihoods of more than 11.3 million rural households, of which 27– 35% of the highland livestock keepers and large proportion of the lowland herders live below poverty line (Shapiro *et al.*, 2017), the livestock subsector supporting, at least in part, the livelihoods of more than 14 million households or 70 percent of the population (FAO, 2019).

In Ethiopia there are numerous underlying factors which constrain the effective utilization and limits contribution of this plenty of livestock resources to the national economy (Solomon *et al.*, 2003; Jabbar *et al.*, 2007; Negassa *et al.*, 2011). Among these,

poor veterinary health services remain one of the main factors (Desta, 2015 and Rich and Perry, 2011). For instance in Ethiopia the coverage of national animal health service is only 40-45% of the country's population (Admasu, 2010) which is not at grass root level as compared to the demand from the rural and urban livestock producers (Tiruneh *et al.*, 2014) due to the fact the want for cattle products is accelerated with an increment of urbanization and number of human population in Ethiopia (FAO, 2019).

Among different forms of veterinary services, non medical therapy plays a vital role in saving life and restoring the vital function of animals (Desta, 2015). For instance, veterinary surgery is one of the disciplines that provide clinical care through diagnosis and surgical manipulation of various surgical disorder including congenital abnormalities or deformities of affected animals (Arju *et al.*, 2014 and Debas *et al.*, 2006). According to the retrospective study conducted by Tiruneh *et al.* (2014) on the surgical conditions and requested procedures encountered in ruminants and small animals using past records in present study area surgical affection like dystocia, uterine prolapse, hernia, urethral obstruction, preputial injuries, wound, abscess, sterilization, aural hematoma and fracture, were found to be the most encountered surgical cases.

Even though veterinary surgery is one of the main treatment modality for different kinds of ailments, deformities, and injuries both at operation theater room and field level with high success rate in a variety of animals, surgical complications during and after surgical operation which might be associated with protocol of anesthesia, animal health status and the surgical procedure conducted in different animal species still a major problem of the discipline. Furthermore, there is dearth information on surgical case studies and its compilation to serve as a reference for future improvement of case handling in Ethiopia.

Therefore, the objectives of this study are:

1. To compile and document the various surgical cases and their managements in domestic animals in the study areas.
2. To develop all rounded practical skills of different surgical treatments and managements in domestic animals.

2. MATERIALS AND METHODOLOGY

2.1. Study Area

The study was conducted at Veterinary Teaching Hospital, SPANA and Donkey Sanctuary Clinics, College of veterinary medicine and Agriculture, Addis Ababa University in Bishoftu town. The town is found in Oromia Regional State at a distance of 45 kilometers southeast of Addis Ababa. Town topography was undulating and characterised by flat land on the north and east parts of town, surrounded by many lakes, whereas the south part was dominated by hills. Town was set at 9°N latitude and 40°E longitudes and has 15,273 hectar with an altitude within the range of 1900-1995m above sea level in the central high land of Ethiopia. The town has a mean annual temperature of 27°C and mean annual precipitation of 746.6 millimeter of that 84% was within the long rainy season (June to September). The dry season of the town extends from October to February. Farmers within the place of Bishoftu use a blended crop and livestock farming system. Additionally, town has many industries operated and there have been opportunities for agro-industry process, hotel and tourism, and business development (Veses et al., 2016).

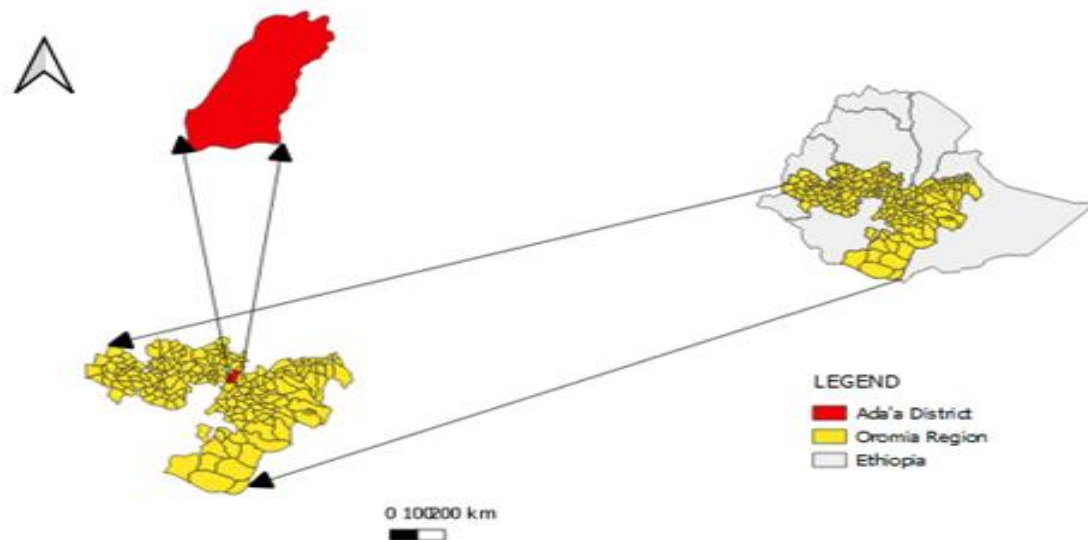


Figure 1: Geographical location of study area

2.2. Study Population

The study populations included were different domestic animals species (small and large ruminants, equines, and companion), age, breeds, and sex from in and around Bishoftu town that was admitted to VTH, SPANA and Donkey sanctuary clinic. Targeted animals included in this case report were brought from different management systems for various surgical treatments from in and around Bishoftu town. Local breed cattle, donkey, sheep and goat were kept under a mixed crop and livestock farming system, and small animals like dogs and cats were kept as companion animals. The surgical interventions were performed at VTH and Donkey sanctuary clinic.

2.3. Study Design

A descriptive study was used to compile and document the conducted various surgical case on different domestic animals that was admitted to VTH, SPANA and Donkey Sanctuary Clinic from in and around Bishoftu town starting from November, 2020 to April, 2021. History of the patient, physical examination, pre-operative animal preparation, surgical operation, post-operative care, post-operative complication and outcome of an individual case were recorded for each case.

2.4. Study Methods

The different livestock and companion animals were brought to respective Veterinary Teaching Hospital, SPANA and Donkey Sanctuary Clinic with various ailments and injuries which need minor or major surgical treatment either in the form of elective, emergency treatment and critical care. Before any surgical intervention, each and every case was thoroughly assessed, evaluated and recorded on the patient record format. During examinations, clinical parameters like patient signallment, history, physical examination and laboratory test were used for surgical judgment. Besides, patients were pre evaluated for anaesthesias and surgical risk. Based on the physical examinations and clinical findings, specific surgical manipulations and management were prescribed and performed under aseptic procedures and safe anesthetic protocol. All animals that undergone the surgical treatments were regularly followed for two weeks to a month

through physical presence and telephone communication with animals owners' to assess the post-operative complications and its outcome. Finally, the relevant information were compiled, the surgical case reports prepared and reported according to relative similarity of procedure and presentations of the surgical patient.

2.4.1. Patient signalement

Patient signalement such as: species, age, breed, sex, and reproductive status (intact or neutered and pregnant or not) of all the animals were recorded at the time of presentation.

2.4.2. Case history

Following the recording of the signalment duration of the illness, severity of the problem, frequencies of the diseases, appearance or character of the illness, history of previous ailment and history of past or present medication and vaccination were recorded for each case based on the anamnesis obtained from the client. Finally, clients signed consent form before proceeding with the remaining procedures.

2.4.3. Physical examination

Animals admitted to each particular veterinary service center were undergone thorough physical examination starting from head to limbs. Hydration status of an individual patient of each case was assessed and recorded by using color of mucous membrane, capillary refill time, dryness or moisture of the muzzle, placement of the eye in the orbit and skin turgor. Vital sign such as: respiratory rate, pulse rate and rectal temperature were measured and recorded. Each case was closely inspected for detection of any structural and/or functional disorders of the affected region when they were at motion and rest. The affected parts and/or lesions were palpated and manipulated to detect their nature, consistency and tenderness. Exploratory puncture was done whenever indicated to reveal the physical characters of the existening fluids or contents in the examined lesions. Whenever situations permit, laboratory examinations such as bacteriological and cytological examination were conducted and the results were recorded on individual case books of each patient. Finally all relevant information were assessed, and interpreted before undergoing particular surgical procedure.

2.4.4. Postoperative management and follow up

All animals that undergone the surgical treatments were regularly followed through physical presence at the hospital and telephone communication with animals owners' for two weeks to a month based on the character of surgical treatment achieved and healing feature of the wound (Annex 6). First, animals have been visited at the hospital and antiseptic dressing of the surgical wound was performed daily for 3-5 days. The animal owners were recommended to keep animals in hygienic and clean comfortable place. An appropriate course of analgesia (diclofenac sulfate @ 2mg/kg), disinfectant (5% iodine solution, 0.1% povidone-iodine and topical cyclo spray), antibiotic and supportive therapy (short acting oxytetracycline @ 10mg/kg, fortified procaine penicillin @ 22,000 IU/kg, and Ringer's lactated solution @ 3ml/kg/hr and 10ml/kg/hr for small and large animal, respectively) were given to achieve better recovery of an animals. Secondly, after last day of follow up through physical presence at the hospital; the postoperative follow-up was continued in all cases through telephone communication with the animal owners' within 3 days interval for 15 days and, the skin sutures were removed on 15th postoperative days but in some case the follow up was extended up to one month.

2.4.5. Outcome and prognosis

The outcome was recorded as good prognosis, whenever the operated animal has been survived and bad prognosis, on every occasion the operated animal has been died. the animal have been recorded as successfully recovered and the wound has been healed successfully; when there was no infection, presence of new epithelium around the wound edge, neovascularization and contraction of tissues, which means cells and tissues were regained the biologic integrity by healing from wounds.

3. COMPILED CASE REPORTS OF DIFFERENT SURGICAL AFFECTIONS AND THEIR SURGICAL MANAGERMENTS ON DIFFERENT DOMESTIC ANIMALS

3.1. Surgical Affections of the Horn

3.1.1. Dehorning in cattle and goat

Abstract

Dehorning is the process surgically removing horns from adult goats and cattle after they have formed from the horn bud to ease the management system and for treatment of various causes of horn injuries. In the current case report, four cases of different ages, sex, and species were presented to VTH. Accordingly, all cases undergone thorough physical examination. Up on clinical findings there were complete fracture with extensive bleeding in case1 and 4, and irreparable wound at base of the horn with discharging of pus around the base of right horn in case 2 and 3. In each case the surgical sites were aseptically prepared and animals were stabilized by the cornual nerve block with 2% lidocaine hydrochloride around the cornual branch of the zygomaticotemporal nerve and in case 4 in addition, infrathroclear nerve was blocked. Thence, unilateral dehorning was performed by amputating the horn using embryotomy wire including the horn secreting tissues. Following successful amputation, the wound edge flaps was apposed in case 1 and 4, but but didn't in case 2 and 3 in which it was left for open wound management. Up on follow up the wound was healed with 15th days of operation in case 1 and 2 while frontal sinusitis was developed and wound healing takes one month to heal in case 2 and 3. Therefore, dehorning by flap methods and approximation of the flaps under the combination of conual nerve block with anti-pain seems preferable approach for successful recovery and healing of wounds without post-operative complications.

Key words: *Cattle; Cornual nerve block; Doe; Horn amputation*

Introduction

The dehorning of cattle is one of the common surgical conditions in modern dairy production systems, making them safer to handle and cause fewer injuries to workers and other nearby animals (Espinoza *et al.*, 2013; Gottardo *et al.*, 2011 and Huber *et al.*, 2012). It involves the surgical removal of horns from adult goats and cattle after they have formed from the horn bud to ease the management system and for treatment of horns may be due to cancer, fracture, overgrown and misdirected horn (Acharya, 2017 and Herskin and Nielsen, 2018). However, it may be criticised in terms of animal welfare as it violates the integrity of the animals and causes stress and pain (Acharya, 2017 and Glynn, 2012).

Various special tools for the amputation of the grown horn are available, these may include using cutting instruments such as gigli wire saw, bone chisels and osteotome, mallet, bone rongeur and bone cutter (Kupczyński *et al.*, 2014), especially in adult cattle or cattle older than 6 months. These method cause Different degree and types of damage of damage to the tissue, and may result in different experiences of pain when done without appropriate anesthesia and analgesia(Winder *et al.*, 2016) and increased risks of bleeding and infection (Glynn, 2012; Thompson *et al.*, 2017 and Winder *et al.*, 2016). Other procedures such as the use of heat cauterization as well as caustic paste can be used to dehorn cattle and goats at an early age (before 2 month) to remove the horn before its attachment to the skull (Espinoza *et al.*, 2013 and Thompson *et al.*, 2017).

Local anesthesia, commonly given as a cornual nerve block but, when given alone, it may rise in physiological and behavioral indicators such as plasma cortisol concentration after the local anesthetic wears off (Doherty *et al.*, 2007 and Duffield *et al.*, 2010). Thus, administration of a non-steroidal anti-inflammatory drug (NSAID) reduces pain behaviors (Duffield *et al.*, 2010). Besides, the use of sedatives has been shown to reduce handling stress (Duffield *et al.*, 2010) and may improve safety when dehorning older animals or when handling facilities are lacking. For treatment of fractured horn amputation of horn alone or along with appropriate chemotherapy were on reports (Dugassa and Fromsa, 2019). Therefore, the aim of present case is to describe the

treatment of unilateral fractured horn and irreparable wound at the base of horn and its successful surgical management.

Case history and examination

Case 1

Eight-year old local breed cow weighing 200 kg was presented to Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with more than 24 hours long history of fractured horn. On physical examination, there was blackish discoloration and paste of the nearby bodies of fractured horn due to local haemorrhage of blood vessels (Figure 1A). There was normal rectal temperature, respiratory and heart rate up on clinical examination. Horn cavity was seen through visual examination in order to check bleeding into the cavity and animal was suggested for surgical horn amputation.

Case 2

Ten-years-old healthy local breed bull weighing 250 kg with a medium body condition was presented to Gerbicha veterinary clinic one month before within history of wound at the base of the horn and clinician was prescribed oxytetracycline injection (20 mg/kg) intramuscularly for three days at one-day interval after amputating the horn at the middle by using saw but after one month, pus was oozing out of the wound, horn was avulsed and become necrotized without regressing. Then, the bull was referred to the Veterinary Teaching Hospital, Addis Ababa University. The owner also complained of discharging of pus around the base of right horn following trauma around the base of the horn as a result of fighting with other bull. When clinically examined, the right horn was partially avulsed and there was oozing of unpleasant discharge through the opening as shown in (Figure 1B). Further close examination of vital organ parameters such as heart rate, respiratory rate, pulse rate and mucous membrane revealed within physiological limits. Finally, based on the history and clinical findings, the case was diagnosed as irreparable wound at the base of horn and decided to be managed surgically by unilateral horn amputation.

Case 3

Eight-years-old healthy local breed bull weighing 320 kg with a good body condition was presented to the Veterinary Teaching Hospital, Addis Ababa University within history of pus discharge from the base of right horn following trauma as a result of friction of rope that was used for the purpose of tying animal at their home. When clinically examined, the structural make up of right horn was intact but there was oozing of unpleasant discharge through wound at the base of the horn as shown in (Figure 1C). Further close examination of vital organ parameters such as heart rate, respiratory rate, pulse rate and mucous membrane revealed within physiological limits. Finally, based on the history and clinical observation, the case was diagnosed as irreparable wound at the base of horn and decided to be managed surgically by unilateral horn amputation but the owner was not cooperative on the surgical amputation of the horn, and we administered oxytetracycline injection (20 mg/kg) intramuscularly for three days at one-day interval and daily washing of the wound by using savlon and 1% povidone iodine. However, the bull was not get any change, after two weeks of final days of medical follow up the owner brought his bull and agreed with the decision of the clinician, which means surgical amputation of the horn.

Case 4

A one year and two months old local breed doe weighing 15 kg was presented to Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with history of right horn fractured one week before admitted to the VTH. The doe had given birth one two weeks ago. The owner also added that the doe was scratching against the standing objects following that continuous oozing of blood was occurred. To stop the bleeding the owner tried to treatment traditional by using different plants at home but the doe doesn't get relief rather than continuous to scratching. Up on physical examination there was necrotized tissue and pus formation at fractured horn with offensive odour (Figure 1D). There was normal rectal temperature, respiratory and heart rate up on clinical examination. Based up on history and physical examination animal was suggested for cosmetic unilateral horn amputation.



Figure 2: Clinical presentation of horn affections in cattle and goat

(A) Fracture of horns in cow (B) Irreparable wound at the base of horn and partially avulsed horn in case 2 (C) Irreparable wound at the base of horns in case 3 (D) Horn Fracture goat

Pre-operative preparation: After proper immobilization by using physical and chemical (xylazine @ 0.1 mg/kg) method in crush, the circumferential skin surface of the base of the affected horn was prepared aseptically by washing with antiseptic solution (savlon) in order to remove coagulated blood and any dirty (foreign) material from surgical site. Then, the hair was shaved and scrubbed with 1% povidone iodine.

Anesthesia and animal control: case 1, 2 and 3 were controlled in standing position in the well-built crush and the head was positioned straight forward by holding with bull holder; whereas, case 4 was controlled in lateral recumbent position on surgical table with affected horn up right side. Before cornual nerve block was conducted case 3 and 4 were sedated by xylazine @ 0.1 mg/kg I.M. in case 3 but through IV in case 4; whereas, case 1 and 2 were received diclofenac sulfate @ 2mg/kg through I.M. Cornual (zygomaticotemporal) nerve block was performed in all cases, but in case 4, additionally, infratrochlear nerve block was performed. The needle was inserted through the skin at a point equidistant between the lateral canthus of the eye and the base of the horn to block cornual branch of zygomaticotemporal nerve (Figure 2A). At this point, 10 and 5 ml of local anesthetic (2% lidocaine hydrochloride) were injected in a fanlike manner in case 1, 2, 3, and 4, respectively and another 2 ml were deposited under the skin as the needle was withdrawn. To block the infratrochlear nerve in case 4, the needle was inserted through the skin at a point of dorso-medial margin of the orbit. Then, the needle became directed subcutaneously towards the base of the horn, and an extra local anesthetic was deposited below the skin. The surgical site was given a final scrub prior to proceeding to surgery. After adequate analgesia and preparation dehorning was done by Flap method in case 1 as suggested by Kumar, (2013).

Surgical procedure and techniques: Two incisions: one towards the poll and a second towards the frontal ridge were made. These two incisions were joined together by taking an incision on anterior and posterior side of the horn 1cm away from the junctions of the base of the horn and skin was done for successful removal of horn secreting tissues. The incisions were deepened until bone was encountered, and the edges of the incision were undermined using sharp dissection to form the flap of the skin to allow placement of the obstetric wire ventrally and deep to the base of the horn on the frontal crest (Figure 2B). Bleeding was controlled by pressure hemostasis (Figure 2B) and by hemostatic forceps to occlude cornual artery. The bony stump was then removed using an obstetric wire as a saw (Figure 2C). After completion of removal horns and attached skin, the head was repositioned and prepared for the closure of the wound. The surgical site was flushed with a normal saline solution, to rinse out any bone dust and/or fragments and the skin

was cleaned with antiseptic solution (savlon) to remove coagulated blood and scrubbed with 1% povidone iodine. Skin was closed by using silk (non-absorbable suture material) in a simple interrupted pattern in one layer (Figure 2F) in case 1 and 4, but in case 2 and 3 since wound edge was wide and difficult to approximate it allowed healing openly (Fig. 2D). Finally, in all cases protective bandage was applied over surgical site and secured to the normal horn and ear to assist hemostasis and reduction of dead space (Figure 2E).



Figure 3: Surgical correction and management of unilateral horn in different animals in progress

A) Zygomaticotemporal nerve block (B) on progression of undermining to make skin flap (C) Amputation of horn on progression with embryotomy wire (D) Progression of open wound healing (E) Application of bandage on the wound (F) completion of suturing of skin flap

Post-operative care and outcome: Post-operative treatment included administration of Fortified procaine penicillin (22,000 IU/kg) intramuscularly for five post-operative days. The wound was properly dressed with 1% Povidone iodine solution and applying wound spray (cyclo spray) and daily changing of bandage with sterile gauze regularly for five days. However, in case 1 and 4 bandaging was applied only on the first days of operation. But, after fifth day wound dressing was done at seventh, ninth days up to twelfth days until healed. Subsequently, skin sutures were removed on fifteenth post-operative day in case 1. In case 1 and 4 the wound was uneventfully healed in fifteen days. However, in case 2 and 3 the wound was complicated with frontal sinusitis development and managed through regular dressing of the wound and administering of parentally antibiotics. Finally, the wound was healed in one month of operative day

Discussion

Dehorning is a routine procedure performed to destroy horn growth, the corium and surrounding tissue in adult animals for many reasons, including reducing the risk of injuries to other animals, to animal itself, to increase need for space during resting and easy to market (Alvarez *et al.*, 2015; El-Hawari *et al.*, 2015 and Hempstead *et al.*, 2018). On other hand, dehorning can be done to treat several horn affections such as avulsion, fracture, empyema, septic horn maggot wound and horn cancer (Prasad *et al.*, 2016 and Reddy *et al.*, 2017). Similarly, in present case, out of four cases, two with fractured horn; while the remaining two cases with irreparable wound at the base of horn have been recorded. According to study conducted by Prasad *et al.* (2016) stated that fracture can occur at any length of the horn, but fractured at the base of the horn is painful and causes bleeding. This is in agreement with present case, where complete fractures of horn with extensive bleeding in case 1 and the base of the horn were loose and hanged in case 4.

In present case, fractured horns were managed through amputation by traditional flap method (Kumar, 2013 and Reddy *et al.*, 2017); whereas, in case of an irreparable wound at the base of horns were managed through amputation of the horns including the horn secreting tissues followed by irrigation with 1% povidone iodine (Dugassa and Fromsa, 2019). After completion of amputation, in present case, the skin flaps were sutured by

simple interrupted suture pattern with silk 2.0 in case 1 and 4. This is conducted as the reported case report by Reddy et al. (2017), who used mattress suture pattern to appose the skin flaps by using the silk 2.0. However, in case 2 and 3 the wound were left open to heal through second intention of wound healing without closure since the surgical wound was wide and difficult to approximate. Similar technique is used as reported in case report by Dugassa and Fromsa (2019).

In present case, dehorning was performed under cornual nerve block by Lidocaine Hcl 2% in combination with anti-pain using diclofenac sulfate @ 2mg/kg in case 1, and 2 (Alvarez *et al.*, 2015; Stafford and Mellor, 2005; Stilwell *et al.*, 2012; and Sutherland *et al.*, 2002), and with sedative using xylazine hydrochloride @ 0.1 mg/kg in case 3 and 4 (El-Hawari *et al.*, 2015 and Reddy *et al.*, 2017 and Stilwell *et al.*, 2010). In the first group the pain-related behavioral response such as vocalizations, struggles, tail movements and discomfort during the first hours after the procedure were not encountered, while in the second group head shaking and vocalization were evidenced especially in case 4. Similar behavioral response to dehorning related pain was reported Alvarez *et al.* (2015) and Hempstead *et al.* (2017) stated that using local anesthesia along with meloxicam could lower the behavioral response (vocalizations and struggles) after procedures.

In present case, wound was managed by dressing the wound with antiseptic solution (1% Povidone iodine solution), applying topical antibiotic (cyclo spray (3.201g chlorotetracycline HCl/211mls, Farvet, Netherlands)) and administration of fortified procaine penicillin 220,000 IU/kg to ensure better wound healing. This is done as reported in case report by Reddy *et al.* (2017) who used 0.1% Povidone iodine as wound dressing solution, Lorexane ointment as topical antibiotic and ceftriaxone (10mg/kg intramuscularly) as post-operative care. Some scholars also reported that the use of anti-pain after dehorning may reduce the risk of behavioral change, pain sensitivity and infection since the cortisol concentration increase after local anesthesia was wear off (Adcock *et al.*, 2020; Duffield *et al.*, 2010; Heinrich *et al.*, 2010 and Huber *et al.*, 2013). The present case management included diclofenac sulphate administration after dehorning procedures were completed.

In present case, even if the dehorning was conducted under aseptic conditions, oozing of purulent fluid as a result of frontal sinusitis was encountered in case 2 and 3. This might be due to improper attempt for dehorning at former clinic, which was exposed the cornual portion of the sinus in case 2, and contamination of bacteria into the wound from environment occurred in case 3. Similar complications were recorded in previous cattle dehorning case reported by Dugassa and Fromsa (2019) and Parizi and Fathi (1999), who stated that post-operative complications may result due to formation of bone sequestra subsequent to dehorning, fracture or avulsion of horns which exposes the cornual portion of the sinus and contamination of bacteria into the wound from environment. However, in case 1 and 4 there were not such encounters of postoperative complications. This might be due to minimal bacterial contamination into the exposed sinus from the environment and reduced dead space as a result of complete closure of the skin flaps.

To conclude, surgical affection of the horn through amputation and closure by modified flap method was felt satisfactory result without significant complication than allowing the wound to heal openly. Dehorning under the combination of cornual nerve block and anti-pain have also reduce the behavioral response such as vocalization, struggling, tail movement and discomfort than the combination of cornual nerve block and sedatives. Therefore, dehorning by flap methods and approximation of the flaps under the combination of conual nerve block with anti-pain should be appropriate procedure for successful recover and healing of wounds without any post-operative complications.

3.2. Surgical Management of Hernia in Different Animals

3.2.1. Surgical correction of umbilical hernia in calf

Abstract

An umbilical hernia is a condition in which abdominal contents usually fat but possibly intestines protrude out past the wall of the abdomen at the belly button. An umbilical hernia left untreated will have deleterious effect on the health and future productivity of the affected animals. In present case report, a seven month old cross breed calf with a history of a small umbilical swelling was presented to VTH. Up on physical examination

findings, there was small, soft and reducible swelling on an umbilical region. Based on of history and physical examination the case was diagnosed as an umbilical hernia and surgical site was prepared aseptically. Thence, an open herniorrhaphy was performed under local infiltration of anesthesia and sedative to obliterate the hernia sac. Following the successful replacement of the hernia contents, the case was recovered without recurrence and other related complications.

Key words: *Calf; Herniorrhaphy; Umbilical hernia*

Introduction

Hernia is the protrusion of part of an organ, an organ, or tissue outside the abdominal cavity through accidental or a normal anatomical opening (Fesseha, 2020 and Sutradhar *et al.*, 2009). Based on anatomical location there are different types of hernia among them umbilical hernia is one of the major congenital disorders of neonatal calves (Mishra *et al.*, 2020 and Sutradhar *et al.*, 2009). Even if congenital umbilical hernias are genetically heritable, but many umbilical hernias are secondary to umbilical sepsis (Fesseha, 2020 and Salim *et al.*, 2015). Therefore, failure of traditional development and closure of navel, infection at the location of the navel, manual breakage of the navel, clamping, or tying of the fetal membrane and probably excessive straining because of diarrhea and constipation are the main factors for the occurrence of umbilical hernias (Dojjode, 2019 and Salim *et al.*, 2015).

Hernias may be small at birth and advanced gradually as the age become increase. Fat and omentum are the common an umbilical hernial contents, but in a few larger hernia, segments of small intestines might be identified. So, based on the size and nature of hernia there are different methods of treatment can be developed such as: redaction and retention by bandage, application of blisters or injection of irritant solutions near to herniationl ring, a ligature or plus of through and thru pad sutures and radical operation during which herniorrhaphy (Sutradhar *et al.*, 2009).

Case history and examination: A seven month old cross breed calf was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis

Ababa University with the history of depression, inappetence and swelling on ventral area of the abdomen exactly on the umbilical region. Up on physical examination there was hanging reduceable mass through ring in ventral abdominal wall around umbilicus region and the case was diagnosed as an umbilical hernia and admitted for umbilical herniorrhaphy. The vital physical parameters such as: rectal temperature, heart rate, and respiratory rate were also assessed and found within the normal range. The animal was with medium body condition.

Pre-operative preparation: After proper calf immobilization with a physical method, the surgical site over the swelling and its adjacent parts was aseptically prepared by washing with soap and tap water followed by shaving of the hair (Figure 3A). Then, the area was again washed by using antiseptic solution (savlon) to remove any fall of hair. Finally, surgical site was scrubbed with 1% povidone iodine in circular manner starting from the center to peripheral area.

Anesthesia and animal control: The calf was controlled in lateral recumbent position with slight tilt to dorsal and the head was positioned straight forward by assistant person to facilitate the flow of IV fluid. Field block anesthesia was used by making walls of infiltration of 2% lidocaine hydrochloride enclosing the hernial borders. In addition to local anesthesia, intravenous injection of xylazine @ 0.1 mg/kg (AnaSed, Bayer Corporation, USA) was used. Ringer lactate solution as intravenous fluid at a rate of 10 ml/kg/hour was administered using 18 G IV cannula (figure 3B).

Surgical procedure and techniques: Two elliptical skin incisions were made on either side of the ring. The skin was bluntly dissected from the underlying tissues and the incision was continued through the abdominal muscle to expose and open the hernial sac. Following blunt dissection of the skin and subcutaneous tissue, the pus was oozed out. Then, the pus was carefully drained and irrigated with 1% povidone iodine solution. After completion of abscess drainage and management the hernial sac and the hernial ring was examined to confirm any adhesions in the abdominal organs. There were no adhesions and the content was pushed back to abdominal cavity. Then, diameter of the hernial ring was measured and some of the portion of the sac was carefully incised at

junction of body wall and sac (Figure 3C). Finally, the edges of the hernial rings were exposed and freshened before closure. Thus, hernial ring was closed with simple interrupted suture pattern and a sub-cutaneous tissue was closed with sub-cuticular suture pattern both by using sterile absorbable chromic catgut suture material size no. 2-0. After that the skin edges were closed by horizontal cross mattress suture with silk (Fig. 3D).



Figure 4: Umbilical hernia and its surgical repair in calf

(A) Prepared surgical site (B) Securing of IV fluid (C) Obliteration of hernia sac on progression (D) Closing of skin on progression (E) Close observation of sutured site after 3 days (F) Fully recovered animals after 15 days at owner home.

Post-operative care: Post-operative treatment included administration of fortified procaine penicillin (22,000 IU/kg) for five days and diclofenac sulfate (2mg/kg) intramuscularly for three days. The wound was regularly dressed with 1% Povidone iodine solution and wound spray (cyclo spray) was applied for five days. The owner was also advised to avoid leaving the calf in the barn with other herd after herniorrhaphy and to supplement good nutrition to facilitate wound healing. Finally, skin sutures were removed on fifteenth post-operative day and the calf was successfully recovered without any complication.

Discussion

The umbilicus in newborn calves includes urachus, umbilical vein and umbilical arteries, that are referred to as umbilical remnants that transport blood among the fetus and its dam before birth (Haile *et al.*, 2017 and Hassen *et al.*, 2017). As a result of the area in the body wall through which these structures passed, if improperly closed the abdominal contents can protrude through the defect resulting in an umbilical hernia (Haile *et al.*, 2017). Causative agents of the umbilical hernia are both congenital and acquired: Congenital causes are under the influence of dominant genetic character or may be environment and acquired causes are secondary to excess traction on an oversized fetus or cutting the umbilical cord too close to the abdominal wall. However, many umbilical hernias are secondary to umbilical sepsis (Haile *et al.*, 2017; Salim *et al.*, 2015 and Sutradhar *et al.*, 2009) because umbilical infection may result in weakening of the adjacent abdominal wall and cause an acquired umbilical hernia (Sutradhar *et al.*, 2009). This agrees with the current case management in terms of causative agent, which was secondary to umbilical abscess.

In the current case report, umbilical hernia is seen in seven month old calf. The previous reports which stated that, umbilical hernias are more commonly observed in young calves whose age is 1-3 month old (Fesseha, 2020; Haile *et al.*, 2017; Jaman *et al.*, 2017; Salim *et al.*, 2015 and Sutradhar *et al.*, 2009). There are different approaches used to correct umbilical hernias such as using closed herniorrhaphy, including counter irritation, clamping, trans-fixation sutures and even safety pins and commercially-available rubber

bands are commonly used for correction of reducible hernia, which has small hernial ring and not strangulated or complicated ones (Sutradhar *et al.*, 2009 and Yasin, 2017). However, this method has certain drawbacks such as infection, loss of clamp or premature necrosis of the hernial sac, result an open wound, and evisceration or formation of an enter-cutaneous fistula (Sutradhar *et al.*, 2009). But for an irreducible umbilical hernia that have large hernia ring, which is more than two fingers or > 5 cm in size or persists for more than 2 to 3 weeks and umbilical hernia is complicated with abscess or has adhesion it is not advisable rather than using other methods such as open herniorrhaphy after administering appropriate local anesthesia and sedation (Yasin, 2017). Similarly, in current case open herniorrhaphy was performed under local block to obliterate the hernia sac and repair hernia defect in calves.

Complication may develop in congenital umbilical hernias as a result of that cannot be completely reduced (Fesseha, 2020 and Shah *et al.*, 2016). Similarly, in this case report, sub cutaneous abscess was seen during the procedure between the hernial sac and umbilical structures. Umbilical hernia was corrected successfully with herniorrhaphy by using simple interrupted technique to close herial ring with absorbable catgut and horizontal cross mattress to close skin with non-absorbable silk as suture material in current case. Similarly, the previous case report reported by Sutradhar *et al.* (2009) stated that both the absorbable (catgut) for comparatively young calves and nonabsorbable (silk/nylon) suture materials for older calves were used to correct the umbilical hernia.

To summarize that, in present case, umbilical herniorrhaphy was performed by surgical method through replacement of the content and closure of the oppening with absorbable catgut 2/0 in the form of simple interrupted suture technique while the skin was closed by horizontal mattress with non-absorbable silk 2/0 besides; there was drainage of the pus. Thus ealy management of umbilical herniorrhaphy is preferable for good recovery and less post operative complications.

3.2.2. Surgical correction of Perineal hernia in dog

Abstract

Perineal hernia is characterized by protrusion of the abdominal or pelvic organs, through a weakened pelvic diaphragm. In current case report, a seven-year-old intact male dog was presented to VTH with a history of unilateral swelling around the anal region. The patient had undergone thorough physical examination and revealed the presence of few hard masses with reduceable and doughy in consistency beside the presence of hernial ring. Following complete physical and clinical examination, surgical site was aseptically prepared and undergone perineal herniorrhaphy. Then, the dog was recovered from the condition in fifteen days of operation. Therefore, herniorrhaphy along with good post operative care is effective for successful management of perineal hernia.

Key words: *Intact male dog; Pelvic diaphragmatic muscles; Perineal hernia*

Introduction

Perineal hernia is characterized by protrusion of the abdominal or pelvic organs (mainly due to weakening of pelvic diaphragmatic muscles and its surrounding tissue) resulting in a fluctuant swelling on either side or rarely below the anus (Pekcan *et al.*, 2010 and Vnuk *et al.*, 2008). The weakening may also occur due to acquired muscle weakness, trauma and straining (Gokulakrishnan *et al.*, 2019). The pelvic diaphragm consists of the external anal sphincter muscle, the levator ani muscle, coccygeus muscle, internal obturator muscle and the sacrotuberous ligament (Al-Akraa, 2015). On other hand, hernial sac usually made of perineal fascia, subcutaneous tissue and skin from interior to exterior (Anderson *et al.*, 2008).

Perineal hernia (PH) most commonly occurred in middle-aged or aged intact male dogs (Guerios *et al.*, 2017 and Pekcan *et al.*, 2010). Gokulakrishnan *et al.* (2019) also reported that short-tailed dogs and aged animals are more prone for perineal hernia. Intact male dogs over the age of 7-9 years are most likely to develop a perineal hernia (Chantawong, 2014). But, perineal hernia is much less likely to develop in female and neutered male

dogs, and cats (Chantawong, 2014 and Vnuk *et al.*, 2008). Most patients present with swelling on one side of the anus, though some patients present with bilateral hernias, one on either side of the anus (Al-Akraa, 2015). The common clinical sign of perineal hernia is perineal swelling either bilaterally or unilaterally, tenesmus, dysquesia, fecal incontinence, constipation, and straining to defecate (Guerios *et al.*, 2020). Diagnosis is mainly made by history, clinical signs and per rectal examination. Confirmation of diagnosis must be supported through contrast radiography or ultrasonography (Chantawong, 2014 and Priyanka *et al.*, 2018).

Basically, treatment of perineal hernia can be achieved by using either conservative treatments or surgical herniorrhaphy. Conservative treatment of perineal hernia including the use of stool softeners, periodic enemas and digital fecal removal but it gives temporary alleviation (Pratummintra *et al.*, 2013). There are several surgical treatment approaches used for the repair of perineal hernia including the standard herniorrhaphy (Al-Akraa, 2015; Lalzawmliana *et al.*, 2019 and Vnuk *et al.*, 2008), transposition of the internal obturator muscle (Gokulakrishnan *et al.*, 2018; Pekcan *et al.*, 2010 and Vnuk *et al.*, 2008), semitendinosus muscle or superficial gluteal muscle (Shaughnessy and Monnet, 2015), autogenous fascia lata graft (Guerios *et al.*, 2017), and polypropylene mesh (Al-Akraa, 2015; Nanaboina *et al.*, 2017 and Shaughnessy and Monnet, 2015). Combined techniques have also been proposed such as colopexy, cystopexy or vas deferens pexy as “2-step protocol” was developed, in which laparotomy was performed as the initial stage of repair in bilateral or complicated perineal hernia and followed by perineal herniorrhaphy (Gokulakrishnan *et al.*, 2018). In intact dogs, castration is recommended along with perineal hernia repair in order to prevent the effects of testosterone or relaxin influence on the prostate gland and perianal musculature (Snell *et al.*, 2015).

Case history and examination: A seven years old intact male dog weighing 16kg was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with a history of unilateral swelling around the anal region. The owner complained that the dog decreased feed intake, straining during defecation, and the bulged mass was seen 3 months before and increased in size from

time to time gradually. Upon clinical examination, there was swelling on left side of anal sphincter, a few hard masses reducible and doughy in consistency, in the perineal region. There were also mild dehydration, fecal bulge, and dried fecal content in the rectum. All the vital parameters were also assessed and found within the normal range. Based on history and physical examination the mass was diagnosed as perineal hernia and admitted for perineal herniorrhaphy.

Pre-operative animal preparation: The dog was withheld from feed and water for 12 hours before coming to the clinic for next day appointment. Upon arrival on the day of the appointment, the dog was rechecked for its vital sign parameters. After controlling the animal, the caudal part of the rectum was evacuated manually by index finger and anus was plugged by using clean surgical gauze (Figure 4A). The perianal region and surrounding area was prepared aseptically by washing with soap and tap water. Then, the hair was shaved from the intended surgical site and surround area (Figure 4A). The area was again washed by using antiseptic solution (savlon) to remove any fall of hair. Finally, surgical site was scrubbed with 1% povidone iodine in circular manner starting from the center to outward.

Anesthesia and animal control: The dog was controlled in sternal recumbent position and the four legs were tied to the surgical table with tail fixed over the back. The dog was tilted up caudally by putting drapes under the dog. The general anesthesia was achieved by administering xylazine @ 1.5 mg/kg (IM) as premedication dose, and ketamine hydrochloride @ 5mg/kg and Dazepam @ 0.5 mg/kg in single syringe as induction dose intravenously (IV). Intravenous fluid (Ringer lactate solution) at a rate of @ 3ml/kg/hr. was administered using 20 G IV cannula. The dog was maintained using the same anaesthetic agent's ketamine @ 5 mg/kg and diazepam 0.25mg/kg intravenously (IV) throughout the surgical procedure. Then, surgical site was draped with sterile drape in single put and secured to the skin with towel forceps, and given a final scrub with 1% povidone iodine in circular manner starting from the center to prefer prior to proceeding to surgery.



Figure 5: Surgical correction of perineal hernia in intact male dog

(A) Placement of sterile gauze in anal canal (B) Curved dorso-ventral skin incision in progress (C) On progression of herniated organ repositioning (D) Inspection of herniated organ and its ring after replacement (E) Closure of the opening in progress (F) After complete herniorrhaphy

Surgical procedure and techniques: A slightly curved dorso-ventral skin incision was made 1 to 2 cm laterally on the left side of anus extending from the base of the tail to the medial angle of the ischial tuberosity (Figure 4B). Subcutaneous tissue became bluntly dissected till identification of the hernial sac. The incision was deepened through the hernia sac and the herniated organs such as: retroperitoneal fat and intestine were identified and replaced to normal anatomical position manually (Figure 4C). After proper positioning and location of the herniated organ anatomic structures, the base of hernial

sac (Figure 4D) was resected and herniorrhaphy was done using a conventional method by suturing the internal obturator muscle to the external anal sphincter, followed by reposition of external anal sphincter and the levator ani muscle in an interrupted suture pattern with No. 2–0 Vicryl. Finally, subcutaneous tissues in a simple continuous pattern using No. 2- 0 chromic surgical Catgut to eliminate dead space and the skin incision was closed using No. 2–0 nylon in a simple interrupted suture pattern (Figure 4E and F).

Post-operative care and outcome: Postoperatively, the dog was administered anti-pain drug diclofenac sulfate @ 2 mg/kg through IM for three days to prevent straining as it may predispose to recurrence. A course of antibiotic (Fortified Procaine Penicillin @ 22,000 IU/kg) was administered through IM for five days. Local anesthesia similar to an Elizabethan collar was placed to prevent self-mutilation. The animal owner was advised to give laxative (Bisacodyl 5mg, Orally) along with a bland, low-fat diet mixed with vegetables for 2 weeks to soften the stool to ease the defecation without straining and allowed the animal to gradually reintroduced to a normal diet until it could finally eat and defecate normally. After 5th days, follow-up was continued with the animal owner through phone call communication. Finally, skin suture was removed after 15 days and the dog recovered uneventfully without any complications.

Discussion

Perineal hernia is a condition which occurs mainly when the pelvic cavity muscles rupture due to weakened pelvic diaphragm to support the rectal wall, through which there is caudal displacement of some of the anatomical structures, such as rectal and pelvic or abdominal contents, resulting the swelling of the perineal region and impaired defecation (Lalzawmliana *et al.*, 2019). Although, the exact cause of perineal hernia is unknown, a multitude of factors have been incriminated, such as neurogenic, congenital predisposition, prostatic disease, chronic constipation, myopathies and hormonal alterations that result the weakness of pelvic diaphragm (Gokulakrishnan *et al.*, 2018 and Vnuk *et al.*, 2008). In present case report, the most clinical signs observed upon presentation and examination, were chronic constipation, fecal impaction, straining to defecate and perineal swelling. Al-Akraa (2015); Guerios *et al.* 2020 and Vnuk *et al.*

(2008) also stated that the most clinical sign, which are detectable up on presentation, were constipation and perineal swelling, but the symptom may present individually or in combination.

According to Vnuk *et al.* (2008) report the median values of animal age was 8.17 ± 1.78 (range, 5–13) years. In present case report, the age of animal was 7 years old. Perineal hernia can be diagnosed accurately based on history, clinical signs and symptoms, physical examination, digital palpation and radiographic findings (Al-Akraa, 2015 and Lalzawmliana *et al.*, 2019). In present case, history, clinical signs and symptoms, physical examination and digital palpation were used to diagnosis the case. Radiographic examination aid in assessment of the condition of the rectum and outline the hernial content (Pekcan *et al.*, 2010), although in present case, radiographic examination was not used. The contents of perineal hernia reported by Guérios *et al.* (2017) and Nanaboina *et al.* (2017) are urinary bladder, rectum, prostrate and retroperitoneal fat. The same is true in present case; where the identified herniated contents were retroperitoneal fat and rectum.

The retrospective study conducted by Pekcan *et al.* (2010) on forty one dogs with perineal hernia at Ankara University, Turkey, out of the total 41(26.8%) dogs had bilateral while the other 30 (73.2%) had unilateral with 17 (56.7%) right and 13(43.3%) left perineal hernia. In present case report, the patient was presented with developed left unilateral hernia. There are several surgical treatments methods have been suggested to repair of perineal hernia (Al-Akraa, 2015; Gokulakrishnan *et al.*, 2018; Guerios *et al.*, 2020; Guerios *et al.*, 2017; Lalzawmliana *et al.*, 2019; Lee *et al.*, 2012; Nanaboina *et al.*, 2017; Vnuk *et al.*, 2008; Pratummintra *et al.*, 2013 and Stoll *et al.*, 2002). Among that, muscle appositional techniques (standard herniorrhaphy) is one of the most commonly recommended procedures to repair the early and unilateral diagnosed cases of PH hernia with success rate 94.6% (Al-Akraa, 2015). This agrees with present case in terms of techniques was used.

According to the report of Pekcan *et al.* (2010) stated that postoperative analgesia have important role in mitigation of straining as a result of pain; whereas, prevention or relief of straining could have a role in preventing the reoccurrence of perineal hernia. Similarly,

in present case, diclofenac sulfate @ 2mg/kg intramuscularly for 3 days as anti-pain and stimulant laxatives (bisacodyl, 300mg) orally for softening stool for two weeks as post-operative care was achieved. The study conducted by Al-Akraa (2015) reported that local sepsis, partial dehiscence, suture sinus, reoccurrence and seroma were the most post-operative complication encountered. However, postoperative complications were not noticed in current case. In conclusion, early management of perineal hernia by internal obturator muscle transposition along with good post operative care are found to be important for the successful management without significant post operative complications.

3.2.3. Surgical correction of ventral hernia in puppy

Abstract

A ventral hernia is defined as a hernia through any part of the abdominal wall other than a natural orifice and ventral to the stifle skin fold caused by the migration of viscera through a tear in the abdominal wall. Among ventral hernia, cranial ventral midline hernias are classically diagnosed at a few months of age in puppies and kittens and reconstructed, early to prevent complications, such as organ strangulation or compartment syndrome. In present case, a 2 months old male puppy was presented to the VTH with a history of small swelling around ventral midline part of the abdomen in between umbilicus and xyphoid cartilage. Upon palpation, the swelling was soft in consistency, reducible to hernial ring. After completion of clinical examination, the surgical site was prepared aseptically and herniorrhaphy was performed under general anesthesia. Following successful surgical treatment and post operative care, the puppy was recovered uneventfully in fifteen post-operative days. Therefore, early diagnosis and surgical management of cranial ventral abdominal hernia is important for good outcome without significant post operative complications.

Key words: *Herniorrhaphy; Pupp; Ventral midline hernia*

Introduction

A ventral hernia is defined as a hernia through any part of the abdominal wall apart from a natural orifice and the hernia is ventral to the stifle pores and skin fold as a result of the migration of viscera via a tear inside the belly wall (Das *et al.*, 2012). Traumatic tear of abdominal wall, which result in rupture of the prepubic tendon in large animals, particularly cow and mare is mostly caused by kicks, horn thrust, violent contact with blunt object and sudden jump from the height (Fesseha and Kidanemariam, 2020). Traumatic abdominal wall hernias, which is caused as result of blunt trauma has been reported to be the most common cause of traumatic herniation in dogs and cats (Rizk and Samy, 2016).

It is difficult to generalize about the diagnosis of herniation, but observation and palpation of contents of the hernia and hernia ring under the skin is important in most cases (Hassen *et al.*, 2017). In case of irreducible hernias, it's difficult to identify hernia ring and diagnosis can be done through X-ray to detect absence of of abdominal wall continuity (Amare and Haben, 2020 and Fesseha and Kidanemariam, 2020). Exploratory laparotomy can also be used to diagnose the defect, while the X-ray used to differentiate abdominal wall hernias from fibrino-cystic, abscess, and inflammatory swellings in bovine animals (Kumar *et al.*, 2014).

Hernia can be treated in different approaches like reduction and retention with the aid of bandage, by using blisters or injection of irritant solution near hernial ring, by applying of a ligature through and via mattress sutures at the bottom of hernial sac after reducing the hernia and by radical operation where in herniorrhaphy (Hassen *et al.*, 2017). Even though ventral abdominal hernia is treated in different ways, herniorrhaphy is the most common form of hernia repair, in which hernial ring is apposed together by incision over the sac or ring (Yasin, 2017). Therefore, the aim of present case is to describe the successful surgical management of a cranial ventral midline hernia in a puppy.

Case history and examination: A two months old male puppy weighing 9 kg was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and

Agriculture, Addis Ababa University with a history of small swelling around ventral part of the abdomen (Figure 5A). The owner complained that there was a bulged mass, which was started one month ago and increased in size gradually. The clinical examination also revealed the presence of swelling on ventral midline cranial to the umbilical region. Upon palpation, there was reducible, lump with soft in consistency, and defined hernial ring. The vital parameters were assessed and all were found within the normal range. Based on history and clinical findings the case was diagnosed as cranial ventral midline hernia and admitted for surgical correction.

Pre-operative preparation: The puppy was put on surgical table and positioned in dorsal recumbency after sedation by xylazine hydrochloride. The ventral part of the abdomen surrounding the swelling area was prepared aseptically by washing with soap and tap water followed by shaving of the hair starting from umbilicus cranially to xyphoid cartilage and surrounding area. The area was again washed by using antiseptic solution (savlon) to remove any fall of hair. Finally, surgical site was scrubbed with 1% povidone iodine in circular manner starting from the center to outward.

Anesthesia and animal control: The dog was controlled in dorsal recumbent position and the four legs were tied to the patient table. The general anesthesia was achieved by administering xylazine @ 1.5 mg/kg as premedication dose, and ketamine hydrochloride @ 5 mg/kg and Dazepam @ 0.5mg/kg in single syringe as induction dose intravenously (IV). The dog was maintained using the same anaesthetic agents using diazepam @ 0.25mg/kg and ketamine @ 5mg/kg intravenously (IV) throughout the surgical procedure. Then, surgical site was draped with sterile drape in single put and secured to the skin with towel forceps, and given a final scrub with 1% povidone iodine in circular manner starting from the center to prefer prior to proceeding to surgery.

Surgical procedure and techniques: A sharp and straight incision was made on the swelling part. The skin was bluntly dissected from the underlying tissues and the incision was continued through the abdominal muscle to expose and open the hernial sacs. Following blunt dissection of the subcutaneous tissue and abdominal muscles, the condition of the hernial sac and the hernial ring was examined to confirm any adhesions

in the abdominal organs. Unfortunately there was no adhesions and the content was gently pushed back to abdominal cavity. Finally, the edges of the hernial rings were exposed and surgically denuded before closure. Thus, hernial ring was closed by using simple interrupted suture pattern and a sub-cutaneous tissue was closed by sub-cuticular suture pattern (Figure 5B and C) with sterile absorbable polyglycolic acid (vincryl) 2-0 suture material.



Figure 6: Cranial ventral midline hernia and its repair in puppy

(A) Presentation of case (B) Progression of subcuticular suturing (C) After completion of herniorrhaphy (D) Observation of wound healing progression on fifth days (E) Observation of wound healing on fifteen days

Post-operative care and outcome: Postoperatively, the dog was administered anti-pain drug diclofenac sulfate @ 2 mg/kg through IM for three days. A course of antibiotic (Fortified Procaine Penicillin @ 22,000 IU/kg) was administered through IM for five days. Local made similar to an Elizabethan collar was placed to the neck until suture removal in order to prevent self-mutilation. The owner was advised to assess for pain, inflammation at the surgical site. After 5th days (Figure 5D) follow-up information was provided through phone call communication with the owner. Finally, the dog recovered after 15 days (Figure 5E).

Discussion

Cranial ventral midline hernias can be due to congenital and acquired with variable size of the hernial opening (Das *et al.*, 2012). It is commonly located in the ventral midline abdominal wall in between umbilicus and xyphoid cartilage, and the nature of hernia contents depends on the site of the herniation (Fesseha and Kidanemariam, 2020). This is in agreement with present case, in terms of location. Even though the exact cause of the hernia in the present case could not be traced it might result from a failure of midline fusion, which occurs progressively from cranial to caudal (Bismuth and Deroy, 2017). Cranial ventral midline hernias are classically diagnosed at a few months of age in puppies and kittens and reconstructed and early to prevent complications, such as organ strangulation or compartment syndrome (Bismuth and Deroy, 2017). This in line with the present case, where the affected animal was two months in age and the case was also treated before complicated.

There are several treatment options for the treatment of ventral abdominal hernia depending on the size of the hernial opening. Among these the application of bandage, clamps or ligatures may be helpful in a few cases where the hernial ring is small. On other hand, if the hernia ring is large, surgical intervention will be useful but hernioplasty might be required in extensive ventral abdominal hernia (Abdin-Bey and Ramadan, 2001; Shaw *et al.*, 2003 and Yasin, 2017). There was a report in Egypt, in a five-month-old male Shiraze cat suffering from ventral hernia about 3cm length in caudal ventral abdomen was successfully managed by a absorbable suture material, with PDS 3-0 size

using simple continuous pattern (Rizk and Samy, 2016) but in another report in Canada, 16-year-old spayed female domestic shorthair cat with caudoventral abdominal wall and approximately 3cm width hernia ring were treated by herniorrhaphy using a 3-0 Prolene to appose the external rectus sheath to the cranial pubis in simple interrupted sutures (Neville-Towle and Sakals, 2015). In the present case, a tear was approximately 5cm length and was successfully corrected by herniorrhaphy by using synthetic absorbable suture material (Vincryl 2-0 in size) with simple interrupted sutures without any complications.

In conclusion that, cranial ventral midline hernias can be managed through herniorrhaphy by using simple interrupted suture technique using synthetic absorbable polyglycolic acid as suture material to obliterate the hernia sac. Following surgical treatment the puppy was recovered uneventfully in fifteen post-operative days. Therefore, early diagnosis and surgical repair of cranial ventral abdominal hernia is effective for positive outcome.

3.3. Surgical Sterilization of Bitch

3.3.1. Ovariohysterectomy

Abstract

Ovariohysterectomy is the surgical removal of the ovary and the uterus both as an elective and a therapeutic surgical procedure to treat a number of female reproductive disorders. In present case, a two years old bitch weighing 12 kg was presented for an elective surgical sterilization to the VTH with history of normal feeding and taking water habit, there was no treatment history before and normal exercises. Accordingly, clinical parameters such as heart beat, respiratory rate and pulse rate were evaluated and found to be apparently normal. After aseptic preparation and control of the the bitch, ovariohysterectomy through caudal midline incision was performed. Following surgical manipulation the bitch was recovered with 15 days of post-operative care.

Key words: *Bitch; Caudal midline incision; Ovariohysterectomy*

Introduction

Ovariohysterectomy is some times called spaying or neutering a female dog (Asrat and Melkamu, 2018). Ovariohysterectomy (OVH) is involves the surgical ablation of the ovary and the uterus both either in elective or therapeutic surgical procedure to treat a number of female reproductive disorders (Ajadi *et al.*, 2018). Besides it also serve as an integral part of dog population management (DPM) to enhance the health and well-being of unfastened-roaming dog, lessen issues they will cause, and can also set goals to lessen the size or turnover of the population (Taylor *et al.*, 2017). Stabilization of dog populations, and, in some cases, the humane reduction of the population over time to a manageable size through ovario-hysterectomy technique is a valuable adjunct to long-term canine rabies control strategies rather than vaccinating a large enough proportion of the dog population to achieve rabies elimination (Taylor *et al.*, 2017).

Thus it minimizes disease related to in reproductive tract, including pyometra and mammary neoplasia, pregnancy and parturition related disorders including metritis, mastitis and dystocia, and hormone-associated disorders such as vaginal prolapse in bitches (Acharya *et al.*, 2016; Asrat and Melkamu, 2018 and Ajadi *et al.*, 2018). Ovariohysterectomy in bitches is performed through an incision of the ventral (DeTora & McCarthy, 2011), or lateral abdominal wall (Howe, 2006; Bushby & White, 2019), or by laparoscopy (Freeman & MacFarlane, 2007). Even if it has some advantages and disadvantages, the ventral midline is most widely used approach to neuter the dog (Bierbrier & Causanschi, 2018). Because uterus sometimes cannot be identified from the flank approach, and it is difficult to be certain whether this is a technical problem or the animal has already been neutered, without exploring from a midline approach (Kiani *et al.*, 2014). Therefore, the aim of present case is to describe the ovario-hysterectomy in bitch by caudal midline incision approach of and its successful surgical management.

Case history and examination: A two years old female dog weighing 12 kg was presented for an elective surgery of ovario-hysterectomy to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with

history of normal feeding and drinking water, and normal exercises. A pre-anesthetic clinical examination was conducted on dog to ascertain whether the dog has a clinical condition that may interfere with the procedure or not. The clinical parameters such as: heart rate, respiratory rate, body temperature, and capillary refill time were recorded. Physical examination also revealed normal body condition with shiny hair coat and also the dog had normal gait and posture up on observation while at motion and rest. Measurement of vital sign, 38 °C, 60 beats/min and 52rpm temperature, pulse rate and respiratory rate respectively. The dog was judged as apparently normal and admitted for ovario-hysterectomy.

Pre-operative preparation of the bitch: Bitch was withheld 12 hours from food and water before surgery was conducted. The ventral midline and surrounding area was aseptically prepared by washing with soap and tap water after the bitches was immobilized through chemical method by intramuscular injection of xylazine hydrochloride @ 1.5 mg/kg. Then, the hair was shaved from the skin that covers ventral midline starting from umbilicus down to the pubis and surrounding area. The area was again washed by using antiseptic solution (savlon) to remove any fall of hair. Finally, surgical site was scrubbed with 1% povidone iodine in circular manner starting from the center to outward.

Anesthesia and animal control: The bitch was controlled in dorsal recumbent position with the four leg was tied to the surgical table and the leg to which IV cannula secured was positioned straight forward by assistant person to facilitate the flow of IV fluid. The general anesthesia was achieved by administering xylazine @ 1.5mg/kg intramuscularly (IM) as premedication, and ketamine hydrochloride @ 5mg/kg and Dazepam @ 0.5mg/kg intravenously (IV) as induction dose and ketamine hydrochloride @ 5mg/kg and Dazepam @ 0.25mg/kg intravenously (IV) as maintenance dose through out surgical procedures. Intravenous fluid (Ringer lactate solution) at a rate of @ 3ml /kg/hr. was administered using 18 G IV cannula. Then, surgical site was draped with sterile drape in single put and secured to the skin with towel forceps, and given a final scrub with 1% povidone iodine in circular manner starting from the center to prefer prior to proceeding to surgery.

Surgical procedure and techniques: After surgical site was prepared aseptically and appropriate analgesia was achieved, a caudal midline incision was performed on the skin along the linea-alba starting from the umbilicus and ending a few centimeters in front of the pubis (Figure 6A). The subcutaneous connective tissue was bluntly dissected to visualize the linea-alba by using blunt Mayo scissors. The linea-alba was grasped in the middle by using rat tooth tissue forceps and tented up. Then, small incision was made on the linea-alba by using scalpel blade. Finally, two fingers were inserted through the small incision and then, linea-alba was tented up to extend the incision in between the two fingers by using blunt Mayo scissors. Bleeding was controlled by using simple swabbing, and ligation or twisting of blood vessel with hemostatic forceps depending on the size of blood vessel and amount of blood oozing out to obtain a very clean surgical field. After inserting gloved hand through incision, cranial to the bladder the body of the uterus and bifurcation of the horns were easily located and pulled out on the surgical field. The ovary was hidden in the fat-filled ovarian bursa (Figure 6B) but it was located through following cranially the horns. Then, ovary was grasped between the thumb and the middle finger and the index finger was placed on suspensory ligament and then, a gentle tension was placed by rotating the index finger caudally until the ligament was broken. Two hemostatic forceps were placed on cranial and caudal aspects of the ovarian pedicle. Trans-fixation ligature of ovarian pedicle was done behind the cranially placed forceps by using absorbable suture material (Chromic surgical cut gut 2-0), and ovary was transected at the proper ligament. Finally, forceps that remain on the proper ligament was gently released to check bleeding from ovarian artery and vein. The same procedure was applied on the second ovary to transect. After excisions of the ovarian were completed transection of uterus was followed. Independently trans-fixation of the right and left uterine artery and vein were done by using absorbable suture material (Chromic surgical cut gut 2-0). Three hemostatic forceps were placed in parallel on uterine body cranial to the cervix (Figure 6C), and two trans-fixations were done: one proximal to distal placed forceps and second was proximal to the middle placed forceps then the middle forceps was removed. Finally, transecting of uterus was done in between the third cranially placed hemostatic forceps and second trans-fixation. Any bleeding was checked; surgical field was cleaned and made it ready for celiotomy closure. Linea-alba was closed by

simple interrupted suture pattern and skin was closed by sub-cuticular suture pattern by using absorbable suture material (Chromic surgical cut gut 2-0) (Figure 6D and E).

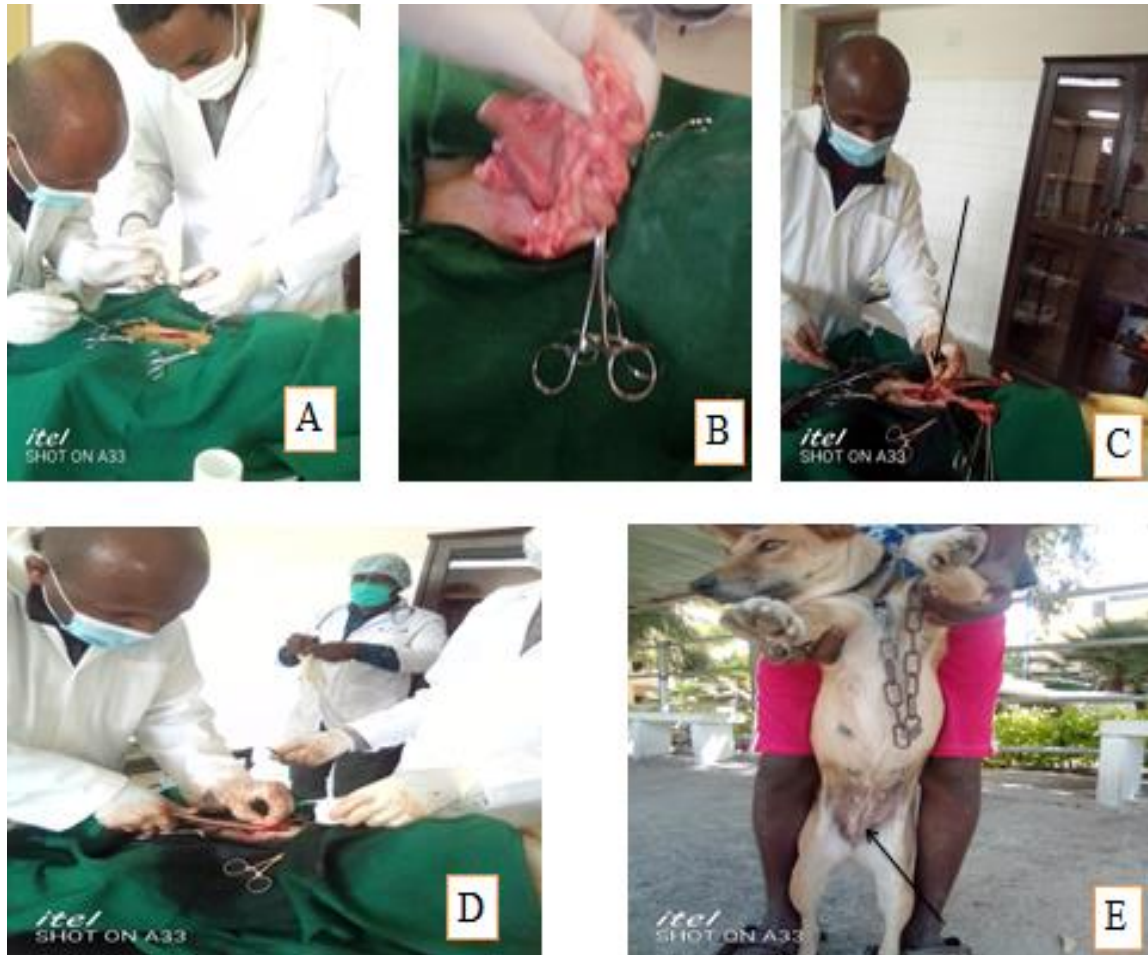


Figure 7: Ovariohysterectomy and its progression in bitch

(A) Making midline skin incision (B) Fat-filled ovarian bursa (C) Applying of hemostatic forceps on uterine body (D) Skin closure on progression (E) Observation of wound site on 5th days

Post-operative Care: Post-operative treatment included administration of Fortified Procaine Penicillin (22,000 IU/kg) through I.M for five days, diclofenac sulfate (2 mg/kg) through I.M for three days and mebendazole 300mg orally twice per day within 12 hour interval for three days for deworming purpose. Local made similar to an

Elizabethan collar was placed to the neck until the wound was fully recovered in order to prevent self-mutilation. The wound was properly dressed with 1% Povidone iodine solution and applying wound spray (cyclo spray) for five days daily. Finally, uneventful recovery was noticed (Fig. 6E) within 15th days of post-operation.

Discussion

Ovariohysterectomy may be performed for contraception to assist the control of pet overpopulation issue (Howe, 2006), as well as to prevent diseases associated with the reproductive system, such as mammary neoplasia or benign prostatic hyperplasia (Levy *et al.*, 2003). However, in present case, ovariohysterectomy was done as a contraception method to control dog overpopulation issue. Ruttema *et al.* (2001) opined that ovariohysterectomy is better alternative birth control method in dog since other methods such as pills are not a practical alternative as a lasting form of sterilization. As reported by Sharma *et al.* (2019) ovariohysterectomy was also performed as a treatment of gravid uterine prolapse in a cat.

Non-surgical and surgical sterilization techniques are commonly practiced in dogs. Among non-surgical sterilization techniques, chemical sterilization such as using of cadmium chloride, zinc arginine, glycerol, and lactic acid are some of the employed methods (Vanderstichel *et al.*, 2014). In addition, progestagens, androgens and anabolic steroids are commonly used hormones for non-surgical sterilization methods in dogs (Max *et al.*, 2014). However, this method has certain drawbacks especially hormonal methods as it is considered to be interfering with mammary tumor pathogenesis (Fazio *et al.*, 2015 and Sorenmo *et al.*, (2000). On the other hand, a surgical sterilization method is a permanent method of dog population control method by complete removal of ovary and uterus to overcome the drawback of non-surgical method (Howe, 2006). In present case, surgical method of dog sterilization (ovario-hysterectomy) was performed by using the ventral midline approach. The same approach was used to sterilize the dog by Kiani *et al.* (2014)

In current case management chromic cat gut No. 2-0 was used for ligation of ovarian pedicle and uterine artery and vein, to encompass cervix and closure of linea-alba. For closure of outermost skin Vicryl 2-0 was used. Similarly, Acharya *et al.* (2016) used cat gut No. 2-0 (Ethicon) and vicryl 2-0 for ligation of ovarian pedicle and cervix, and closure of outermost skin, respectively. During ovariohysterectomy, hemorrhage is one of the most common complications so using a careful technique while breaking the suspensory ligament, handling and manipulating the ovarian and uterine pedicles, and placing ligatures is important in preventing intraoperative and postoperative hemorrhage (Howe, 2006). Similarly, in present case, ovario-hysterectomy was performed under proper controlled of bleeding by proper placement of hemostat forceps, and putting circumferential trans-fixation ligatures at ovarian pedicle and uterine artery and vein.

Ovario-hysterectomy has been shown to increase the incidence of developing evisceration, hernia, suture dehiscence, maggot infestation, and infection of wound and tearing of tissue (Kiani *et al.*, 2014). However, in present case, such post-operative complication was not encountered. According to the reports of Acharya *et al.* (2016) proper wound management and using of non-steroidal anti-inflammatory drugs and antibiotic has been reducing post-operative complication in the incision site. Similarly, in this case, ant-pain (diclofenac sulfate, 2 mg/kg body weight) for three days and antibiotic (fortified procaine penicillin @ 22,000 IU/kg body weight) for five day as post-operative medications were administered to ensure the post-operative complication free healing process.

In the present case report, the ovario-hysterectomy was surgically performed under aseptic condition and pain was alleviated through general anesthesia. Finally, after ovariohysterectomy, the incision site was regularly dressed and collar was applied for bitch to prevent liking of the wound as post-operative care for 15 days. In conclusion, ovariohysterectomy is one of the economically feasible petpopulation controls specially where there are limited resources and related reproductive diseases.

3.4. Surgical Management of Dystocia in Small Ruminant

3.4.1. Casearean section in ewes

Abstract

Dystocia means difficulty in parturition to the point of needing human intervention and it is a major cause of lamb loss in the flock and may result in great economic loss to the farmers. Two local breed adult ewes of different age and causes of dystocia were presented to VTH with the history of full term gestation and three month gestation in case 1 and 2, respectively. Clinical and physical examination finding revealed that there were weak and unable to stand, and straining in case 1 and anorexia, lethargy, recumbent with attempt to stand, abdominal distension and grunting sound in case 2. Live fetus in case 1 and died fetus in case 2 was dictated up on abdominal palpation and ultrasonography findings. Vaginal palpation also has undergone and revealed that incomplete dilation of cervix in case 1. Depending on diagnostic finding caesarian section were admitted and a single live fetus and a twin died fetuses were removed from case 1 and 2, respectively under line infiltration anaesthesia in case 1 and inverted “L” blocks in case 2. Following the successful caesarian section the dam of case 1 was died after 18 hours of post-surgery but the dam of case 2 was recovered in period of 15 post-operative days.

Key words: *Caesarian section; Dystocia; Ewes*

Introduction

Dystocia means difficulty in parturition to the point of needing human intervention (Abdullah *et al.*, 2015). Dystocia also defined as the failure of transmission of stage one to stage two labor or when thirty minutes spend to start of stage two of labor or parturition (Ahmed *et al.*, 2017; Iqbal *et al.*, 2020; Ismail, 2017 and Pandey *et al.*, 2018). The first stage of parturition (labor) is usually characterized by decreased appetite, preparing a birthing area, isolation from the herd, restlessness, and leading up to the early uterine contractions but it end up with forceful abdominal contractions. Stage two of parturition is fetal expulsion or delivery of neonate which usually occurs within 15-30

minutes. The third stage of parturition follows and ends by the expulsion of the fetal membranes which usually takes place within 4-6 hours (Bhattacharyya *et al.*, 2015; Khan, 2018; Iqbal *et al.*, 2020 and Ismail, 2017).

Dystocia in small ruminants can be resulting from either maternal or fetal predisposing factors. Among fetal-related factors the most common causes of dystocia were oversized fetus, lamb mal-presentation, malposition, postural defects, and congenital abnormalities (Elchikh *et al.*, 2019 and Ismail, 2017), whereas, over feeding of dam during pregnancy, uterine inertia in polytocous ewes, incomplete cervical dilatation (ringwomb) and small diameter of pelvic canal are maternal related factors of causes dystocia (Abdullah *et al.*, 2015 and Elchikh *et al.*, 2019). Other factors that may contribute for the occurrence of dystocia are age of ewe, gender of offspring, large or small birth weights (Ahmed *et al.*, 2017).

Dystocia constitutes a major reproductive problem among small ruminants and can hinder or affect their productivity because of newborns and dams deaths with severe economic losses (Elchikh *et al.*, 2019). Close observation of the ewe and doe throughout parturition is crucial for well timed interference due to the fact early recognition and interference in cases of dystocia both manually or surgically will bring about uneventful final results each for the dam and the neonate (Ismail, 2017). Bhattacharyya *et al.* (2015) stated that survival of the animals (and their fetuses) presented for treatment of dystocia irrespective of whether they are managed manually or surgically is directly related to their clinical status. Survival of each the dam and new born lamb were drastically laid low with the duration of time delay among the start of labor and the time of presentation for surgical intervention (Dutt *et al.*, 2018 and Sharma *et al.*, 2014). Hence, the outcome and success rate of caesarean section is higher if surgery was performed early when the fetus is alive or freshly dead (Dutt *et al.*, 2018 and Hussain and Zaid, 2010). Generally, the effectiveness of the type of the treatment for delivering the fetus in case of dystocia depends upon the type of dystocia and its cause (Hussain and Zaid, 2010 and Odedara *et al.*, 2017). Therefore, the aim of this case report is to presents the surgical management of dystocia in ewes.

Case history and examination

Case 1

A two years old local breed female sheep weighing 18 kg was brought to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with the history of full term gestation in lateral recumbency. Sheep was in 3rd parity and on the past all two parities the animals was given a single lamb without history of any difficulty in birth. Further, history revealed that the parturition process commenced 12 hour before presentation to the hospital and also the animal was anorexic since two days. On clinical examination, body temperature and respiration were with normal range and also the ewe had tachycardia and pale mucous membrane with capillary refill time of 3 seconds. The ewe was weak and unable to stand. There was no rupture of the fetal membrane and no vaginal discharge was observed. No fetal part was observed in the birth canal. To detect the status of fetus abdominal palpation was used and was an active fetal movement was felt. Up on vaginal examination there was incomplete dilation of cervix. Therefore, the condition was diagnosed as maternal dystocia due to incomplete dilation of cervix, and animal was admitted to caesarian section to safe the fetus.

Case 2

A five years old local breed sheep weighing 16 kg was brought to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with the history of three month gestation in sternal recumbency. Sheep was in 4th parity and the past three parities, the animals have given birth to twins without any history of difficulty in birth. The history also revealed that five days before, the animal was admitted to the VTH with distended abdomen and the distension gradually increased. The ewe was also treated with oxytetracycline injection (10 mg/kg) intramuscularly for three days at one-day interval by calling animal health professional from Denkaka animal health clinic at home but after four days, animal doesn't get relief. Up on physical examination, the animal become anorectic, lethargy, had ruff hair coat, recumbent with attempt to stand, distended abdomen and grunting sound was heard. On clinical

examination, body temperature and respiration were with normal range and also the ewe had tachycardia and pale mucous membrane with normal range of capillary refill time. There was no rupture of the fetal membrane and no vaginal discharge was observed. No fetal part was observed in the birth canal. To detect the status of fetus abdominal palpation can be used but there was no active fetal movements were felt. Depending on history and abdominal palpation the condition was diagnosed as dystocia as a result of fetal death in utero, and animal was suggested to caesarian section to safe the dam.

Pre-operative animal preparation: Ewes were immobilized by using physical method of restraining by placing the animal on the surgical table. Then, the left paralumbar fossa area was prepared aseptically by washing with soap and tap water. The hair was shaved by using scalpel blade no. 23 from the skin that covers the left paralumbar fossa area (Fig. 7A). Then, the area was again washed by using antiseptic solution (savlon) to remove any fall of hair. Finally, surgical site was scrubbed with 1% povidone iodine in circular manner starting from the center to prefer and made it ready for aseptic surgery. In both cases, the animals received diclofenac sulfate @ 2mg/kg through intramuscularly (IM) injection. Ringer lactate solution was also administered using 18 G IV cannula as intravenous fluid at a rate of 10 ml/kg/hour to prevent hypo-volumic shock as a result of bleeding and to correct the dehydration status.

Anesthesia and animal control: Both ewes were controlled in right lateral recumbent position and the head was positioned straight forward by assistant person to facilitate the flow of IV fluid. Field block anesthetics were used by making line infiltration in case 1 and inverted “L” blocks in case 2 with 2% lidocaine hydrochloride enclosing the surgical incision site. Surgical site was draped in single put on without any movement and secured to skin with towel forceps. Finally, the surgical site was given a final scrub with 0.1% povidone iodine in circular manner starting from the center to prefer prior to proceeding to surgery.

Surgical procedure: After surgical site was prepared aseptically and appropriated analgesia was achieved, a celiotomy was performed by incising the skin, starting from 10 cm away from transverse process of lumbar vertebrae and 5 cm distant from the last rib,

and ending a 20 centimeters ventrally from starting point on left paralumbar fossa. The subcutaneous fascia was bluntly dissected by using blunt Mayo scissors. The three abdominal muscles were gently incised by using scalpel blade no.20 that was loaded on scalpel handle no.4. Peritoneum was grasped by using serrated tissue forceps and tented up. Then, small incision was made on the peritoneum by using scalpel blade. Finally, two fingers were inserted through the small incision and peritoneum was tented up to extend the incision in between the two fingers down and up by using blunt Mayo scissors and the abdominal contents were exposed. To control bleeding simple swabbing and ligation and twisting of blood vessel with heamostatic forceps was performed depending on the size of blood vessel and amount of blood oozing out to obtain a very clean surgical field. After inserting gloved hand through incision, the gravid uterus was searched and gently pulled out on the surgical field. Then, the uterus was swapped by using gauze and incision was made on greater curvature in parallel to blood vessel. After excision of the uterus was completed, live fetus in case 1 (Fig. 7B) and died fetus in case 2 (Fig. 7C) were removed. Independently trans-fixation of the umbilical cord was done by using absorbable suture material (Chromic surgical cut gut 2-0). The uterus was lavaged externally with warm normal saline and powder of fortified procaine penicillin was poured onto the incision site in both cases immediately after fetus was removed out. Then, uterus was sutured with a continuous inverting pattern (Cushing) followed by lambert suture pattern. After suturing of uterus was completed any bleeding was checked, cleaned and returning it into abdominal cavity. Finally, surgical field was cleaned and celiotomy was closed in three layers in case 1 and four layers in case 2 with chromic surgical cut gut 2-0 and synthetic non-absorbable suture material (silk) for soft tissues and skin suture (Fig. 7D), respectively in both cases.

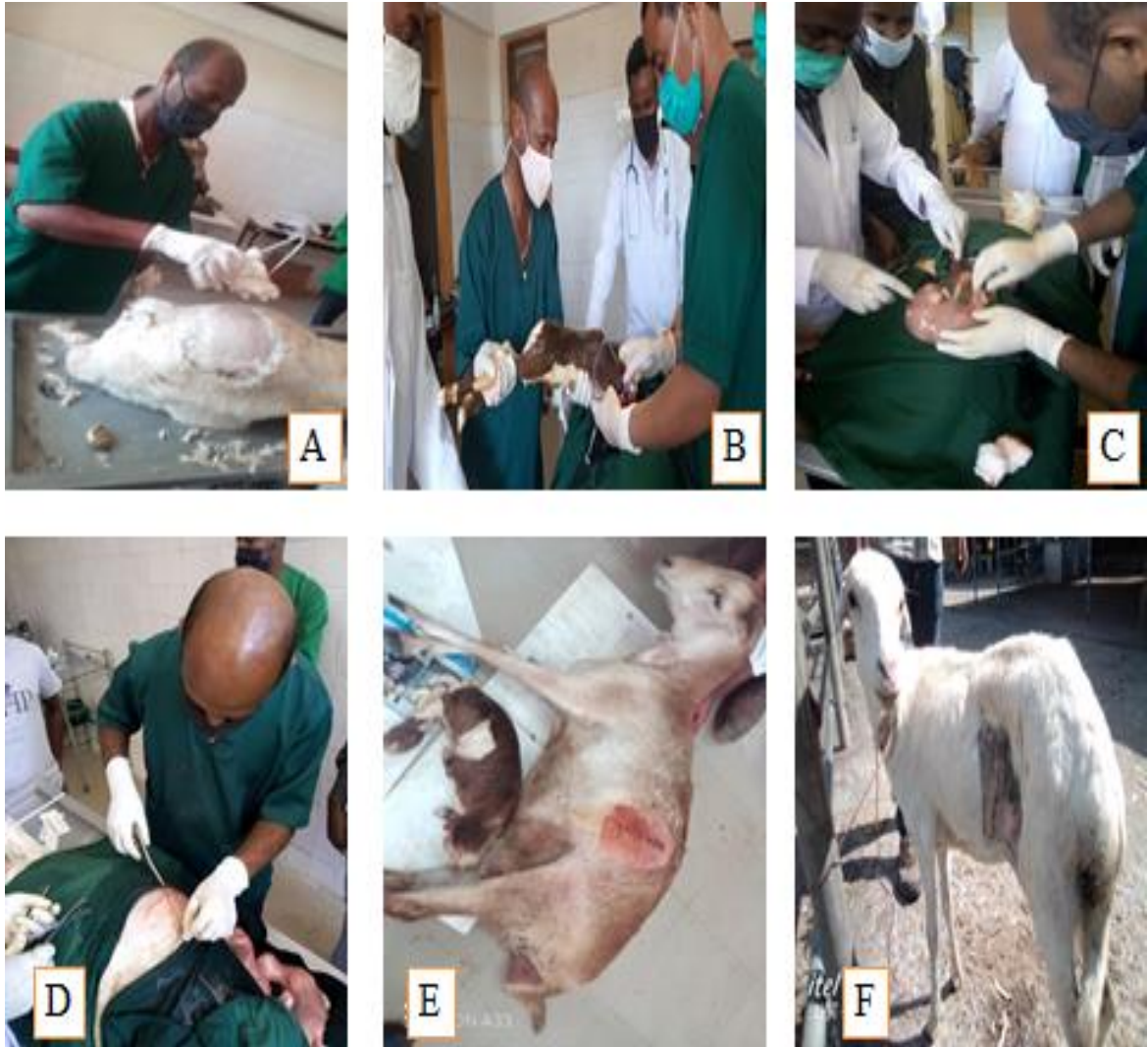


Figure 8: Surgical manipulations of caesarean section in ewes

(A) Surgical site preparation (B) Removal of live fetus in case 1 (C) Removal of died fetus in case 2 (D) Skin closure on progression (E) New born lamb and dam after completion of C-section (F) Observation of surgical site after 15th days before suture removed

Post-operative care: Post-operative treatment included administration of Fortified procaine penicillin (22,000 IU/kg) through I.M. for five days. The owner was also advised to supplement good nutrition to facilitate wound healing. The wound was properly dressed with 1% Povidone iodine solution and applying wound spray (cyclo spray) for five days daily. Finally, skin sutures were removed on fifteenth post-operative

day (Fig. 7F) and uneventful recovery was noticed in case 2, but the dam of the case 1 was died after 18 hours of surgery.

Discussion

Dystocia or difficult birth is a major cause of lamb loss in the flock and may result in great economic loss to the farmers (Elchikh *et al.*, 2019). The causes of dystocia are either maternal or fetal origin. In this particular case, the causes of dystocia were maternal origin. This in agreement with the previous studies by Sharma *et al.* (2014) who reported the occurrence of dystocia due to maternal factors (63.33%) were higher than fetal factors (36.67%). In contrary to present case, other researchers Ahmed *et al.* (2017); Bhattacharyya *et al.* (2015) and Elchikh *et al.* (2019) reported that the occurrence of dystocia as a result of fetal related factors were higher than maternal related factors. From maternal causes of dystocia, in present case, insufficient dilation of cervix was identified in case 1, which is in agreement with similar case report by Dutt *et al.* (2018) and Sharma *et al.*, (2014), whereas, premature fetal death in utero was identified in case 2, which is agrees with Jacobson, *et al.* (2020).

Dystocia can be managed through various ways either non-surgically (medically or manual traction) or surgically depending upon time of initiation of labour pains, time of rupture of water bags, and per vaginal examinations (Ahmed *et al.*, 2017; Hussain and Zaid, 2010 and Sharma *et al.*, 2014). The most common indications for non-surgical management of dystocia in small ruminants are lateral deviation of the head and neck, and bilateral shoulder flexion associated with absolute fetal oversize (Ismail, 2017), but their uses were limited due to the small diameter of the pelvis (Ahmed *et al.*, 2017). However, cesarean section was an effective method for treatment of most types of dystocia and was safe for dam as well as fetus, especially when it is performed as early as possible after onset of labor when the fetus is alive or freshly dead (Ahmed *et al.*, 2017; Hussain and Zaid, 2010; Kisani and Wachida, 2012 and Sharma *et al.*, 2014). The most common causes of dystocia that recruit caesarean section in ewe are failure of cervix to dilate and relative or absolute oversize of fetus (Dutt *et al.*, 2018). Similarly, in present

case, dystocia due to failure of cervix to dilate was diagnosed and managed through cesarean section.

In small ruminants, cesarean section usually performed while the animal is in right lateral recumbency under local analgesia, with (Iqbal *et al.*, 2020 and Kisani and Wachida, 2012) or without (Aliciah *et al.*, 2019; Bhattacharyya *et al.*, 2015; Dutt *et al.*, 2018 and Odedara *et al.*, 2017) sedation. In present case, cesarean section was performed while the animal was in right lateral recumbency under line infiltration (Bhattacharyya *et al.*, 2015 and Dutt *et al.*, 2018) and inverted “L” blocks (Aliciah *et al.*, 2019 and Iqbal *et al.*, 2020) of local anesthesia using 2% lidocaine without sedation in case 1 and case 2, respectively. Uterine wall closure, in present case, was done with Cushing followed by Lambert suture pattern by using surgical chromic catgut no.2 without penetration of the mucosal layer, similar techniques of closure was reported by Aliciah *et al.*, (2019) and Verma *et al.* (2017). In contrast to present case, Kisani and Wachida (2012) and Bhattacharyya *et al.* (2015) used two layers of Lambert suture pattern with chromic catgut size 1-0, Iqbal *et al.* (2020) used single layer Cushing suture pattern with chromic cat gut number 2-0 and Dutt *et al.* (2018) used continuous interlock suture patterns with chromic catgut-1 to close the uterine wall.

The length of time delay between the start of labor and the time of presentation for surgical intervention significantly affects the survival rates of both the dam and newborn (Ahmed *et al.*, 2017; Bhattacharyya *et al.*, 2015 and Iqbal *et al.*, 2020). In present case, ewe was straining for at least 12 hours in case 1 and 3 days in case 2. It was reported that fetal and dam survival rates in sheep and goats undergoing the relief of dystocia with caesarean section was 94.12% (Bhattacharyya *et al.*, 2015). After operation was conducted, in present case, a single live fetus and a twin died fetuses were removed from case 1 and 2, respectively. However, the dam of case 1 was died after 18 hours of operation. This agrees with the reports of Odedara *et al.* (2017), the survival rate of dam was lower following surgical fetal delivery.

The most intra- and post-operative complication following caesarian section was shock, adhesion formation, peritonitis and death (Bhattacharyya *et al.*, 2015). This agrees with

the present case, where the dam of case 1 was died after 18 hours of post-surgery. It might be due to prolonged straining attempt to parturition. pre-operative preparation of the patient by administration of intravenous fluids, analgesics and antibiotic has a proven effect in preventing hypovolumic shock, pain and swelling, and secondary bacterial infection of wound, respectively (Aliciah *et al.*, 2019; Bhattacharyya *et al.*, 2015 and Verma *et al.*, 2017). Similarly, in present case, intravenous fluids (Ringer lactate solutions), analgesic and antibiotic were administered before operation and as a post-operative care for five days done.

It is concluded from the present case report that caesarean section is a fairly common surgical procedure to resolve dystocia due to incomplete dilation of cervix and fetal death in utero. Double layer closure of uterus with Cushing followed by Lambert suture pattern prevents the leakage of fluid from the uterus and withstands pressure from the contraction of uterus to result into normal healing for cesarean section. The effective pre- and post-operative management and anti-septic dressing of surgical wound for animals undergo C-section is very important in preventing bacterial contamination of the wound.

3.5. Surgical Management of Wound in Different Animals

3.5.1. Surgical management of open wound due to horn thrust in ram

Abstract

A wound is damage or disruption to the normal anatomical structure and function, which can range either from a simple break in the epithelial integrity of the skin or deeper extending into subcutaneous tissue with further damage to the other structures. The present case, briefly describes the open wound management in a three years old ram which was presented to the VTH, following a horn thrust over the right axillary part that was traumatized in the form of incision of the skin including the dermis and fascia of the medial aspect of right forelimb at axillary region. Accordingly physical and clinical examination was undergone. The physical examination finding revealed that regular and narrow wound edges and contaminated wound that was not fresh. Following aseptic surgical site preparation, lavage with antiseptic solution and surgical debridement the

wound was allowed to heal through primary intention of wound healing. The ram was recovered and suture was removed after fifteen days of wound management.

Key words: *Axillary region; Horn thrust; Open wound; Ram*

Introduction

Small ruminant are the primary sources of livelihood for landless farmers in rural communities comparing to other livestock species. Ethiopian smallholder farmers own approximately 31–38% of the sheep and 21–33% goat (Kenfo *et al.*, 2018). There are approximately 53 million small ruminants in Ethiopia, of which 30 million are sheep (*Ovis aries*) and the remaining 23 million are goats (*Capra hircus*) (FAO, 2019). Among small ruminant sheep are mostly kept by smallholders and the rural poor including women headed household stations (Getu, 2015). The need of low initial capital and able to use the marginal land as well as crop residues for feeding; additionally, low labor requirements makes the sheep the most valuable, appropriate cash income and provides social security for the smallholder farming systems in bad crop years in Ethiopia (Mengesha and Tsega, 2012).

Small ruminants account for approximately 40% of the coins profits earned with the aid of farm families, 19% of the full cost of subsistence food derived from all livestock production, and 25% of overall domestic meat consumption (Adane and Girma, 2008). Sheep contributes near 30% of the overall ruminant livestock meat output and 14% of the overall domestic meat manufacturing (Ayalew *et al.*, 2004). Sheep and goats are found widely distributed across the different agro-ecological zones of the country and easily integrated into different farming systems (Mengesha and Tsega, 2012). Hence, the sheep enterprise within the Ethiopian highland, in which crop and farm animals production system are integrated, is the most critical form of investment (Kenfo *et al.*, 2018) due to shrinking of cultivated area in keeping with household, decreased feed availability and land degradation, which can be big challenge to maintain large ruminants (Legesse *et al.*, 2008).

Sheep, like most other livestock species, is vulnerable to a wide range of diseases that are similar to what a large ruminant is prone to infection, inflammation, parasitic infestation, degenerative disease, wound of different causes and cancer (Tiruneh *et al.*, 2014). Wound is a physical injury disrupting the normal continuity of anatomic structures that can be caused by physical, chemical or biological agents, with impairment of the tissue's protective or physiological functions (Mickelson *et al.*, 2016), with or without loss of underlying connective tissues, muscles, nerves, bones (Velnar *et al.*, 2009).

In veterinary medicine the commonly encountered wounds include lacerations, avulsions, puncture and bite wounds. One of the causes of wound is mechanical injuries due to inanimate objects such as car accidents, kicks, hyena bite and horn thrust are common resulting from minor laceration to deep avulsion on exposed body parts especially in developing countries where management of animals are poor (Theoret, 2008). According to the retrospective study done by Tiruneh *et al.* (2014) open wound management or wound repair by primary closure of traumatic wound (18.12%) in sheep is the most surgical affection next to urethral obstruction (18.79%) and dystocia(18.79%). There is a dearth of information about the exists structure relating to the treatment and management of open wound as a result of horn thrust in domestic animals. Therefore, this case report briefly describes the surgical methods of open wound management as a result of horn thrust in ram.

Case history and examination: A three years old male sheep weighing 20 kg was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University, following a horn thrust over the right axillary part 24 hours before admitted date (Figure 8A). The ram was traumatized in the form of incision of the skin including the dermis and fascia of the medial part of right forelimb at axillary region. The wound edges were regular like surgically incised wound edge and narrow to close but it was not fresh. Even though the wound is unilateral limb affections, the animal was showed the sigh of head bob and nod up on walking. The clinical parameters such as: heart rate, respiratory rate, body temperature; capillary refill time, body weight and age were recorded. Measurement of vital sign such as temperature, pulse rate and respiratory rate was in normal physiological range limit. Physical

examination revealed normal body condition with shiny hair coat up on observation. Depending on physical examination the case was diagnosed as incisional type of open wound and decided to manage as open wound management.

Pre-operative preparation of the ram: After physical restraining and stabilizing of the ram the area surrounding the periphery of the wound was prepared aseptically by washing with soap and tap water. The hair was shaved from the skin that covers area surrounding the periphery of the wound. Then, the area was again washed by using antiseptic solution (savlon). Finally, shaved area was scrubbed with 1% povidone iodine in circular manner starting from the center to periphery and made it ready for aseptic open wound management (Figure 8B).

Anesthesia and animal control: The ram was controlled in left lateral recumbent position with the wounded part is right up side. Field block anesthesia was used by making walls of infiltration of 2% lidocaine hydrochloride enclosing the wounded borders. In addition to local anesthesia, intramuscular injection of diclofenac sulfate @ 2mg/kg was used in order to prevent sensation to pain and development of inflammation. The wounded site was given a final scrub with 1% povidone iodine in circular manner starting from the center to periphery prior to proceeding to open wound management.

Surgical procedure and techniques: After surgical site was prepared aseptically and appropriated analgesia was achieved, an open wound management was performed on the areas, which were enclosed by field blocks. Then, the wound was thoroughly lavaged with normal saline solution to remove all dirty such as dead tissue and foreign bodies and also scrubbed with a mild antiseptic solution in order to decrease bacterial colonization of the wound and frequency of infections. The wound was surgically debrided to remove the non-viable, infected and hyperkeratotic tissue in order to convert a chronic wound into an acute one, which can facilitate the progress of the normal stages of wound healing. Finally, the wound was again lavaged in order to remove any blood and devitalized tissues as a result of debridement. Since there was no loss of part of tissue, wound edges were regular like surgically incised wound edge and narrow to close, it was allowed to heal through primary intention of wound healing. The wound edges was then pulled

together by traction using Allis tissue forceps and a subcutaneous suture applied to apposed the subcutaneous tissue with absorbable chromic catgut no.2-0 suture material in continuous suture pattern thus reducing the tension on the skin. Simple interrupted suture pattern with non-absorbable suture material (Silk no.2) was used to close the wound edges (Skin) (Figure 8C). Finally, the peripheral area of the wound was sprayed with cyclo spray.

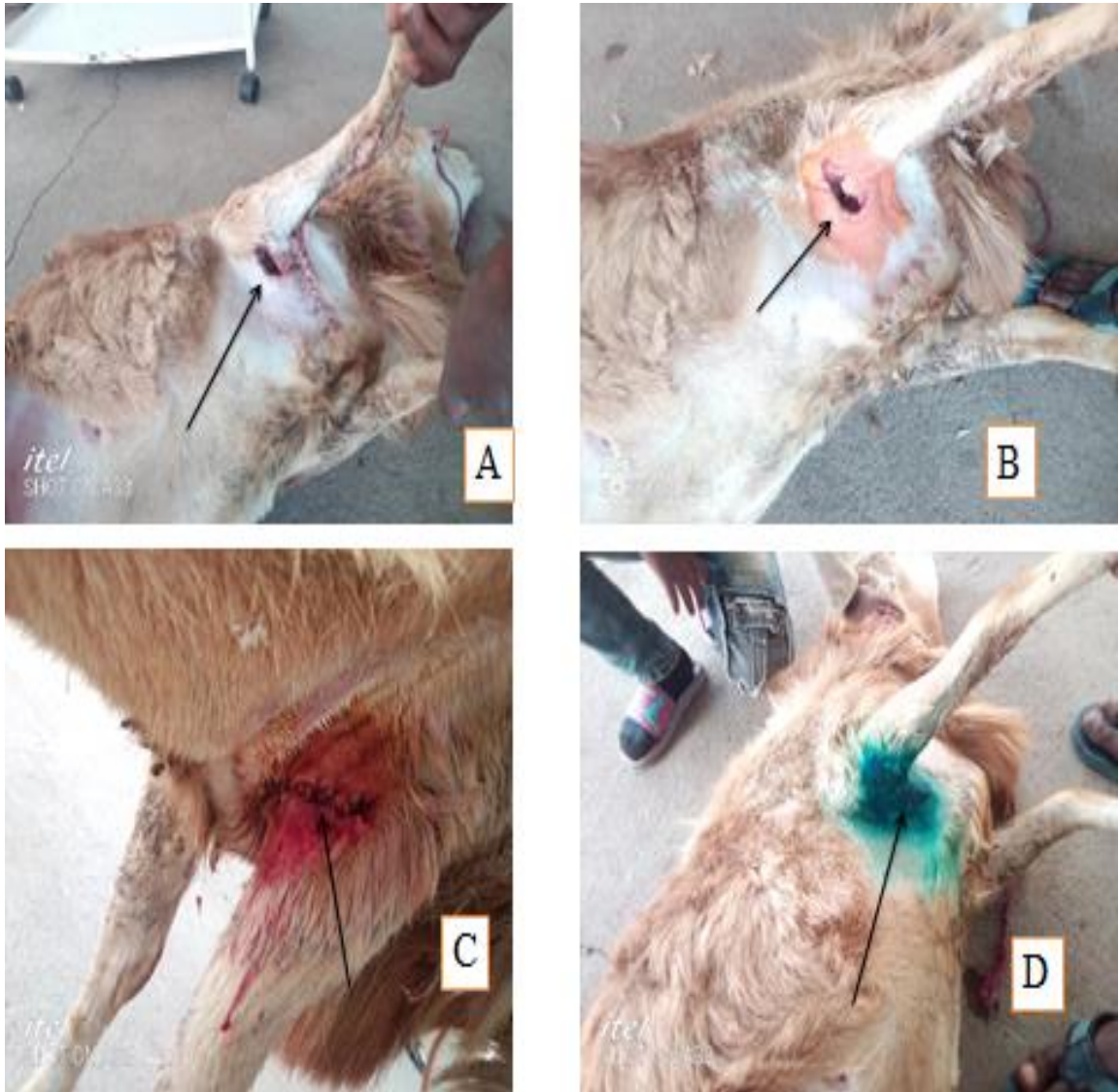


Figure 9: An open wound due to horn thrust and its surgical management in ram

(A) Clinical presentation of the case (B) Prepared surgical site (C) Completion of skin suture (D) Wound dressing and application of cyclo spray on 5th day

Post-operative care and outcome: The wound was regularly cleaned by using antiseptic solution (savlon) and dressed with 1% Povidone iodine solution for five days daily. The ram was administered short acting Oxy-tetracycline (1mg/kg) through I.M for five days and the wound was sprayed by using cyclo spray for five days daily (Figure 8D). The owner was advised to maintain the cleanliness of the surgical site from contamination by providing well-built shelter. In addition the owner was also advised to follow the overall discomfort of animal and status of the wound. The suture was removed after fifteen days of wound management and the ram was recovered without any post-operative complication.

Discussion

A wound is defined as damage or disruption to the normal anatomical structure and function, which can be range either from a simple break in the epithelial integrity of the skin or deeper, extending into subcutaneous tissue with damage to other structures such as tendons, muscles, vessels, nerves, parenchymal organs and even bone (Kayode, 2017). Similarly, in present case, the anatomical structure of skin and subcutaneous tissues were broken without affecting the underlying tissues. Wound can have an accidental or intentional aetiology or the result of a disease process (Velnar *et al.*, 2009). Among the accidental causes bites; automobile accidents; lacerations from sharp objects; penetration by bullets, sticks, metal objects; and thermal injuries are the common factors for the occurrence of wounds in animals (pavletic, 2018). However, in present case, the cause of wound in ram was accidental caused by horn thrust. Because small ruminants and cattle are traditionally sharing the same barn during the night in the area, which is the predisposing factor for kicking and horn thrust while they compete for space and feed (Tiruneh *et al.*, 2014).

The goring in nature and violent of cattle can cause the wound that varies in shapes, sizes and directions by its horns, which can result blunt wounds, or contusions, and penetrating, or open wounds (Onoja *et al.*, 2011). Similarly, in present case, an open wound with regular wound edge was produced at axillary region of the right forelimb was encountered. Horn easily tearing the skin that cover the ventral parts of sheep because the

skin and muscle found in this region are naturally thin (Al-Sobayil & Ahmed, 2007), especially the area where wound occurred in present case. The process of wound healing is a normal biological procedure for reparation of any tissue damage in the living body (Al-Salihi *et al.*, 2019). It also a complex process involving co-ordinated interactions between diverse immunological and biological systems, which comprises a balanced activity of inflammatory, vascular, connective tissue and epithelial cells leading to the rebuilding of tissue integrity (Velnar *et al.*, 2009).

After assessment of the overall stability of the animal, in present case, the horn thrust wound should be assessed for the presence of infection and classified according to its type, size, condition and depth to choose the appropriate intervention procedures (Al-Salihi *et al.*, 2019 and pavletic, 2018). Before goes to the definitive treatment the basis for treatment of any type of wound is irrigation by vigorously washing with mild antiseptic solution and debridement to remove the necrotized tissue debris followed by lavaging again the wounded area to help in preventing infection (Al-Salihi *et al.*, 2019; Kose *et al.*, 2011 and Tiruneh *et al.*, 2014). In the present case, the wound area was shaved and the wound was irrigated by using savlon, surgically debrided and lavaged by using 1% povidone iodine. Following initial inspection, lavage, and debridement, the correct approach for treatments of open wound are depends upon the wound size, location, and condition (pavletic, 2018). For instances, in present case, wound was allowed to heal through primary intention of wound healing by closing of the wound margin since there were no risk factors for infection, wound edges were regular like surgically incised wound edge, and no tissue lose and narrow to close up on examination (Babalola *et al.*, 2018 and Kose *et al.*, 2011).

The types of suture and suture patterns used to close the wound edge depend on the size and location of the wound and the size of the animal (Tiruneh *et al.*, 2014). Similarly, in present case, the wound was located at the place where friction is high as a result of limb movement and skin was loosely attached to underlying tissues, so apposition of wound edge was done in two layers. accordingly, the first layer of the wound edges was apposed subcutaneously by using a continuous suture pattern with absorbable suture material (chromic catgut no.2-0) in order to reduce dead space so as to prevent seroma formation

and fastening wound healing (Tiruneh *et al.*, 2014), and the second layer was used to appose the skin by using a simple interrupted suture pattern with non-absorbable suture material (nylon no. 2-0), the present case is done as reported case report by Babalola *et al.* (2018) in terms of apposition of wound edge.

It can be concluded that there were no risk factors for infection, wound edges were regular and narrow to close, and no tissues lost surgical management of open wound through primary intention of wound healing by closing of the wound margin along with parenteral administration of short acting oxytetracycline and topical application of cyclo spray are effective for successful management open wound.

3.5.2. Surgical management of open wound due to hyena bite of jack

Abstract

Working donkeys in many countries including Ethiopia are suffered from wounds of different sources such as inappropriate harness, hobbles and saddle design, sharp objects, hyena bite, donkey bite, car accident, overloading and injury by the owners or other people. In present case, a five years old jack was presented to the clinic of Donkey Sanctuary Clinic, following a hyena bite over the maxillary lip 36 hours before admitted. The donkey was traumatized in the form of avulsion of the skin including the dermis, fascia and parts of muscle of the upper lip. Clinical finding revealed avulsed wound that with the part was not lost, regular wound edges and contaminated wound that was not fresh. Based up on clinical finding the wound was allowed to heal through primary intention of wound healing following aseptic surgical site preparation, lavage and surgically debridement. The jack was recovered after fifteen days of wound management. The wound should need quick and careful attention and aseptic surgical techniques since the anatomical site which was bitten by hyena is a rarely seen case in donkeys.

Key words: *Avulsion wound; Hyena bite; Jack; Maxillary lip*

Introduction

The number of working donkeys, horses and mules close to 112 million of the global livestock population in less developed countries (Valette, 2015). Among the overall world population of equines Ethiopia will share 6.9% and 42.4% of the world and Africa equine population, which make the country the biggest equines population in Africa and therefore the second largest equine population within the world next to China (Addis and Megra, 2017 and Tesfaye and Mekuria, 2017). Out of 42.4% that Ethiopia contribute for African equines population 37%, 58%, and 46% are donkeys, horses, and mules, respectively (Tesfaye and Mekuria, 2017 and Tiruneh *et al.*, 2016). In Ethiopia, there are approximately 9 million equines, of which 6.2 million, 2 million and 0.38 million are donkeys, horses and mules, respectively (FAO, 2019). Among equines species Ethiopia has the largest donkey population, which are play a fundamental role in human livelihoods by their direct and indirect contributions in a wide range of sectors including agriculture, construction, tourism, mining, and public transport (Tanga and Gebremeskel, 2019 and Valette, 2015).

It is calculable that working equine facilitate close to 600 million individuals globally, fairly often within the poor and marginalized communities (Valette, 2015) especially, in the place where under developed road transportation network, and rough characteristics of terrain under the smallholder farming systems like Ethiopia donkeys are the most valuable pack animal (Fсахaye *et al.*, 2018). The majority of working donkeys are owned by the individuals who use them as their sole source of income to sustain their large and extended families (Tsega *et al.*, 2016). Recurrent and drought in Ethiopia resulting increase cattle mortality has conjointly contributed to a rise in donkey usage as drought and beast of burden each in rural and urban due to their inherent tolerance for dehydration, low sweating rate and sensible thermo-ability (Addis and Megra, 2017)

Even if Ethiopia have large number of working donkey population, their welfare issues are compromised by resource poor farmers in terms of overloading, overwork, inadequate access to feed and health care facilities (Fсахaye *et al.*, 2018). External injuries are the most common health Problem of working donkey in Ethiopia due to their negligence for

the proper care and handling by the owner (Fikru *et al.*, 2015 and Garoma, 2018). Wound is a physical injury disrupting the normal continuity of anatomic structures that can be caused by physical, chemical or biological agents, with impairment of the tissue's protective or physiological functions (Mickelson *et al.*, 2016), with or without loss of underlying tissues (Velnar *et al.*, 2009).

Working donkeys in many countries including Ethiopia are suffered from wounds of different sources such as inappropriate harness, hobbles and saddle design, sharp objects, hyena bite, donkey bite, car accident, overloading or overworking and injury by the owners or other people (Biffa and Woldemeskel, 2006; Fikru *et al.*, 2015; Pearson *et al.*, 2003 and Garoma, 2018). The study on donkey in Ethiopia has demonstrated that back sores and other wound forms are the most commonly observed health problem (Biffa and Woldemeskel, 2006; Fikru *et al.*, 2015 and Garoma, 2018).

In addition to wounds caused by biting, zebu horn damage and Overloading donkeys were more exposed to hyenas bite due to improper housing and allowed to eat at night after long hours of laborious work, which resulting minor laceration to deep avulsion on exposed body parts (Garoma, 2018). According to reports of retrospective study conducted by Addis and Megra, (2017) the common anatomical site bitten by hyena was thigh and perianal muscles area this might be due to quantity and quality of muscle, whereas, limbs was unlikely to be bitten by hyena. To manage open wounds in horses and donkeys there are different treatments, medications, bandages, and bandaging techniques could be applied (Gomez and Hanson, 2005). However, the routine management and treatment of open wound in livestock involve washing the site of injuries with an antiseptic solution and topical antibiotic application accompanied by systemic antibiotic and sometimes suturing of the large macerated areas (Acevedo *et al.*, 2019). Therefore, this case report briefly describes the surgical methods of management of open wound as a result of Hyena bite in jack.

Case history and examination: A five years old male donkey weighing 120 kg was presented to the clinic of Donkey Sanctuary Project, College of Veterinary Medicine and Agriculture, Addis Ababa University, following a hyena bite over the maxillary lip part

36 hours before admitted. The donkey was traumatized in the form of avulsion of the skin including the dermis, fascia and parts of muscle of the upper limb. The wound edges were regular and the avulsed part is hanged but it was not lost, and also the wound was contaminated with soil and straw (Figure 9A). The clinical parameters such as: heart rate, respiratory rate, body temperature; capillary refill time, body weight and age were recorded. Measurements of vital sign were indicating within range of physiological limit. Depending physical examination the case was diagnosed as avulsed type of open wound and was managed as open wound management.

Pre-operative preparation of the donkey: After physical restraining and stabilizing of the animal the area surrounding the periphery of the wound was prepared aseptically by washing with soap and tap water in order to clean any contaminant soil and straw from wounded site. Then, the area was again washed by using antiseptic solution (savlon) to bacterial load from surgical site. Finally, shaved area was scrubbed with 1% povidone iodine in circular manner starting from the center to periphery and made it ready for aseptic open wound management.

Anesthesia and animal control: The jack was controlled in standing position by using physical and chemical methods. The combination of detomidine @ 0.01 mg/kg and butorphanol @ 0.025 mg/kg through intravenous injection was used to obtain effective sedation and analgesia of jack. In addition intramuscular injection of diclofenac sulfate @ 2mg/kg was used in order to prevent sensation to pain and development of inflammation. The surrounding wounded area was given a final scrub with 1% povidone iodine in circular manner starting from the center to periphery prior to proceeding to open wound management.

Surgical procedure: The wound was thoroughly washed by using savlon to remove all dirty dead tissue and foreign bodies such as straw and soil and also lavaged with a mild antiseptic solution (1% povidone iodine) to decrease bacterial colonization of the wound and frequency of infections. The wound was surgically debrided to remove the non-viable, infected and hyperkeratotic tissue in order to convert a chronic wound into fresh, which can facilitate the progress of the normal stages of wound healing. Finally, the

wound was again lavaged in order to remove any blood and devitalized tissues as a result of debridement. Since the wound was avulsion type of wound with hanging of avulsed parts but there was no loss of part of tissue, and the wound edges were regular, it allowed healing through primary intention of wound healing by closing the wound edge using simple interrupted suture pattern with vincryl no.2. Finally, the peripheral area of the wound was sprayed with cyclo spray.



Figure 10: An open wound due to hyena bite and its surgical management in jack

(A) Clinical presentation of the case (B) Appearance of the wound on the 3rd day (C) healing of the wound on the 15th days

Post-operative care: The wound was regularly cleaned by using antiseptic solution (savlon) and dressed with 1% Povidone iodine solution for five days daily. The donkey was administered Fortified procaine penicillin (22,000 IU/kg) I.M for three days (Figure

9B). The wound spray (cyclo spray) was applied on wound for five days daily. Finally, the wound was healed in fifteen days of post-operative care (Figure 9C)

Discussion

A wound may be a breakdown within the protecting function of the skin or loss of continuity of epithelial tissue, with or while not loss of underlying connective tissues, muscles, nerves, bones following injury to the skin (Olaifa *et al.*, 2017). In the present case, the anatomical structure such as skin, subcutaneous tissues and muscles were damaged. The causes of wound in working donkeys are basically related with animal welfare problems like improper harnessing, overloading and overworking of the donkey. However, in rural areas, one of the major causes of wound to working donkeys is hyena bite, whereas in urban areas it was due to road traffic accidents (Fсахaye *et al.*, 2018) as was the present case, where the cause of wound was due to hyena bite. The study conducted in Ada'a Woreda by Addis and Asfaw (2017) stated that the major predisposing factor of donkey for hyena bite are lack of timely follow up, ability of defense mechanism of the animals, supply feed and water problems, housing problems, destruction of hyena habitat and season. The present case was also predisposed due to lack of timely follow up.

Skin and underlying tissues wound can also be caused by a nail, glass, broken fence rails, farm machinery and sharp objects that lead to abrasions, puncture, incision, or laceration wounds (Agina and Ihedioha, 2017). In addition wound caused by hyena biting is range from minor laceration to deep avulsion on exposed body parts (Biffa and Woldemeskel, 2006 and Garoma, 2018). In the present case, a deep avulsion wound was produced but the avulsed tissue was not lost rather than it was hanged to one side. The common anatomical site bitten by hyena was thigh and perianal muscles area this might be due to quantity and quality of muscle (Addis and Megra, 2017). However, in present case the donkey was bitten at maxillary lib.

Management of an animal bite wound should start with proper local care of the wound through vigorously washing and irrigating of wounds with saline solution to reduce the

high inocula of the oral flora of the biting animal and devitalized tissues (*Kose et al.*, 2011). Similarly, in present case, the wound was irrigated through washing by using savlon, surgically debrided and lavaged by using 1% povidone iodine. In present case, wound was treated by closing of the wound margin so as to heal through primary intention of wound healing since there were no risk factors for infection, tissues were viable and not lost, wound edges were regular and narrow to approximate. The study conducted by *Wilmink et al.* (2002) also stated that if there is no factors which provoke the possible establishment of wound infection, primary closure is the preferred method of treatment, as healing is usually faster and the cosmetic results better than after second-intention healing.

In present case, apposition of wound edge was done in two layers. Accordingly, the first layer of the wound edges was apposed subcutaneously, and the second layer was used to appose the skin, which is in agreement with previous case report by *Wilmink et al.* (2002) and *Olaifa et al.* (2017) in terms of apposition of wound edge. The location of the wound can affect the rate of contraction, but shape of the wound does not (*Seid and Birhan*, 2019). Wounds located on the upper body part can contract more efficiently (0.8 to 1 mm/day) than those located on the legs (0.2 mm/day) because of joint movement, poor blood circulation, and presence of minimal soft tissues between the skin and bone (*Agina and Ihedioha*, 2017 and *Westgate et al.*, 2011). This suggestion agrees with present case, where the wound was located at the place where friction is high as a result of limb movement since limb is prehension organ for equines.

Wound infection is a challenge to wound management by delaying wound healing and may cause wound breakdown, herniation of the wound and complete wound dehiscence in both surgically or traumatically induced wounds (*Shittu et al.*, 2002), which were not encountered in present case. In conclusion that there seems to be a rise in the number of hyena bite injuries because of the increase in Spotted hyena populations, destruction of Spotted hyena natural habitat and increasingly occupied by humans (*Addis and Asfaw*, 2017). The wound should be needed quick and careful attention and aseptic surgical techniques since the anatomical site which was bitten by hyena is a rarely seen case in donkeys.

3.6. Surgical Management of Abscess

Introduction

Abscess is that the commonest swelling discovered on the skin surface of animal body, sometimes caused by a microorganism infection (Fesseha and Getachew, 2020). It's a circumscribed inflammatory lesion that consists of a purulent exudate 'the pus' enclosed by a 'limiting membrane' the pyogenic membrane (Sahoo and Ganguly, 2015). Pus is that the end result of a war established between the invasive pyogenic microorganisms and living tissues and cells. It's consisting of dead and living polymorph nuclear leucocytes, cellular debris, pyogenic microorganisms, lymph and serum (Misk *et al.*, 2016 and Sadan, 2019). Symptom might occur superficially on the skin or internally in tissues or organs anyplace within the body usually in the middle of swelling (Buba *et al.*, 2019).

Superficial abscess is one amongst the common type of abscess that seems outwardly as a swollen, pus-filled lump beneath the surface of the skin (Fesseha and Getachew, 2020 and Sadan, 2019). Common predilection seats of superficial abscesses in line to the manner of entrance of infection in some domestic animal salivary gland region, mandibular region, sub-conjunctival, cheek region, ears, neck, thoracic limbs, thoracic wall behind the elbow, ventral abdominal wall, umbilicus, girdle limbs, gluteal region, perineal region, tail and female genital organ lips (Misk *et al.*, 2008). Causes of abscess formation in domestic animals are variable and embrace a breach on the surface of the skin or mucosa and entrance of pyogenic microorganisms through it, infected foreign bodies migrating from the lumen of alimentary tract, non-sterilized needle used for injection, pierced wounds elicited by infected foreign bodies and blood and lymph-borne infection (Misk *et al.*, 2008 and Misk *et al.*, 2020).

Pain, heat, swelling, tenderness, and redness are the typical symptoms and signs of cutaneous and subcutaneous abscesses. Whereas, for deep abscesses, local pain, tenderness and systemic symptoms, especially fever, anorexia and weight loss, are common findings (Hassan *et al.*, 2019). Diagnosis and differential diagnosis of body

surface swellings (hematomas, abscesses, hernias, neoplasms, bursitis and cysts) depends mainly on anamnesis and clinical examination such as palpation, exploratory puncture and aspiration (Misk *et al.*, 2016) and that of deep abscesses often requires imaging/ultrasonography examination since the local pain, skin thickness and critical body location may hinder the clinical decision (Abdelaal *et al.*, 2017; Hassan *et al.*, 2019 and Sadan, 2019). Abscesses can be treated in several ways, depending on the type of abscess and its size. However, the routine management and treatment of abscess in livestock involve maturation of the abscess if it not, shaving of hair and washing the site with an antiseptic solution, drainage of abscess and disrupting of pyogenic membrane of the abscess cavity by iodine tincture accompanied by systemic antibiotic (Sahoo and Ganguly, 2015). Therefore, this case report briefly describes the surgical methods of abscess management in cow and En bloc excisions of chronic abscesses in bull.

3.6.1. Surgical drainage of abscess in heifer

Abstract

An abscess is a circumscribed inflammatory lesion, which consists of collection of pus in confined tissue spaces that caused as a result of infection, trauma by sharp object and bacteria migration in circulation. In present case, successful surgical management of abscess was performed on a two years old female zebu cattle presented to VTH with history of multiple swelling on the face and mandible region. Clinical finding revealed that there was warm, hard, and painful swelling masses when palpated. Heifer was successfully treated by maturation, incision and evacuation of the abscess content from abscess cavity followed by irrigation of the cavity with 5% iodine tincture and packing of the cavity with gauze soaked in 5% iodine tincture along with antimicrobial therapy. The heifer was successfully recovered after 15 days post-intervention without any other complications.

Keywords: *Abscess; Heifer; Iodine tincture; Abscess maturation*

Case history and examination: A two years old female zebu cattle weighing 150 kg was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and

Agriculture, Addis Ababa University with history of multiple swelling on the face and mandible region, and the gradual reduction of feed intake and water consumption. The multiple abscess swelling was subcutaneously located at the base of the ear and lateral to the lateral canthus of the eyes at the place where parotid gland is found, check and submandibular on both side of an animal (Figure 10A and B). Up on clinical examination, the masse was warm, hard, and painful in the initial stages when palpated. The clinical parameters such as: heart rate, respiratory rate, body temperature; capillary refill time, body weight and age were recorded. Measurement of vital sign and all were within range of physiological limit. To differentiate it from other types of lesions causing swelling like a tumor, hematoma, cyst, etc., aspiration of the content from the swollen mass was performed using a 16-gauge sterile needle that revealed white creamy discharge was aspirated and diagnosed as an abscess. Based on clinical examination the case was diagnosed as an abscess and was managed as abscess drainage.

Pre-operative preparation of the heifer: Maturation of an abscess was done by the application of Ichthammol daily, which was completed on the third day before incision was done to drain an abscess. On fourth days the heifer was restrained and stabilized physically in the crush, and the area surrounding the swelling was prepared aseptically by washing with soap and tap water. The hair was shaved from the skin that covers swelling and surrounding area (Figure 10B). Then, the area was again washed by using antiseptic solution (savlon) to remove any fall of hair. Finally, the shaved area was scrubbed with 1% povidone iodine in circular manner starting from the center to prefer and made it ready for aseptic abscess management.

Anesthesia and animal control: The heifer was controlled in standing position by using physical and chemical methods. Animal was sedated by xylazine hydrochloride @ 0.01 mg/kg intramuscularly. The swollen and surrounding area was given a final scrub with 1% povidone iodine in circular manner starting from the center to prefer prior to proceeding to incising of the swollen and drainage of abscess.



Figure 11: Abscess and its surgical drainage in heifer

(A) Clinical presentation of case (B) Prepared surgical site (C) Making an incision on the ventral part of the swelling and drain of pus (D) Milking the swelling to facilitate drainage of pus (E) irrigation of the cavity on progression

Surgical procedure and techniques: After surgical site was prepared aseptically and appropriated analgesia was achieved, an abscess management was performed on the areas. On fourth days aspiration was done by using 16-gauge needles on the swollen mass then thick, green yellowish, creamy pus came out through a needle. Then, surgical management of abscess was performed by incising on ventral side of swollen with a disposable sterile scalpel (Figure 10C). Pus was drained by milking the swollen until all accumulated abscess was evacuated (Figure 10D). The cavity was irrigated by using 5%

iodine tincture to disrupt the pyogenic membrane that encloses the pus (Figure 10E). Finally, the cavity was filled by packing with gauze soaked in the 5% iodine tincture to prevent refilling of the cavity, and peripheral area of the incised swollen was sprayed with cyclo spray to prevent the entrance of bacteria from the skin.

Post-operative care and outcome: The wound was regularly cleaned by using savlon and dressed by 1% Povidone iodine solution for five days daily and then 5% iodine tincture soaked gauze was changed daily by reducing the size of soaked gauze into the cavity daily. The cow was administered short acting oxy-tetracycline (10ml/kg) I.M for three days. Diclofenac sulfate was administered at a dose rate of 2mg/kg intramuscularly daily for three successive days for pain management. The wound spray (cyclo spray) was applied on wound for five days daily. The owner was advised to maintain the cleanliness of the surgical site by washing daily with slit warm water contains salt. On the second day post-surgery when the soaked gauze was changed small skin bleeding was noticed on the submandibular region of the drained abscess. Finally, the wounds successfully recovered after 15 days without any signs of recurrence.

Discussion

An abscess is a circumscribed inflammatory lesion, which consist of collection of pus in confined tissue spaces that caused as a result of infection, trauma by sharp object and bacteria migration in circulation causing septicemia and necrosis of tissue leading to migration to the area of least resistance to form the abscess (Sahoo and Ganguly, 2015). Predilection seats of abscesses in different farm animals depend mainly on the way of entrance of infection and its causes are variable (Fesseha, 2020 and Misk *et al.*, 2016). In present case, a multiple abscess swelling was subcutaneously located at the parotid, check and submandibular regions on both side of an animal. This is in agreement with Misk *et al.* (2020) and Misk *et al.* (2008) who stated that the occurrence of submandibular and parotid region abscess is due to transmission of bacteria causing caseous lymphadenitis occurs through ingestion or inhalation from the environment, and or migrating of infected foreign body from the mouth cavity or lymphatic born infection, respectively.

Moreover, according to the report of Misk *et al.* (2020) formation of abscess at the cheek, mandibular space, pharynx and oral cavity were due to entrance of either nonspecific microorganisms or specific microorganisms through oral abrasions caused as a result of hard plant awns, thorns, stickers or dry coarse stemmed feeds. This is in agreement with present case, where the cow was feed on crop left over (stubble) which may causes laceration of the oral cavity and may expose the animal into either specific or non-specific soil born pyogenic micro-organism.

In present case, diagnosis of the swelling was performed by location, size, consistency of the swelling, and aspiration of its contents to differentiate from the tumor, hernia, hematoma and cyst. This is agrees with the reports of Misk *et al.* (2016) who stated that the species of the affected animals and locations of the swelling as well as the size, consistency, nature, and color of its contents will help in diagnosis and differential diagnosis of body surface swellings. Whereas, it is strongly in agreement with the report of Fesseha (2020) who stated that exploratory puncture was highly diagnostic tool in case of abscesses. On the other hand, this is disagrees with the report of Sadan (2019) who stated ultrasonography was found to have a specificity of 100% for the diagnosis of hernias, urethral diverticula, and tumors, and a lower specificity of 80% for hematomas and 93% for abscesses when used for evaluation of superficial swellings.

Even if an incision and evacuation of abscess contents, and en bloc excisions were the two surgical approaches used for treatment of body surface abscesses (Misk *et al.*, 2020), in present case, treatment of the case was performed by maturation, incision and evacuation of the abscess content from abscess cavity followed by irrigation of the cavity with 5% iodine tincture to destroy the pyogenic membrane and packing of the cavity with gauze soaked in 5% iodine tincture along with antimicrobial therapy. This is agrees with Fesseha (2020); Hassan *et al.* (2019) and Sahoo and Ganguly (2015) in terms of treatment procedures followed. Therefore, aseptic surgical drainage of the pus followed by packing of gauze socked in 5% iodine tincture along with parental administration of antibiotics should be the best option for successful and effective management of superficial skin abscess.

3.6.2. *En bloc excisions of chronic abscesses in bull*

Abstract

Abscess is the most common swelling observed on the skin surface of animal body with collection of pus due to microbial invasion of the dermis and its supporting structures. In present case, nine years old a male zebu cattle was presented to the VTH with history of swelling on the check. Clinical finding of the mass revealed that there was well circumscribed, firm, movable cold, and not painful superficial skin swelling on the body of the mandible and check. Culturing on blood agar and gram staining was conducted and then, *Corynebacterium pseudotuberculosis* was isolated from the sample taken. Following clinical and laboratory finding the case was diagnosed as caseous lymphadenitis and En bloc excision of the case was performed under local infiltration of anesthesia. The suture was removed after 15 days post-intervention and the bull was successfully recovered without any other complications. Therefore, management of well circumscribed, firm and movable superficial skin abscess in cattle through en bloc excision along with antibacterial therapy and allowed the skin wound healed by first intention should be effective.

Keywords: *Abscess; Bull; Caseous lymphadenitis; En bloc excision*

Case history and examination: A nine years old male zebu cattle weighing 300 kg was presented to the surgery unit of the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with history of swelling on the check, and the gradual reduction of feed intake and water consumption. The owner also added that the swelling was small in size at starting time before four years of admitted days. As the owner said that he was trying to incise the swelling by using blade at home before three years and the white viscous fluids was oozing out. Following his incision bleeding was occurred and he was unable to stop the bleeding so that he took the bull to Hidi veterinary clinic. Then, clinician was trying to stop bleeding and prescribed the drugs for consecutive three days. But the swelling was not disappeared and get enlargement gradually. The swelling was subcutaneously located at the body of the mandible, and

check (figure 11A). Up on clinical examination, the masse was cold, hard, and not painful when palpated. To differentiate it from other types of lesions causing swelling like a tumor, hematoma, cyst, etc., aspiration of the content from the swollen mass was performed using a 16-gauge sterile needle that revealed nothing was aspirated. Sample was taken from the swelling and *Corynebacterium pseudotuberculosis* was isolated through laboratory finding by gram staining procedures and culturing on the blood agar. The clinical parameters such as: heart rate, respiratory rate, body temperature; capillary refill time, body weight and age were recorded. Measurement of vital sign and all were within range of physiological limit. Based on clinical examination and laboratory finding the case was diagnosed as caseous lymphadenitis and was managed as en bloc excisions.

Pre-operative preparation of the bull: After physical restraining and stabilizing of the animal in the crush the area surrounding the swelling was prepared aseptically by washing with soap and tap water. The hair was shaved from the skin that covers swelling and surrounding area (Figure 11B). Then, the area was again washed by using antiseptic solution (savlon) to remove any fall of hair. Finally, the shaved area was scrubbed with 1% povidone iodine in circular manner starting from the center to prefer and made it ready for aseptic abscess management.

Anesthesia and animal control: Bull was controlled in standing position by using physical and chemical methods by intramuscular injection of xylazine hydrochloride @ 0.01mg/kg of body weight. Field block anesthesia was used by making walls of infiltration of 2% lidocaine hydrochloride enclosing the swollen parts. The swollen and surrounding area was given a final scrub with 1% povidone iodine in circular manner starting from the center to prefer prior to proceeding to en bloc excision of chronic abscess as a result of caseous lymphadenitis.

Surgical procedure and techniques: Two elliptical skin incisions were made on the base of the swelling and advanced gently with blunt dissection by using mayo scissor (Figure 11C). After careful handling and blunt dissection of adjacent tissues the swelling mass that enclosed with capsule was surgically excised (Figure 11D). Bleeding during the procedure was managed by using blunt dissection. In addition, applying sterile gauze,

using different straight and curved hemostatic forceps was applied. Then, the cavity was irrigated by using 1% povidone iodine (Figure 11E) and the skin flap was trimmed in order to achieve cosmetic wound appearance while suturing the wound edge. Before skin closure, obliteration of dead space was made through continuous apposing sutures of subcutaneous tissue including the underlying tissues in continuous interlocking suture pattern with natural absorbable suture material (catgut no. 2-0) to prevent accumulation of serosanguinous fluid. Finally, the skin was closed with vertical suture pattern using non-absorbable suture material (silk no. 2) (Figure 11F). Lastly, the area was properly cleaned and dressed in a 1% povidone-iodine solution, and peripheral area of the incised swollen was sprayed with cyclo spray to prevent the entrance of bacteria from the skin.



Figure 12: Chronic abscess and its surgical correction through en bloc excision in bull

(A) Clinical presentation of the case (B) On progression of shaving of hair from surgical site (C) elliptical incision and blunt dissection on progression (D) Excised mass (E) Irrigation of cavity (F) Wound appearance after completion of skin suture

Post-operative care and outcome: The wound was regularly cleaned by using savlon and dressed by 1% Povidone iodine solution for five days daily. The bull was administered short acting oxy-tetracycline (10mg/kg) I.M for three days. Diclofenac sulfate was administered at a dose rate of 2mg/kg intramuscularly daily for three successive days for pain management. The wound spray (cyclo spray) was applied on wound for five days daily. After continuous daily follow up for five days the follow up was continuous through phone communication for two weeks. Then, the sutures were removed after 15 days and the wound was successfully recovered without any other complications.

Discussion

Abscess is the most common swelling observed on the skin surface of animal body that result from microbial invasion of the dermis and its supporting structures, leading to the formation of a collection of pus (Misk *et al.*, 2020 and Thomas *et al.*, 2020). Bacterial infection is the most common causes of abscess in animal. According to the clinical and bacteriological study of subcutaneous abscesses caused by gram positive bacteria in cow and sheep conducted by AL-Tufflyli and Shekhan (2019) stated that the commonly isolated bacterial species from abscess are *Staphylococcus aureus*, *S. epidermidis*, *S. hycus*, *Arcanobacterium pyogenes*, and *Corynebacterium pseudotuberculosis* at percentage of (33.9 %), (17.8%), (12.6%), (23.2%) and (7.1%) respectively. This is in agreement with the present case, where *Corynebacterium pseudotuberculosis* was isolated from the sample of surgical managed case (Annex 2). Predilection seats and formation of abscess is depending on the way of entrance of infection agents (Hassan *et al.*, 2019 and Misk *et al.*, 202). This is in agreement with in the present case; where the affected site was parotid region and the way of entrance of the isolated bacterium might be through oral abrasions.

The exploratory puncture was highly diagnostic technique in case of cutaneous and subcutaneous abscesses (Fesseha, 2020 and Hassan *et al.*, 2019). Similarly, in present case, exploratory puncture was done. Abscess is classified as either extended abscess without limitations or well circumscribed, firm and movable under the skin based on the nature (AL-Tufflyli and Shekhan, 2019 and Misk *et al.*, 2020). This is in line with present

case, where the encountered abscess was circumscribed and hard under the skin. Surgical treatment was dependent on the nature of abscess. In present case, treatment of abscess was performed by en bloc excision along with antibacterial therapy and allowed the skin wound healed by first intention. A similar surgical correction of treatment was followed by Misk *et al.* (2020). In conclusion that, management of well circumscribed, firm and movable superficial skin abscess in cattle through en bloc excision along with antibacterial therapy and allowed the skin wound healed by first intention should be effective.

3.7. Surgical Management of Exploratory Laparotomy in Bull

Abstract

Exploratory laparotomy is commonly performed when a clinical diagnosis is still uncertain. Therefore, in present case, a local breed adult bull of seven years was presented to VTH with history of gradually reduced weight gain, reduction of feed intake and water consumption. Up on physical examination, the animal was showed signs of dehydration, occasional grunting and defecate black, pasty and scanty faeces. Up on poll and pinch grip test, the bull showed signs of pain, discomfort and arching its backs down to the ground. Based on the history and poll and pinch grip test observation, the case was tentatively diagnosed as presence of indigestible foreign bodies in the forestomach and decided to done exploratory laparotomy to reach on definitive diagnosis and surgically manage it. Accordingly, surgical site was prepared aseptically and exploratory rumenotomy was admitted under proximal paravertebral nerve block and field block anesthesia by making inverted “L” blocks. Following successful exploratory rumenotomy indigestible foreign bodies such as ropes and plastics fibers were removed from rumen and reticulum. The suture was removed after 15 post-operative days and the bull was recovered uneventfully without any complications and increased in body conditions. So recommend that once the case encountered it should have to be managed early before the animals are emaciated and immunologically compromised.

Key words: *Bull; Exploratory laparotomy; Indigestible foreign bodies; Rumenotomy*

Introduction

Environmental pollution as a result of rapid urbanization and industrialization are the triggering factors for ingestion of foreign body in ruminants that become a major global health problem in ruminants worldwide (Fesseha, 2020; Omer, 2018 and Semieka, 2010) especially in developing countries, like Ethiopia, where the standard of animal management is unsatisfactory, and low nutritional statuses of ruminants have forced them to scavenge for food (Fesseha, 2020). Because pasture and supplementary concentrate feed for intensive livestock management are limited and expensive, as result, most livestock farmers adopt free-range management system in the urban and semi-urban communities where their animals, scavenge for food, often going into refuse dumps, which are around the towns (Omer, 2018).

Cattle are more likely to ingest foreign bodies than small ruminants because they do not use their lips for prehension, which make them indiscriminate feeding habits (Mushonga *et al.*, 2015; Semieka, 2010 and Tesfaye and Chanie, 2012). The ingested foreign bodies by cattle are divided into two main groups: the first group is non-penetrating foreign bodies such as plastic bags, sack thread, ropes, leather, rubber, bed linen, pieces of lead pipe, straw baskets, hair and plant fibers (bezoars) (Fesseha, 2020 and Ismail *et al.*, 2007) and the second group is penetrating foreign bodies include metallic pieces of wire, needles, nails and stones (Nugusu *et al.* 2013). The entry and migration of ingested foreign bodies through the body tissues lead to many complications based on nature of the foreign body entrance into the tissues (Fasil, 2016; Nugusu *et al.* 2013 and Semieka, 2010). For example, the presence of foreign bodies in the rumen and reticulum affects the absorption rate of volatile fatty acids and consequently result in reduction of animal fattening and milk production, moreover; the ingested material may cause perforation of the wall of the reticulum, which allow leakage of ingest and bacteria which contaminates the peritoneal cavity, resulting in local or diffuse peritonitis (Omer, 2018; Sandeepa *et al.*, 2019 and Tesfaye and Chanie, 2012).

Foreign body diagnosis in ruminants depends on the diagnostic imaging technique used and the nature of the ingested foreign material ingested (Mushonga *et al.*, 2015; Ramin *et*

al. 2008; Sadan *et al.*, 2020 and Semieka 2010). However, clinical diagnosis of rumenal and reticular foreign bodies may be inconclusive, so their diagnosis depends mainly on radiographic (detection of the presence of foreign body) (Braun *et al.*, 2018 and Semieka 2010), ultrasonographic (characterizing pericardial effusion as well as determine the extent of the lesions and assess the prognosis) (Braun, 2003), hematological and biochemical examinations (Ismail *et al.*, 2007). For confirmatory diagnosis of the ingested foreign bodies exploratory surgery and advanced modern diagnostic techniques such as laparoscopy could be used (Sadan *et al.*, 2020).

Exploratory laparotomy is commonly performed when a clinical diagnosis is still uncertain. Paralumbar fossa acts as the main entrance to the abdominal cavity for both large and small ruminants in case of exploratory or surgical treatment for a specific purpose when a clinical diagnosis has already been made (Baird, 2013). Paralumbar fossa is the most prominent feature of the bovine flank (Niehaus and Anderson, 2016), which is roughly a triangular area bounded dorsally by the transverse processes of the lumbar vertebrae and the last rib cranially, whereas the caudal boundary is formed by the tuber coxae proximally and the sheath of the external abdominal oblique muscle distally (Baird, 2013). The ventral and lateral wall of the abdomen is formed by four abdominal muscles such as the external abdominal oblique, internal abdominal oblique, transversus abdominis, and the rectus abdominis and their aponeuroses (Niehaus and Anderson, 2016).

Case history and examination: A seven years old local breed bull was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with history of gradually reduced weight gain, reduction of feed intake and water consumption since 2 months (Figure 12A). History also revealed that, bull was grunting, grinding of tooth, abdominal pain, reduced feed intake, progressive weight loss, and lagging behind from the herd up on walking. One week before admitted to the VTH the animal was treated by short acting Oxy-tetracycline for three days at Adea Woreda veterinary clinic. Up on physical examination, the animal was showed signs of dehydration, occasional grunting, anorexia and defecate black, pasty and scanty faeces. The clinical parameters such as: heart rate, respiratory rate, body temperature; capillary

refill time, body weight and age were recorded. Measurement of vital sign such as heart rate, respiratory rate and body temperature within range of physiological limit and conjunctival mucous membrane pale pink. Up on poll and pinch grip test, the bull showed signs of pain, discomfort and arching its backs down to the ground. Based on the history and clinical observation, the case was tentatively diagnosed as presence of indigestible foreign bodies in the rumen and reticulum and decided to done exploratory rumenotomy to surgically manage and reach on definitive diagnosis.

Pre-operative preparation of the bull: The bull was immobilized through using physical method by lying down on the ground and tying the two fore and hind legs together separately and hold by the assistant. Then, left paralumbar fossa area was prepared aseptically by washing with soap and tap water. The hair was shaved by using scalpel blade no. 23 from the skin that covers the left paralumbar fossa area. Then, the area was again washed by using antiseptic solution (savlon) to remove any fall of hair. Finally, surgical site was scrubbed with 1% povidone iodine in circular manner starting from the center to prefer and prepared for paravertebral nerve block by using local anesthesia and also made it ready for aseptic surgery.

Anesthesia and animal control: The bull was controlled in right lateral recumbent position and the head was positioned straight forward by assistant person. Local nerve block was used by making proximal paravertebral nerve block with 2% lidocaine hydrochloride to desensitize T13, L1 and L2 nerve and also two linear infiltrations were made in the pattern of inverted 'L' using local anesthetic lidocaine to desensitize and put in sufficient analgesia enclosing the site of incision. In addition to local anesthesia, intramuscularly (I.M) injection of dexamethasone @ 2mg/kg was used in order to prevent sensation to pain. Finally, the surgical site was given a final scrub with 1% povidone iodine in circular manner starting from the center to prefer prior to proceeding to surgery.

Surgical procedures and techniques: After surgical site was prepared aseptically and appropriated analgesia was achieved, a celiotomy was performed on the area which were enclosed by inverted "L" blocks through incising the skin, starting from 10 cm away from transverse process of lumbar vertebrae and 5 cm distant from the last rib, and

ending a 30 centimeters ventrally from starting point on left paralumbar fossa (Figure 12B). The subcutaneous fascia was bluntly dissected to visualize the underlying abdominal muscles by using blunt Mayo scissors. The three abdominal muscles were gently incised to avoid the incision of underlying visceral organ by using scalpel blade no.23 that was loaded on scalpel handle no.4. Peritoneum was grasped by using serrated tissue forceps and tented up and then small incision was made on the peritoneum by using scalpel blade. Then, two fingers were inserted through the small incision and peritoneum was tented up to extend the incision in between the two fingers down and up by using blunt Mayo scissors and the abdominal contents were exposed. Simple swabbing, ligation and twisting of blood vessel with heamostatic forceps was performed depending on the size of blood vessel and amount of blood oozing out to obtain a very clean surgical field. After inserting gloved hand through incision, the rumen was gently grasped and pulled out on the surgical field. Then, the rumen was swapped by using gauze to see clearly the direction of blood vessel lies and two staying suture was placed to easily holds the rumen on surgical field by assistant and then incision was made in between the two applied staying sutures in parallel to blood vessel lying. After the opening of the rumen the half of ruminal content was removed and searching of foreign material was conducted in remain half of the ruminal content and in the reticulum (Figure 12C). Then, the ruminal wall was closed in two layers with Cushing followed by lambert suture pattern by using absorbable suture material (catgut no. 2-0) after completion of searching and removal of foreign material (Figure 12D). Finally, celiotomy closure was performed in three layers as described in the following ways. The peritoneum and all the three abdominal muscles were opposed using chromic surgical cut gut 2-0 in a lockstitch suture pattern followed by closing of subcutaneous tissue with sub-cuticular suture pattern, using a non-synthetic absorbable suture material (Chromic surgical cut gut 2-0). The skin was opposed in simple interrupted suture pattern using synthetic non-absorbable suture material (silk) (Figure 12E).



Figure 13: Surgical removal of indigestible foreign body from rumen and reticulum

(A) Clinical presentation of the case (B) Making of skin incision (C) On progression searching of foreign body (D) the removed foreign body from rumen and reticulum (E) on progression of closing of the skin (F) Appearance of wound site on 15th days

Post-operative Care: Post-operative treatment included administration of short acting Oxy-tetracycline through I.M. for three days post-operation at Adea Woreda veterinary clinic. The owner was also advised to supplement good nutrition to facilitate wound healing. The wound was properly dressed with 1% Povidone iodine solution and applying wound spray (cyclo spray) for five days daily. Finally, skin sutures were removed on fifteenth post-operative day and the bull was recovered uneventful after 15 days of surgery (Figure 12F).

Discussion

In the country where cattle are managed extensively underneath the poor farming system and there's continual drought, ruminants are notorious for ingestion of foreign bodies from different sources due to feed scarcity, high environmental contamination with plastic bags, construction materials, and the growing trend of urbanization and industrialization (Kebede *et al.*, 2020 and Nugusu *et al.*, 2013). Obtaining accesses to indigestible foreign bodies is common particularly in urban and peri-urban areas wherever in depth building are distributed and correct plastic material disposal isn't conditioned (Tesfaye and Chanie, 2012) and additionally the grazing areas don't seem to be offered and animals rummage around for food at non feeding places (Kuotsu *et al.*, 2019). This is suggestion might be in agreement with present case, where the animal comes from pri-urban area were more industry was found.

In this case report, a significant a part of the foreign body was removed from the reticulum while the rest was removed from the rumen. This finding was in agreement with the findings of (Kebede *et al.*, 2020) who report higher prevalence of indigestible foreign bodies in the reticulum than in the rumen. However, the finding of the present case was disagrees with previously reported finding of (Bwatota *et al.*, 2018; Fasil, 2016; Fesseha, 2020; Sadan *et al.*, 2020 and Tesfaye and Chanie, 2012) who report a higher prevalence of IFB in the rumen than reticulum, that is perhaps to its larger volume and size as compared to other compartments. In this case report, the bull was improved its body condition, feed intake and wellbeing within one month of post-operation. This finding agreed with an experimental study conducted by Olatunji-Akioye *et al.* (2019) and Ghurashi *et al.* (2009) and case report by Fesseha (2020) who concluded that the surgical removal of the foreign body did improve the body condition of the animals by growing the feed intake, weight gain, and productivity following removal of the foreign body.

Even though the procedure is a clean-contaminated surgery, it is an effective and safest procedure for retrieving ingested foreign bodies as well as to resolve other conditions of the paunch and its related structures “forestomach” (Saidu *et al.*, 2020). In present case,

surgical operation was conducted in lateral recumbent position under proximal paravertebral nerve block to desensitize T13, L1 and L2 nerve and inverted “L” block by using stay suture rumenotomy technique. This is disagreement with the work of Fesseha, (2020) who used the standing restraint position. Wound dehiscence, hemorrhage, fever, edema, wound infection (peritonitis), death, intestinal obstruction/adhesion, and physiological bloat were the commonly observed postoperative complications of rumenotomy (Asrat and Velappa, 2016). But in present case, such types of post-operative complication were not encountered in bull.

In conclusion from present case that the bull was undergone rumenotomy and found with variable sizes of indigestible foreign bodies. The bull was recovered from the problem and increased in body conditions because ruminal foreign body is one of the GIT problems in ruminants due to their feeding behaviors in both urban and rural areas especially where waste disposal is not regulated at grass root level. So recommend that once the case encountered it should have to be managed early before the animals are emaciated and immunologically compromised.

3.8. Surgical Management of Tumors

Overview

A neoplasm could be a pathologic disturbance of cell growth, which may be solid or fluid filled mass that characterized by excessive and abnormal proliferation of cells (Sinha, 2018). It can be benign or malignant. Benign neoplasms do not grow rapidly, not invade the encompassing body tissues, and do not unfold throughout the body. On the other hand, malignant neoplasms tend to grow rapidly, invade the tissues around them, and metastasized to other parts of the body. The word “tumor” or “mass” is wont to describe the particular swelling or alternative physical look of a tumor. The word “cancer” is usually confused with neoplastic, however solely malignant neoplasms are truly cancers. Cancer could be a common problem in dogs, though all dog breeds and crossbreed dogs is also affected, it's notable that some breeds of pedigree dogs seem to be at increased risk

of certain types of cancer suggesting underlying genetic predisposition to cancer susceptibility (Munkhtuul *et al.*, 2014).

The skin is the largest organ system of the body (Lafta and Alabbody, 2020), and the organ most commonly affected by neoplastic conditions in dogs (Chikweto *et al.*, 2011 and Mukaratirwa *et al.*, 2005). Among the wide range of tumour types can be found in the skin, subcutaneous tissue and adnexa are the common one (Brønden *et al.*, 2010). The aetiology and pathogenesis of canine tumours is likely to be similar to that of human tumours since dogs live in our environment and eat similar food and are thus exposed to similar risk factors (Dobson, 2013). On other hand, ultraviolet radiation from sunlight is one of the predisposing factor involved in the development of skin neoplasms due to skin is an organ commonly exposed to sunlight, however, several other etiological factors can also cause this disease, including: trauma, the presence of pigmented cells, chemical exposure, genetic susceptibility and inflammation, which may be associated with the etiology (Lafta and Alabbody, 2019).

Cytology and in cases where a biopsy is taken, histopathology is a useful technique and is usually used to establish the diagnosis of skin tumours (Brønden *et al.*, 2010 and Choi, 2019). Treatment of skin neoplasms, in particular malignant tumours, is difficult. Depending on the type of cancer, stage, grade, and location in most cases the treatment choice of skin neoplasia is surgical excision. In addition, in case of malignant neoplasms radiation or chemotherapy is used alone or as adjunctive therapy (Brønden *et al.*, 2010). The objectives of this case report were to briefly describe the surgical excision of perineal gland adenoma and canine mammary tumor in dog.

3.8.1. Surgical excision of perineal gland adenoma in bitch

Abstract

Tumors of the perianal area of dogs are common and the two most common tumors are perianal gland adenoma and anal sac adenocarcinoma. Perianal gland adenomas occur often, whereas adenocarcinomas of the apocrine glands of the anal sac occur less frequently. In present case, a six years old exotic bitch with swelling on the left lateral

side of anal orifice that was started before 6 month was presented to VTH. Clinical examination revealed that there were pediculate, cold, hard and painless mass when palpated. Accordingly, aspiration of the content was conducted and revealed that there was blood coming out through 16-gauge sterile needle and tentatively case was diagnosed as perineal gland adenoma. The tumor was surgically removed from the base under general anesthesia and the dog was recovered uneventfully without any complications in period of 15 post-operative days. Therefore, complete surgical excision of the tumor including some margin of healthy tissues should be better to prevent this disease in bitch.

Key words: *Bitch; Perineal gland adenoma; Tumor*

Introduction

The perianal region of dogs contains multiple structures and glands, some of which are unique to the area (Esplin *et al.*, 2003). The anal sacs of the dog are paired; cutaneous pouches situated between the internal and external sphincter muscles at the 4-5 and 7-8 o'clock positions, and are connected to the outside by a short duct that opens laterally to the either side of the anus (Sağlam and Kaya, 2008 and Scarff, 2010). Perianal glands are non-secretory modified sebaceous glands occurring commonly around the anus of dogs however may also be present at alternative sites like skin of prepuce, tail, loin, groin, posterior part of hind limbs, ventral surface of abdomen, head and neck (Jagmeet *et al.*, 2019 and Kaur *et al.*, 2019). Tumors of the perianal area of dogs are common and the two most common tumors are perianal gland adenoma and anal sac adenocarcinoma. Perianal adenomas occur often, whereas adenocarcinomas of the apocrine glands of the anal sac occur less frequently (Choi, 2019 and Esplin *et al.*, 2003). Perianal gland adenoma occur most frequently in older intact male dogs because of the tumor's testosterone dependence (Bennett *et al.*, 2002), but can occur in younger, neutered, or female dogs, which constitute over 81% of tumors of the perianal glands (Choi, 2019) and approximately 0.7-2.2% of all the neoplastic conditions associated with the skin (Sharma *et al.*, 2019).

Even though the exact cause of perianal sebaceous adenoma is not clearly understood, the development of these benign tumors appears to be sex hormone-dependent, where growth

is either stimulated by androgenic hormones or depressed by estrogenic hormones (Turek and Withrow, 2007). The perianal gland adenoma swelling was found to be firm, not well demarcated, raised, focal, pedunculated and creamish-white in look with size starting from 12-15 cm in diameter (Sharma *et al.*, 2019) and mostly occur on the hairless skin area around the anus, although they may extend to haired regions and can develop on the prepuce, scrotum, or tail head (stud tail or “caudal tail gland”) (Turek and Withrow, 2007). The average age of perianal gland adenoma occurrence in dog is ten years (Turek and Withrow, 2007) and breeds such as Spaniels, Dachshunds, and Shepherd dogs are predisposed (Polton *et al.*, 2006). Diagnosis and differential diagnosis of perianal gland adenoma from other superficial swelling depends mainly on anamnesis and clinical examination such as palpation, exploratory puncture and aspiration. However, cytology is a useful technique and is usually used to establish the diagnosis of these tumors (Choi, 2019).

The treatment of perianal gland adenoma depends on careful staging, digital rectal exam, hematologic and serologic examinations, thoracic radiographs as well as abdominal sonography (Kessler, 2014). Classical modalities of cancer therapy include surgery, radiation therapy, hormonal therapy, or chemotherapy. Hence, perianal adenomas are hormonal dependent, the vast majority of these tumors will regress up to 95% following castration, and recurrence is uncommon (Michelle *et al.*, 2007 and Tozon *et al.*, 2005). In addition, adenomas can regress following estrogen therapy. However, the potential risk of severe myelo-suppression following estrogen therapy limits its use (Tozon *et al.*, 2005). Adenomas can be excised with minimal margins. Use of this technique precludes evaluation of the surgical margins for completeness of excision, which may be acceptable for benign masses; however, as the most consistent criteria for malignancy is invasiveness, lack of margin assessment is not without risk (Michelle *et al.*, 2007). Therefore, this case report briefly describes the surgical excision of perineal gland adenoma in bitch.

Case history and examination: A six years old exotic female dog weighing 10 kg with swelling on the left lateral side of anal orifice that was started before 6 month was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and

Agriculture, Addis Ababa University. History from the owner revealed that the swelling was small in size the time of starting but it became increase in size gradually from time to time and became pediculate and sometimes the bitch was scooting it on the ground (Figure 13A). The owner also added that the bitch has normal feeding and taking water habit, and also had anti-rabies vaccination history one year before. Up on physical examination, the mass was pediculate, cold, hard and painless when palpated. To differentiate it from other types of lesions causing swelling like an abscess, hematoma, cyst, etc., aspiration of the content from the swollen mass was performed using a 16-gauge sterile needle that revealed blood was aspirated and diagnosed as tumor. Pre-anesthetic clinical examinations was conducted on bitch to ascertain that bitch has no a clinical condition that may interfere with the procedure. The clinical parameters such as: heart rate, respiratory rate, body temperature; and capillary refill time were recorded, and their measurement was in normal physiological ranges. Physical examination revealed normal body condition with shiny hair coat and also the bitch had normal gait and posture up on observation while at motion and rest. Then, animal was suggested for surgical excision of tumor.

Pre-operative preparation of the bitch: The bitch was withheld from food and water for about 12 hours before surgery. The perineal and surrounding area of the swollen was prepared aseptically by washing with soap and tap water after the bitches was immobilized through chemical method. Then, the hair was shaved from the skin that covers perineal and surrounding area of the swollen. The area was again washed by using antiseptic solution (savlon) to remove any fall of hair. Finally, surgical site was scrubbed with 1% povidone iodine in circular manner starting from the center to periphery. Then, the patient was transferred to the surgical table. Intravenous fluid was secured at a rate of @ 3mL/kg/hr. using 20 G IV cannula and made it ready for aseptic surgery.

Anesthesia and animal control: The bitch was controlled in sternal recumbent position by tilt up of the hind limb with the four leg was tied to the surgical table. The general anesthesia was used by administering atropine sulphate @ 0.03 mg/kg and xylazine @ 1.5mg/kg in separate syringe intramuscularly (IM) as premedication, and ketamine hydrochloride @ 5mg/kg and Dazepam @ 0.5 mg/kg as induction dose in single syringe

intravenously (IV) and ketamine hydrochloride @ 5mg/kg and Dazepam @ 0.25 mg/kg as maintenance dose in single syringe intravenously (IV) through out surgical procedures. Then, surgical site was draped with sterile drape in single put and secured to the skin with towel forceps, and a final scrub was given with 1% povidone iodine in circular manner starting from the center to prefer prior to proceeding to surgery.

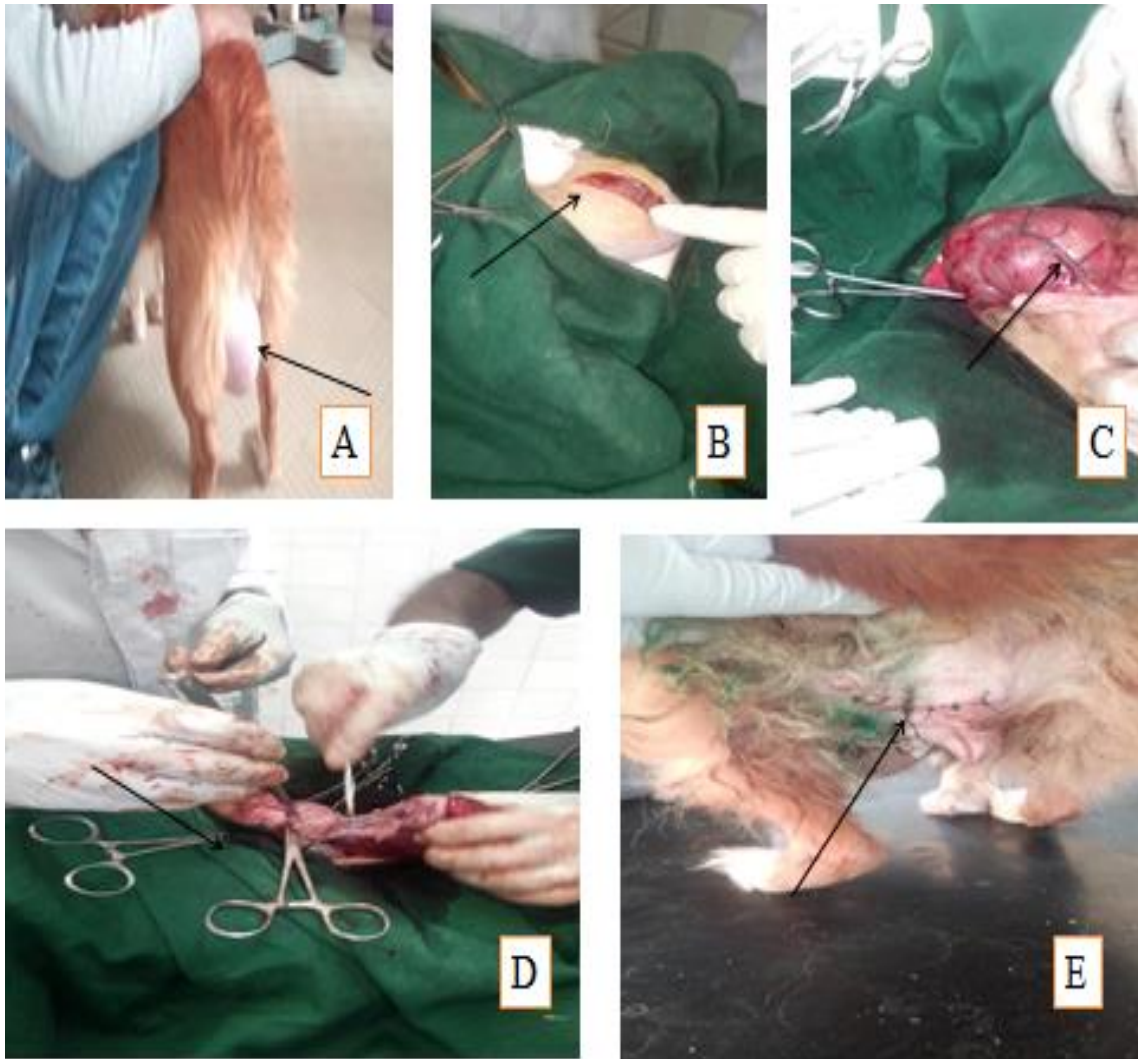


Figure 14: Perineal gland adenoma and its surgical excision in bitch

(A) Clinical presentation of the case (B) Longitudinal skin incision on the tumor mass (C) Appearance of tumor mass and large blood vessels after separation of skin and the mass (D) On progression of excision of tumor mass at its base (E) Appearance of the wound site on the 2nd days

Surgical procedure and techniques: A straight longitudinal skin incision was made on the tumor mass (Figure 13B). Then, the incision was deepened through bluntly dissection until base of the tumor mass attached to the underlying tissues identified. After proper skin and tumor mass separation was done, all superficially observable blood vessels supplying the tumor (Figure 13C) was ligated at two points by using absorbable suture material (catgut no.2-0) and dissected in between the two ligatures. Then, the base of tumor mass was clamped by using large hemostatic forceps and two ligatures were applied anterior and posterior to the forceps by using absorbable suture material (vincryl no.2-0). Finally, tumor mass was excised in between anterior ligation and forceps (Figure 13D). The cavity was irrigated by using 1% povidone iodine and the skin flap was trimmed in order to achieve cosmetic wound appearance while suturing the wound edge. Closing of the incised wound can be done by two layers: first layers, suturing of subcutaneous tissues including the underlying tissues in an interrupted suture pattern with natural absorbable suture material (catgut no. 2–0) to eliminate dead space and tension while closing of the skin, followed by second layer, re-apposition of the skin incision using synthetic absorbable suture material (vincryl no.2-0) in a simple interrupted suture pattern.

Post-operative care and outcome: The wound was regularly cleaned by using antiseptic solution (savlon) and dressed with 1% Povidone iodine solution for five days daily (Figure 13E). The bitch was administered Fortified procaine penicillin (22,000 IU/kg) through I.M for three days. The wound spray (cyclo spray) was applied on wound for five days daily. In addition the owner was also advised to follow the overall discomfort of animal and status of the wound and applying homemade collar to prevent self-mutilation of the wound. The bitch also dewormed by giving mebendazole bolus twice per day for three days. Finally, depending on the phone communication the owner brought his bitch on fifteen days post-surgery and checked that the wound was successfully healed and the health status of an animal is good. The follow up was also continuous for two months through phone communication and there was no any reoccurrence of the diseases noticed.

Discussion

Skin is the largest organ of the body that provides protection for all body parts, and it is permanently exposed to the influence of physical, chemical and other environmental factors (Aleksić-Kovačević *et al.*, 2005). A wide variety of tumor types can occur in the skin, subcutaneous tissue, and adnexa (appendages), which constitutes approximately 9.5% to 51% of all neoplasms in dogs (Lafta and Alabbody, 2019). Among adnexial tumor occurring in dog, the sebaceous glands tumor such as perianal gland tumor, apocrine tumor of the anal sac and apocrine gland tumor are the three most commonly occurring tumor in perianal region of the dogs (Kaur *et al.*, 2019). Perianal adenomas comprise more than 80% of the perianal tumors and are the third most common tumor in non-castrated adult male, but can occur in younger, neutered, or female dogs (Choi, 2019; Devi *et al.*, 2012; Kaur *et al.*, 2019; Petterino *et al.*, 2004 and Tunc *et al.*, 2014), whereas perianal adenocarcinoma occurs in castrated or intact males, implying no hormonal dependency (Tozon *et al.*, 2005). Even though the present case is disagreement with this argument on the sex of animal which was encountered, the affected animal was not neutered.

The main target of all diagnostic methods is to enable a rapid, reliable and economic diagnosis to be made within the shortest time possible with minimum damage to the patient (Hazirolu *et al.*, 2010). A fine needle aspiration biopsy technique is one of diagnostic method to do cytological examination for confirmatory and differential diagnosis of the tumor mass whether it's benign or malignant with 84.37% of accuracy when cytological and histopathological findings confirmed each other (Yumuşak *et al.*, 2016). Furthermore, the accuracy rate of cytological diagnosis in canine mammary tumors was reported as 92.9% by Casalli *et al.* (2007), as 93% by Simon *et al.* (2009), and as 96.5% by Sontas *et al.* (2012). This is in agreement with the present case where the fine needle aspiration sample was taken and confirmed through cytological laboratory test (Annex 3A). In addition, in present case, diagnosis of the tumor mass can be performed based on location of the tumor, and size and consistency of the swelling through palpation, and aspiration of its contents to differentiate from the abscess, hernia, hematoma and cyst. This is agrees with the reports of Kokila *et al.* (2016) and Sharma *et*

al. (2019) who stated that the locations of the tumor mass as well as its size, consistency, nature, and color of the contents will help in diagnosis and also for differential diagnosis of tumor mass from other body swelling.

Even though there are various treatments of perianal gland tumour have been documented, the choice of the correct method is depends on the particular type of the tumor, extent of the lesion and its invasiveness (Sobczyńska-Rak *et al.*, 2018 and Tozon *et al.*, 2010). Forexample, Tozon *et al.* (2005) suggested that castration causes regression of perianal gland adenomas up to 95% but it is not sufficient alone to cause the total regression of these tumors. Therefore, the treatment choice of perianal adenomas involves surgical removal of the tumor together with a margin of healthy tissue, coupled with castration (Sobczyńska-Rak *et al.*, 2018). This is in agreement with present case, where tumor mass was removed through surgical excision with a margin of healthy tissues. However, the present case, was disagrees in terms of neutering the patient. In addition, adenomas can regress following estrogen therapy due to its hormone dependency (Pasini *et al.*, 2006). However, the potential risk of severe myelo-suppression following estrogen therapy limits its use (Tozon *et al.*, 2005). Moreover, the previous study conducted by Tozon *et al.* (2010) reported that Electrochemotherapy proved effective for local tumor control in both perianal adenocarcinomas and benign tumors resulting in long lasting complete responses and can as such represent a good alternative for standard treatments of tumors in the perianal region.

To sum up, perineal gland adenoma is a common tumors in dog that need an accurate diagnosis, complete surgical excision of the tumor mass and proper follow-up of the case to prevent recurrence and restore function. Therefore, complete surgical excision of the tumor including some margin of healthy tissues should be better to prevent this disease in bitch.

3.8.2. *Surgical excision of mammary tumor in bitch*

Abstract

Among many tumor occurring in dog, canine mammary neoplasms (CMNs) are second most commonly occurring tumors next to skin tumors that account approximately 50% of all tumors in female dogs of which 40 to 50% are malignant. In present case, a ten years old exotic bitch with swelling of the left cranial abdominal mammary gland that was started before 4 month of admitted day was presented to VTH. On clinical examination, the mass was cold, hard; teat was damaged and not seen and painless when palpated. Accordingly, aspiration of the content was conducted and revealed that there was blood coming out through 16-gauge sterile needle and tentatively case was diagnosed as mammary tumor. The cytological examination of the mass also confirmed that the canine mammary tumor. The tumor mass was removed by unilateral mastectomy procedure under general anesthesia after surgical site was prepared aseptically, and the bitch was recovered uneventfully without any complications in period of 15 post-operative days. Therefore, treatment of mammary tumor including the adjacent mammary gland which was drained by the some lymph node and blood vessels should be better to prevent this disease in bitch.

Key words: *Bitch; Mammary gland tumor; Unilateral mastectomy*

Introduction

Mammary gland is a modified apocrine sweat gland, divided into lobules by interlobular connective tissue, which contain alveoli and ducts that surrounded by connective tissue, vessels and nerves (Petrov *et al.*, 2014 and Benavente *et al.*, 2016). Bitches usually contain five pairs of glands, which are numbered 1 to 5; moving cranial to caudal. The two thoracic pairs of mammary glands are referred as cranial thoracic and caudal thoracic, which numbered as 1 & 2, the two abdominal pairs of mammary glands are referred as cranial abdominal and caudal abdominal, which numbered as 3 & 4 and one inguinal (pubic) pairs of mammary glands, which numbered as 5 (Petrov *et al.*, 2014). Mammary gland is the common site for both benign and malignant neoplasms

development in female dog next to skin tumors and constitutes an important problem in veterinary medicine (Lana *et al.*, 2007; Cassali *et al.*, 2011 and Benavente *et al.*, 2016).

Cancer is a common problem in dogs, among that canine mammary gland tumor is one of the most common tumors, especially in non-spayed females, and is still one of the leading causes of death among canines (Bujak *et al.*, 2020). The root causes for the development of canine mammary tumors aren't absolutely recognized.. However, hormones of the estrous cycle seem to be involved. Female dogs who are not spayed or who are spayed later than the first heat cycle are more likely to develop mammary tumors (Petrov *et al.*, 2014; Al-Akraa *et al.*, 2015 and Shahzamani *et al.*, 2015). All dog breeds and crossbreed dogs is also affected, it's notable that some breeds of pedigree dogs seem to be at increased risk of certain types of cancer suggesting underlying genetic predisposition to cancer susceptibility (Bujak *et al.*, 2020).

Mammary tumor affects both sexes; however, the occurrence in female is higher than males, and the tumors developed are usually benign. In female, mammary tumor is 50%, and half of these tumors have the ability to metastasize (Araujo *et al.*, 2014; Gupta *et al.*, 2014; Petrov *et al.*, 2014 and Kivrak and Aydin, 2017). Canine mammary neoplasms are commonly presented as small, properly circumscribed, firm on palpation, and they grow slowly if it is benign tumors, while malignant tumors are characterized by metastasis, fixed to overlying pores and skin or deep tissues, may be ulcerated and hemorrhagic, and develop rapidly (Benavente *et al.*, 2016). According to many studies, the average age of mammary tumor occurrence is seven to eight years (Al-Akraa *et al.*, 2015; Shahzamani *et al.*, 2015; Kivrak and Aydin, 2017 and Bujak *et al.*, 2020).

The treatment of canine mammary tumor depends on stage and well-established prognostic factors (Sorenmo, 2003). Classical modalities of cancer therapy include surgery, radiation therapy, hormonal therapy, or chemotherapy. Though surgery is the treatment of choice, its value depends on the disease extent, lymphatic drainage, size and location of the lesion (Sorenmo, 2003; Cassali *et al.*, 2011 and Gupta *et al.*, 2014). Surgical treatment of malignant neoplasms has limitations and regularly is unsatisfactory. Despite the fact that even if a most cancers is metastasized, removing of a bleeding or

inflamed mass that is interfering with a normal physical function can provide alleviation and temporarily enhance the best of life (Sharma *et al.*, 2018). Clinical characteristics such as tumor size, lymph node status and the presence of distant metastasis and histological prognostic factors for mammary tumors have been suggested to be important parameters in determining the possible outcome and progression of the disease (Fesseha, 2020). Therefore, this case report briefly describes the surgical excision of mammary tumor in bitch.

Case history and examination: A ten years old exotic female dog weighing 6 kg was presented for an elective surgery of excision of mammary tumor to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with swelling of the left cranial abdominal mammary gland that was started 4 month before admitted to the hospital. The swelling was small in size the time of starting but it became increase in size gradually from time to time. The owner also added that the bitch has normal feeding and taking water habit, and the bitch also have the history of anti-rabies vaccination 6 months before. Up on physical examination, the mass was cold, hard; teat was damaged and not seen and painless when palpated. To differentiate it from other types of lesions causing swelling like an abscess, hematoma, cyst, etc., aspiration of the content from the swollen mass was performed using a 16-gauge sterile needle that revealed blood was aspirated and diagnosed as tumor. Pre-anesthetic clinical examinations was conducted on bitch to ascertain that bitch has no a clinical condition that may interfere with the procedure. The clinical parameters such as: heart rate, respiratory rate, body temperature; and capillary refill time were recorded, and their measurement was in normal physiological ranges. Physical examination revealed normal body condition with shiny hair coat and also the bitch had normal giant and posture up on observation while at motion and rest. Then, animal was suggested for surgical excision of tumor.

Pre-operative preparation of the bitch: The bitch was withheld from food and water for 12 hours before surgery. The ventral abdomen and surrounding area of the swollen was prepared aseptically by washing with soap and tap water after the bitch was immobilized through chemical method. Then, the hair was shaved from the skin that covers

surrounding area of the swollen. The area was again washed by using antiseptic solution (savlon) to remove any fall of hair (Figure 14A). Finally, surgical site was scrubbed with 1% povidone iodine in circular manner starting from the center to prefer. Then, the patient was transferred to the surgical table, intravenous fluid at a rate of @ 3 mL/kg/hr. was administered using 20 G IV cannula and made it ready for aseptic surgery.

Anesthesia and animal control: The bitch was controlled in dorsal recumbent position with the four leg was tied to the surgical table. The general anesthesia was used by administering xylazine @ 1.5mg/kg intramuscularly (IM) as premedication dose, and ketamine hydrochloride @ 5mg/kg and Dazepam @ 0.5 mg/kg as induction dose in single syringe intravenously (IV) and ketamine hydrochloride @ 5mg/kg and Dazepam @ 0.5 mg/kg as maintenance in single syringe intravenously (IV) through out surgical procedures. Then, surgical site was draped with sterile drape in single put and secured to the skin with towel forceps, and given a final scrub with 1% povidone iodine in circular manner starting from the center to prefer prior to proceeding to surgery.

Surgical procedures and techniques: An elliptical skin incision was made on the base of the swelling and advanced gently with blunt dissection by using mayo scissor (Figure 14B). After careful handling and blunt dissection of adjacent tissues, the skin, all tumorous mass, mammary tissue, and fat down to the rectus fascia was surgically excised (Figure 14C). However, the rectus fascia or its underlying muscle was not removed. During dissection, bleeding was managed by ligation of the caudal superficial epigastric artery and vein. In addition, applying pressure by using sterile gauze, different straight and curved hemostatic forceps was applied to stop bleeding. Then, the cavity was irrigated by using 1% povidone iodine, dusted with procaine penicillin powder and the skin flap was trimmed in order to achieve cosmetic wound appearance while suturing the wound edge (Figure 14D). Before skin closure, obliteration of dead space was made through continuous apposing sutures of subcutaneous tissue including the underlying tissues in continuous interlocking suture pattern with absorbable suture material (chromic catgut no. 2-0) to prevent accumulation of serosanguinous fluid (Figure 14E). Finally, the skin was closed with simple interrupted suture pattern using synthetic absorbable

suture material (vicryl no. 2). Lastly, the area was properly cleaned and dressed in a 1% povidone-iodine solution and the bitch was admitted home after full anesthetic recovery.



Figure 15: Mammary tumor and its management through unilateral mastectomy in bitch

(A) Prepared surgical site (B) On progression of making skin incision (C) The removed tumor mass (D) Dusting of the wound with procaine penicillin powder before closure (E) On progression of subcutaneous suturing (F) Appearance of the wound site on 5th days

Post-operative care and outcome: The wound was regularly cleaned by using antiseptic solution (savlon) and dressed with 1% Povidone iodine solution for five days daily. The

bitch was administered Fortified procaine penicillin (22,000 IU/kg) I.M for five days. The wound spray (cyclo spray) was applied on wound for five days daily (Figure 14F). The owner was also advised to follow the overall discomfort of animal and status of the wound and applying homemade collar to prevent self-mutilation of the wound. The bitch also dewormed by giving mebendazole 300mg bolus twice per day for three days. Finally, depending on the phone communication the owner brought his bitch on fifteen days post-surgery and checked that the wound was successfully healed and the health status of an animal is good.

Discussion

A tumor is an extraordinary mass of tissue resulting from autonomous, progressive, immoderate proliferation of body cells not included into normal tissue and exhibits varying degrees of fidelity to their precursors (Fesseha, 2020). Among many tumor occurring in dog, canine mammary neoplasms (CMNs) are second most commonly occurring tumors only next to skin tumors that account approximately 50% of all tumors in female dogs of which 40 to 50% are malignant (Gupta *et al.*, 2014). The development of mammary gland neoplasms are most commonly occur in intact bitches whose their mean of age are above 5 years old and are very rare in dogs less than 5 years of age (Dhami *et al.*, 2010; Han *et al.*, 2016 and Sharma *et al.*, 2018). However, the risk of development of mammary tumors in female dogs was dramatically decreased when the dog was Ovario-hysterectomized at or prior to first estrus, suggesting that sex hormone status is an important risk factor (Han *et al.*, 2016). This is in agreement with present case, where the age of animal was 10 years old and also not neutered.

According to the report of Kamiguchi *et al.* (2016) and Shahzamani *et al.* (2013) the most affected mammary gland was the inguinal one, followed by the caudal abdominal, which is in line with present case, where the cranial and caudal abdominal mammary gland was affected. However, the present case, is disagrees with the previous similar case report by Feseha (2020) stated that the caudal thoracic pairs of mammary glands was affected. In present case, diagnosis of the tumor mass can be performed based on location of the tumor, and size and consistency of the swelling trough palpation, and aspiration of its

contents to differentiate from the abscess, hernia, hematoma and cyst. This is agrees with the reports of Feseha (2020) stated that the locations of the tumor mass as well as its size, consistency, nature, and color of the contents will help in diagnosis and also for differential diagnosis of tumor mass from other body swelling. On other hand, in present case, for confirmatory diagnosis and to differentiate weather the tumor mass was benign or malignant the fine needle aspiration biopsy sample from the mass and lymph node was taken and cytological test was conducted (Annex 4A). This is in agreement with the report of Cassali et al. (2007); Gupta *et al.* (2014); Simon *et al.* (2009) and Sontas *et al.*, (2012) who stated that cytological examination for diagnosing of malignancy have a 77.14 - 96.5% of diagnostic accuracy, a 78.78 - 100% of sensitivity and 86 - 100% of specificity.

Even though there are different treatment methods, surgical excision is a treatment choice for canine mammary tumors (Fauzi *et al.*, 2018 and Gupta *et al.*, 2014). Based on the size of the tumor, its location, adherence and fixation to the underlying tissues, its possible extension through the lymphatic routes to regional lymph nodes, total number of lesions and the probability to achieve local tumor control there are several techniques in surgical removal of mammary gland tumor (Papazoglou *et al.*, 2014). These may include; regional mastectomy (Fauzi *et al.*, 2018 and Han *et al.*, 2016), unilateral mastectomy (Campos *et al.*, 2017; Fesseha, 2020 and Gupta *et al.*, 2014), bilateral mastectomy (Miyazaki *et al.*, 2018), and simple mastectomy (Gupta *et al.*, 2014; Han *et al.*, 2016 and Rajesh and Jyothi, 2018). This was in line with the current case report, where regional masectomy was performed by removing the left cranial and caudal abdominal mammary glands.

Dead space obliteration and management of tension in the incision line after mastectomy are the most important issues that need special attention. So, to reduce this challenge closure of the surgical wound can be accomplished by using various techniques (Papazoglou *et al.*, 2014). In present case, after completion of excision of the tumor mass the wound closure could be performed in two layers: deep sub-cutaneous tissues with continuous interlocking suture pattern and skin with simple interrupted suture pattern by using absorbable suture material. This is in agreement with previous similar case report by Fesseha (2020); Shahzamani *et al.* (2013); Rajesh and Jyothi (2018) and Sharma *et al.*

(2018) in terms of dead space obliteration and surgical wound management, whereas, in contrast with the report of Miyazaki *et al.* (2018) who used three layer wound closure.

To sum up that, canine mammary gland tumor is a common tumor in dog so that unilateral mastectomy followed by proper dead space management and follow-up is result an uneventful recovery without any reoccurrence. Therefore, treatment of mammary tumor including the adjacent mammary gland which was drained by the some lymph node and blood vessels should be better to prevent this disease in bitch.

3.9. Correction of Vaginal Prolapse in Holstein Friesian Crossbred Dairy Cow

Abstract

Vaginal prolapse is the most common problem presents in mature females during their last trimester of pregnancy; however, the condition is also seen in non-pregnant ewes and heifers. In present case, six years old of seven months pregnant multiparous Holstein Friesian crossbred dairy cow with a history of vaginal prolapse since the last 18 hours was presented to VTH. Physical examination of the case also revealed that hanged prolapsed mass with not swollen and edematized exposed vaginal wall. The prolapsed mass was repositioned after it was aseptically prepared under caudal epidural anesthesia. Following successful repositioning of the prolapsed mass a horizontal suture technique was applied parallel to vulva apart from the vagina beneath the skin. Therefore, early diagnosis and careful correction and management of vaginal prolapse should be save the cow from life-threatening condition.

Key words: *Caudal epidural anesthesia; Cow; Holstein Friesian; Vaginal prolapse*

Introduction

Vaginal prolapse is defined as a protrusion of part or the whole of the everted vaginal wall with/or without the cervix outside the female body through the vulva (Hassaneen, 2018). Vaginal prolapse is the most common problem presents in mature females during their last trimester of pregnancy; however, the condition is also seen in non-pregnant

ewes and heifers (Umesh *et al.*, 2016). Sometimes, it might be observed after parturition and seldom does it occur unconnected with pregnancy and parturition (Anil *et al.*, 2017). The first and foremost predisposing factor for vaginal prolapse is the combination of tissue relaxation as a result of hormonal changes, especially the increase of estrogen and the production of relaxin, which cause a relaxation of the pelvic ligaments and surrounding soft tissue structures and the increased intra-abdominal pressure caused by the pregnant uterus during the last trimester of pregnancy (Fesseha and Ayele, 2020; Selvaraju *et al.*, 2020 and Umesh *et al.*, 2016). In addition, hereditary factor in some breeds of cattle, intra-abdominal fat accumulation, large and multiple fetuses, forced extraction, rumen distension and dietary factors such as hypocalcemia due to it causes atony and foods containing estrogenic substance may also act as potential key factors for vaginal prolapse (Bhattacharyya *et al.*, 2012; Kumar *et al.*, 2018 and Patra *et al.*, 2015).

Three degrees of vaginal prolapse are described. Type I is mild to moderate eversion of the vaginal floor without a protrusion of vaginal tissue. Type II is prolapse of the cranial floor and lateral walls of the vagina via the vulvar lips, forming a tongue or pear-fashioned mass. Type III is prolapse of the complete vaginal circumference as a “doughnut”-formed mass with a lumen (Sarrafzadeh-Rezaei *et al.*, 2008). Vaginal prolapse is an emergency condition and it need special attention and immediate treatment before any trauma or laceration may occur in order to prompt recovery without any complication (Hasan *et al.*, 2017). So that various surgical (Fesseha and Ayele, 2020) and/or nonsurgical by using oestrogen (Gyimesi *et al.*, 2008 and Sarrafzadeh-Rezaei *et al.*, 2008) treatment techniques can be used to manage vaginal prolapse, but the success of treatment depends on the type of case, the duration of the case, the degree of damage and contamination (Umesh *et al.*, 2016 and Yotov *et al.*, 2013). Therefore, this case report describes the approach and surgical management of acute vaginal prolapse in a Holstein Friesian (HF) crossbred of dairy cow.

Case history and examination: A six years old, weighting 300 kg and 7 months pregnant multiparous (parity; n=2) Holstein Friesian (HF) crossbred dairy cow was presented to Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University, Ethiopia with a history of vaginal prolapse since the last 18 hours

(Figure 15A). Upon physical examination, it was noticed that the cow was in standing position and prolapsed mass was found to be hanging with exposed vaginal wall but, the prolapsed mass was not swollen and edematized. Animal was showing signs of discomfort, restlessness, continuous straining, off feed and water intake, hanging of whitish mucoid vaginal discharge and attempting of intermittent urination was evident. The clinical parameters such as: heart rate, respiratory rate, body temperature; and capillary refill time were recorded, and their measurement was in normal physiological ranges.

Pre-operative preparation of cow: After proper cow immobilization by using physical method in crush the prolapsed tissue was prepared aseptically by gently washing with normal saline solution in order to remove any dirty (foreign) material from prolapsed vaginal tissues.

Anesthesia and animal control: The cow was controlled in standing position in the well-built crush and the head was positioned straight forward by holding with bull holder. Caudal epidural anesthesia was performed by administering 2% lidocaine hydrochloride. The needle was inserted through the skin at the joint between sacrum and coccygeal bone (sacro-coccygeal). The depression formed by joint was easily identified by moving the tail up and down. At this point, the needle was inserted and checked by dropping small drop of anesthesia into the needle, and then drop was drawn into the joint without forming pop. Finally, 5 ml of local anesthetic (2% lidocaine hydrochloride) were injected.

Surgical procedures and techniques: The prolapsed mass was lifted upward above the level of ischial arch to release the retained urine and then washed with normal saline solution. The repositioning of the prolapsed mass was done by initially pushing the lateral walls and middle portion followed by roof of cervix and vagina. After repositioning, a horizontal suture technique, using sterile silk thread as a suture material, was applied parallel to vulva apart from the vagina beneath the skin to keep it in position (Figure 15B and C).



Figure 16: Vaginal prolapse and its correction in seven months pregnant dairy cow

(A) Clinical presentation of the case and prolapsed mass (B) On progression of putting horizontal suture pattern (C) After completion of prolapsed mass and suture

Post-operative care and outcome: The cow was kept on antibiotic (Pen and Strep, 5 gm/kg, I.V.), and Diclofenac sulfate (2 mg/kg, IM) for 3 successive days. The owner was advised to manage the cow on inclined surface in barn to prevent recurrence. During the

follow-up of the cow, no complications on the vulvar area were noticed. The follow up was continuous through phone communication and the owner was ordered to bring the cow after one month and then the status of cows and the fetous was checked. As information obtained from the owner the cow was strained attempt to push out the repositioned prolapsed vaginal mass. Therefore, suture was decided so as to retain until parturition to hold the prolapsed mass in position. The owner was advised to cull the cow after a given birth.

Discussion

Vaginal prolapse in ruminants mainly appear at last trimester of gestation, which is considered as an emergency maternal disorder that needs immediate attention before any further complication should occur (Hasan *et al.*, 2017). Vaginal prolapse should be treated as early as possible, because delaying might lead to excessive edema, mucosal trauma, contamination, tear and fatal hemorrhage (Fesseha and Kidanemariam, 2020; Fesseha and Ayele, 2020 and Hasan *et al.*, 2017). This is in agreement with present case, where the case was presented 18 hours after the prolapse was evident and managed as early as possible. According to the study conducted by Bhattacharyya *et al.*, (2012) vaginal prolapse is mostly occurs in multiparous animal than heifers with the rate of 90.48% and 9.52% in multiparous and heifers, respectively. This is in agreement with present case, where the case was occurred in cow with second parity. In present case report, vaginal prolapse was occurred at first month of third trimester's period. This is agrees with previous similar cases report by Fesseha and Ayele, (2020); Hasan *et al.*, (2017); Hassaneen, (2018) and Umesh *et al.*, (2016) in terms time where the prolapse was occurred. However, the present case, was disagrees with the report of Anil *et al.*, (2017) where the prolapse was occurred after 6 hours of parturition.

At third trimester's period of pregnancy the cow was predisposed to vaginal prolapse due to many factors. Among that the combination effect arising from an increment of estrogens levels with the production of relaxin and low progesterone that led to relaxation of the pelvic ligaments and surrounding soft tissue structures is one factor (Kurpinska and Skrzypcza, 2019). The other factor which play key role in the occurrence of vaginal

prolapse is increments of intra-abdominal pressure caused by the pregnant uterus (Umesh *et al.*, 2016) and sudden change in feeding habit (Hasan *et al.*, 2017). In addition, poor quality forage; hypocalcaemia; high estrogenic-content foodstuffs, such as legumes, maize, barley and soybean meal are a dietary factors which involved in vaginal prolapse (Miesner and Anderson, 2008). In this case report, high intra-abdominal pressure was recorded which may due to feeding of maize, which is high estrogen contain feedstuff and change in feeding habit.

In present case, the prolapsed mass was managed by washing with normal saline and prolapsed mass was lubricated with diluted savlon and gently repositioned into the pelvic cavity. This is in agreement with Patra *et al.*, (2015), Patra *et al.*, (2014) and Yotov *et al.*, (2013) in terms of using normal saline solution to wash the prolapsed mass, whereas, disagrees with the report of Anil *et al.*, (2017), Hasan *et al.*, (2017) and Umesh *et al.*, (2016) in terms of using potassium permanganate solution to wash the prolapsed mass instead of normal saline solution. After repositioning of the prolapsed mass into normal anatomical position the modified Bhuner's suture technique by using infusion set tubing (Bhattacharyya *et al.*, 2012), sterile cotton thread (Fesseha and Ayele, 2020 and Patra *et al.*, 2014), Jimat (Fesseha and Kidanemariam, 2020), sterile gauzed tape (Yotov *et al.*, 2013), and rope truss (Hasan *et al.*, 2017 and Umesh *et al.*, 2016) as suture material is found to be the most successful technique for preventing further recurrence. This is disagrees with the present case, where the vertical suture technique by passing through the holes created on the vertically placed "quills" made from locally available material that is highland plastics was used, whereas, agrees with Patra *et al.*, (2015) in terms of using silk (No.2) as suture material.

To conclude that since vaginal prolapse mainly appears at last trimester of gestation daily follow up and diagnosis of pregnant cow is very important task. If it occurred emergency treatment is good because delayed in correction may cause some critical condition such as edema, fibrosis, necrosis, septicemia, myiasis. So the farmers and veterinarian should have to give careful attention to early diagnosis and correction of vaginal prolapse for good recovery and save the cow from life-threatening condition.

3.10. Surgical Management of Eye in Diferent Animals

Introduction

The eye is one of the sense organ, which contains eyeball, optic nerve, and associated structures such as eyelids, conjunctiva, orbital fascia, muscles and lacrimal apparatus and located in the orbital cavity of the skull (Sharma *et al.*, 2012). Ocular disease and injury as a result of tumours, accidents or gore injuries remain a common occurrence in ruminants (Kamalakar *et al.*, 2014). Acquired ocular disease occurs at at a higher prevalence than congenital ailment because injuries may also occur due to direct or indirect trauma to the ocular which can result varies degree of injury that can range from a simple contusion or an abrasion of the skin in the orbital region to the fracture of the orbit (Das *et al.*, 2008).

In many instances, medical management is sufficient for the resolution and amelioration of clinical signs of eye affections (Ali *et al.*, 2015 ad Kamalakar *et al.*, 2014). However, surgical treatment such as enucleation or exenteration is indicated in severe cases of ocular disease (Kamalakar *et al.*, 2014). Exenteration refers to the surgical removal of the entire contents of the orbit: globe, muscle, adipose tissue and the lacrimal gland, whereas enucleation refers to removal of the ocular globe, leaving behind muscle and adipose tissue following transection of the ocular muscles and optic nerve (Chigerwe *et al.*, 2017 and Potter, 2007). Therefore, the objectives of the present case is to briefly describe the surgical management of ocular injuries by enucleation and exenteration of two cases, of which, a ewe suffering from eviscerated of the eye ball due to Hyena bite and a cow suffering from chronic glaucoma leading to continuous epiphora.

3.10. 1. Enucleation of eviscerated eye ball due to hyena bite in ewe

Abstract

Enucleation involves the removal of the globe, leaving behind muscle and adipose tissue as dictated by the specific disease process and desired outcome. In present case, a five years old ewe was presented to VTH, following a hyena bite over the right side of the

head and eye before 16 hours. On clinical and physical examination the traumatized eye was characterized by eviscerated and hanged of eye ball out of the orbital cavity with black discoloration of the hanged mass and surround area. The hanged mass was surgically removed through enucleation under peterson's nerve block. Skin sutures were removed on fifteenth post-operative day and uneventful recovery was noticed. Therefore, enucleation is best and cost effective surgical treatment technique for animals and clients to repair irreparable traumatized eye with proper post-operative care and strict follow up.

Key words: *Ewe; Enucleation; Hyena bite; Peterson's nerve block*

Case history and examination: A five years old ewe weighing 16 kg was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University, following a hyena bite over the right side of the head and eye (Figure 16A) 16 hours before admitted. The ewe was traumatized multiple area between the ear and eye in the form of puncture of the skin including the dermis, fascia and parts of muscle of temporal part of the skull and it was fresh. And also the eye was traumatized and the eye ball was eviscerated and hanged out of the orbital cavity. The clinical parameters such as: heart rate, respiratory rate, body temperature; capillary refill time, body weight and age were recorded. Measurement of vital sign and all were within range of physiological limit. Physical examination revealed normal body condition with shiny hair coat up on observation while at motion and rest. Depending clinical examination the case was diagnosed as irreparable ocular trauma with the loss of globe and was managed as surgical enucleation of the eye.

Pre-operative preparation of the ewe: After physical restraining and stabilizing of the ewe the area surrounding the periphery of the wound and the affected eye was prepared aseptically by washing with soap and tap water. The hair was shaved from the skin that covers area surrounding the periphery of the wound and eye lid (Figure 16B). Then, the area was again washed by using antiseptic solution (savlon) to remove any fall of hair. Finally, shaved area was scrubbed with 1% povidone iodine in circular manner starting from the center to periphery and made it ready for aseptic eye enucleation.

Anesthesia and animal control: The ewe was controlled in lateral recumbent position with the affected eye was right up. Peterson nerve block was performed by administering 2% lidocaine hydrochloride to desensitize the globe. The needle was inserted through the skin at the orbitotudum foramen (Figure 16C). At this point, the needle was inserted and checked by dropping small drop of anesthesia into the needle, and then drop was drawn into the joint without forming pop. Finally, 5 ml of local anesthetic (2% lidocaine hydrochloride) were injected. In addition, to desensitize the lower and upper eyelid aurocculopalpebral nerve by depositing of 2% lidocaine hydrochloride mid-way between the base of the ear and lower border of the lateral canthus of the eye and lacrimal branches of supra-orbital nerve blocks were performed respectively. Then, surgical site was draped with sterile drape in single put and secured to the skin with towel forceps, and given a final scrub with 1% povidone iodine in circular manner starting from the center to prefer prior to proceeding to surgery.

Surgical procedures and techniques: After surgical site was prepared aseptically and appropriated analgesia the patient was transferred to surgical table and draped. Before starting to surgical incision temporary tarsorrhaphy was made by suturing together the palpebral borders of the lower and upper eyelids with simple continuous suture by using non-absorbable suture material. Then, an elliptical incision on upper and lower eyelids was made without opening into the conjunctival sac. Dissection was advanced towards the orbital rim through blunt dissection of subcutaneous tissues by using curved Metzenbam scissors. Simple pressures by swabbing, ligation and twisting of blood vessel with heamostatic forceps was performed depending on the size of blood vessel and amount of blood oozing out to control hemorrhage and obtain a very clean surgical field. The extra ocular muscles were severed close to the globe by using curved Metzenbam scissors. A curved artery forceps was applied on the optic nerve and blood vessels to control hemorrhage. Severing of the globe was performed anterior to the placed forceps by leaving orbital contents behind. Then, the orbital cavity was packed with sterile gauze to control bleeding. Finally, the skin edges were sutured by apposition sutures leaving a small gap at the inner commissure (medial canthus) for removal of gauze packed next day (Fig. 16D).



Figure 17: Eviscerated eye ball and its management through eye enucleation in ewe

(A) Clinical presentation of the case and appearance of traumatized eye (B) On progression of surgical site preparation (C) Peterson nerve block and injection of lidocaine (D) Completion of eye enucleation

Post-operative care and outcome: Post-operative treatment included administration of Fortified procaine penicillin (22,000 mg/kg) through I.M. for five days. The owner was also advised to avoid leaving the ewe in the yard with the flock after eye enucleation but advised to supplement good nutrition to facilitate wound healing. The wound was regularly cleaned by using savlon and dressed by 1% Povidone iodine solution and then

5% iodine tincture soaked gauze was changed daily by reducing the size of soaked gauze into the cavity and applying superficially wound spray (cyclo spray) for five days daily. Finally, skin sutures were removed on fifteenth post-operative day and uneventful recovery was noticed.

Discussion

Enucleation involves the removal of the globe by leaving behind muscle and adipose tissue as dictated by the specific disease process and desired outcome (Potter, 2007). A painful blind eye; ocular neoplasia; intense corneal or intra-ocular infection; and ocular trauma not amenable to surgical restore are the main indications for enucleation of eye (Kamalakar *et al.*, 2014 and Schulz and Anderson, 2010). This is in agreement with the present case, where an irreparable ocular trauma due to hyena bite was managed through eye enucleation. According to reports of retrospective study conducted by Addis and Megra, (2017) the common anatomical site bitten by hyena was thigh and perianal muscles area this might be due to quantity and quality of muscle, whereas, limbs was unlikely to be bitten by hyena. This disagrees with present case, where the hyena was bite the on the head region and causes the unilateral eye trauma that was not resolved through medical management.

Enucleation is frequently performed in the standing position under local anaesthetic, which requires proper restraint of the animal, with adequate facilities for head restraint to allow it to be immobilized during the procedure (Potter, 2007). However, in present case, the surgical procedures was conducted in lateral recumbent position with affected side was up sided under Peterson eye block with 2% lidocaine hydrochloride with sedation by using xylazine. The most common complications encountered after eye enucleation includes simple incisional and orbital infection, suture dehiscence, infection of peri orbital tissue and pruritis. Since care was taken during surgery in present case, such complications were not encountered. As post-operative care in present case, administration of analgesic (diclofenac sulfate @ 2 mg/kg body weight) and antibiotic (procaine penicillin G @ 220,000 IU/kg body weight was given for five days. This is in agreement with the previous case report by Sharma *et al.*, (2012) who used procaine

penicillin and streptomycin @ 11,000 IU per kg bodyweight along with meloxicam 0.3 mg per kg body weight once daily for 5 days.

To conclude that, enucleation of eye is remains a feasible and simple option of treatment to resolve painful blind eye; ocular neoplasia; severe corneal or intra-ocular infection; and ocular trauma not amenable to surgical repair. Enucleation can be performed with routine restraint under local anesthesia and surgical equipment at minimal cost to the client and uneventful result was noticed. Therefore, enucleation is best and cost effective surgical treatment technique for animals and clients to repair irreparable traumatized eye with proper post-operative care and strict follow up.

3.10. 2. Exentration of eye in cow suffering from chronic glaucoma

Abstract

Exentration refers to the surgical removal of the entire contents of the orbit to alleviate traumatic and painful ophthalmic conditions that further damage the tissue, particularly when restoration of the vision is not possible by conservative treatments. In present case, a nine years old cow was presented to VTH, following a continuous flow of tear from left side of the eye. Up on clinical and physical examination there was continuous flow of tear, cloudiness of the cornea and loss vision and the case was diagnosed as chronic glaucoma that leads to continuous flow of tear (epiphora) with the loss of vision. The condition was managed by surgical removal of the eye through exentration after surgical site was aseptically prepared under Retro-bulbar nerve block. Swelling was noticed at surgical site for few days of post intervention. Skin sutures were removed on fifteenth post-operative day and uneventful recovery was noticed. Therefore, the successful outcome of this case suggests that radical exentration of the orbit is a viable alternate to alleviate the discomfort of the animal the condition and hasten the recovery.

Key words: *Cow; Chronic glaucoma; Exentration; Retro-bulbar nerve block*

Case history and examination: A nine years old cow weighing 250 kg was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture,

Addis Ababa University, following a continuous flow of tear from left side of the eye (Figure 17A). Based up on the whole physical and clinical examination gentamycin eye drops was prescribed and treated for one week. The cow was showed some change and the flow of tear also decreased but cow was not totally recovered from the problem. After four months of the treatment the owner again brought his cow with the some chief of complaint. Based up on physical examination there was continuous flow of tear, cloudiness of the cornea and loss vision. The clinical parameters such as: heart rate, respiratory rate, body temperature; capillary refill time, body weight and age were recorded. Measurement of vital sign and all were within range of physiological limit. Depending up physical and clinical examination the case was diagnosed as chronic glaucoma that leads to continuous flow of tear (epiphora) with the loss of vision and was managed as surgically by eye exentration.

Pre-operative preparation of the cow: After physical restraining and stabilizing of the animal the area surrounding the periphery of the affected eye and eye lid was prepared aseptically by washing with soap and tap water. The hair was shaved from the skin that covers area surrounding the periphery of the wound and eye lid. Then, the area was again washed by using antiseptic solution (savlon) to remove any fall of hair (Figure 17B). Finally, shaved area was scrubbed with 1% povidone iodine in circular manner starting from the center to prefer and made it ready for aseptic eye enucleation.

Anesthesia and animal control: The cow was controlled in standing position in the well-built crush and the head was positioned straight forward by holding with bull holder. Retro-bulbar nerve block was performed by administering 2% lidocaine hydrochloride using an 18-gauge needle at four points. The needle was inserted through the skin at four points such as medial, lateral, dorsal and ventral canthus of the eye in between orbital rim and eye ball. At these four points, the needle was inserted and aspirated in order to check whether the needle was in blood vessels or not. Finally, 2 ml of local anesthetic (2% lidocaine hydrochloride) were deposited at each point. In addition, to desensitize the lower and upper eyelid aurocculopalpebral nerve by depositing of 2% lidocaine hydrochloride mid-way between the base of the ear and lower border of the lateral

canthus of the eye and lacrimal branches of supra-orbital nerve blocks were performed respectively.



Figure 18: Surgical exenteration of eye due to chronic glaucoma in cow

(A) Clinical presentation of the case and arrow indicate discolored of skin due to the flow of tear (B) On progression of surgical site preparation (C) Putting temporarily tarsorrhaphy (D) Making an elliptical incision on the eye lid (E) Applying gauze pressure (F) On progression of closing of margin of eye lid

Surgical procedures and techniques: After surgical site was prepared aseptically and appropriated analgesia was achieved temporary tarsorrhaphy was made by suturing

together the palpebral borders of the lower and upper eyelids with simple continuous suture pattern by using non-absorbable suture material (Figure 17C). Then, an elliptical incision on upper and lower eyelids was made without opening into the conjunctival sac (Figure 17D). Dissection was advanced towards the orbital rim through blunt dissection of subcutaneous tissues by using curved Metzenbam scissors. Simple pressures by gauze (Figure 17E), ligation and twisting of blood vessel with heamostatic forceps was performed depending on the size of blood vessel and amount of blood oozing out to control hemorrhage and obtain a very clean surgical field. The extra ocular muscles were severed bluntly and detached close to the orbital rim by using curved Metzenbam scissors. A curved artery forceps was applied on the optic nerve and blood vessels to control hemorrhage. The globe was cut anterior to the placed forceps by removing all contents of orbital cavity and leaving an empty cavity behind. Then, the orbital cavity was packed with sterile gauze soaked in 1% povidone iodine to control bleeding and refilling of the cavity. Skin edges were sutured by using simple interrupted suture pattern with non-absorbable suture materials by leaving a small gap at the inner commissure (medial canthus) for changing of packed gauze and medication during post-operative care (Figure 17F).

Post-operative Care and outcome: The owner was advised to supplement good nutrition to facilitate wound healing. Post-operative treatment included administration of Fortified procaine penicillin (22,000 mg/kg) through I.M. for five days of post-operation. On the 3rd days of follow up the surgical site was swelled (Figure 18A) and the cow was treated additionally with dexamethasone 2mg/kg through IM for three days. The wound was regularly cleaned by using savlon and dressed by 1% Povidone iodine solution and then 5% iodine tincture soaked gauze was changed daily by reducing the size of soaked gauze into the cavity and applying superficially wound spray (cyclo spray) for five days daily (Figure 18B). Finally, skin sutures were removed on fifteenth post-operative day and uneventful recovery was noticed (Figure 18C).



Figure 19: Post-operative care and follow up

(A) Swelling of wound site on 3rd days of follow up (B) Wound on satisfactory result and regression of the swelling on 5th days of follow up (C) Healing of the wound and removal of suture on 15th days of follow up

Discussion

Exenteration refers to the surgical removal of the entire contents of the orbit to alleviate traumatic and painful ophthalmic conditions that further damage the tissue, particularly when restoration of the vision is not possible by conservative treatments (Sharma *et al.*, 2012). Indications for exenteration include chronic endophthalmitis or panophthalmitis leading to blindness in the affected eye, chronic glaucoma leading to buphthalmia and associated retinal and optic nerve damage, intraocular neoplasms where intraocular surgery is not feasible, trauma or proptosis of the globe leading to irreversible damage of the eye and intraocular contents (Ali *et al.*, 2017; Chigerwe *et al.*, 2017; Potter, 2007 and

Schulz and Anderson, 2010). This is agrees with the present case, where epiphora due to chronic glaucoma that leading to buphthalmia was encountered.

Extirpation of eye in cattle is mostly performed in the standing position with regional anesthesia (Akbaş *et al.*, 2021; Reddy *et al.*, 2017). However, in present case, surgical procedures were under taken in cow with lateral recumbent position. Retrobulbar block allows diffusion of the local anesthetic agent to block sensory innervation to the eye and orbit and motor innervation to the extraocular muscles (Pearce *et al.*, 2003). This argument was in agreement with present case, where regional nerve block of the eye was conducted through retrobulbar nerve block by depositing of 2% lignocaine hydrochloride at four points through the skin on the dorsal, lateral, ventral and medial aspects of the eye, auriculopalpebral nerve block and linear infiltration at the site of incision after sedation of cow was achieved through administration of 2% Xylazine hydrochloride, This is also in agreement with the previous case report by Ali *et al.* (2015); Akbaş *et al.* (2021); Kamalakar *et al.* (2014); Ozmen *et al.* (2016) and Sharma *et al.* (2012) in terms of using anesthetic techniques, whereas; disagreement with the reports of Reddy *et al.*, (2017) who used auriculo palpebral nerve block and Gautam *et al.* (2016) who used Peterson's nerve block to achieve desensitization of motor and sensory nerves of the orbit and surrounding tissues.

The retrospective study conducted on 115 case of transpalpebral exenteration in cattle by Chigerwe *et al.* (2017) stated that out of 99 cases were their anesthetic technique was reported 92 cases were performed under regional anesthesia alone without any complications while 7 cases were performed under combination of general and regional anesthesia. However, the study conducted on the comparison of retrobulbar and Peterson anesthetic techniques of the eye by Pearce *et al.* (2003) stated that the retrobulbar technique was considered successful in all heads with ananesthetic complication of orbital hemorrhage, penetration of the globe, optic nerve injury, and acute death following injection into the optic nerve meninges, but the Peterson technique was successful in less than half of the treated heads with ananesthetic complication of accidental injection of anesthetic into the ethmoid turbinates. In the present study, since a retrobulbar nerve block for sensory and motor blockade of the orbit and surrounding

tissues was used there were no local anesthetic complications were noted (Schulz and Anderson, 2010).

In conclusion, this case report stated that the successful exentration of eye due to epiphora along with total loss of vision as a result of chronic glaucoma that is unresponsive to the conservative topical treatments. The successful outcome of this case suggests that radical exenetration of the orbit is a viable alternate to alleviate the discomfort of the animal and hasten the recovery.

3.11. Surgical Management of Testicle and Scrotum Injury

3.11.1. Surgical management of orchitis and vaginocoele due to trauma in ram

Abstract

Scrotal enlargement is commonly caused due to protrusion of abdominal organs through an enlarged inguinal ring into the scrotum or fluid accumulation within the vaginal cavity and it is either unilateral or bilateral. In present case, an indigenious breed ram ageing around 1.2 years affected with swelling of right testicle was presented to VTH. Up on clinical and physical examination there was enlarged, hard and fluctuating of right testis. Aseptic needle aspiration of right testicle was also dictated that straw colored fluid in the needle and then, the case was diagnosed as unilateral orchitis along with hydrocele. Total scrotum and testis ablation was performed after aseptic surgical site preparation under caudal epidural anesthesia, and the ram was recovered uneventful without any post-operative complication within fifteenth post-operative day. Therefore, total ablation is the best method for management of severe complications like scrotal necrosis and hydrocele due to severe trauma of testicles.

Key words: *Ablation of testis; Caudal pidural anesthesia; Orchitis; Ram*

Introduction

In small ruminants there are numerous testicular and scrotal diseases consisting of: varicoceles, epididymitis, orchitis, sperm granulomas, testicular hypoplasia and

degeneration and cryptorchidism (Malbrue and Zorilla, 2018). Orchitis is inflammation of the testicle, with or without infection (Sambo *et al.*, 2019 and Trojian *et al.*, 2009) and it is usually occurred due to hematogenous spread of disease causing microorganism, especially bacteria but in rare cases may be due to puncture wounds through the scrotum. Occasionally, traumatic testicular rupture may occur and is diagnosed by an amorphous clot-like consistency by palpation (Wolfe, 2015). Inflammation of the testicles might be unilateral or bilateral; although unilateral orchitis seem extra common the animals may be substantially infertile. The occurrence of orchitis may be acute or chronic. The acute stage is characterized by enlargement, heat, pain, and swelling of the affected testicles and epididymis, while, in chronic orchitis, there is reduced testicular size, mobility and induration of testicular tissues (Sambo *et al.*, 2019).

On other hand, trauma to the scrotum may additionally produce hematocele (hemorrhage into the vaginal hollow space) or hydrocele (accumulation of inflammatory exudate or transudate in vaginal hollow space) (Heath *et al.*, 1998). Hydrocele (vaginocele) is peculiar series of serous fluid among the visceral and parietal layer of tunica vaginalis which accompanied with neoplasm, ascitis and orchitis (Dalal *et al.*, 2017). But in the normal scrotum, 1–2 mL of serous fluid may be discovered in the potential tunica vaginalis hollow space and have to no longer be mistaken for hydrocele (Patil *et al.*, 2015). Swelling of the wall of the scrotum can usually be differentiated from different causes of scrotal growth by way of palpation of the thickened scrotal skin, presence of pitting edema, with confirmation by ultrasound (Wolfe, 2015). Therefore, in present case both bilateral orchietomy and scrotal ablation were used (Dalal *et al.*, 2017; Kamalakar *et al.*, 2014 and Yadav *et al.*, 2019).

Case history and examination: An indigenous breed ram ageing around 1.2 years and weighing 16 kg, affected with swelling of right testicle was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University. Feed and water intake were normal. There was abduction of hind limb and ram was unwilling to move. History revealed that previously the ram was treated with analgesic and antibiotics at home by calling woreda animal health worker but failed to ameliorate the condition. Up on palpation, right testis was enlarged, hard and fluctuating.

On aseptic needle aspiration of right testicle, straw colored fluid came out with pressure. So, the case was diagnosed as unilateral orchitis along with hydrocele and decision was made to manage the case through orchiectomy.

Pre-operative preparation of the ram: The ram was restrained and stabilized physically on the ground by an assistant. Then, the skin surrounding the both testicle were prepared aseptically by washing with soap and tap water. The hair was shaved from the skin that covers the testicles. Then, the area was again washed by using antiseptic solution (savlon) to remove any fall of hair. Then, the ram was transferred to surgical table and the area was draped with single put to prevent any contamination from surgical site. Finally, shaved area was scrubbed with 1% povidone iodine in circular manner starting from the center to prefer and made it ready for aseptic orchiectomy and scrotal ablation (Figure 19A).

Anesthesia and animal control: The ram was controlled in dorsal recumbancy with slight tilt to lateral position on the surgical table and the head was positioned straight forward by assistant. Caudal epidural anesthesia was performed by administering 2% lidocaine hydrochloride. The needle was inserted through the skin at the joint between sacrum and coccygeal bone (sacro-coccygeal). The depression formed by joint is easily identified by moving the tail up and down. At this point, the needle was inserted and checked by dropping small drop of anesthesia into the needle, and then drop was drawn into the joint without forming pop. Finally, 3 ml of local anesthetic (2% lidocaine hydrochloride) were injected. Additionally, the ram was received dexamethasone 2mg/kg through IM. Then, surgical site was draped with sterile drape in single put and secured to the skin with towel forceps, and given a final scrub with 1% povidone iodine in circular manner starting from the center to prefer prior to proceeding to surgery.

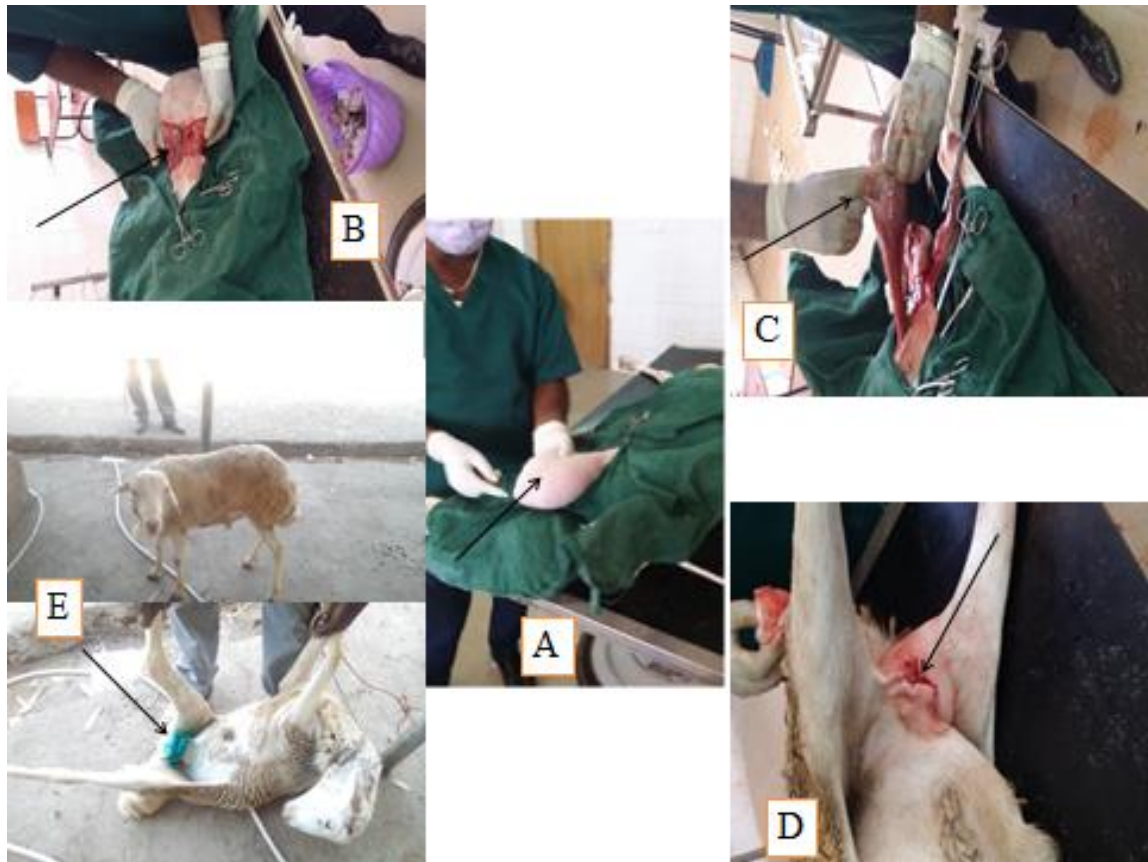


Figure 20: Surgical ablation of testis and scrotum due to orchitis and hydrocele in ram

(A) Appearance of swollen testicle and surgical prepared site (B) Circular skin incision on the scrotum (C) Making an incision on parietal vaginal tunic and drainage of accumulated fluid (D) Appearance of the wound after completion of total scrotum and testis ablation (E) Appearance of the wound site on 3rd days of follow up and observation of the ram at standing

Surgical procedures and techniques: A circular skin incision was made on the middle of the scrotum (Figure 19B). The subcutaneous tissue was incised in the same line and both testicles were displaced cranially from the scrotum to the incision. The next tissue layer encountered was spermatic fascia and carefully incised and then, the white, glistening, parietal tunic overlying the testicle was exposed. Pressure was maintained on the testicle to keep it in the incision. A hemostatic forceps was placed on the ligament of the tail of the epididymis and it was transected and ligated with synthetic absorbable material

(vincryl 2-0) to allow further extraction of the tunic-covered testicle and spermatic cord. Parietal tunic was incised and the accumulated fluid was drained (Figure 19C). Up on completion of fluid drainage, the testicle was extracted from the enveloping parietal tunic by applying pressure on it. Three hemostatic forceps were placed on the pampiniform plexus and other structures of the spermatic cord and then, testicle was removed by cutting in between the middle and the one closest to the testicle forceps. Then, two separate circumferential ligatures were placed on the stump of the spermatic cord, one beneath the middle forceps and the second beneath the most distal forceps. After completion of ligatures the forceps were removed, and the stump of the cord checked for any bleeding. The opposite testicle was brought to the incision and removed in the same manner. The vaginal tunic and subcutaneous tissue was sutured with simple interrupted suture pattern by using chromic catgut 2-0 and skin was remaining unclosed. Finally, surgical site was cleaned dressed by using 1% povidone iodine (Figure 19D).

Post-operative care and outcome: Post-operative treatment included administration of Fortified procaine penicillin @ 220,000 IU/kg body weight through I.M. for five post-operation. Additionally, the ram was also treated with dexamethasone 2mg/kg through I.M for three days. The owner was also advised to avoid leaving the ram in the yard with the flock until the wound was completely healed and also supplement good nutrition to facilitate wound healing. The wound was regularly cleaned by using savlon and dressed by 1% Povidone iodine solution and applying superficially wound spray (cyclo spray) for five days daily (Figure 19E).

Discussion

Scrotal enlargement is either unilateral or bilateral and caused by a variety of conditions but the common cause is either protrusion of abdominal organs through an enlarged inguinal ring into the scrotum (Radišić *et al.*, 2010) or fluid accumulation within the vaginal cavity (Wolfe, 2014). This is in agreement with the present case, where the enlargement of scrotum was occurred as a result of fluid accumulation in vaginal cavity and that was unilateral. Accumulation of fluid in vaginal cavity is commonly associated with ascitis, intestinal oedema (Dalal *et al.*, 2017) and trauma that can damage the tubular

integrity of the testicle or epididymis, which may lead to an autoimmune reaction due to the extravagated haploid sperm that produce granulomatous reactions (Wolfe, 2014). Similarly, in present case, development of hydrocele might have been due to traumatic injury accompanied with autoimmune reaction.

There are several methods of castration in domestic animals depending on their pros and cons; however, in current case, an invasive technique such as the incisional orchiectomy and scrotal ablation was used to manage the encountered case. This is in agreement with the previous case report by Malbrue and Zorilla, (2018) in terms of case management. According to Yadav *et al.*, (2019) reports orchiectomy and scrotal ablation can be done under light sedation with diazepam and local infiltration of 2% lignocaine hydrochloride in scrotum layer wise. This agrees with present case, where the case was managed through orchiectomy and scrotal ablation, whereas; the case was disagrees in terms of using anesthetic techniques, which was used the lower epidural anesthesia by using 2% lignocaine hydrochloride along with sedation by using xylazine. In present case, after proper total ablation of testicles along with scrotum, subcutaneous tissue was sutured with chromic catgut no. 2 by interrupted suture. This is in agreement with previous report of (Yadav *et al.*, 2019) in terms of subcutaneous tissue suturing and using suture material. However, there was disagreement on skin closure since the skin was left without suturing in present case.

According to the research conducted by Stilwell *et al.*, (2008) and Price and Nolan, (2001) on calf and lamb castration, respectively administration of non-steroidal anti-inflammatory drugs (Carprofen) along with local anaesthetic agents significantly prevents the delayed cortisol response and the pain associated with inflammation. This agrees with present case report, where administering dexamethasone @ 2mg/kg through IM was achieved during operation and as post-operative analgesia. This is also in agreement with the report of Kamalakar *et al.*, (2015); Wolfe, (2014) and Yadav *et al.*, (2019) in terms of using analgesia as post-operative care. It is concluded that one of the cause of scrotal swelling in ram is accumulation of fluid in vaginal cavity as a result of trauma was presented and successfully managed through total ablation of scrotum. Therefore, total

ablation is the best method for management of severe complications like scrotal necrosis and hydrocele due to severe trauma of testicles.

3.11.2. Orchiectomy of scirrhou cord due to traditional castration in bullock

Abstract

Permanent treatments of scrotal conditions are requiring the attention of the surgeons because it was affected by various conditions. In present case, a local breed bullock aging around 4 years, affected with swollen and perforated scrotal skin at the tip of left testicle, and protrusion of testis through the opening was presented to VTH following traditional castration method performed by hitting at the neck and tip of testicles using hammer one month ago. Up on clinical and physical examination there was enlarged, hard and protrusion of left testis through the opening of scrotal skin was revealed and then, the case was diagnosed as scirrhou cord. Orchiectomy was conducted under ring block anesthesia after aseptic surgical site preparation and the bullock was recovered uneventful without any post-operative complication within fifteenth post-operative day. Therefore, orchiectomy is the only method requiring for management of severely traumatized and damage of testicles with proper post-operative care.

Key words: *Bullock; Orchiectomy; Scirrhou cord*

Introduction

The castration of male cattle is considered to be a common practice for beef production in many countries since it decreases the management problems associated with aggressive and sexual behavior (Fisher *et al.*, 2001). it is also a tool used to improve meat quality in livestock species such as pigs, sheep, and cattle (Needham *et al.*, 2017) because meat from steers is often of a more consistent quality than that from bulls, due to a lesser occurrence of dark-cutting and high pH meat (Coetzee *et al.*, 2010). Castration in cattle may be performed using a variety of techniques, including rubber rings, surgical methods and the burdizzo procedure (Chakrabarti *et al.*, 2019; Fisher *et al.*, 2001 and Needham *et al.*, 2017). Burdizzo method as the best practice as compared to Elastrator or Banding

method and short testicles method (Nsoso *et al.*, 2004) but may result in different experiences of pain when done without appropriate anesthesia and analgesia (Needham *et al.*, 2017).

Despite the fact that all method of castration procedures have its own advantage, may lead to complications like orchitis and hydrocele (Kamalakar *et al.*, 2014), pyocele (Sagar *et al.*, 2010), scrotal necrosis (Yadav *et al.*, 2019) and inguinal hernia, torsion of spermatic cord and scirrhus cord (Kamalakar *et al.*, 2015) when they are used improper ways. Therefore, the present cases briefly describe scirrhus cord due to traditional castration by animal owner at his home by hitting at the tip of testicle using hammer application.

Case history and examination: A local breed bullock aged 4 years with a history of traditional castration method performed by hitting at the neck and tip of testicles using hammer one month ago. Following castration, the scrotal sac appeared swollen, scrotal skin holed at the tip of left testicle, and protrusion of testis through the opening of scrotal skin was presented to the Veterinary Teaching Hospital of College of Veterinary Medicine and Agriculture, Addis Ababa University. Up on physical examination scrotal sac and its contents were hard, and the scrotum was traumatized and left testis was protruded through trauma (Figure 20A) and also there was pain on palpation. As both the testicles were necrosed along with the spermatic cord, it was decided to perform orchiectomy.

Pre-operative preparation of the bullock: The bullock was restrained and stabilized physically on the ground using robe by an assistant. Then, the scrotum was prepared aseptically by washing with soap and tap water. The hair was shaved from the skin that covers the scrotum. Then, the area was again washed by using antiseptic solution (savlon) to remove any fall of hair. Finally, shaved area was scrubbed with 1% povidone iodine in circular manner starting from the center to periphery and made it ready for aseptic orchiectomy.

Anesthesia and animal control: The bullock was controlled in right lateral recumbancy on the ground with securing four legs together and the scrotum was pulled out for easy maneuverability. Local analgesia was achieved by ring block using 2% lidocaine hydrochloride and sedation was achieved by using intramuscular injection of Xylazine hydrochloride @ 0.01 mg/ kg. Then, a final scrub with 1% povidone iodine was given in circular manner starting from the center to prefer prior to proceeding to surgery.

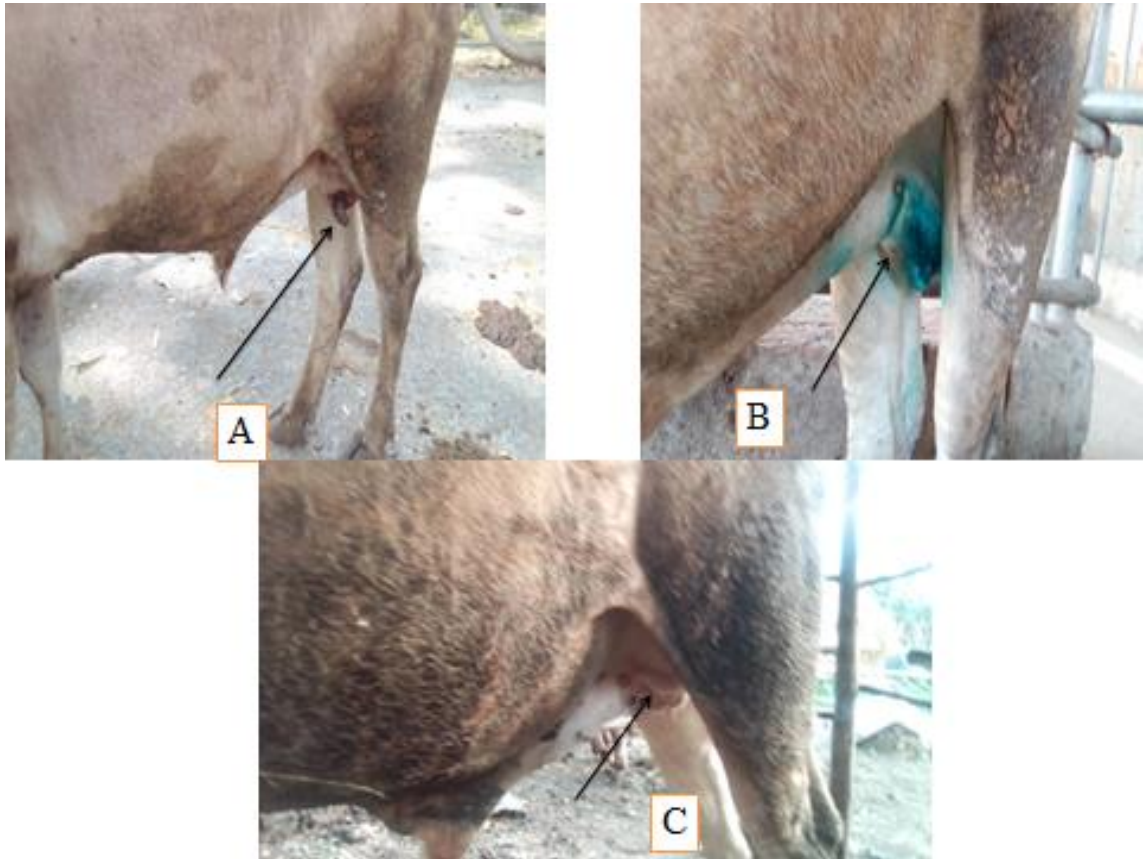


Figure 21: Scirrhus cord due to traditional castration and its management in bullock

(A) Clinical presentation of the case (B) completion of orchiectomy (C) observation of the bullock after two months of operation

Surgical procedures and techniques: A vertical incision was made on the cranio-medial part of scrotum, after local anaesthesia with Lignocaine hydrochloride (2%) was achieved to exteriorize the testicle and spermatic cord. The subcutaneous tissue was incised in the same line. First one testicle with its vaginal tunics was displaced to the surgical field from

the scrotum. Then, two hemostatic forceps were placed on the pampiniform plexus and other structures of the spermatic cord. Transection of the spermatic cord was made above the cranial forceps, and then testicle was removed. One separate circumferential ligature was placed on the stump of the spermatic cord, beneath the distal forceps with synthetic absorbable material (vincryl 2-0). The forceps was removed, and the stump of the cord replaced in the scrotum. The opposite testicle was brought to the same incision and removed in the same manner. The subcutaneous tissue and skin were closed with simple interrupted suture pattern by using vincryl 2-0. Finally, the surgical site was dressed with 1% povidone iodine and sprayed with topical antibiotic cyclo spray (Figure 20B).

Post-operative care and outcome: Post-operative treatment included administration of Fortified procaine penicillin @ 220,000 IU/kg body weight through I.M. for five. The owner was advised to supplement good nutrition to facilitate wound healing. The wound was regularly cleaned by using savlon and dressed by 1% Povidone iodine solution and applying superficially wound spray (cyclo spray) for five days daily. The bullock was recovered uneventfully (Figure 20C)

Discussion

Castration of male farm animals meant for beef production is common procedure performed to avoid management problems related to the farming of bulls (Fisher *et al.*, 2001). Despite the fact that there are several techniques of castration depending on castrating age of animals and developmental level of the testicle with their pros and cons in most production settings, physical castration methods involving surgical removal of the testes, or methods that irreparably damage the testicles by interruption of the blood supply using a castration clamp (Burdizzo castration), rubber ring or latex band are the most common (Coetzee *et al.*, 2010). But faulty application of those method or inhuman method of castration may cause urethra and part of testes damage (Kamalakar *et al.*, 2015; Kamalakar *et al.*, 2014 and Yadav *et al.*, 2019). This is in agreement with present case, where testicle and scrotum was damaged as a result of traditional castration of bull.

The permanent treatment of scrotal conditions requiring the attention of the surgeons because it was affected by various conditions such as testicular tumours, varicocele, hydrocele, trauma, orchitis, periorchitis, torsion of spermatic cord, scrotal hernia (Kamalakar *et al.*, 2015; Kamalakar *et al.*, 2014; Sagar *et al.*, 2010 and Yadav *et al.*, 2019). This is in agreement with present case, where scrotum was perforated and its content was herniated out due to inhumane method of castration by the owner using hammer. Depending on the extent of scrotal involvement, either orchietomy (Maxwell, 2005) or total scrotal ablation (Kamalakar *et al.*, 2015 and Yadav *et al.*, 2019) were suggested. However, in present case, since the testicles were severely damaged and scrotum was perforated at the tip but it was not necrotized, orchietomy was adopted.

Post-operative complications are untoward sequelae of the process of surgery because of the manner and conditions under which surgical operation is performed. To prevent the post-operative complication such as pain, swelling, and secondary bacterial infection of wound in the patient after surgery was completed, administration of ketoprofen and ceftriaxone as analgesics and antibiotic, respectively (Dalal *et al.*, 2017; Kamalakar *et al.*, 2015; Kamalakar *et al.*, 2014) but Yadav *et al.*, (2019) was used Streptopenicillin @ 10mg/kg and Meloxicam @ 0.2 mg/Kg as analgesics and antibiotic, respectively. Similarly, in present case, analgesic (diclofenac sulfate @ 2 mg/kg) and antibiotic (procaine penicillin G @ 220,000 IU/kg) were administered as a post-operative care for five days.

It is concluded that one case of scrotal injury in present case is improper technique of closed method of castration and successfully managed surgically through orchietomy with uneventful result. The effective pre- and post-operative management and anti-septic dressing of surgical wound for animals undergo orchietomy is very important in preventing bacterial contamination of the wound. Therefore, orchietomy is the only method for management of severely traumatized and damage of testicles with proper post-operative care.

3. 12. Surgical Management of Urethral Injury

3.12.1. Surgical management of mechanical urethral rupture in Buck

Abstract

Urethral injuries range from a mild contusion with preservation of epithelial continuity, to a partial tear of the urethral epithelium, or full urethral transection. In present case, an indigenous breed buck ageing around 8 months, affected with rupturing of urethra and swelling of the left hind leg due to leakage of urine into subcutaneous tissues was presented to VTH. Clinical finding revealed that there was perforated skin including urethra at ischiatic level and an enlarged, firm and pain up on palpation on left leg and then, the case was diagnosed as urethral rupture complicated with leakage of urine into subcutaneous tissues. Perineal urethrostomy was conducted under caudal epidural anesthesia after the surgical site was prepared aseptically. The buck was recovered uneventful without any post-operative complication within fifteenth post-operative day.

Key words: *Buck; Perineal urethrostomy; Urethral rupture*

Introduction

Urethral trauma occurs more commonly in male, as opposed to female; in part because of the male animals has longer and externally more accessible urethra (Boothe, 2000). Urethral injuries range from a mild contusion with preservation of epithelial continuity, to a partial tear of the urethral epithelium, or full urethral transection possibly combined with disruption (Chapple, 2000). it can be caused by iatrogenic urethral catheterization, pelvic fractures, urethral obstruction secondary to calculi or lower urinary tract disease, or external trauma(vehicular trauma, gunshot trauma, and bite wounds) (Meige *et al.*, 2008 and Watrous *et al.*, 2016).

Clinical signs and the options available for treatment associated with urethral rupture are often vague and depend on the location, severity and duration of the injury (Boothe, 2000 and Meige *et al.*, 2008). It may be accompanied by life-threatening complications and

uremic cellulitis and also can cause serious soft-tissue damage due to urine extravasation (Hassibi *et al.*, 2019). Urine retention is more likely to occur with trauma of the proximal urethra, because urine may collect in the peritoneal cavity or retroperitoneal space. Urine leakage from more distal urethral sites is more likely to fistulate to the outside, and the patient may have fewer systemic signs attributable to azotemia (Boothe, 2000). The management of traumatic urethral injuries involves accurate patient assessment and stabilization, the correction of systemic metabolic imbalances, restoration of the urethral integrity, and the toxicity of urine to local tissues and subsequent tissue necrosis (Clarke and Findji, 2011).

Urethral injuries may be treated best by surgically bypassing the injured urethral segment, either temporarily urinary diversion through a urethral catheter or cystotomy tube and second intention healing or permanently urinary diversion through urethrostomy and primary repair to maintain urethral integrity (Clarke and Findji, 2011; Meige *et al.*, 2008 and Watrous *et al.*, 2016). Therefore the purpose of the present case report was to describe the management of traumatic urethral rupture in goat by perineal urethrostomy, and to report any complications following this procedure.

Case history and examination: An indigenous breed buck ageing around 8 months, affected with rupturing of urethra and swelling of the left hind leg due to leakage of urine was presented to the surgical units of Veterinary Teaching Hospital of College of Veterinary Medicine and Agriculture, Addis Ababa University following mechanical injury due to horn thrust one week before admitted day (Figure 21A). Feed and water intake were normal. There was abduction of hind limb at rest and lamination up on motion. History revealed that previously the buck was not treated. Up on physical examination there were a perforated skin including urethra at ischiatic level, and pruritic and black discoloration of skin of medial parts of the hind leg, scrotum and perineal region below the perforated parts. Up on palpation, there was swollen area on the left perineum as well as an enlarged, firm and pain on left leg were present. So, the case was diagnosed as urethral rupture and correction of the case through surgical manipulation was decided.

Pre-operative preparation of the buck: After physical restraining and stabilizing of the animal the area surrounding the periphery of the wound and the perianal region was prepared aseptically by washing with soap and tap water. The hair was shaved from the skin that covers the perianal region. Then, the area was again washed by using antiseptic solution (savlon) to remove any fall of hair. Finally, shaved area was scrubbed with 1% povidone iodine in circular manner starting from the center to periphery and made it ready for aseptic urethrostomy.

Anesthesia and animal control: The buck was controlled in lateral recumbent position on the surgical table and the head was positioned straight forward by assistant. Caudal epidural anesthesia was performed by administering 2% lidocaine hydrochloride. The needle was inserted through the skin at the joint between sacrum and coccygeal bone (sacro-coccygeal). The depression formed by joint is easily identified by moving the tail up and down. At this point, the needle was inserted and checked by dropping small drop of anesthesia into the needle, and then drop was drawn into the joint without forming pop. Finally, 3 ml of local anesthetic (2% lidocaine hydrochloride) were injected.

Surgical procedures and techniques: Perineal urethrostomy was performed by making a perineal skin incision ventral to the anus at the point where urethral perforation occurred; leaving at least a centimeter of intact skin between the anus and the incision and some of the subcutaneously accumulated urine was removed by milking the swollen parts (Figure 21B). The penis and the ischiocavernosus and ischiourethralis muscles were isolated by careful blunt dissection within the subcutaneous tissues. The ischiocavernosus and ischiourethralis muscles are incised using scissors at their ischial attachments by retracting the penis laterally to facilitate the incision. Simple pressures by swabbing, ligation and twisting of blood vessel with hemostatic forceps was performed depending on the size of blood vessel and amount of blood oozing out to control hemorrhage and obtain a very clean surgical field. The penile body was identified by careful blunt dissection ventrally, and digital elevation of the penis and pelvic urethra from the pelvic floor to permit mobilization and posterior displacement of the penis and pelvic urethra (Figure 21C). Then, the dorsal blood vessels of the penis was separated from the penile body and retracted cranially and then ligated by using absorbable suture material before

transected. The retractor penis muscle, bulbocavernosus muscle was identified on the dorsal aspect of the penis and dissected from the urethra. Urethra was transected at the point where rupture was occurred and catheterization was applied (Figure 21D). Following catheterization the incised pelvic urethra was sutured to the skin using non-absorbable suture material (2-0 silk) in an interrupted suture pattern. The remaining skin incision was closed by using non-absorbable suture material (2-0 silk) in an interrupted suture pattern.



Figure 22: Urethral rupture and its correction through urethrostomy in buck

(A) Clinical presentation of the case (B) on progression of drain of the subcutaneously accumulated urine (C) Elevation of urethra from perineal floor and prepare it for transection (D) Catheterization of urethra on progression (E) Observation of the buck after one month at home

Post-operative care and outcome: Post-operative treatment included administration of Fortified procaine penicillin @ 220,000 IU/kg body weight through I.M. for five days. Daily wound cleaning was done using 1% iodine povidone on the skin and subcutaneous tissue. The urethra was lavaged with clean tap water and NSS using catheter. Topical cyclo spray and insect repellent was applied. Finally, skin sutures were removed on fifteenth post-operative day and uneventful recovery was noticed. But after one month urethral stricture was occurred (Figure 21E) and recommended the owner to cull the buck.

Discussion

Urethral rupture can be accompanied by way of existence life-threatening complications and uremic cellulitis due to urine extravasation (Hassibi *et al.*, 2019). Extravasation of urine from the distal urethra is possible complication subsequent to urethral obstruction, iatrogenic perforation following urethral catheterization, perineal urethrostomy and traumatic injury; including road traffic accident, gunshot, bite wound, and pelvic fracture (Chapple, 2000; Clarke and Findji, 2011; Meige *et al.*, 2008 and Watrous *et al.*, 2016). This is in agreement with the present case, where urine was extravagated into the sub cutaneous tissues due to rupture of urethra. Urethral rupture is characterized by urine retention, which is more likely to occur with trauma of the proximal urethra, because urine may collect in the peritoneal cavity or retroperitoneal space, whereas; urine leakage from more distal urethral sites is more likely to fistulate to the outside, and the patient may have fewer systemic signs attributable to azotemia (Boothe, 2000). This is in agreement with present case, where urethra was ruptured and communicates with the external environment.

The main things to be considered with the management of urethral rupture are the correction of systemic metabolic imbalances, restoration of the urethral integrity, and the toxicity of urine to local tissues and subsequent tissue necrosis (Clarke and Findji, 2011; Meige *et al.*, 2008 and Watrous *et al.*, 2016). Traumatic urethral injuries can be managed either through temporary urinary diversion by using a urethral catheter or cystostomy tube and second intention healing or permanent urinary diversion through urethrostomy and

primary repair depending upon (Hassibi *et al.*, 2019; Meige *et al.*, 2008 and Watrous *et al.*, 2016). Permanent urinary diversion through urethrostomy and primary repair was an effective method for treatment of urethral rupture, urethral stricture, or urethral obstruction with multiple stones that are not conducive to dissolution with urine acidification (Oman *et al.*, 2019), but its use was limited due to stricture formation and recurrent obstruction, bacterial urinary tract infection (UTI), sterile cystitis, subcutaneous urine leakage at the surgical site, urinary and fecal incontinence, rectal prolapse, rectourethral fistula formation, and perineal hernia (Milgram, 2017). This agrees with present case, where urethral rupture was managed through permanent urinary diversion by using perineal urethrostomy and primary repair technique. However, treatment of urethral rupture through temporary urinary diversion by using a urethral catheter or cystotomy tube and allowed for second healing intention is indicated if the integrity of the urethra is in question, with severe contusion and haematoma formation (Chapple, 2000).

In small ruminants, perineal urethrostomy usually performed while the animal is in sternal recumbency with its rear legs hanging over the end of a padded surgery table under local analgesia, with sedation (Tobias and van Amstel, 2012). Perhaps, in present case, perineal urethrostomy was performed while the animal was in left lateral recumbency under lower epidural anesthesia by using local anesthesia using 2% lidocaine with sedation. The most post-operative complication following perineal urethrostomy were hemorrhage, wound dehiscence, ascending urinary tract infection, urethral stricture, urinary incontinence, perineal hernia, rectourethral fistula and death (Meige *et al.*, 2008; Milgram, 2017; Oman *et al.*, 2018; Smith, 2002 and Tobias and van Amstel, 2012). This agrees with the present case, where urethral stricture was occurred after one month of post-surgery.

To prevent the post-operative complication in the patient after urethrostomy was done administration of analgesics and antibiotic has a proven effect in preventing pain and swelling, and secondary bacterial infection of wound, respectively (Thongtip *et al.*, 2016). Similarly, in this case, analgesic (diclofenac sulfate @ 2 mg/kg body weight) and antibiotic (procaine penicillin G @ 220,000 IU/kg body weight) were administered

before operation was done. The same analgesic and antibiotics was also used as a post-operative care for five days. To conclude that from the present case, urine extravasation due to rupture of urethra is a common problem, so permanent urine diversion through urethrostomy is a fairly common surgical procedure to resolve it. Although several surgical approaches to treat urethral rupture were available and provide long-term resolution with fewer complications, perineal urethrostomy remains an important treatment for goats in which other options have failed or were deemed likely to fail.

3.12.2. Surgical management of urethral blockage due to uroliths in bull

Abstract

Urolithiasis is a common disease of ruminants caused by the formation of calculi anywhere in the urinary system with a subsequent blockage to urine outflow consequently leading to uraemia and death. In present case, a local breed bull ageing around 8 years, affected with rupturing of urethra and swelling of the ventral abdominal area starting from scrotum up to end of prepuce orifice due to leakage of urine was presented to VTH following complete obstructive urolithiasis. Up on clinical and physical examination there was an enlarged, firm and painful swelling on the ventral abdominal and the fluid was oozing out up on puncturing on the swelling. Based up on history, physical and clinical examination, the case was diagnosed as complete obstructive urolithiasis that lead to urethral rupture and post-scrotal urethrostomy was conducted under lignocaine hydrochloride (2%) via local infiltration. Following successful surgical intervention the bull was recovered uneventful but there were abscessation at the area where urine was accumulated.

Key words: *Bull; Obstructive urolithiasis; Post-scrotal urethrostomy; Urethral rupture*

Introduction

Urolithiasis is a common disease of ruminants caused by the formation of calculi anywhere in the urinary system but most frequently at the distal end of sigmoid flexure in ruminants with a subsequent blockage to urine outflow consequently leading to uraemia

and death (Kushwaha *et al.*, 2014). It affects equally both sexes; however, it is only a main problem in males because of the anatomical conformation of their urinary tract (Rafee *et al.*, 2016). It also known as uroliths or calculi, the third most common prevalent urinary disorder that involves the process of stone formation in any part of urinary tract by the successive physiochemical events of super saturation, nucleation, aggregation, and retention at the site of stone formation (Ansari, 2020).

Geographically the disease develops in most temperate zone countries (Parrah, 2010), apart from temperate zone it also investigated in Indian (Muhee, 2006), Sub-Saharan country including Ethiopia (Tiruneh, 2000; Bokre *et al.*, 2010; Tiruneh *et al.*, 2014) and Egypt (Abdelaal *et al.*, 2016) and Latin America in Brazil (Loretti *et al.*, 2003). Factors such as diet, sex, age, season, water intake, urine PH and urinary tract infections play a key role in the genesis of urolithiasis (Bayoumi and Attia, 2017). The clinical signs associated with urolithiasis depend upon the degree of obstruction to free flow of urine (Makhdoomi and Gazi, 2013). Animals suffering from partial obstruction of urolithiasis usually show signs of abdominal pain, restlessness, groaning and grunting while straining to urinate but passing only a few drops of blood stained urine (Abba *et al.*, 2015) but the Common sequel of complete urethral obstruction includes urethral perforation, hydronephrosis or urinary bladder rupture (Panigrahi *et al.*, 2016).

Obstructive urolithiasis results in economic loss to the farmer due to loss of animals' life and value of treatment. Mortality rate in cases of obstructive urolithiasis is very high which is mainly due to rupture of urethra or urinary bladder (Khurma *et al.*, 2017). Obstructive urolithiasis is often difficult to detect until it is life threatening because the clinical signs can be quite variable depending upon duration, extent (partial or complete) and location of obstructing urolith. The condition is thus diagnosed by history of anuria coupled with other clinical manifestations. Besides clinical, physical and haematobiochemical examination (Loretti *et al.*, 2003), imaging techniques as Ultrasonography and radiography are usually used in evaluation of the urinary tract lesions in small and large ruminants (Ewoldt *et al.*, 2008 and Misk and Semieka, 2003). Treatment of obstructive urolithiasis has been found to vary depending upon clinical status of animal and duration of obstruction (Khurma *et al.*, 2017). Medical

dissolution of calculi can be done if the obstruction is mild or partial but immediate surgical management is necessary if the obstruction is complete (Kumar *et al.*, 2016).

Case history and examination: A local breed bull ageing around 8 years, affected with rupturing of urethra and swelling of the ventral abdominal area starting from scrotum up to end of prepuceal orifice due to leakage of urine was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University following complete obstructive urolithiasis (Figure 22A). History from the owner revealed that the bull was mechanically bitten by stick on the penile urethra before one year following that paraphimosis was encountered and then, the bull was taken into Hidi veterinary clinic for treatment. The clinician was corrected the paraphimosis and prescribed short acting oxytetracycline (10ml/kg) for consecutive three days and then, the bull was gotten a relief for the problem encountered. But after one year of the treatment the bull dribble blood tinged urine and attempts pain up on urination. Again the owner was took his bull to the same clinic and they prescribed again short acting oxytetracycline (10ml/kg) for consecutive three days and the animal was gotten a relief. But after one month of the second treatment the bull showed distension of ventral abdomen, suspended urination and decreased water and feed intake. Now when the owner took his bull again for third time to the clinic the clinician was referred the case to Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa. Up on arriving, there was swollen on ventral abdomen area starting from scrotum up to end of prepuceal orifice. When puncturing on the swelling the fluid was oozing out. Based on history and physical examination the case was diagnosed as urethral rupture and leakage of urine into subcutaneous tissues due to urolithiasis.

Pre-operative preparation of the bull: After physical restraining and stabilizing of the animal on the ground using rope by an assistant the area around the post-scrotal region was prepared aseptically by washing with soap and tap water. The hair was shaved from the skin that covers the post-scrotal. Then, the area was again washed by using antiseptic solution (savlon) to remove any fall of hair and decrease bacterial load. Finally, shaved area was scrubbed with 1% povidone iodine in circular manner starting from the center to periphery and made it ready for aseptic urethrostomy.

Anesthesia and animal control: The bull was controlled in lateral recumbent position on the ground with securing four legs together using rope by assistant. Local infiltration of anesthesia was performed by administering 2% lidocaine hydrochloride along the incision line.

Surgical procedures and techniques: Urethrostomy was performed by making an incision on midline through the skin and subcutis exactly at post-scrotal region. The fascia was incised and the incision was deepened in between the two retractor penis muscles, through the bulbo-cavernosus muscle and corpus cavernosum urethrae. The penile body was identified by careful blunt dissection ventrally, and digital elevation of the penis and pelvic urethra from the pelvic floor to permit traction and posterior displacement of the penis and pelvic urethra. While traction was placed to exteriorize the penile shaft, careful blunt dissection was used to free the penis from the surrounding fascia. Then, considerable part of the penis has been exteriorized through straightening the sigmoid flexure by cutting of retractor penis muscles using scissors at their penile attachment (Figure 22B). Simple pressures by swabbing, ligation and twisting of blood vessel with heamostatic forceps was performed depending on the size of blood vessel and amount of blood oozing out to control hemorrhage and obtain a very clean surgical field. Then, the dorsal blood vessels of the penis was separated from the penile body and retracted cranially and then ligated by using absorbable suture material before transected (Figure 22C). The urethra was transected just above the point of obstruction and it was removed. The incised pelvic urethra was sutured to the skin using non-absorbable suture material (2-0 silk) in an interrupted suture pattern. The remaining skin incision was closed by using non-absorbable suture material (2-0 silk) in an interrupted suture pattern. Finally, the surgical site was sprayed with topical antibiotic (cyclo spray) and animal was stand from lateral recumbent position (Figure 22D).



Figure 23: Urethral blockage and its surgical management in bull

(A) Clinical presentation of the cases (B) On progression of exteriorizing and straightening of sigmoid flexure by cutting retractor penis muscles (C) Ligating of dorsal penile blood vessels (D) On progression of urination of the patient after completion of urethrostomy (E) Appearance of wound site on 2nd days (F) Complete heal of wound and on progression of urination of animals on 15th days

Post-operative care and outcome: Post-operative treatment included administration of Fortified procaine penicillin @ 220,000 IU/kg body weight through I.M. for five Daily wound cleaning was done using 1% iodine povidone on the skin and subcutaneous tissue. The urethra was lavaged with clean tap water and NSS using catheter. Topical cyclo spray was applied. Finally, skin sutures were removed on fifteenth post-operative day and uneventful recovery was noticed (Figure 22F).

Discussion

Urolithiasis refers to the causes and effects of stones anywhere in the urinary tract (Panigrahi *et al.*, 2016) including nephrolithiasis (renal calculi or kidney stone), ureterolithiasis (ureter calculi) and cystolithiasis (urinary bladder calculi) (Onmaz *et al.*, 2016). The calculi might be lodged in any a part of the urinary tract starting from renal pelvis to glans penis, but the lodgment of the urolith in the bladder neck and urethra can also lead to complete obstruction to urine flow thereby enhancing the acuteness and severity of the circumstance (Khairuddin *et al.*, 2016). This is in agreement with present case, where the uroliths were lodged in the urethra and result in urethral rupture as a result of complete obstruction. Male ruminants are more commonly affected than female due to their anatomical conformation of the urethral tract because the length of urethra, presence of sigmoid flexure and urethral process in male make more prone to the lodgment of calculi as compared to female urinary tract in the ruminants ((Loretti *et al.*, 2003 and Tamilmahan *et al.*, 2014). This suggestion is in line with present case, where sex of encountered animal was male.

According to the reports of Abba *et al.*, (2015); Khairuddin *et al.*, (2016) and Tiruneh, (2000) among the parts of urethra, the distal part of the sigmoid flexure of cattle, sheep and goats, and urethral process of sheep and goats are the most common sites for uroliths to lodge. Similarly, in present case, uroliths were occurred at distal parts of the sigmoid flexure as well as urethral rupture was observed at proximal to the obstructed site of the urethra. Among many factors which have been incriminated as a cause of urolithiasis in ruminants increased urine concentration, decreased water intake or increased insensible water loss, urine stasis, diet composition, and decreases in the concentration of protective colloids are the main factors which predispose the precipitation of minerals from urine (Smith and Sherman, 2009). As the information obtained from history suggested that in present case, the predisposing factor for the occurrence of urolithiasis might be due to lower urinary tract infection. This is in agreement with previous study reported by Yeruham *et al.*, (2006) who state that ascending urinary tract infection such as cystitis, urethritis and pyelonephritis is incriminated as predisposing factor for urolith formation,

because some urease positive organism may result in urinary tract alkalization by forming ammonia from urea (Suarez *et al.*, 2002).

The clinical signs associated with urolithiasis depend upon the degree of obstruction to free flow of urine and severity of surrounding tissue reactions (Makhdoomi and Gazi, 2013). But the common sequel of complete urethral obstruction includes urethral perforation, hydronephrosis or urinary bladder rupture and death from uremia (Panigrahi *et al.*, 2016). Similarly, in present case, urethral rupture so as to complete urethral obstruction and result in the swelling of pre-scrotal and ventral abdomen area was encountered. Different surgical interventions such as tube cystostomy (Gaber *et al.*, 2014 and Helayel *et al.*, 2015), Penile Urethrotomy (Kushwaha *et al.*, 2014 and Tamilmahan *et al.*, 2014), urethrostomy (Seddek and Bakr, 2013 and Tamilmahan *et al.*, 2014) and Bladder marsupialisation (Gaber *et al.*, 2014; Helayel *et al.*, 2015; Khairuddin *et al.*, 2016 and Parrah *et al.*, 2014) are employed for the management of obstructive urolithiasis in ruminant either to establish normal urine flow by removal urolith or to allow the time for the urinary tract to restore patency by urinary diversion. Even if each operation having their own advantages and disadvantages in present case, post-scrotal penile urethral urethrostomy was conducted to manage the encountered case.

The most post-operative complication following post-scrotal penile urethral urethrostomy was poor long term outcomes due to stricture formation, resulting in recurrent obstruction (Tamilmahan *et al.*, 2014), whereas; such type of condition was not encountered in present case. To prevent the post-operative complication in the patient after urethrostomy was done administration of analgesics and antibiotic has a proven effect in preventing pain and swelling, and secondary bacterial infection of wound, respectively (Kalim *et al.*, 2011 and Kumar *et al.*, 2019). Similarly, in this case, analgesic (diclofenac sulfate @ 2 mg/kg body weight) and antibiotic (procaine penicillin G @ 220,000 IU/kg body weight) were administered as a post-operative care for five days. To conclude from present case that even if it has its own limitations; immediate surgical intervention through post-scrotal penile urethral urethrostomy should be the best choice in cases of obstructive urolithiasis.

4. SUMMARY OF COMPILED CASES

In this compiled case report, a total of twenty four surgical operations were performed in different species of animals presented to Veterinary Teaching Hospital and Donkey Sanctuary Clinic at College of Veterinary Medicine and Agriculture from in and around bishoofu town with different causes of surgical cases, sex, and age. Among surgical affections dehorning 4(16.67%) and hernia repair 3(12.5%) were the most commonly performed surgical procedure during the study period followed by wound management, abscess management, excision of tumor, open castration, eye enucleation, urethrostomy and dystocia with 2(8.33%) for each cases, and ovariohysterectomy, vaginal prolapse and exploratory rumenotomy with 1(4.17%) patients for each cases (Table 1).

Table 1: Surgical conditions and their treatment methods

Surgical affections	Innervation/treatments	percent
Horn fracture	Cosmetic dehorning by using dehorning wire and closing of the skin flaps	4(16.167%)
Irreparable wound at the base of horn	Dehorning by using dehorning wire and allowed to heal by secondary wound intention	
Hernia	Herniorrhaphy	3(12.5%)
Dystocia	C-section	2(8.33%)
Prolapse (vaginal prolapse)	Surgical manipulation of the prolapsed mass	1(4.17%)
Traumatic wound	Open wound management through primary wound intention	2(8.33%)
Perineal tumor	Excision of tumor mass	2(8.33%)
Mammary tumor	Unilateral regional mastectomy	
Abscess	Surgical drainage of abscess	2(8.33%)
Chronic abscess	Surgical excision of the mass	

Scirrhus cord due to faulty traditional castration	Corrected through open castration	2(8.33%)
Orchitis	Total scrotal ablation	
Traumatic injury to the eye	Eye enueclation	2 (8.33%)
Chronic glaucoma of the eye	Eye exntration	
Traumatic injury to the urethra	Perineal urethrostomy	2(8.33%)
Urethral blockage	Post-scrotal urethrostomy	
Rumen foreign body	Exploratory rumenotomy	1(4.17%)
Sterilization	Ovariohysterectomy	2(8.33%)
Total		24(100%)

Discomfort and loss of appetite during few day of the first weeks of post-surgery in 3(12.5%) patient, swelling at surgical site in 2 (8.33%) patients, frontal sinusitis development in 2(8.33%) patient abscessation in 2(8.33%) patient followed by postoperative urethral stricture after one month in 1 (4.17%) patient, were the most post-operative surgical complication encountered (Table 2). During the study period, out of twenty four patients presented for surgical intervention only 1(4.17%) animal death was encountered due to prolonged straining for parturition and lethargy before surgical treatment. The rest twenty three animals were recovered with satisfactory outcomes for the cases to which were presented for surgical treatment.

Table 2: Type of operation performed, complication and surgical outcomes

Surgical treatments	No of animal subjected	Post-operative complications	Percentage	Survive	Died
Exploratory Rumenotomy	1	Discomfort and loss of appetite during few day of the first weeks of surgery	4.17%	1	0
Dehorning	4	Frontal sinusitis development in two cases	16.67%	4	0
Urethrostomy	2	Abscessation at the site of urine accumulation in bull and urethral stricture in goat	8.33%	2	0
Open castration	2	Not encountered	8.33%	2	0
Abscess (En bloc excision and drainage)	2	Discomfort and loss of appetite in case of abscess drainage	8.33%	2	0
Herniorraphy	3	Straining during defecation in case of perineal hernia	12.5%	3	0
Correction of vaginal prolapse	1	Not encountered	4.17%	1	0
Eye enuclation	2	Swelling of the surgical site in case of cow	8.33%	2	0
Caesarian section	2	Discomfort, lethargy and loss of appetite in case 2	8.33%	1	1
Open wound management	2	Swelling of surgical site in case of ram	8.33%	2	0
Ovariohysterectomy	1	Not seen	4.17%	1	0
Tumor excision	2	Not seen	8.33%	2	0

The distribution of surgical cases according to species showed that cattle with the highest number followed by dogs, sheep, goats and donkey (Table 3). The distribution of the surgical cases based on sex indicated that male cases predominate in cattle with 6 (54.54%). On the other hand, in dogs and sheep female cases predominate with 3(60%).

Table 3: Distribution of surgical cases among species and sex

Species	No. of surgical cases	Sex	
		M	F
Cattle	11(45.83%)	6(54.54%)	5(45.45%)
Sheep	5(20.83%)	2(40%)	3(60%)
Goats	2(8.33%)	1(50%)	1(50%)
Dogs	5(20.83%)	2(40%)	3(60%)
Donkey	1(4.17%)	1(100%)	0(00.00%)
Total	24(100%)	12(50%)	12(50%)

The distribution of surgical cases according to affected body systems showed that the integumentary system and appendages was predominate with 13(54.17%) followed by reproductive system 6(25%, urinary system 2(8.33%), sense organ 2(8.33%) and digestive system 1(4.17%) according to their frequency of the occurrence (Table 4).

Table 4: Affected body system and encountered surgical case in different species of domestic animals

System involved	Animal species	Specific surgical cases	Total (%)
Integumentary and appendages	cattle	Horn fracture and irreparable wound at the base of horn	3 (12.5%)
		Abscess	2(8.33%)
		Umbilical hernia	1(4.17%)
	Sheep	Lacerated wound due to horn thrust	1(4.17%)
	Goats	Horn fracture	1(4.17%)
	Dogs	Perineal hernia	1(4.17%)
		Ventral hernia	1(4.17%)
		Perineal gland adenoma	1(4.17%)
		Mammary tumor	1(4.17%)
	Donkey	Avulsed wound due to hyena bite	1(4.17%)
		Total	13(54.17%)
Reproductive system	Cattle	Vaginal prolapse	1(4.17%)
		Scirrhus cord due to faulty traditional castration	1(4.17%)
	Sheep	C-section	2(8.33%)
		Total scrotal ablation due to orchitis	1(4.17%)
	Dogs	Ovariohysterectomy	1 (4.17%)
		Total	6(25%)
Urinary system	Cattle	Urolithiasis	1(4.17%)
	Goat	Traumatic urethral rupture	1(4.17%)
		Total	2(8.33%)
Digestive system	Cattle	Exploratory rumenotomy	1(4.17%)
Sense organ	Cattle	Chronic epiphora of the eye	1(4.17%)
	Sheep	Traumatic eye injury due to hyena bite	1(4.17%)
		Total	2(8.33%)

5. CONCLUSION AND RECOMMENDATIONS

Livestock subsectors are essential assets for livelihoods of pastoralists, agro-pastoralists, and smallholder farmer especially in developing countries like Ethiopia. However, there are various bottle neck factors that are hindering the contribution of this huge and valuable subsector. Out of these constraints, poor veterinary surgical management of different deformities and injuries are the main problems since failure of surgical intervention provides no alternatives except for culling or eventual loss of a productive or valuable animal through death. In this compiled case reports, horn amputation, herniorrhaphy, cesarean sections, ovario-hysterectomy, exploratory ruminotomy, wound management, drainage of abscess, tumor excision, vaginal prolapse, eye enucleation, open castrations and urethrostomy were successfully conducted with different surgical treatment procedures and techniques at Veterinary Teaching Hospital and Donkey Sanctuary Clinic. Despite the fact that there were no conducive place especially with regards to basic surgical equipment, instruments and accessibility of anesthetic drugs, except death of one patients following cesarean sections almost all performed surgical procedures were successful recovered and cured in the study area.

Therefore, depending on the above conclusion the following recommendations were forwarded.

- VTH should fulfill with all necessary anesthetic drugs and a surgical instrument in order to improve surgical failure as a result of delay in surgical intervention up to it's prescribed to outside pharmacy.
- Aseptic pre, intra and post-operative patient preparation and management should have to need so as to reduce or obtain free of intra and post-operative complication.
- VTH should equipped with required diagnostic imaging equipment to promote practical knowledge and clinical proficiency in the diagnosis.
- The government ought to develop and adopt policies in producing competent, innovative veterinary surgeons and veterinarians with efficiency who will endure surgical treatment effectively.

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7. ANNEXES

Annex 1: Case recording format

Date. _____

Case No. _____

Owners' Name _____ Address: Town _____ Kebele _____

Occupation _____ Phone No _____

Animal Species _____ Breed _____ Sex _____ Age _____

CASE HISTORY

PHYSICAL EXAMINATION

CLINICAL FINDING

Body Temp _____ oC Respiration rate _____ Breaths/min Heart rate _____ Beat/min

Ruminal Motility _____/min Gut sound _____ VMM: _____ CRT: _____

Body Condition: _____ Superficial Ln: PF___ PS___ MND _____ RPH _____

OTHER _____

List Differential Diagnosis: _____

Tentative Diagnosis: _____

LABORATORY EXAMINATION

Sample taken: _____

Laboratory Exam Method Employed: _____

Results: _____

Definitive Diagnosis: _____

Prognosis: _____

TREATMENT

Surgical _____ Medical _____

Gynaecology/Obstetric _____ Follow up /Quarantine _____

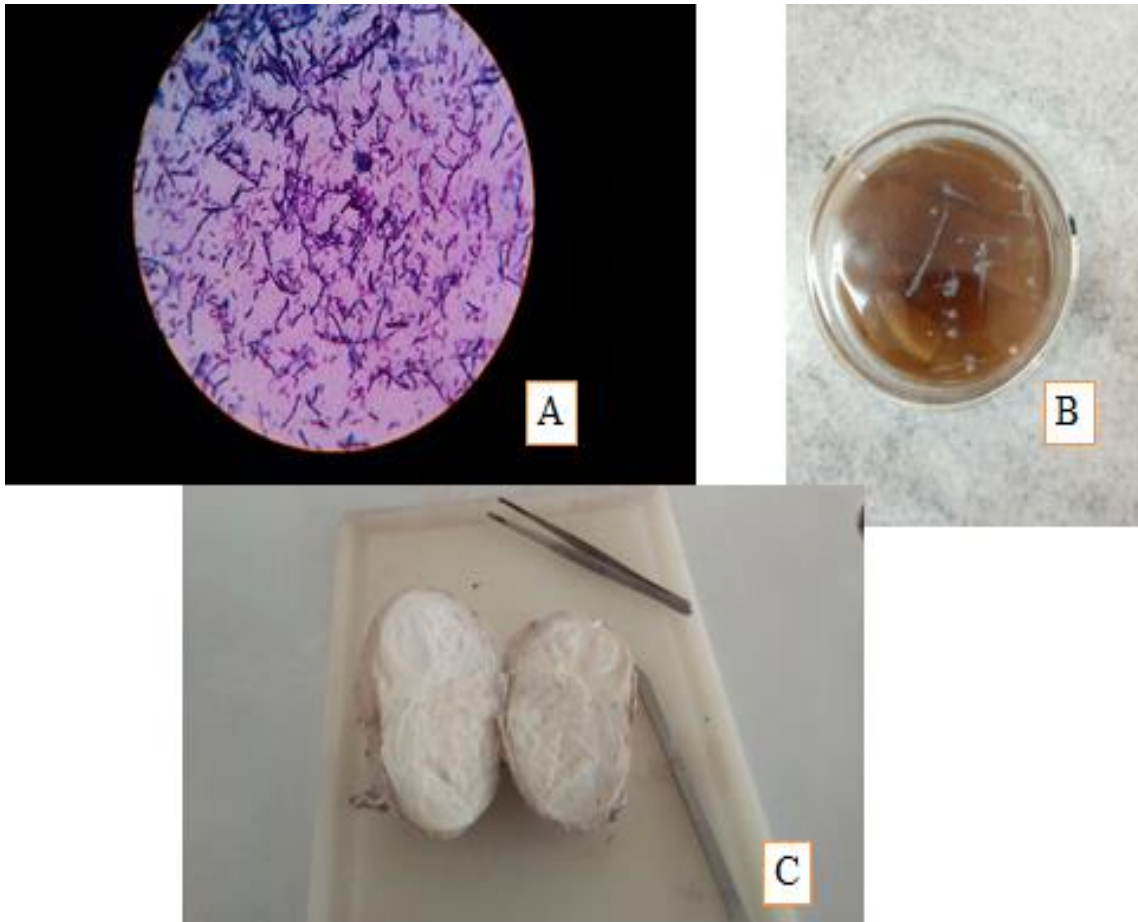
MEDICAL TREATMENT

Drug used (dosage, rate of drug administration, treatment interval)

Name of Staff in Charge _____ Signature _____

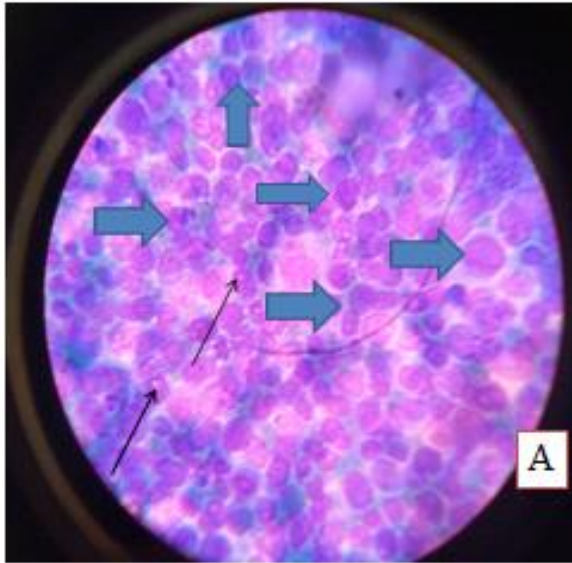
Student in Charge: _____ Signature _____

Annex 2: Laboratory test result of sample from excised chronic abscess



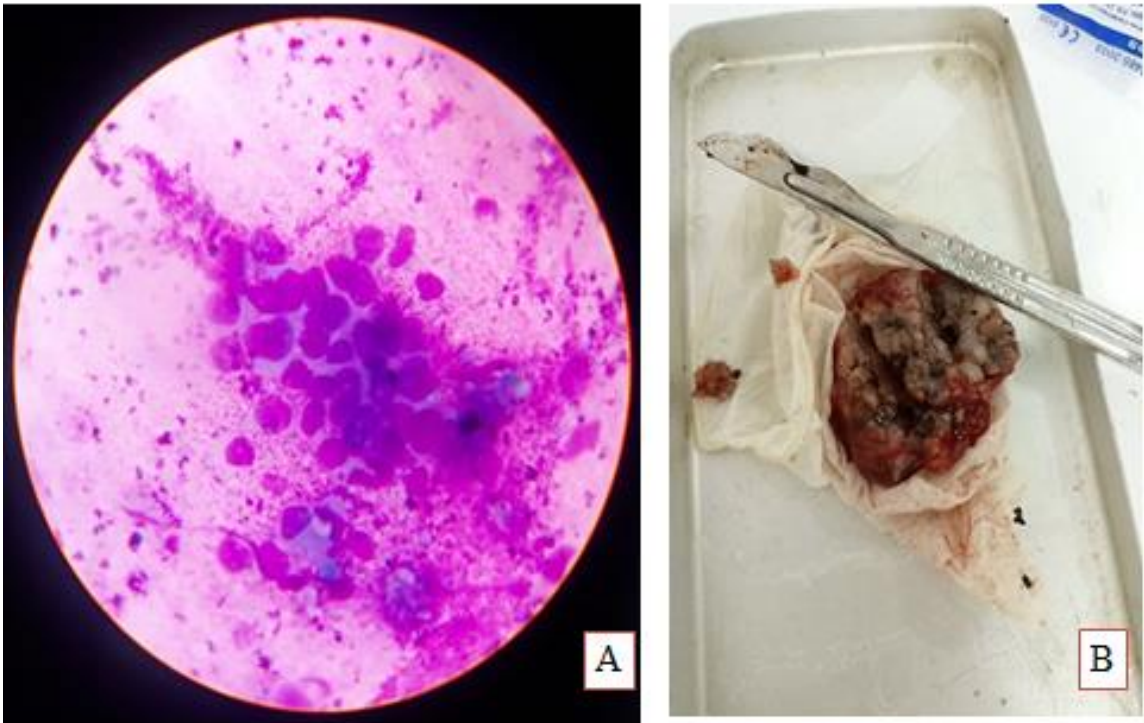
- (A) Gram positive short coccobacilli in groups, pairs as well as single bacterial morphology on gram staining result that resemble *Corynebacterium pseudotuberculosis*
- (B) On blood agar growth I observed small, white, dry, opaque and concentrically ringed characteristics of bacterial colony that resemble *Corynebacterium pseudotuberculosis* (C) Appearance of cross sectioned excised mass

Annex 3: Cytological test result of sample from swelling of perineal area



(A) Moderately abundant cytoplasm which contains fine granules was observed (**big arrows**). Centrally or slightly eccentrically located cells' nuclei with uniform appearance were observed (**small arrows**) which resemble perineal gland adenoma. (B) The excised mass

Annex 4: Cytological test result of sample from swelling of canine mammary gland



(A) A group of epithelial cells arranged in papillary form and also there were a mild variation in cell (anisocytosis) and nuclear (anisokaryosis) were observed on giemsa stain that resemble canine mammary carcinoma (B) The excised mass

Annex 5: Consent form for surgical operation

Owner's name: ----- Phone number: -----
Address: Town----- kebele-----
Species: ----- Breed: ----- Age: ----- Colour: -----
Sex: ----- Weight: -----, Vaccination status: -----
Patient's name----- Surgical procedure employed on the
patient: -----, current medication: -----
-----:

I herewith provide permission for the above animal to be admitted for patient tests, treatment, observation and the other procedures that will prove necessary. I perceive that while very care and attention will be given to -----, the follow can not be command answerable for any untoward events that will occur. I understand that the full fee will be payable on release of the animal.

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

Date: -----

Annex 6: Post operative observations and follow up format

Examination of patients 3-5 days of the first week through physical presence		
Day 1	Treatment/s	Remark/s
Appetite		
Temperature		
Heart Rate		
Respiratory rate		
Exudates		
Incision sites		
Any other		
Day 2	Treatment/s	Remark/s
Appetite		
Temperature		
Heart Rate		
Respiratory rate		
Exudates		
Incision sites		
Any other		
After the last day of physical presence the follow up continued through phone calling		
Information to be asked		Remarks
Is there a change in appetite?		
Have you seen any fluid that discharge from incision site?		
Is there any discomfort on the animal?		
Have you seen any behavioral change on the patient after treatment?		
Is there occurrence of any swelling at incision site?		
Have you seen any spilled of suture?		