MANAGEMENTS OF MINOR AND MAJOR SURGICAL CONDITIONS AND TREATMENT OUTCOMES IN RUMINANT AND SMALL ANIMAL PATIENTS

MSc Thesis

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MSc program in veterinary surgery

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MANAGEMENTS OF MINOR AND MAJOR SURGICAL CONDITIONS AND TREATMENT OUTCOMES IN RUMINANT AND SMALL ANIMAL PATIENTS

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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June, 2018

Bishoftu, Ethiopia
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College of Veterinary Medicine and Agriculture
Department of Clinical Studies

Managements of minor and major surgical conditions and treatment outcomes in ruminant and small animal patients

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<tr>
<td>AAU</td>
<td>Addis Ababa University</td>
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<tr>
<td>CSA</td>
<td>Central Statistical Authority</td>
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<td>CVMA</td>
<td>College of Veterinary Medicine and Agriculture</td>
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<td>IV</td>
<td>Intravenous</td>
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<td>OVH</td>
<td>Ovariohysterectomy</td>
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<td>POP</td>
<td>Plaster Of Paris</td>
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<td>VTH</td>
<td>Veterinary Teaching Hospital</td>
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SUMMARY

Surgery is one of the oldest and commonest techniques employed in all species of animals for the purpose of correcting acquired functional and structural disturbances as well as genetic defects affecting the health, welfare and productivity of individual animals. All surgical conditions, managements and outcomes are not systematically studied and documented in Ethiopia. Therefore, in this study, surgery was conducted on a total of 55 (35 ruminants and 20 small animals) at Veterinary Teaching Hospital of College of Veterinary Medicine and Agriculture to gain surgical skill as well as manage, treat and document outcomes of both minor and major surgical procedures performed on both ruminant and small animal patients. A standard accepted surgical procedure was performed on each animal presented with specific surgical condition and demanding specific surgical procedures. Accordingly, surgery was performed on 24 bovines, 6 ovines and 5 caprines. Among the ruminants presented for the treatment of surgical condition 21(60%) were males whereas 28(80%) were adults. In the case of small animals, surgery was performed on 19 canines and one feline that constituted 14(70%) females and 18(90%) adult cases. Minor veterinary surgery includes procedures ranging from removing skin masses and suturing minor wounds to certain dental procedures. It is therefore difficult to produce a definitive list of minor surgical procedures. The decision of what constitutes minor surgery will depend on: Size, depth and position of wound; condition of underlying tissue; complexity of surgery, including incision and repair; Overall health of the patient; proximity of surgical area to delicate or important organs. Most surgical procedures (30/55) performed on ruminants and small animals were minor surgery including draining abscess, subcutaneous seroma, and hematoma, testicular ablation following scrotal necrosis due to faulty application of Burdizo, wound management due to hyena and dog bite, correction of paraphimosis, uterine prolapse and skin tumor resections. Major surgical procedures (7/55) performed on ruminants were atresia ani, atresia ani-et recti, metacarpal fracture repair, rumenotomy, and urethrotomy. Major surgical procedures (18/55) performed on small animals were tail docking, C-section, forelimb amputation, fracture repair, inguinal herniorrhaphy, cystotomy, mastectomy, ovariohysterectomy, and open castration for testicular tumor removal. All surgical interventions performed on the ruminant and small animals culminated in successful
recovery (96.36%, 53/55) except in two animals (3.64% 2/55), a calf and a dog that had died after fifth and second day of surgery, respectively, due to lack of intensive postoperative care. Postoperative complications, such as swelling and wound dehiscence were also recorded in some cases, which were discussed with the respective cases with appropriate conclusions and recommendations forwarded.

**Keywords**: Minor and major surgical conditions, managements, outcomes, VTH of CVMA
1. INTRODUCTION

Ethiopia is a home for many livestock species and suitable for livestock production owning the largest livestock population in Africa (CSA, 2013; Tilahun and Schmidt, 2012). An estimate indicates that the country is a home for about 54 million cattle, 25.5 million sheep and 24.06 million goats (CSA, 2013). The livestock subsector has an enormous contribution to Ethiopia’s national economy and livelihoods of many Ethiopians, and still promising to rally round the economic development of the country. Livestock plays vital roles in generating income to farmers, creating job opportunities, ensuring food security, providing services, contributing to asset, social, cultural and environmental values, and sustain livelihoods (MoA and ILRI, 2013).

In Ethiopia, recently there is an increase in demand for better veterinary services due to the increasing awareness of the importance of treatment of individual animal by both rural and urban community. A growing trend of keeping pure or crossbred animals as companion pets, especially dogs, in urban areas also contributed to the increased demand in the veterinary care of individual animal (Tiruneh et al., 2014). Surgery is a skill and equipment based specialty that uses sutures, incisions, excision, manipulation, or other invasive procedures, as well as, local, regional, or general anaesthesia for patient management (Debas, 2006). Surgery lays heavy demand on space, equipment and personnel proficiencies for patient management and could be used as an index of high profile clinical veterinary practice especially in poor resource settings as obtained in many developing countries of Africa and Asia (Eyarefe and Dickson, 2014). Surgical disorders are the major causes of fatality in animals if not treated in time. However, surgical disorders are major threat for our economy and failure of surgical intervention provides no alternatives except for culling or eventual loss of a productive or valuable animal through death (Berge and Westhues, 1986). Surgical disorders can also hinder the growth, performance and economic value of the animal (Hossain et al., 1986; Arju et al., 2014).

Surgery is one of the oldest and commonest techniques employed in all species of animals for the purpose of correcting acquired functional and structural disturbances as well as genetic defects affecting the health, welfare and productivity of the individual animals. The
common surgical conditions previously handled at CVMA were abscess, wound, urethral obstruction, horn fracture, penile and/or preputial injuries, traumatic hernia, uterine prolapse, dystocia and request for sterilization (Tiruneh, 2000; Tiruneh et al., 2014). Although, surgical procedures are the best means of treating certain health conditions such as neoplastic growths, fractures, rumen foreign body, congenital problems like atresia ani and urocystolith. Managements of such surgical conditions, methods employed and the associated outcomes are not systematically studied and documented in Ethiopia. Therefore, the objectives of this study were:

1. To gain and develop surgical skills on various surgical techniques and procedures performed on both ruminant and small animal patients as partial fulfillment for MVSc degree in veterinary surgery.
2. To manage and document the outcomes of both minor and major surgical conditions performed on both ruminant and small animal patients for future improvement of current surgical practice at VTH, CVMA.
2. MATERIALS AND METHODS

2.1. Species, sex, age and surgical conditions of study animals

The present study was conducted from January 2017 to April 2018 on 35 ruminant species (24 Bovine, 6 Ovine, 5 Caprine) and 20 pets (19 dogs and 1 cat), of either sex, with age range of 3 day old to 16 years and body weight ranging from 3–250 kg, presented at Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University, Bishoftu Ethiopia. Animals suffering from various disorders requiring surgical intervention were included in this study. Grouping was done according to the disease or organ involved and all the animals were subjected to systematic evaluation for diagnosis of the disease conditions and they were grouped based on their surgical condition as: Minor surgical conditions performed on ruminants and small animals (abscess, hematoma, orchitis due to faulty application of Burdizo forceps, hyena bite, paraphimosis, subcutaneous seroma, skin tumor, uterine prolapse and wound/traumatic/dog bite), major surgical conditions performed on ruminants (atresia ani, atresia ani-et recti, fracture of metacarpus, rumen foreign body removal, and urethral rupture and urolithiasis) and major surgical conditions performed on small animals (tail docking, dystocia, forelimb amputation following paralysis due to car accident, fracture repair of radius and ulna, inguinal herniorrhaphy and cystotomy for cystic calculi removal, mammary tumor resection, overiohysterectomy, and open castration for testicular tumor removal).

2.2. Case Reporting Outline

2.2.1. Case History and Clinical Parameters

Signalment of all study animals such as species, age, breed, sex, and health status of all the animals were recorded at time of presentation. The following features were recorded for each case including: duration of the illness, severity of the problem, history of previous ailment and medication. Clinical symptoms suchlike anorexia, lethargy, depression, weight loss, vomition, enlargement of abdomen, polydipsia, polyuria, dysuria, haematuria, vaginal discharge, any changes on the animal behavior, locomotion disorders, swellings and expressions of pain, and other alignments were recorded. Physical examination as respiratory
rate (RR), pulse rate (PR), rectal temperature, colour of mucous membrane and hydration status were recorded. Each case was closely inspected for detection of any structural and/or functional disorders of the affected region. 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 existence fluids or contents in the examined lesions. Whenever situations permit, laboratory examinations such as hematology (packed cell volume), and cytology were examined and the results were recorded on individual case books of each patient.

2.2.2. Surgical Prescriptions

Procedure - preoperative preparation of surgical sites and operation of minor or major surgeries have been done as dictated and demanded by each individual case. Animals with high surgical and anaesthetic risk were stabilized before surgical interferences. For example, dehydrated animals were rehydrated first administration of warm, sterile isotonic fluids parenterally before and during the surgery. The surgical sites were prepared by shaving of the hair from the surgical site and its surrounding of approximately 15 to 20 cm in diameter followed by surgical scrubbing starting at the proposed surgical site and working in circles of increasing diameter to the edge of the clipped area using antiseptic solution such as 0.05% chlorhexidine gluconate. Ruminant animals were secured and restrained in a crush with the help of rope in addition to the application of local anaesthetic block or infiltration at the surgical site. Accordingly, desensitization of the operative site was achieved either by epidural nerve block or local infiltration using the appropriate amount of 2% lignocaine HCl (Glocain, Vital Care Limited, India) to effect at the recommended site for the given surgical procedure. For example, local infiltration was done at broad base of a swelling and stab skin incisions were given over the swollen mass for minor surgeries such as abscess and haematoma drainage whereas inverted L block was performed for rumenotomy.

In case of small animals, general anaesthesia using injectable anaesthetic agents was employed. Based on the temperament of the presented animal, either of the two types anesthetic protocol have been used. The first protocol employed xylazine @ 1-1.5mg/kg and tramadol @ 2mg/kg intramuscularly (IM) as premedication, and ketamine hydrochloride @
5mg/kg and xylazine @ 1-2mg/kg intramuscular (IM) for induction and intravenous (IV) for maintenance while the second protocol employed xylazine @ 1-1.5mg/kg and tramadol @ 2mg/kg (IM) for premedication, and ketamine hydrochloride @ 5mg/kg and diazepam @ 0.2mg/kg combined in the same syringe (IV) for both induction and maintenance. Intravenous fluid was administered at a rate of 1 drop/second to all animals operated under both protocols using 18 G IV cannula. All surgical procedures were performed keeping Halsted’s seven surgical principles in mind including preserving local blood supply, proper apposition and gentle handling of tissues, avoiding tension, decreasing dead space, abiding by aseptic principles, and hemostasis. Hypothermia was prevented by placing the animals on a padded surface and supplied with extra bedding or supplemental heat as required, by taking care to prevent thermal burns and hyperthermia. A surgical record was kept for each surgical patient and parameters such as readings made by continuous monitoring of body temperature, respiratory pattern, heart rate, mucous membrane colour, capillary refill time protective reflexes were registered at every 10 minutes interval. Drugs administered, dosages, routes of administration and all complications that arise during the procedure were also recorded on each surgical patient’s case book.

2.2.3. Postoperative management and follow up

Animals were daily visited at the hospital for 3-5 days and antiseptic dressing of the surgical wound was performed daily. The owners were recommended to keep animals in hygienic and clean comfortable place. An appropriate course of analgesia (tramadol @ 1mg/kg), disinfectant (2% iodine solution, 0.1% povidone-iodine, 0.05% chlorhexidine and topical cyclo spray), antibiotic and supportive therapy (oxytetracycline 10%, penstrep 20%, procaine penicillin 300,000 IU/ml, dexamethasone 4mg/ml, 0.9% NaCl or lactated Ringer’s and multivitamins complex) were given until complete recovery. The skin stitches were removed within 8-10 days postoperatively. Postoperative follow-up were performed in all cases by telephone communication with the family veterinarian and/or owners.

2.2.4. Outcome and prognosis

The outcome was recorded as good prognosis, whenever the operated animal has been survived and bad prognosis, whenever the operated animal has been died. Also the animal
have been recorded as successfully recovered and the wound has been healed successfully whenever the restoration of function, recovery of organ or limb function which is based on cells and tissues regaining biologic integrity by healing from wounds; when no infection is present, presence of new epithelium around the wound edge, epithelization, neovascularization and contraction with normal all physiological parameters and normal appetite.
3. RESULTS AND DISCUSSIONS

3.1. Species, sex and age of ruminants and small animals generally

A total of 55 surgical cases presented to CVMA, VTH were handled and treated surgically, of which 35 were ruminants including 68.57% (24/35) Bovine, 17.14% (6/35) Caprine, and 14.29% (5/35) Ovine whereas 20 were small animals including 95% (19/20) canine and 5% (1/20) feline. Out of 35 ruminants cases presented with surgical condition, 21(60%) were males and 14(40%) were females whereas 28 (80%) adult animals (> 2 years) followed by 7(20%) were young animals (< 2 years) as described in Table.

Table 1: Surgical cases presented and surgical procedures performed on different species, sex and age of ruminants.

<table>
<thead>
<tr>
<th>Species</th>
<th>Total No. of Surgical cases</th>
<th>Sex</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>Adult</td>
</tr>
<tr>
<td>Bovine</td>
<td>24(68.57%)</td>
<td>14(66.7%)</td>
<td>10(71.43%)</td>
</tr>
<tr>
<td>Caprine</td>
<td>5(14.29%)</td>
<td>4(19.05%)</td>
<td>1(7.14%)</td>
</tr>
<tr>
<td>Ovine</td>
<td>6(17.14%)</td>
<td>3(14.3%)</td>
<td>3(21.43%)</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>21(60%)</td>
<td>14(40%)</td>
</tr>
</tbody>
</table>

From 20 small animal surgical cases presented 14(70%) were females and 6(30%) were males whereas age wise 18(90%) were adult animals and 2(10%) were young animals as described in Table 2.

Table 2: Surgical cases presented and surgical procedures performed on dogs and cats of both sex and various age groups.

<table>
<thead>
<tr>
<th>Small Animals</th>
<th>Total No. of Surgical cases</th>
<th>Sex</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>Adult</td>
</tr>
<tr>
<td>Canine</td>
<td>19(95%)</td>
<td>6(100%)</td>
<td>13(92.86%)</td>
</tr>
<tr>
<td>Cat</td>
<td>1(5%)</td>
<td>0</td>
<td>1(7.14%)</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>6(30%)</td>
<td>14(70%)</td>
</tr>
</tbody>
</table>
3.2. Minor Surgical conditions performed on Ruminants and small animals

Minor veterinary surgery includes procedures ranging from removing skin masses and suturing minor wounds to certain dental procedures. Specifically, minor veterinary surgery: does not involve any procedure considered to be life-threatening or risky; does not involve any complex procedure; were carried out on a patient that is otherwise healthy; does not involve entry into a body cavity. It is therefore difficult to produce a definitive list of minor surgical procedures. The decision of what constitutes minor surgery were depend on: Size, depth and position of wound; condition of underlying tissue; complexity of surgery, including incision and repair; overall health of the patient; proximity of surgical area to delicate or important organs (Julian, 2006).

3.2.1. Abscess

3.2.1.1 Case history and clinical examination findings

A total of six cattle were presented with an abscess at Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University, of which the sex representation was four male and two female, the age representation was five adult and one calf. All the abscess swellings were subcutaneous located in different parts of the body of cattle that included one at the base of the ear, two between the mandibles, one at cranial surface of the shoulder region, one in left ventro-lateral abdomen area and one at the dorsal surface of the gluteal muscles. On clinical examination the masses were warm, hard and painful in the initial stages, and become fluctuating and soft for maturation whereas their history revealed gradual reduction of feed intake and water consumption. All physiological parameters were normal in all the animals presented. To differentiate it from other type of lesions causing swelling like tumor, hematoma, hernia etc, aspiration of the content from the swollen mass was performed using a 16 gauze sterile needle that revealed creamy discharge in all cases that were diagnosed as an abscess. In one of the case, the maturation of the abscess was done by the application of Ichtamol daily which completed by third day. Exploratory puncture was again done on 3rd day with 16 gauze needle on the swollen mass which revealed thick, yellowish, creamy pus came out either through needle or the punctured site. On the basis of history, clinical findings and exploratory puncture the cases were
diagnosed as a case of superficial skin abscess in different part of the body. Finally it was decided to perform surgery for complete evacuation of the pus to relieve the patient from this condition and was surgically treated.

3.2.1.2 Surgical prescription

Table 3: Description, procedure, outcome and prognosis of Abscess

<table>
<thead>
<tr>
<th>Case No</th>
<th>Description</th>
<th>Procedure</th>
<th>Outcome</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>A subcutaneous swelling located at base of the ear</td>
<td>Puncture of the swelling to confirm content</td>
<td>Wound successfully healed after a week of treatment</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Preparation of the skin for drainage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complete removal of exudates and packing of the wound with 2% tincture of iodine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5ml of 20% Penstrep, IM with regular aseptic wound dressing using 0.05% chlorhexidine for 5 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case 2</td>
<td>A subcutaneous swelling located on cranial surface of the shoulder</td>
<td>Same as above procedure</td>
<td>Wound successfully healed after 10 days of treatment</td>
<td>Good</td>
</tr>
<tr>
<td>Case 3</td>
<td>A subcutaneous swelling located between mandibles (sub-mandibular region)</td>
<td>Same as above procedure</td>
<td>Reoccurrence after 20th day of postoperation. The animal has been retreated with 5ml OxyTTC 10%, IM for 5 days, along with Dexamethasone @ 2 mg/kg and Multivitamin 10 ml, IM for 4 days with regular dressing of wound by 0.1% povidone iodine.</td>
<td>Good</td>
</tr>
</tbody>
</table>
The animal showed remarkable improvement and completely recovered with normal appetite within 7 days.

<table>
<thead>
<tr>
<th>Case</th>
<th>Location</th>
<th>Treatment</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>A subcutaneous swelling located on left ventro-lateral abdomen</td>
<td>Same as above procedure</td>
<td>Wound successfully healed after 12 days of treatment</td>
</tr>
<tr>
<td>5</td>
<td>A subcutaneous swelling located between mandibles (sub-mandibular region)</td>
<td>Same as above procedure</td>
<td>Wound successfully healed after 10 days of treatment</td>
</tr>
<tr>
<td>6</td>
<td>A subcutaneous swelling located on dorsal surface of the gluteal muscles</td>
<td>Same as above procedure</td>
<td>Wound successfully healed after two weeks of treatment</td>
</tr>
</tbody>
</table>

### 3.2.1.3 Discussion

An abscess is a circumscribed inflammatory lesion, which consist of purulent exudates. Causes of abscesses formation are variable and include a breach on the surface of the skin or mucous membrane and entrance of pyogenic microorganisms through it, infected foreign bodies migrating from the lumen of digestive tract, non-sterilized needle used for intramuscular injection, punctured or penetrating wounds (Williamson, 2001; Valentine, 2004; Abdel-Hady et al., 2015). All the abscess swellings were subcutaneous located in different parts of the body of cattle that included one at the base of the ear, two between the mandibles, one at cranial surface of the shoulder region, one in left ventro-lateral abdomen area and one at the dorsal surface of the gluteal muscles. This result was in agreement with that reported by Misk et al., (2008) who stated that the predilection sites of abscesses in different animals depend mainly on the way of entrance of the infection. Also the reason behind the occurrence of the abscess in these sites may be domestic animals are exposed to many of the foreign bodies like sharp stones, nails, wires etc. and similarly in these cases the animals may be exposed to any foreign body. Similar findings were also described by Tiwari and Kashyap, (2011) in foot abscess of elephant (Sahoo and Ganguly, 2015). Abscess cases were higher in male than female, due to use of male for draught purpose in the area and
fighting between them. Cattle are the species predominantly used in agriculture operations to pull agricultural implements (e.g. plough, weeder, pudler, etc) (Ramaswamy, 1994).

Exploratory puncture was highly diagnostic in case of abscesses. In addition, size, consistency, nature and colour of the contents play a considerable role in diagnosis and differential diagnosis of abscesses. Treatments of all cases depend on maturation and evacuation. Thorough examination of the abscesses cavity was essential to extract any migrating foreign bodies; otherwise the abscesses will continue to discharge pus after its opening (Misk et al., 2008; Abdel-Hady et al., 2015). Treatment of large abscess was performed by evacuation of pus from the abscess cavity along with antibacterial therapy. Similar line of treatment was followed by Thorat et al., (2008); Sahoo and Ganguly, (2015). Drainage is essential to prevent dead space and seroma formation. Simple dependent stab incisions, passive drains, or active drainage systems were used depending on the wound (Davidson, 1998; Pavletic, 1999). Reoccurrence in abscess (16.67%, 1/6) in one case has been encountered due to opening of the abscess cavity before complete maturation during management. The animal has been retreated with 5ml OxyTTC 10%, IM for 5 days, along with Dexamethasone @ 2 mg/kg and Multivitamin 10 ml, IM for 4 days with regular dressing of wound by 0.1% povidone iodine after ensuring complete maturation of the abscess. The animal showed remarkable improvement and completely recovered with normal appetite. So it is recommended to ensure a complete maturation of abscess before surgical treatment.

3.2.2. Hematoma

3.2.2.1 Case history and clinical examination

From all cases adult cattle presented with swelling of different kinds, five (two cow and three bulls) were diagnosed as haematoma causing swellings on ventral abdomen, left abdomen, shoulder area, Pre-femoral region and left leg and on the hock joint, respectively. The history of each case was taken from the animal’s owner. The data regarding age, sex, species, breed, time of onset of the disease, previous medication and health status were recorded. Four of the cases were presented with the history of injuries caused by other animal’s horn. One of the cases were presented with the history of fall down and severe
swelling on the hock joint. Clinical examination was revealed that the animal had weight bearing lameness on left hind leg, pain evidenced on palpation at the site of the swelling and uniform fluid fluctuation in the subcutaneous layer.

Each case was closely inspected for detection of any structural and/or functional disorders of the affected region. The affected parts and/or lesions were manipulated to detect their nature, consistency and tenderness. Exploratory puncture was done to reveal the physical characters of the existence fluids or contents in the examined lesions blood and serous fluid was aspirated using a needle. Physical parameters like temperature, pulse, respiration and appetite were normal. Based on history, clinical examination and anatomical location of the cases were diagnosed as subcutaneous haematoma. Treatment of hematoma: In the early phase, sterile puncture; later, surgical exploration is required.

3.2.2.2 Surgical prescription

Table 4: Description, procedure, outcome and prognosis of hematoma

<table>
<thead>
<tr>
<th>Case No</th>
<th>Description</th>
<th>Procedure</th>
<th>Outcome</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>A subcutaneous swelling located on Ventral abdomen</td>
<td>Puncture of the swelling to confirm content</td>
<td>Wound successfully healed after a week of treatment</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Preparation of the skin for drainage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complete removal of blood clot and packing of the wound with 2% tincture of iodine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5ml of 20% Penstrep, IM with regular aseptic wound dressing 0.1% povidone-iodine for 5 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case 2</td>
<td>A subcutaneous swelling located on Left abdomen</td>
<td>Same as above procedure</td>
<td>Wound successfully healed after week of treatment</td>
<td>Good</td>
</tr>
<tr>
<td>Case 3</td>
<td>A subcutaneous swelling located on dorsal surface of the shoulder</td>
<td>Same as above procedure</td>
<td>Wound successfully healed after 8 days of treatment</td>
<td>Good</td>
</tr>
</tbody>
</table>
**Case 4**
A subcutaneous swelling located on flank region (lateral surface of the abdomen between last rib and the hind leg)
Same as above procedure
Wound successfully healed after a week of treatment
Good

**Case 5**
A subcutaneous swelling located at Left leg, on the hock joint
Same as above procedure
Wound successfully healed after 10 days of treatment
Good

### 3.2.2.3. Discussion

A hematoma is the accumulation of a large volume of free blood under the skin. Hematoma can be differentiated from edema or inflammatory fluid by the 'finger press test'. In the case of edema, a finger pressed onto the swelling and then removed will leave an indent that remains visible for some minutes. If the swelling is inflammatory, there will probably be no pitting with pressure: in the case of hematoma the indentation will disappear immediately the finger is removed. Hematoma can be left to organize or can be drained according to clinical preferences. Direct pressure on the drained area is sometimes helpful, but can also be difficult in some locations (Knottenbelt, 2003).

Large haematomata, particularly in confined spaces, may need decompression or evacuation to prevent necrosis of overlying tissues. Secondary infection of a haematoma is uncommon that is why complication was not encountered similar result has been reported by Knottenbelt, (2003). Haematomas start out soft and firm up as they get older. That’s because the swelling starts to fill with blood clots, fibrin and various kinds of cellular debris from the initial insult, gradually changing the feel of the swelling from water balloon to gel. By the time a hematoma is ready to open, it has basically become a seroma, which is a swelling full of serum. The opening should be at the most ventral aspect and large enough to remove the fibrin clot (Briggs, 2008; Radostits *et al.*, 2006; Pothiappan, 2013).

Minor injuries occur routinely and the body is usually able to repair the damaged vessel wall by activating the blood clotting cascade and forming fibrin patches. Sometimes the repair fails if the damage is extensive and the large defect allows for continued bleeding. As well, if
there is great pressure within the blood vessel, for example a major artery, the blood will continue to leak (Evans, 1998; Pothiappan, 2013).

3.2.3. Testicular ablation as a treatment for orchitis due to faulty application of Burdizo forceps and hyena bite

3.2.3.1 History and clinical findings

The history indicated that the three goats were intended for fattening and previously presented to VTH for castration, during which undergraduate students performed closed castration using baurdizo forceps. Then a week later the goats were brought back to VTH with complication having swelling and necrosis of the whole scrotum due to faulty use of the baurdizo instrument during the previous castration, which required testicular ablation. Also a five year old ram was presented with the history of injury at scrotum and testes due to hyena bite before sixth hours of admission. On clinical examination and observation revealed bleeding of testes without coverage of scrotum. Both testis and vaginal tunic was present but the tunics at the tail of the epididymis have been teared and were bleeding out. A temporary ligation was applied at site of bleeding to stop the bleeding before the operation.

3.2.3.2 Surgical prescription

Open castration was done as salvaged procedure. An assistant restrained the goats in lateral recumbency: the goat's head was held under one arm and the limbs grasped firmly together. The scrotal skin and both spermatic cords are locally infiltrated with 2% lidocaine solution. Skin Incision was made around the base of the scrotum. Ligation of the bleeding vessels on the lateral aspect of the scrotum was done. Using Metzenbaum scissors, the subcutaneous tissues and scrotal skin was separated by undermining. The testicular tissues and spermatic cord, covered by vaginal tunic, was ligated with number 0- vicryl. The spermatic cord was transected 1 cm distal to the ligature and the stump was checked for bleeding. The opposite testicle was removed in a similar manner. In two goats and a ram, the subcutaneous tissue and skin were left open. In one goat, the subcutaneous tissue and skin were closed in a continuous pattern using number -0- vicryl, an absorbable synthetic monofilament suture material.
3.2.3.3 Postoperative management and outcome

Each goat and a ram was administered 3 ml of 20% penstrep intramuscularly with regular aseptic wound dressing using 0.05% chlorhexidine for 5 days to prevent infections. Postoperative complication of severe edematous swelling was observed in one goat in which the subcutaneous tissue and skin were closed, that required treatment with Diclofenac sodium, a NSAID. The remaining two goats and a ram in which the skin and subcutaneous tissue left open didn’t show any postoperative swelling. However, finally, all the animals
recovered completely after 8-10 days and the skin stitch was removed at this time from the goat, in which suture was placed.

3.2.3.4 Discussion

Orchitis due to faulty application of Burdizo forceps were handled by surgical ablation of the testicle in three male goats, at the VTH, CVMA, AAU. The problem was caused by faulty application of burdizo forceps during close castration when undergraduate students performed the procedure using burdizo forceps. The animals were presented with complication having swelling and necrosis of the whole scrotum. After the testicular ablation was done accompanied by open castration, complete recovery has occurred in all of the three cases. Castration is the most commonly performed surgical intervention as most of the farmers want to fetch more income by castrating their male goats as castration is helpful in rendering improvement of meat quality which have a great demand at the local market and its management is easier (Khandoker et al., 2011; Al Noman et al., 2018).

Hyena bite is a common problem in equines in the study area and it was recorded in one ram bitten at the scrotal area during this study. Open castration was performed for successful recovery. The natural environment of hyenas has been altered in Africa by the steady cultivation of land due to population pressure. This tends to destroy the animals’ natural habitat, as is the case in Ethiopia where the human population has risen to 90 million alongside an estimated 4000–5000 resident hyenas (Fell et al., 2014). Postoperative complication in the form of swelling can occur following suturing of skin requiring additional treatment with anti-inflammatory drug adding to the cost of treatment for the farmer. Therefore, it is wise decision to leave the skin and subcutaneous tissue open for free drainage.

3.2.4. Paraphimosis

3.2.4.1 Case history and clinical examination

A 6 year old bull was presented to the VTH, CVMA, Addis Ababa University with a history of anorexia, constant bleating, and sustained penile protrusion since coitus i.e. three days ago
at date of admission. On clinical examination the glans penis was swollen and adhesions were presented between preputial skin and gland penis.

Figure 3. A bull with swollen protruded penis collecting dirt on the glans and the prepuce.

3.2.4.2 Surgical prescription

Correction of the protruded penis was performed after the bull was restrained in lateral recumbency using cast and locally infiltrated with 2% lidocaine solution. The protruded penis was washed with chlorhexidine gluconate (savlon) was applied to the exposed glans penis and the adhesions between the preputial skin and glans penis were separated by making a circular incision at the junction of glans penis and preputial orifice. Repositioned the glans penis by sliding it into the preputial cavity and retention was achieved by applying purse string sutures to the preputial orifice as described by Nevi et al. (2015).

3.2.4.3 Postoperative management and outcome

Postoperatively animal was administered dexamethasone @ 0.2 mg/kg with 3 ml of 20% penstrep intramuscularly to reduce swelling of glans penis for 5 days. Purse string suture was removed on 7th postoperative day and animal was recovered uneventfully without any complications.
3.2.4.4 Discussion

The primary goal in treating paraphimosis is to reduce the swelling and replace the prolapsed penis back to the preputial cavity as soon as possible to protect it from further injuries. Nevi et al., (2015) mentioned that acquired paraphimosis is a result of trauma to the penis which causes damage to the innervations of the penis leading to the paralysis of penile retractor muscles. In the present case the paraphimosis might be due to the trauma to the penis during coitus. Temporary purse string sutures were applied to the preputial orifice to keep the penis in the preputial cavity as one of the options in the initial surgical treatment of paraphimosis as mentioned by Fossum, (2002). Kumaresan et al., (2014) applied purse string sutures for retension of penis whereas Adeola and Enobong, (2016) used tension release incision with simple interrupted sutures for treatment of paraphimosis in dogs.

3.2.5. Skin tumor

3.2.5.1 Case history and clinical examination

Two adult bulls and one dog were presented to the VTH, CVMA, Addis Ababa University with a history of nodular raised growth on neck and head region. On clinical examination, observation revealed cauliflower-like growths which appeared as wart like growth whereas the dog was presented having large swelling on the front left leg. Up on clinical examination and palpation the mass was appeared superficial involving the skin and was movable. The animals were prepared for surgery and treated by surgical excision of the tumors.

3.2.5.2 Surgical prescription

Surgical excision was performed after infiltration of the surgical area was done with 5 ml of 2% lignocaine (Glocain, Vital Care Limited, India) and shaving/ cleaning of the site were performed. A long curved hemostatic forceps were applied behind the excision mass to control hemorrhage and the tumors were removed. After excision bleeding vessels were ligated using absorbable suture as prescribed by Birchard and Sherding, (2006) and Merck et al., (2010).
3.2.5.3 Postoperative management and outcome

After excision and removal of the growth, the areas were bandaged. Since there was tension with large gapping space between the wound edges suturing was impossible. Therefore, open wound management was employed by continuous dressing of the wound with iodine tincture. 20% penstrep @ 1 ml/10kg and tramadol @ 1 mg/kg intramuscularly were given for five days. The animals recovered successfully.

3.2.5.4 Discussion

Skin tumors are the most common neoplasm in farm animals (Fubini and Ducharme, 2004). This is in large part caused by the high incidence of papillomavirus-induced lesions in the skin of cattle. Papillomas, commonly called warts, are the most common skin tumor of cattle. Shorthorn cattle appear to be predisposed to development of cutaneous papillomatosis (Fubini and Ducharme, 2004). Lesions appeared at neck, ear and leg in these tumor cases. Lesions can occur anywhere on the body, but the head, neck and dewlap are common sites (Fubini and Ducharme, 2004). Also several cases of skin neoplasm were reported in sheep, goats and dogs (Zabady et al., 2004; Abu-Seida and Ahmed, 2007), surgical excision of the tumor was revealed as best treatment.

3.2.6. Subcutaneous seroma

3.2.6.1 Case history and clinical examination

A two year cross breed Holstein Friesian was presented to the VTH, CVMA, Addis Ababa University with a history of swelling on ventral abdomen. On clinical examination and palpation, the mass was cold and soft in consistency. Aspiration of fluid from the swollen mass by a sterilized needle revealed black tarry fluid. The case was diagnosed as subcutaneous seroma and surgical drainage of the seroma was recommended.
Figure 4. Cow with a large subcutaneous seroma swelling on ventral abdomen

3.2.6.2 Surgical prescription

Surgical drainage of the seroma was performed after the animal was controlled in dorso-lateral recumbence using robe and ventral abdominal area was shaved and prepared. Infiltration of 2% lidocaine was performed around the incision. Incision of ventral abdomen on the seroma was made. Immediately after the incision a large amount of black tarry fluid with fouls smelling gushed out.

Figure 5. A- Draining out the content of seroma; B- standing cow after drainage
3.2.6.3 Postoperative management and outcome

The cavity was flushed and washed with a lot of water and savlon several times. Finally the cavity was irrigated with gauze impregnated with iodine. Finally 5 ml of 20% penstrep was prescribed for 5 days leaving the incision for drainage. The animal was recovered successfully.

3.2.7. Uterine prolapse

3.2.7.1 Case History and Clinical observation

A second parity cross bred cow was presented with a history of a difficult parturition and during parturition the owner forcibly pulled the fetus to support the laboring cow. Up on clinical examination, a prolapsed uterine mass was observed where the placenta was adhered to the fetus. The animal was lying down. Physical examination was carried out and the vital parameters were: Temperature 39 °C, Respiratory rate 49 cycles /min and pulse rate 120 beats/min. The mucous membrane was pinkish and the prolapsed uterine mass was swollen and stained with debris.

![Figure 6: Uterine prolapse in a second parity cross breed cow](image)

3.2.7.2 Surgical prescription

The animal was given caudal epidural analgesia by injecting 5 ml of 2% lignocaine at sacrocoocygeal space to eliminate straining. Placenta adhered to fetal bed and the prolapsed
uterus was washed with normal saline. Then the placenta was carefully separated by detaching foetal cotyledons from maternal caruncles avoiding damage to maternal caruncles and bleeding. Then the uterus was washed and cleansed with warm water and then water with salts. The uterus was inspected for tears. Then replacement of the uterus back to its normal position was performed by the application of gentle pressure, using the palms of lubricated hands using rectal glove but reposition was impossible after several minutes’ of manipulation since a cow was laid in lateral recumbency. The cow was put into sternal recumbency and then using both hands with moderate force the prolapsed uterus was gently pushed in through the vagina. The body was first pushed in followed by the horns and progressively replaced whole organ in to its normal position as mentioned by Dey et al., (2017).

3.2.7.3 Postoperative management and outcome

To prevent further complications and secondary bacterial contamination, Procaine Penicillin 22000 IU/kg intrauterine was administered. Then Buhner’s suture was applied for retention and prevention of re-occurrence of prolapse due to straining. On immediate postoperative time, the cow was shown normal defecation and urination but unable to stand. This complication was suspected to be due to hypocalcaemia and calcium borogluconate was administered that resulted in the cow to recover quickly. Then suture was removed after 10 days postoperatively.

3.2.7.4 Discussion

According to Noakes et al. (2001), uterine prolapse normally occurs during the third stage of labour at a time when the fetus has been expelled and the fetal cotyledons have separated from the maternal caruncles. The goal in the treatment of uterine prolapse is replacement of the organ followed by a method to keep it in the retained position. Uterine prolapse can be replaced with the animal in standing or recumbent position (Hanie, 2006). In this presented case, the condition was corrected successfully in a sternal recumbency. Recovery was achieved successfully. Similar successful correction of uterine prolapse in sternal recumbent position followed by recovery was reported by Dey et al., (2017) and White, (2007).
3.2.8. Wound management

In total of 9 cases of different traumatic and dog bite wounds inflicted on different species of animals (cattle, goats, sheep and dog) of different age and sex groups have been presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University which had different wound on different area. Two of them were sheep that had been bitten by dog. Five animals (cattle, sheep, goat and dog) were presented with traumatic wounds of other causes as hit of other animal’s horn, hit of motor vehicle and fall down. Also two animals were presented with wound for unknown reason. On physical examination there were an open bleeding and non-bleeding contaminated wounds situated at different body parts including the elbow, udder, hock joint, lip, neck, hamstring, wither and umbilicus area. There is extensive damage to the skin around the wound area with complete tearing away of some skin and adjacent tissues. All parameter were within the normal range. All cases were treated as open wound management.

3.2.8.1 Surgical prescription

Table 5: Species, description, procedure, outcome and prognosis of Wound

<table>
<thead>
<tr>
<th>Case No</th>
<th>Species</th>
<th>Description</th>
<th>Procedure</th>
<th>Outcome</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>Bovine</td>
<td>A large avulsion wound at left hind leg on dorsal surface below the stifle, lameness</td>
<td>the animal properly restrained the area surrounding the wound have been clipped and prepared 0.05% chlorhexidine scrubs were used to prepare the skin and cleaned with tap water copious lavage using 0.05% chlorhexidine and thorough debridement was made medications for oxytetracycline ointment, Glyco spray topically and 5ml of 20% Penstrep, IM with regular aseptic wound dressing for 5 days</td>
<td>Wound successfully healed after two week of treatment and the animal was successfully recovered</td>
<td>Good</td>
</tr>
<tr>
<td>Case 2</td>
<td>Ovine</td>
<td>A lacerated wound</td>
<td>Same as above procedure</td>
<td>Wound successfully</td>
<td>Good</td>
</tr>
<tr>
<td>Case</td>
<td>Animal</td>
<td>Description</td>
<td>Treatment</td>
<td>Outcome</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
<td>-------------</td>
<td>-----------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Caprine</td>
<td>A lacerated wound at left hind limb on dorsal surface hock joint</td>
<td>Healed after 10 days of treatment</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bovine</td>
<td>Avulsion wound at left side of front leg on caudal surface of the elbow</td>
<td>Healed after 12 days of treatment</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ovine</td>
<td>A dog bite wound on the upper lip</td>
<td>Healed after 6 days of treatment</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Ovine</td>
<td>A dog bite wound on the neck and hamstring muscle</td>
<td>Healed after a week of treatment and the animal was successfully recovered</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>dog</td>
<td>A lacerated wound on the ventral neck</td>
<td>Healed after 8 days of treatment</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Bovine</td>
<td>Avulsion wound on the dorsal surface of wither</td>
<td>Healed after a week of treatment and the animal was successfully recovered</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Caprine</td>
<td>A lacerated wound on ventral surface of the abdomen at umbilical region</td>
<td>Healed after 8 days of treatment</td>
<td>Good</td>
<td></td>
</tr>
</tbody>
</table>
3.2.8.2 Discussion

The primary goal in the management of wounds is to achieve rapid healing with optimal functional and aesthetic results. This is best accomplished by preventing infection and further trauma and by providing an environment that optimizes healing of the wound. All wounds should be thoroughly cleansed with tap water or normal saline (Chatterjee, 2005). Wound was categorized by their cause as dog or hyena bite wound, traumatic wound, and wound of unknown cause. Lavage reduces bacterial inoculums in the wound and removes debris, foreign material, and clots. Use of a 35-mL syringe and 18-gauge needle to generate a lavage pressure of 8 psi has been well reported (McKiernan et al., 1984; Brook, 2005).

Certain wounds benefit from bactericidal lavage solutions of chlorhexidine diacetate, chlorhexidine gluconate, or povidone iodine. Chlorhexidine is more effective than povidone iodine in reducing bacterial numbers and allows for more rapid healing (Sanchez et al., 1988). Bite wounds must be explored to discover the degree of underlying trauma. The hair around the bite wound should be liberally clipped, prepared, and draped for aseptic surgery. Wounds with little or minimum tissue trauma may be left open to drain and heal by secondary intention or closed with skin sutures after thorough lavage. In more contaminated wounds, hair and foreign debris are removed. Shredded or necrotic muscle, fat, and fascia are excised (Brook, 2005). Open wound management with antibiotics was revealed complete recovery of the animals.

3.3. Major Surgical conditions performed on Ruminants

3.3.1. Atresia ani in a female calf

3.3.1.1 Case history and clinical examination

A four day old local bred calf was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with the complaint of not passing the feces and variable degree of distended abdomen. The clinical examination reveals imperforate anus (lack of anal opening).
3.3.1.2 Surgical prescription

The calf was controlled in lateral recumbency and the perineal area was prepared for aseptic surgery by scrubbing with povidone iodine. The site was anesthetized by infiltration of 5 ml of 2% lidocaine hydrochloride subcutaneously at the proposed site of incision around the scar below the sacral margin. A circular incision was made upon the bulge of the anus and the circular piece of incised skin was removed. Muconium came out immediately. The patency of opening was maintained by application of interrupted sutures by silk #2 between rectal mucosa and skin to make a permanent anal orifice.
3.3.1.3 Postoperative management and outcome

Post-operatively, the surgical wound was cleaned and dressed regularly with liquid povidone iodine was applied daily till recovery and injection 20% Penstrep (3ml) was given intramuscular daily for 5 days. The animal was successful recovered and shown good prognosis. The sutures were removed on the 10th post-operative day.

3.3.1.4 Discussion

Cattle embryos are more susceptible for chromosomal aberrations between 14 – 42 days age leading to mutations (Bademkiran et al., 2009). Atresia ani is one of such congenital and hereditary anomaly at embryonic period resultant of autosomal recessive gene (Loynachan et al., 2006). Though other reasons like environmental teratogens, plant toxins (Bademkiran, 2009) and viral infections (Loynachan et al., 2006) were stated as causative factor of atresia ani in calves, in the present case the reason could not be ascertained and unspecific as reported by Johnson et al., (1980). Epidural anaesthesia could achieve sufficient desensitization to complete surgery as followed by Badawy, (2011). However, reports indicated use of ketamine + diazepam (Monsang et al., 2014), local infiltration of lignocaine + adrenaline (Shakoor et al., 2012), lignocaine only (Suthar et al., 2010). Surgical correction of atresia ani is the only successful treatment for calves born with this abnormality. The prognosis of surgical correction was also found good.

3.3.2 Atresia ani- et recti

3.3.2.1 Case history and clinical examination

A three day old Holstein Friesian cross bred calf was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with the history of lack of muconium and distended abdomen. On Clinical examination revealed increased respiratory and heart rate but the temperature was normal; absence of anal opening and recto-vaginal fistula; the signs of tenesmus and abdominal pain was observed. The calf appeared dull, with arched back. Based on the history and clinical examination tentatively it was diagnosed as a case of atresia ani and surgical correction was planned as emergency.
3.3.2.2 *Surgical prescription*

The calf was controlled in dorso-ventral position with its hindquarter raised high on a table and restrained. The perineal region below the base of the tail was prepared for aseptic surgery. Epidural anesthesia was given with 2% lignocaine HCl @ 2mg/kg body weight. After achieving the desensitization at the site, an artificial opening of anus was made to simulate the normal anatomical/ topographical opening. Through this opening, rectum was searched but could not be found. The rectal cul de sac was positioned too cranially along with peripheral adhesions and laparotomy was chosen to approach rectal end. The right flank was prepared for aseptic surgery and animal was placed on left lateral recumbency. Under, 2% lignocaine HCl local infiltration, right flank incision was made and the associated muscles were incised and the caudal alimentary tract was identified, distended colon with blind termination of rectum was observed. Rectum was located and a long curved artery forceps was then sent through the circular skin incision made at the natural anal opening is supposed to be found and the forceps was used to clamp the blind end of the rectum while gently pushing the rectum towards the anal opening with hand inserted in the abdomen through the flank incision. After ensuring pulling and putting the rectum at the proper anatomical location, blind end of rectal wall was opened by surgical incision to evacuate the meconium, the massive amount of which came out immediately. The rectal mucosa was then
sutured to the skin edge of the circular skin incision made to make artificial anal opening using an interrupted suture pattern with number 2-0 Polyglycolic acid. Then finally the abdominal wall was sutured routinely as described by Kumar et al., (2011) and Dubey et al., (2015).

Figure 10. A - An artificial circular skin opening made at the natural position of the anus without rectal cul de sac being seen as expected. B- Meconium coming out after blind end of rectal mucosa was opened

3.3.2.3 Postoperative management and outcome

The calf had concurrent congenital abnormalities including absence of tail and atresia ani-et recti with recto-vaginal fistula that was letting small amount of meconium coming out through the vulva. Although the case was very complicated during surgery, the calf was normally defecating after surgery but the owner had been reported that the calf died on fifth day of postoperation. The cause of the death of the calf seems to be lack of postoperative care by the owners. It was reported that the owner was admitted for appendicitis surgical intervention the next day after the calf was operated, resulting in redirection of all the focus of the family members to the owner fighting for its own life with a life threatening surgical condition.
3.3.2.4 Discussion of atresia ani et recti

Absence of anal opening and recto-vaginal fistula that was letting small amount of meconium coming out through the vulva; the signs of tenesmus and abdominal pain were observed. The atresia ani et recti was associated with depression, anorexia, abdominal distension and lack of feces. The diagnosis of intestinal atresia is often presumptive based on the age, history, and physical examination findings. Atresia ani can be diagnosed by visual inspection of the perineal region or by limited digital palpation if a vestigial anal opening is present. Further diagnostic testing or surgery is required for confirmation of intestinal atresia in a more proximal location. In calves with either small intestinal atresia or atresia coli, the intestinal portion proximal to the atretic segment is distented with gas and ingesta (Kiliç and Sarierler 1, 2004). These cases need surgical intervention as soon as possible. History, clinical signs and physical examination findings were sufficient to establish the diagnosis in our case, as also reported (Dubey et al., 2015). Surgical correction and procedure was in a manner similar to that of Kumar et al., (2011) and Shakoor et al., (2012).

The calf was recorded as not good outcome due to death after five days of surgery. The Calf had congenital abnormalities of taillesness and Atresia Ani-et recti with recto-vaginal fistula. This Atresia ani-et recti was suspected for falling under the category of type III, where the rectum ends as a blind pouch which is located farther cranial as also reported by Dubey et al., (2015). Similar case of death result had been reported by Kumar et al., (2011) which the calf died in two days after surgery. The long term survival rate of surgically treated animals depends largely on the site of the intestinal atresia and the surgical technique used (Matins et al., 1995; Kumar et al., 2011). Also this study shows that postoperative care is one of main dependant factor for long term survival and good surgical outcomes. Calves have usually died due to such defects causing economic loss to the owners (Saperstein, 1993).

3.3.3. Fracture of metacarpus

3.3.3.1 Case history and clinical examination

A 2.5 year old cross breed heifer was presented to the Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with the complaint of
fracture in right front leg at metacarpus. History revealed that to the heifer fall down on a concrete area. Clinical examination and palpation revealed complete closed fracture of metacarpal bone.

3.3.3.2 Surgical prescription

External coaptation was applied using plaster of paris cast and locally available PVC as a splinting material in order to repair the fracture. The animal was sedated and restrained in lateral recumbency with affected limb upper most. The whole limb was cleaned including the foot. At the end of the limb, a rope was tied to facilitate reduction and proper alignment of fractured fragments and to keep the limb in normal position during the application of the cast. A layer of gauze and two layers of cotton padding were applied from toes up to mid-radius. Splints were prepared and cut to appropriate sizes and put over the cotton padding. The POP cast was submerged in lukewarm water using both hands till the air bubble stop emerging. The POP cast was gently squeezed to remove excess water and applied without creating wrinkles or crease on the POP layers. Each turn of the POP was overlapped with the previous turn by half of its width. Second spiral layer results in four layers. Finally it was secured with adhesive tape. Proximal end was similarly taped. The POP cast was changed every three weeks as described by Brinker et al., (2006).

Figure 11. After splint and POP application to repair fracture of metacarpus in a heifer

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3.3.3.3 Postoperative management and outcome

After giving antipain for the animal the owner was recommended to keep the cast dry and to limit activity of the animal. The cast was changed every three weeks. Finally the owner was reported that the animal was recovered successfully.

![Figure 12. Fracture of metacarpus; A- at third week of treatment having little swelling and B- at sixth week of treatment without swelling, showing good prognosis and recovering](image)

3.3.4. Rumen foreign body

3.3.4.1 Case history and clinical examination

A six year old female goat was presented to the VTH, CVMA, Addis Ababa University with the history of distended abdomen and inappetence. Both right and left abdomen has shown a pendulous distention. On clinical examination and palpation, hard material lodged in rumen was revealed and the case was diagnosed as foreign body in rumen and then it was surgically treated.

3.3.4.2 Surgical prescription

Left flank laparotomy and ruminotomy was performed. The left-flank area was prepared for surgery in a routine manner, and local anesthesia was instituted by inverted L block. Rumenotomy was performed through a left paralumbar incision with the animal standing. A vertical incision was made in the middle of the paralumbar fossa extending from 3 to 5 cm
ventral to the transverse processes of the lumbar vertebrae for a distance of 10 to 15 cm. The incision was continued to ventral, so the skin was opened in one smooth motion. Separation of the skin and subcutaneous tissue reveals fibers of the external abdominal oblique muscle and fascia. This layer was incised vertically to reveal the internal abdominal oblique muscle. A similar incision through the internal abdominal oblique muscle reveals the glistening aponeurosis of the transverse abdominal muscle. Then the muscle was picked up with tissue forceps and was nicked with a scalpel in the dorsal part of the incision to avoid cutting the rumen. The incision through the transverse abdominal muscle and peritoneum was extended with scissors or a scalpel for entrance into the peritoneal cavity. To avoid potential contamination of the abdominal cavity by ruminal contents, the rumen wall was exteriorized from the abdominal cavity. A continuous suture pattern was used to fix rumen wall to the cut edge of the skin incision.

Incision of rumen was performed starting 2.5 cm ventral to dorsal commissure and ending 3 cm dorsal to ventral commissure of the abdominal wall incision. By exploration of the inside of the rumen content by a hand inserted through the rumen wall incision, a large indigestible rope and plastic bags were discovered and removed. The rumen incision was then closed with inverting suture patterns of Cushing applied over lambert using of no. 2 PDS absorbable suture. The surgical site is thoroughly irrigated with polyionic fluid after closure of the lumen and contaminated gloves, gowns, and drapes were replaced prior to removal of the rumen-fixation suture and second layer closure. The abdominal wall incision is closed routinely in three layers. The peritoneum and transverse abdominal muscles are closed together with a simple continuous suture pattern using no. 1 PDS absorbable suture. The internal and external abdominal oblique muscles were closed with a second simple continuous layer using similar suture. Generally, skin closure was performed with a continuous Ford interlocking pattern using no. 1 silk suture.
3.3.4.3 Postoperative management and outcome

Postoperatively, the surgical wound was cleaned and dressed regularly with 0.05% chlorhexidine was applied daily till recovery. 20% penstrep was administrated at a dose of 1 ml/10kg for 5 days intramuscularly, to prevent infection. Finally the animal was recovered successfully.

3.3.4.4 Discussion

It was opined that a single layer closure of rumen wall incision can be adequate (Weaver et al., 2005), but a double row was generally used with the second row an inverting pattern with similar suture material. Systemic antibiotic therapy was given for three to five days as also done by Weaver et al., (2005) and Hendrickson and Baird, (2013).

3.3.5. Urethral rupture and Urolithiasis (urethral obstruction)

3.3.5.1 Case history and clinical examination

Three adult male ruminents (two local (Borana) breed bull and one local breed ram) were presented to the VTH, CVMA, Addis Ababa University with a complaint of anorexia, suspended rumination, decreased water intake, dribble blood tinged urine after prolonged, painful attempts of urination, arched stance, tread their feet, teeth grinding and depression. In
addition to this, the first bull has shown anuria (not passing urine) and large edematous swelling on the ventral abdominal wall and being in discomfort for almost two days. According to the owner, the bull was bought from market and during transportation; one of the transporter hit the animal by a stick at ventral part of abdomen on the penis two days before date of admission. Up on clinical examination and aspiration on the ventral abdominal wall fluid by abdominocentesis urethral rupture with leakage of urine around prepuce was revealed including ‘water belly’ for the first bull. On clinical examination and rectal palpation of the second bull, there was large swelling above the pubis at base of pelvic urethra but bladder was not full and animal shown seldom inappetant, frequent passage of small quantities of urine often with much straining. The third animal was ram (male sheep) that had shown dribbling blood tinged urine after prolonged attempts of urination and diagnosed as partial obstruction of urethra.

3.3.5.2 Surgical prescription

Urethrostomy was performed as treatment. Urethrostomy can be performed at any site along the perineum, but we preferred to place the urethrostomy site low in the perineum in order to minimize urine scalding of the skin and to allow room for repeated urethrostomy higher in the perineum if stricture at the original site occurs. Surgical procedure was performed using caudal epidural and local infiltration of 2% lidocaine on incision site with the animal in cast for dorso-lateral recumbency with its legs tied cranially. Routine skin preparation from anus to scrotal neck and about 10 cm to each side of midline raphe was made. The skin and subcutaneous incisions was made on midline for a total length of 6-8 centimeters. Deep to the subcutis, the paired retractor penis muscles were found beside midline. While traction was placed to exteriorize the penile shaft, sharp and blunt dissection were used to free the penis from the surrounding fascia until a 4-6 cm segment of the penis were exteriorized to minimize a tension. A considerable part of the penis has been exteriorized by straightening the sigmoid flexure. The urethra that lies in the urethral groove on ventral aspect of penis was noticed in below the insertions of the retractor penis muscle. The urethra was incised for 3-5 cm along the midline, and the urethral mucosa was sutured to the skin in order to provide a longer-lasting opening (stoma) for urine passage. Monofilament, 3-0, non-absorbable suture material was used to appose the mucosa to skin on each side and the remaining skin incision
with simple interrupted sutures pattern. Several small stab incisions were made through the skin and into the subcutis and abdominal musculature to facilitate urine drainage as described by Dabas, (2009); Azari et al., (2010) and Thomas, (2018).

The second bull was treated by administration antibiotic (20% penstrep at a dose of 1 ml/10kg) with anti-inflammatory drug (Meloxicam @0.24mg/kg body weight) I/M for 5 days. The third animal, the ram was treated for urethral amputation. Urethral amputation was performed after 5 ml of 2% lidocaine was given at epidural region and the animal restrained in lateral recumbence. The penis was grasped through the skin at the base of the scrotum and forced the penis cranially. As the glans protrudes from the prepuce, it was grasped with dry gauze, and the penis was exteriorized completely. The urethral process was amputated at its base, near the glans of the penis and immediately a large amount of urine with blood oozed out. Removal of the urethral process has no adverse effect on breeding ability or fertility (Nabil et al., 2013; Thomas, 2018).

3.3.5.3 Postoperative care and outcome

Postoperatively for first bull, 20% penstrep was administrated at a dose of 1 ml/10kg with Dexamethasone @ 2 mg/kg body weight for 3 days intramuscularly, to prevent infection. The animal started to urinate the fistula and recovered but the owner was recommended to penalize the animal at market with a lower value for slaughter and the owner was reported for slaughter of the animal and marketed for lower price.

3.3.5.4 Discussion

Urethrostomy is a surgical operation for the treatment of urethral obstruction and mainly useful for urethral rupture cases. The procedure can be performed with or without amputation of the penis and carried out in the perineum. Urethrostomy in steers and bulls may be performed at several sites. If it is performed just ventral to the anus at the level of the floor of the pelvis (perineal or high urethrostomy), severe scalding and matting of the escutcheon and medial aspects of the limbs result. The other site for urethrostomy is in the region of the distal bend of the sigmoid flexure of the penis (low urethrostomy). The advantage of the low incision, described here, is that the penis can be directed so that the urine is forced caudal,
away from the medial aspects of the limbs, to reduce damage from urine scald. In addition, an incision in this region is more likely to expose the calculi because they most commonly lodge in this region. A low urethrostomy may also be performed cranial to the scrotum or scrotal remnant; generally, the animal is penalized at market with a lower value for slaughter because of recurrence of urinary calculi may occur (Roman et al., 2014; Weaver et al., 2005).

3.4. Major Surgical conditions performed on small animals

3.4.1 Forelimb amputation due to paralysis as a result of car accident

3.4.1.1 History and clinical examination findings

A local mongrel bitch that sustained a forelimb paralysis with a paw constantly rubbing against its own body resulting in an injury and permanent non-healing wound on the dorsum of the paw was presented for consultation for which limb amputation was indicated.

Figure 14. Surgical site of the forelimb shaved and prepared for amputation in a dog with left forelimb paralysis following car accident resulting in nonfunctional limb with permanent non-healing wound on the dorsum of the dog’s paw due to constant rubbing against its own body

3.4.1.2 Surgical prescription

Limb amputation was performed under general anaesthesia. The animal was prepared and given xylazine 1mg/kg and tramadol 1mg/kg as premedication intramuscularly. Ketamine 5
mg/kg and Diazepam 0.5 mg/kg mixed in the same syringe was given for induction and maintained using the same anaesthetic agents Ketamine 5 mg/kg and Diazepam 0.25 mg/kg. Intravenous fluid at the recommended surgical rate of 10 ml/kg/hour was administered using 18 G IV cannula. The patient was placed in lateral recumbency with the affected limb uppermost. The affected left forelimb was prepared for aseptic surgery by shaving the hair from the dorsal midline to the carpus, including ample cranial and caudal part of the surrounding skin where preparation was extended up to the ventral margin to the sternum, caudally to the fifth rib and cranially to the mid cervical area. A curved skin incision was made beginning at the greater tubercle extending caudo-distally to the mid humerus, then caudo-dorsally to axilla. A straight incision was made on medial side of the limb, connecting the cranial and caudal extent of the lateral incision. The skin was reflected, and the cephalic vein was double ligated and divided between ligatures. The insertion of the cleidobrachialis muscle was severed from the humerus and reflected proximally. The deltoid muscle was cut at its insertion on the deltoid tuberosity. The brachial fascia was incised to expose the insertion of the lateral head of the triceps on the humerus.

The humeral attachment of the lateral head of the triceps was transected and reflected the deltoid proximally. The tendon of the triceps was isolated and cut just proximal to the olecranon. The insertions of the pectorals muscle were cut on the crest of the humerus and reflected proximally. On the medial side, the brachial artery and vein was double ligated using 2-0 vicryl absorbable suture and divided between ligatures. The median, ulnar, radial and musculocutaneous nerves were transected. The joint capsule and tendons of the biceps brachii, supraspinatus, infraspinatus, and teres minor were cut to disarticulate the shoulder. The insertions of the teres major and latissimus dorsi muscle were severed from the humerus. The limb was removed and all bleeders were ligated. The cleidobrachialis and pectoral muscles were folded dorsally and sutured over the deltoid and lateral and long head of the triceps muscle. The subcutaneous tissue and skin were closed using a continuous pattern with absorbable suture material of size number 2-0 polyglactin 910 (vicryl). The skin was closed in a subcuticular fashion using continuously suture pattern. A non-adherent bandage with antibiotic ointment was applied on the wound and finally a pressure bandage was applied to help prevent seroma formation as described by Tobias, (2010).
3.4.1.3 Postoperative care and outcome

As part of postoperative care, topical antibiotic cream as well as a mixture parenteral (IM) antibiotic containing penicillin and streptomycin @ 2ml SID and intramuscular (IM) analgesic (tramadol) @ 2mg/kg was given for 3 consecutive days postoperative. On fifth (5) day postoperative complication of partial wound dehiscence was seen but the wound remained clean without any sign of infection and odour. To fix the area of dehiscence three, simple interrupted sutures were placed using number 2, polyglactin 910 (vicryl). After disinfecting the area with 2% iodine solution, a sterile bandage was applied. The non-adherent and pressure bandages were changed and same types of new bandages were replied daily for five consecutive days. Finally the wound was healed uneventfully.
Limb (leg) amputation is the removal of a portion of a limb. Dogs and cats, in general, function extremely well following amputation. Poor candidates for amputation include very large dogs, obese dogs, and dogs with orthopedic or neurologic disorders that affect the other legs. Amputations may be performed for numerous reasons, including trauma, infection, and cancer. Certain neurologic diseases (paralysis of one or more nerves to the leg) and severe, painful osteoarthritis (degenerative joint disease) may also be treated by limb amputation. In some instances, such as trauma or bacterial infection (osteomyelitis), amputation is curative. In cases of bone tumors, amputation is done to relieve pain but rarely cures the underlying cancer (Tobias, 2010). As with any surgery, having an amputation carries a risk of complications. Surgeon’s could aims to reconstruct the limb to the best of their ability, taking into account soft tissue viability, bone length and other anatomical considerations. However, underlying disease state and post-operative management can result in complications, the most common of which are: Oedema, wound dehiscence and infection, pain, muscle weakness and contractures, autonomic dysfunction (Tobias, 2010).

Surgical site infection after amputation is common and as well as increasing patient morbidity, can have negative effects on healing (Coulston et al., 2012). Risk factors for a stump infection include diabetes mellitus, old age and smoking, which are all common denominators amongst the amputee population. The decision to insert a drain and use clips instead of sutures is also associated with an increased infection risk (Mcintosh and Earnshaw, 2009). Literature suggests a post-operative infection rate ranging from 12-70% in the UK but this is widely due to the variation in the classification of stump wounds (Coulston et al., 2012).

The potential consequences of infection include wound debridement and revision surgery. This can increase hospital length of stay and the risk of secondary morbidities such as pneumonia or reduced function. Wounds should be inspected regularly so that any signs of
infection can be detected (Harker, 2006). The wound may also open up along the surgical line (dehiscence). This happens when the wound is not strong enough to resist the forces placed on it and could result in muscle and bone being exposed. These forces include a direct fall (most common), trauma, or shearing, similarly in this case may happen. Surgical intervention is usually indicated with total dehiscence (Harker, 2006). Poor tissue perfusion leads to ischaemia and necrosis. Dusky skin changes, mottled discoloration and slough can be observed. This can lead to subsequent wound breakdown and dehiscence (Harker, 2006). In order to prevent the complications, up on discharge from the hospital, restricted exercise (leash walking) is usually prescribed until the surgery site has healed. The owner should notify his veterinarian if any swelling or excessive redness occurs at the surgery site or if there is any drainage from the incision. Pain relieving medications are commonly dispensed when the animal is discharged. Depending on the reason for the amputation, antibiotics may also be prescribed.

3.4.2. Cesarean section

3.4.2.1 Case history and clinical examination

A five year old bitch was presented to the Surgery Unit of the VTH, CVMA, Addis Ababa University for history of restlessness, nesting, panting, depression and prolonged gestational length. Up on examination by vaginal digital palpation a closed cervix and a foul smelling vaginal discharge was revealed. The case was diagnosed as dystocia with dead fetuses and the bitch was prepared for surgery.

3.4.2.2 Surgical prescription

Cesarean section procedure was performed: An intravenous catheter was placed and intravenous fluid administration was initiated before anesthetic induction. General anesthesia has been provided by various combinations of drugs. Anaesthetic drugs given were xylazine @ 1.5mg/kg and tramadol @ 2mg/kg intramuscularly (IM) as premedication followed by ketamine hydrochloride @ 5mg/kg and diazepam @ 0.5mg/kg as induction and ketamine hydrochloride @ 5mg/kg and diazepam @ 0.25mg/kg as maintenance (IV). Intravenous fluid at surgical rate of 10ml/kg/hour was administered using 18 G IV cannula. Preparation of the
ventral abdomen and washing with savlon was performed. The animal was positioned in dorsal recumbency. In the ventral midline, incision of the skin, subcutaneous tissue and linea alba was made by beginning from a distance of two fingers caudal to the umbilicus and extending the incision caudally for about 8 cm. The uterus was exteriorized and isolated with moistened laparotomy pads inserted through the abdominal incision before incision is made on the uterine body. By tenting the uterine body with smoothly serrated thumb forceps, a small incision was made on the midline of the uterine body by a stab incision using scalpel blade and the incision is extended with metzenbam scissors to a sufficient length for easy removal of the fetus. There was only one dead fetus, which was grasped and gently removed from the uterus. The inside of the uterus was palpated and checked from the cervix to the uterine horns to be certain that no fetus remain. The uterus was closed with 2-0 polyglycolic acid in a two layers of inverting suture pattern (Lambert followed by Cushing). The surgical area of the uterus was Lavaged with sterile normal saline solution and checked for any leakage of uterine content prior to returning it to the abdominal cavity. The linea alba was apposed with -0- polyglycolic acid absorbable suture in a simple interrupted pattern. The skin was closed with -0- polyglycolic acid absorbable suture in a subcuticular (intradermal) pattern as mentioned by Tobias, (2010).

3.4.2.3 Postoperative care and outcome

Antibiotic, 2 ml of penstrep and analgesic tramadol @ 2mg/kg were administered intramuscularly (IM) postoperatively for 5 days. Up on following post operatively inappetence was reported by the owner. Multivitamin was prescribed and the bitch was recovered successfully.

3.4.3 Fracture of radius and ulna

3.4.3.1 Case history and clinical examination

A two adult male dog was presented to the Surgery unit of the VTH, CVMA, Addis Ababa University for history of traumatic fracture of radius and ulna due to car accident in both animals. Up on clinical examination and palpation revealed complete closed fracture.
3.4.3.2 Surgical prescription

External coaptation (Plaster of paris) was applied in order to repair the fracture. The animal was sedated and restrained in lateral recumbency with affected limb upper most. The whole limb was cleaned including the foot. After dried the interdigital space was padded with cotton and the wound was cleaned and antiseptic dressing was applied. At the end of the limb (paw) a rope was tied to facilitate reduction and proper alignment of fractured fragments and to keep the limb in normal position during the application of cast. Adhesive tape stirrups were applied to lower limb & extend beyond toes. Polypropylene stockinet/ordinary bandage was applied which extend beyond toes & to axilla. One layers of cast padding was applied from toes up. The POP cast was submerged in warm water using both hands till the air bubble stop emerging. The POP cast was gently squeezed to remove excess water and applied without creating wrinkles or crease the POP layers. Each turn of the POP was overlapped pervious turn by half of its width. Second spiral layer results in four layers. Distally the tape was folded over the end of cast. Tape & stockinet was secured with adhesive tape. Proximal end similarly was taped (Brinker et al., 2006).
Figure 17. Fracture of radius and ulna, A- before application of POP cast in first dog; B- after application of POP cast in first dog; C- before application of POP cast in second dog; D- after application of POP cast in second dog.

3.4.3.3 Postoperative care and outcome

The animals were given antipain and anti-inflammatory drugs. Then owners were recommended to keep the animals in dry hygienic place and to limit activity of the animal. Up on following post operatively one of the dogs had presented on 7\textsuperscript{th} day of postoperation with complaint of swelling and chewing of the cast which may be due to excessive pressure (tight) cast during the application of the cast. The POP cast was changed and a new POP cast was applied. Finally the owner was reported that the animal was recovered successfully.

3.4.3.4 Discussion

All the various types of radial and ulnar fractures can be seen involving either bone or both the radius and the ulna (Harrison, 1984; Unger \textit{et al.}, 1990; Brinker \textit{et al.}, 2006). The cases were closed fracture type and were treated by external coaptation (POP application) successfully. Lappin and colleagues (Lappin \textit{et al.}, 1983) reported a 75\% serious complication rate in toy and miniature breeds, whereas medium-sized dogs (10-65 pounds) less than 1 year of age responded well, with no serious complications. Reduction may be accomplished closed by a combination of traction, counter traction, and digital manipulation (Brinker \textit{et al.}, 2006).
3.4.4 Inguinal hernia and cystic calculi

3.4.4.1 Case history and clinical examination

An eight years old male dog was presented to the surgery unit of the VTH, CVMA, Addis Ababa University for history of depression, inappetence and swelling on inguinal area. Up on clinical examination and palpation hernia ring was revealed and the case was diagnosed as inguinal hernia, and animal was prepared for surgery.

3.4.4.2 Surgical prescription

The animal was anaesthetized using xylazine @ 1-2mg/kg and tramadol @ 2mg/kg intramuscularly (IM) as premedication, and ketamine hydrochloride @ 5mg/kg and diazepam @ 0.2mg/kg body weight as induction and maintenance (IV) has been used and intravenous fluid at a rate of 10 ml/kg/hour was administered using 18 G IV cannula. Aseptic preparation of the ventral abdomen was done by washing the incision site with savlon. The animal was positioned in dorsal recumbency. The hernia was approached through an incision directly over the superficial inguinal ring. The hernial sac transected at its fascial attachments. Since hernia contents were swollen and impossible to return to the abdominal cavity, a midline celiotomy was performed.

Up on entering the abdominal cavity and palpation/examination of the abdominal content revealed normal, there was no any abnormality or adhesion of herniated contents but the urinary bladder was hard to touch and confirmed as cystic calculi. The bladder was exteriorized and isolated with moistened laparotomy pads to reduce peritoneal contamination before incision. After catheter was inserted and stay sutures was placed cranial and caudal to the incision lines, cystotomy incision was made in the dorsal surface of the bladder. Large cystolith having a jackstone appearance looking like silica stone was removed and retrograde flushing the urethra was done with sterile saline multiple times to ensure all stones have been removed. The incision was closed with a rapid two-layer inverting pattern using 2-0 vicryl absorbable suture material. Just beyond the end of the incision, a bite was taken perpendicular to the incision line and two knots were tied. The suture end of the knot was leaved a long and tagged it with a hemostat. Cushing pattern was performed by taking bites
parallel to the incision line. Contralateral bites were overlapped slightly and the suture has been tightened after each bite to invert the bladder wall. Immediately a Lambert pattern, suturing back over the Cushing’s pattern was performed by taking bites perpendicular to the incision line. After it was finished the second layer, tied off to the tagged suture end were performed. After returning the hernia contents the linea alba incisions and the tear in inguinal area were closed with interrupted suture patterns using number 2-0 vicryl. The skin was closed with 0- vicryl absorbable suture in a subcuticular (intradermal) pattern (Tobias, 2010; Treadwell et al., 2012).

Figure 18. Cystic calculi, A- exteriorization of urinary bladder which was hard to touch; B- large silica (stone) which was removed from urinary bladder

3.4.4.3 Postoperative care and outcome

After the first day following operation the animal was given fluid therapy and the dog appeared in good condition but unfortunately the owner had reported the death of the animal the second day postoperative due to inappetence and dehydration. This may be due to a need for long term fluid therapy as electrolyte imbalances may occur. Also may be due to kidney failure since large cystic calculi was removed.

3.4.4.4 Discussion

Inguinal hernias are reportedly rare in male dogs (Strande, 1989; Dean et al., 1990). In one large series study, males accounted for only 8% of dogs with inguinal hernia (Waters et al., 1993). Accurate diagnosis can be readily established radiologically and/or with cystoscopy.
3.4.5 Mammary tumor

3.4.5.1 Case history and clinical examination

An 8 year German shepherd bitch was presented to the VTH, CVMA, Addis Ababa University with the history of swelling on right caudal thoracic mammary gland which started before three month at date of admission and swelling become large and hard. Up on clinical examination and palpation the mass appeared superficial on skin and was movable. The tumor was diagnosed cytologically as adenocarcinoma. Grossly, it appeared as single nodule (1-25 cm) in one glands. The cut surface is usually lobulated, gray-tan, and firm, often with fluid filled cysts. Mixed mammary tumors may contain grossly recognizable bone or cartilage on the cut surface. Cytologically, cells from adenocarcinomas may exfoliate in sheets or clusters. Individual epithelial cells contain a round to oval, eccentrically-placed nucleus and a moderate amount of basophilic cytoplasm. Acinar arrangements of epithelial cells also may be observed. One single gland was affected and the animal was prepared for surgery.

![Image](A)

![Image](B)

![Image](C)

Figure 19. Mammary tumor diagnosis, A- single gland growth; B- grossly recognizable bone or cartilage on the cut surface; C- cytological appearance of the tumor

3.4.5.2 Surgical prescription

The presented mammary tumour in this case was treated surgically by simple mastectomy. The animal was anaesthetized by xylazine 1mg/kg and tramadol 1mg/kg IM as premedication. Ketamine 5 mg/kg and diazepam 0.5 mg/kg given IV as induction and maintenance agents. Intravenous fluid was administered at a rate of 10 ml/kg/hour using 18
G IV cannula. The area around the lesion was clipped and the animal was prepared for aseptic surgery by scrubbing using chlorhexidine 0.05%. An elliptical incision was made through the skin around the gland to be removed. Incision through the medial subcutaneous tissues was made using a surgical blade and scissors. A blunt subcutaneous tissue dissection and transection was continued cranially and all around the tumor using a scissor. Any bleeding blood vessels were ligated using 2-0 vicryl absorbable suture materials. By using polyglactin 910 (vicryl), number 2-0. All minor and major blood vessels were double ligated dissection between the external abdominal fascial sheath and the mammary glands was made cranially, medially, caudally and laterally. To reduce the subcutaneous dead space interrupted sutures using 2–0 Vicryl suture material was applied and the skin was closed with interrupted horizontal mattress sutures pattern to withstand the existing tension at the wound edges.

Figure 20. Mammary tumours, A- during excision of the tumor; B- after removal of the growth

3.4.5.3 Postoperative care and outcome

Tramadol 2mg/kg was administered intramuscularly as postoperative analgesia. The owner of the animal was Addis Ababa Commission; the care taker of the dog was a veterinarian, who was capable of providing daily wound care and advised to change the bandage and clean the wound on daily basis. Finally the owner reported that the animal had recovered successfully without any postoperative complication.
3.4.5.4 Discussion

Mammary gland tumors are difficult to diagnose and determine their malignancy by physical examination or routine cytology. Histological evidence of malignancy does not always imply an aggressive clinical course of disease (Henson, 2001). Cotran et al., (1994) revealed that mammary tumors were the most frequent neoplasm in both dogs as well as women. Yamagami et al., (1996) also reported mammary tumors to be the most commonly occurring neoplasm in dogs next only to the skin tumors. The overall incidence of mammary tumors was found to be 111 dogs per 10,000 dogs (Gupta et al., 2012). The first choice of treatment for mammary gland neoplasia is surgical excision. The goal of surgery is to remove the entire neoplasm by the simplest procedure available. There is no difference in recurrence rate or survival time when a simple versus a radical mastectomy is performed. Also, it does not appear to be of benefit to spay the dog at the time of the mastectomy surgery. An effective chemotherapeutic protocol has not been reported (Rutteman et al., 2000). Analgesia with opioids should be provided in all dogs undergoing mastectomy incisions (Papazoglou et al., 2014).

3.4.6 Request for Sterilization

3.4.6.1 Case history and clinical examination

Nine dogs and one cat were presented with an elective surgery for ovariohysterectomy to the VTH, CVMA, AAU. All of the bitches were of different breeds and between 3 to 5 years of age and 3 to 30kg body weight. All bitches were withheld for 12 hours from feed. The owners signed a consent form expressing that they understood surgery and general anaesthesia have unforeseen risk including causing death of the animal and that they won’t sue the surgeon if any of undesired complication happen associated with the surgical procedure. Pre-anaesthetic clinical examinations were conducted on all animals to ascertain that all animals have no a clinical condition that may interfere with the procedure. All animals determined to be healthy on the basis of medical history and physical examination involving measurement of heart rate, respiratory rate, body temperature, capillary refill time, body weight and age were recorded.
3.4.6.2 Surgical prescription

Overiohysterectomy was performed as follows: Two types of protocol have used for premedication, induction and maintenance anesthesia. The first protocol were xylazine @ 1-1.5mg/kg and tramadol @ 2mg/kg intramuscularly (IM) as premedication, and ketamine hydrochloride @ 5mg/kg and xylazine @ 1-1.5mg/kg as induction and maintenance intravenously (IV) has been used in some animals. The second one were xylazine @ 1-1.5mg/kg and tramadol @ 2mg/kg (IM) as premedication, and ketamine hydrochloride @ 5mg/kg and diazepam @ 0.2mg/kg body weight as induction and maintenance (IV) has been used in other animals. Intravenous fluid at a rate of 1drop/second was administered using 18 G IV cannula in both protocols.

All the animals which had been starved overnight, each were controlled in dorsal recumbency and the caudal mid ventral abdomen were prepared for aseptic surgery after premedication. General anesthesia were induced and maintained as the above protocols. An incision through the skin and subcutaneous tissue were made along the midline celiotomy, extending from the umbilicus to approximately halfway between umbilicus and os-pubis, depending on animal size. Blunt Mayo scissors were used to extend the incision to the length of the skin incision, exposing the abdominal contents. The ovary were located, and retracted caudally to expose the suspensory ligament and ovarian pedicle. The suspensory ligament was stretched, or broken by finger, to improve manipulation and observation of the pedicle. The arteriovenous complex within the pedicle, arising from the ovarian artery and vein was ligated with 0-4/0 polyglactin 910 (Vicryl, Ethicon) or polyglycolic acid (Dexon, Ethicon) absorbable suture depending on pedicle size, 2 cm proximal to the ovary around the ovarian pedicle. A second ligature were placed 1 cm proximally to the first. After the ovarian pedicles were ligated and severed, the broad ligament was examined. If it is vascular, it was ligated with 1 or 2 ligatures using 2/0-4/0 absorbable suture material before it was cut or torn. A clamp was placed on the uterine body just cranial to the cervix. The uterine arteries were individually ligated proximal to the clamp using 2/0-4/0 polyglactin 910 (Vicryl, Ethicon) or polyglycolic acid (Dexon, Ethicon) absorbable suture material and the uterus, was ligated circumferentially in the crushing groove that remains after removal of the clamp using 0-4/0 absorbable suture material. After inspection for potential bleeding at the ligated pedicles, the
Celiotomy was closed in layers (Hedlund, 1997; Fingland, 1998; Stone, 2003; Goethem et al., 2006).

Figure 21. Ovariohysterectomy in different bitch for sterilization; A- preparation for aseptic surgery; B- during the operation at ligation of ovarian artery and vein after three forceps clump; C- after the operation at final skin closure.

3.4.6.3 Postoperative care and outcome

2 out of 10 cases were recorded for intraoperative and postoperative complications; case 2 was encountered intraoperative hemorrhage and hypothermia. Case 9 had been shown Vomition and inappetance, dehydration, inflammation, licking and Wound dehiscence as postoperative complications. Antipain (Tramadol), Antibiotic (penistrip), fluid therapy, heat therapy and vitamin B and C complex (Hepargrizeovin amp.®) had been given in order to treat postoperative complications for 5 days intramuscularly, and finally all animals had shown good outcomes and prognosis.

Table 6: Complication, Treatment given and outcome of animals performed OVH

<table>
<thead>
<tr>
<th>no.</th>
<th>Species</th>
<th>Age</th>
<th>Complication observed</th>
<th>Treatment given</th>
<th>Outcomes</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Canine</td>
<td>Young</td>
<td>-</td>
<td>-</td>
<td>Wound healed after 8 days</td>
<td>Good</td>
</tr>
<tr>
<td>2</td>
<td>Canine</td>
<td>Adult</td>
<td>Hemorrhage</td>
<td>Immediate ligation</td>
<td>Wound healed after</td>
<td>Good</td>
</tr>
<tr>
<td>No.</td>
<td>Species</td>
<td>Stage</td>
<td>Hemorrhage, Vomition, Inappetance, inflammation and wound dehiscence</td>
<td>Antipain (Tramadol), Antibiotic (penistrip), multivitamin and reapplication of suture</td>
<td>10 days and suture was removed</td>
<td>Outcome</td>
</tr>
<tr>
<td>-----</td>
<td>---------</td>
<td>-------</td>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>--------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>3</td>
<td>Canine</td>
<td>Adult</td>
<td>-</td>
<td>-</td>
<td>Wound healed after 8 days and suture was removed</td>
<td>Good</td>
</tr>
<tr>
<td>4</td>
<td>Canine</td>
<td>Adult</td>
<td>-</td>
<td>-</td>
<td>Wound healed after 8 days and suture was removed</td>
<td>Good</td>
</tr>
<tr>
<td>5</td>
<td>Cat</td>
<td>Adult</td>
<td>-</td>
<td>-</td>
<td>Wound healed after 8 days and suture was removed</td>
<td>Good</td>
</tr>
<tr>
<td>6</td>
<td>Canine</td>
<td>Adult</td>
<td>-</td>
<td>-</td>
<td>Wound healed after 8 days</td>
<td>Good</td>
</tr>
<tr>
<td>7</td>
<td>Canine</td>
<td>Adult</td>
<td>-</td>
<td>-</td>
<td>Wound healed after 8 days</td>
<td>Good</td>
</tr>
<tr>
<td>8</td>
<td>Canine</td>
<td>Adult</td>
<td>-</td>
<td>-</td>
<td>Wound healed after 8 days</td>
<td>Good</td>
</tr>
<tr>
<td>9</td>
<td>Canine</td>
<td>Adult</td>
<td>Hemorrhage, Vomition, Inappetance, inflammation and wound dehiscence</td>
<td>Antipain (Tramadol), Antibiotic (penistrip), multivitamin and reapplication of suture</td>
<td>Wound healed after 15 days and suture was removed</td>
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<tr>
<td>10</td>
<td>Canine</td>
<td>Adult</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Good</td>
</tr>
</tbody>
</table>

3.4.6.4 Discussion

Ovariohysterectomy was successfully performed and all animals were recovered. In a study of 1712 canine OVHs, 1409 (82%) were performed for elective sterilization, and only 313 (18%) for reproductive tract disease (as adjunctive therapy for mammary neoplasia, for treatment of pyometra, endometrial hyperplasia, vaginitis, and several miscellaneous genital tract diseases) (Wilson and Hayes, 1983). This and other reports clearly reflect textbook recommendations that the preferred technique for gonadectomy in dogs and cats is OVH (Stone et al., 1993; Hedlund, 1997; Fingland, 1998; Stone, 2003; Goethem et al., 2006). Hemorrhage, hypothermia, vomition, inappetance, inflammation and dehiscence in
ovariohysterectomy which May be due to rupture of right ovarian artery during exteriorization, anesthetic complication and licking of the patient on wound. Another common cause of ovarian pedicle hemorrhage is insufficient knot-tying technique, a problem that is most often revealed when a surgeon-in-training attempts to ligate a large, fat-filled pedicle in a mature female dog (Adin, 2011).

Complications associated with hemorrhage may be more common when bitches and queens are spayed while in oestrus under the influence of oestrogen, and increased incidence of complications is associated with increased surgery time and increased body weight of the patient (Howe, 1997; Howe et al., 2001; Burrow et al., 2005). Hemorrhage was considered minor and not life threatening in any of the animals of the present study, and no adverse consequences were developed, although two animals had encountered intra-operative hemorrhage, it was immediately resolved. This finding is similar with the report of Peeters and Kirpensteijn, (2011). Hypothermia is common complication during operation for small animals and this was prevented by administration of heated intravenous fluid and application electrical heat stove.

In Conclusion Spay-neuter (sterilization) programs are an integral and imperative part of veterinary medicine/surgery and the community. By following these steps, including paying careful attention to perioperative care and intraoperative monitoring, recognition of potential complications, and thorough record keeping, these programs succeed in their mission to provide humane methods for neutering large numbers of cats and dogs. At this time, these programs are the best antidote to mass euthanasia of cats and dogs resulting from overpopulation. By engaging in this new and rapidly developing practice area, veterinarians can play vital roles in alleviating overpopulation and decreasing untimely euthanasia of cats and dogs.
3.4.7 Tail docking

3.4.7.1 History and clinical examination findings

A 2 month old female puppies weighting 3 kg was presented to the Surgery Unit of the VTH, CVMA, Addis Ababa University for purpose of cosmetic tail docking. Up on examination and measuring vital sign was normal and the animal was prepared for surgery.

3.4.7.2 Surgical prescription

Tail amputation was performed as follows. The animal was prepared for aseptic surgery and was sedated using Butorphanol (0.2mg/kg). Lumbosacral epidural nerve block was done with 2% lignocaine (Glocain, Vital Care Limited, India) at a dose rate of 1 ml/6 kg body weight (Skarda and Tranquilli, 2007). A V-shaped skin incision was made 1-2 cm caudal to the joint space at the proposed amputation site, at base of the tail. After ligating the lateral caudal and medial caudal arteries cranial to the amputation site using chronic catgut 2-0, the tail was amputated or transected cranial enough to the skin incision to provide a tension free closure using scalpel blade. Finally the skin was closed with cruciate suture pattern using size 1-0 nylon non absorbable suture material (Tobias, 2010; Eyarefe and Oguntoyinbo, 2016).

3.4.7.3 Postoperative care and outcome

The area was bandaged guaze with iodine, 0.5 ml of Penstrep and tramadol @ 2mg/kg intramuscularly (IM) was given as postoperative antibiotic and analgesia for 3 days. Healing was uneventful; sutures were removed after 10 days of surgery.

3.4.8 Testicular tumor

3.4.8.1 Case history and clinical examination

A 16 year old local breed male dog was presented to the VTH, CVMA, Addis Ababa University with the history of large swelling on testicle. Up on clinical examination and observation the dog was cryptorchid (single testicles). Testicular tumor was diagnosed cytologically as Sertoli cell tumors which is most common in dogs, especially in cryptorchid testicles; often hormonally active, producing manifestations of hyperestrinism; Sertoli cell
tumors are very firm, discrete nodular or multinodular tumors that are well demarcated within the affected testicle. Typically consist of variable sized aggregates of Sertoli cells (tubular and diffuse forms) separated by an abundant fibrous tissue stroma. The tumor cells are elongate, with small, round to elongate nuclei and have either vacuolated or dense eosinophilic cytoplasm that frequently contains lipochrome pigment granules.

Figure 22. Sertoli cell tumors with its gross (A) and cytological (B) appearance

3.4.8.2 Surgical prescription

Open castration was performed as a treatment procedure. General anesthesia has been provided by various combinations of drugs. xylazine 1mg/kg and tramadol 1mg/kg was given as premedication intramuscularly. Ketamine 5 mg/kg and Diazepam 0.5 mg/kg was given as induction and maintenance. Intravenous fluid at a rate of 1drop/2second was administered using 18 G IV cannula. The dog was controlled in dorsal recumbency and the scrotal area was prepared for aseptic surgery after premedication. After pushing the testicle cranially to protect the urethra, an incision was made through caudal scrotal skin and subcutaneous tissues over the testicle. Incision through the parietal tunic was made to expose the testicle and epididymis. The testicle was pop out of the tunic incision and, with scissors; the tunic opening was extended to expose the vessels. Ligation of the parietal tunic and cremaster muscle was performed with 2/0 vicryl absorbable suture material, using transfixing - encircling ligatures and transected and removed the tissues. Double ligature and transection
of the vessels was performed. The skin was closed with an intradermal or cutaneous pattern (Tobias, 2010).

Figure 23. Testicular tumor; A- growth appearance before the operation; B- removed growth; C- appearance after the operation

3.4.8.3 Postoperative care and outcome

The area was disinfected with iodine, 2 ml of Penstrep and tramadol @ 2mg/kg intramuscularly (IM) was given as postoperative antibiotic and analgesia for 3 days. Healing was uneventful; sutures were removed after 10 days of surgery.

3.4.8.4 Discussion

Testicular tumor - generally is biologically nonaggressive in dogs, and mostly can be cured with simple orchiectomy. In rare cases functional or metastatic testicular tumors can cause significant morbidity or mortality. Several factors may influence the development of testicular tumors, including age, breed, cryptorchidism, and exposure to environmental carcinogens. In the intact male dog, the testis is the second most common anatomic site for cancer development, and testicular tumors account for approximately 90% of all cancers arising from the male genitalia (Vail and Withrow, 2007).
The three most common testicular tumor types in the dogs are Sertoli, seminoma, and interstitial-cell tumors which occur with equal frequency in descended testes. In retained testes, 60% of tumors are Sertoli cell, and 40% are seminomas. Two or more tumor types can occur in the same testicle (Boothe, 2003). In this case the dog was cryptorchid testes and cytologically the tumor was diagnosed as Sertoli cell tumors. The left testis was affected and it was firm and lobulated. In Sertoli cell tumors the left testis is more frequently involved. The tumors may vary from 1-17 cm in diameter. They are usually firm, lobulated, well circumscribed, and yellowish or grayish-white. Sertoli cell tumors are usually unilateral, but there is a significant incidence of bilateral tumors. Perhaps one-half of all canine Sertoli cell tumors arise in cryptorchid testicles, and the incidence of Sertoli cell tumors is more than 20 times higher in cryptorchid than in scrotal testes (Donald, 2002). In dogs with localized disease, orchietomy with scrotal ablation remains the treatment of choice and often is curative (Vail and Withrow, 2007).
4. CONCLUSION AND RECOMMENDATIONS

This work was done emphasizing on the management of minor and major surgical conditions and outcomes of the various surgical procedures performed on both ruminant and small animal patients presented to VTH of CVMA. A total of 55 surgical cases were handled and treated surgically. Surgeries performed on both ruminant and pets included draining abscess, subcutaneous seroma, and hematoma; scrotal ablation, wound management; correction of paraphimosis, uterine prolapse; skin tumor resections; atresia ani, atresia ani-et recti, metacarpal fracture repair, rumenotomy, and urethrostomy; tail docking, C-section, forelimb amputation, fracture repair, inguinal herniorrhaphy, cystotomy, mastectomy, ovariohysterectomy, and open castration as a treatment for testicular tumor removal. All surgical interventions performed on the ruminant and small animals culminated in successful recovery except in two animals, a calf and a dog that had died after fifth and second day of surgery, respectively, due to lack of intensive postoperative care. Postoperative complications, such as swelling and wound dehiscence were recorded in some cases, which were managed with appropriate postoperative interventions. It was found that intensive care for some severely ill animals, postoperative care by a relevant professional and owners’ compliance to prescribed postoperative handling and care are crucial in order to achieve a desired outcome. Most diagnostic works done in this study were based on history and physical examinations alone. Sometimes this has led to wrong diagnosis and putting patients to unnecessary surgery. It is therefore recommended for VTH in CVMA to improve the diagnostic facility by including a radiographic unit as well as to establish an intensive care unit to reduce mortality of some severely sick animals requiring intensive care and to avoid various morbidities associated with immediate postoperative complications.
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