Surgical Management of Limb Amputation of a kitten: A Case Report

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ABSTRACT

The study was designed to develop a concept on complete surgical technique of limb amputation surgery of cat (kitten) including preoperative and postoperative management. A kitten was rescued by an organization in injured condition caused by automobile accident. The right hind limb of that kitten was fractured and affected by gangrene. To save its life the veterinarian had no option without limb amputation surgery. The entire surgical procedure was performed according to standard surgery guidelines. After surgery, the kitten continued to ambulate on 3 limbs without any complications. 45 days after surgery the kitten abled to use 3 limbs for weight bearing. Partial amputation of the it's right hindlimb turned into excellent limb function and use. The strategy described in this report made it possible to save an injured cat from severe pain and ultimately save his life.

Key Words: Amputation, cat, limb, surgery.

CHAPTER I

INTRODUCTION

The word amputation is derived from the Latin word amputate “to cut away” where ambi “about”, “around” and putare “to prune”. In the past time, there were few common words which were used instead of amputation such as extirpation, disarticulation or simply cutting. After the end of 17th century, the term “amputation” was accepted globally (Mishra, 2014).

A surgeon needs to go through amputation for many reasons. Most common causes for limb amputation are Trauma (e.g., fracture, dog bite, wire fence injury etc.)**,** Infections**,** Degenerative Diseases (e.g., osteomyelitis, osteoarthritis etc.)**,** Bone tumors etc (Jongeward, 1985; Gam’s jaeger and Chigerwe, 2018).

Generally, complications are not developed in an aseptic surgery. But some complications may be happened if any undesirable thing (e.g., suture tension, dead space etc.) happened during surgery. Mismanagement during post-operative care is another cause. Common complications are Inflammation and wound infection**,** Pus formation**,** Necrosis**,** Skin ulceration**,** Gangrene**,** Acute Myocarditis**,** Seroma/Water accumulation**,** Chronic intermittent pain, chronic lameness etc (O’Hagan, 2006; Hymavathi et al., 2014 and Raske et al., 2015).

There is no document observed on the limb amputation surgery in Bangladesh. Relatively few comparative studies on total surgical procedure of limb amputation in cats have been published.

The aim of the case study was to establish the complete surgical procedure including preoperative and postoperative management of limb amputation surgery in cat.

CHAPTER II

MATERIALS AND METHODS

2.1 Case Description

A 2.5 month female, 0.68 kg stray kitten was rescued by a rescue team Rise for paws & Claws Chattogram (RFPC, a charitable organization) from Bashundhara Residential Area, Halisohor Chittagong with severe leg injury due to automobile accident (Figure 2.1). The kitten was referred to Veterinary hospital for checkup and treatment as emergency case. The veterinarian observed the health condition and found severe bone fracture and bruised lesion from hock joint to phalanges of its right hind limb. The veterinarian also observed that the limb was affected with wet gangrene characterized by foul-odor, red skin that feels warm to the touch, swollen area with blisters, oozing fluid from affected limb. The veterinarian recommended for partial limb amputation to the owner.

2.2 Observation and diagnosis

General physical examination

Increased temperature and high respiratory rate were recorded from the cat manually with the help of thermometer and stethoscope.

Veterinarian observed the clinical signs such as severe pain, hot and swelling by palpating the injured leg, lameness, wet gangrene in affected area on the basis of characteristics, mild dehydration by observing mild pink mucous membrane.

Table-1: Vital Signs

Rectal Temperature	104ºF
Heart Rate	150/bpm
Respiratory Rate	30/ minute
Mucous Membrane/ Hydration status	Mild Pink
Capillary refill time (CRT)	2 sec

2.3 Pre-operative Care

The surgery was performed one day after physical examination. The owner was suggested to keep the patient under rest and observation until surgery.

2.4 Surgery

2.4.1 Preparation for the surgery

At first, the cat was prepared for anesthesia, and sedated by applying pre-anesthetics with xylazine (Inj. Xylazine, Mesco Pharmaceuticals, India, 30 ml vial) at the dose of 1mg/kg body weight through intramuscular(i/m) route (Clarke and Trim, 2013). After sedation, the incision site from stifle joint to downward was shaved with blade. Following that, the shaved part was sprayed and rubbed with 10% povidone-iodine (Solution Viodin, Square Pharmaceuticals LTD., Bangladesh, 100 ml bottle) (Curtis et al., 2013).

2.4.2 Anesthesia

General anesthesia was done by administration of Ketamine HCL (Inj. Ketalar, Popular Pharmaceuticals LTD., Bangladesh, 10 ml vial) at the dose of 10mg/kg body weight with intravenous (i/v) saline at the dose of 20 mg/kg body weight (Clarke and Trim, 2013). In whole surgery 0.9% Sodium Chloride (Acme's Normal Saline, The ACME laboratories LTD., Bangladesh, 500ml) was administered continuously through intravenous route in cephalic vein. During surgery maintenance dose of Ketamine HCL (every time, half of its previous dose) was given several times based on patient condition. The anesthesiologist monitored the vital signs (Heart rate and Respiration rate through stethoscope, Oxygen saturation by Pulse Oximeter, Temperature by thermometer) carefully.

2.4.3 Operation procedure

The surgical site was aseptically prepared for surgery with antiseptic (Povidone-Iodin 10%) and 70% alcohol. A straight skin incision was made along to the tibia fibula bone. The incision was made to allow for more skin on the medial aspect of the limb, approximately 2cm from the laterally and 3 cm from medially. The gastrocnemius muscle was removed from tibia fibula. The saphenous artery and popliteal artery were identified and hemostasis was achieved with vasoconstriction by straight artery forceps and ligation with blind suture by 2-0 catgut. at the level of stifle joint. The anterior and posterior cruciate ligament were also incised at the level of stifle joint with sharp dissection. The stifle joint was then disarticulated through incision. Following disarticulation, the incision was closed through apposition of the subcutaneous tissue with walking sutures by 2-0 catgut. The skin was closed with simple interrupted suture using 1cm silicon. There was given few gaps among the sutures for preventing fluid accumulation. A temporary bandage was given for preventing contamination. (Johnson and Dunning, 2005). (Table-3)

Table-3: Suture patterns and suture materials

Tissues	Suture names	Suture materials
1. Muscle Layers	Ford Interlocking	Catgut
2. Subcutaneous Tissue	Subcutaneous	Catgut
3. Skin	Vertical Mattress	Silk
4. Blood Vessels	Ligation	Catgut

2.5 Post operative care

The patient was recovered uneventfully from anesthesia and was hospitalized for 2hours for supportive care. The patient was inhaled oxygen for 30 minutes (50ml/minute). 5% povidone-iodine (Ointment Viodin, Square Pharmaceuticals LTD., Bangladesh, 25 gm tube) was applied at suture site as antiseptic. After completing Surgery, the patient was treated with Ceftriaxone (Inj. Triject Vet 250 mg, SK+F Pharmaceuticals, Bangladesh, 2 ml vial) as antibiotic at the dose of 20 mg/kg body weight, Chlorpheneramine Maleate (Inj. Renacin Vet, Reneta Limited, Bangladesh, 10 ml vial) as antihistaminic at the dose of 0.5 mg/kg body weight, Meloxicam (Inj. Mel-Vet, The ACME laboratories LTD., Bangladesh, 10ml vial) as Nonsteroidal anti-inflammatory drug; NSAID at the dose of 0.5 mg/k body weight. Elizabethan collar was applied to avoid licking (Gangwar et al., 2020). The owner was also suggested to apply Bacitracin Zinc + Neomycin Sulphate Tropical (Nebanol Powder, Square Pharmaceuticals LTD., Bangladesh, 10 gm) as Tropical Antibiotic and Viodin Ointment as Antiseptic at the suture site for 15 days. Finally, the was discharged to his owner's care. After 4-5 hours following the surgery, the cat was ambulatory on 3 limbs. Bandage changes were scheduled for every 2 to 3 days to monitor the suture site. During this time skin incision was noted to have healed appropriately. Bandage changes were performed regularly until such time that this recovery(1month) and the kitten was ambulatory on limb with no sign of discomfort.

FIGURES

Figure 2.1

Figure 2.2

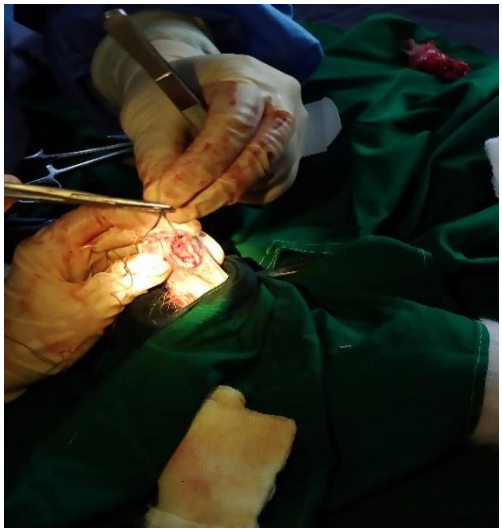

Figure 2.3

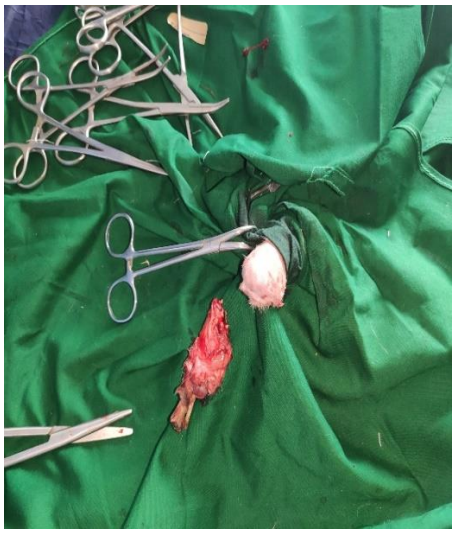

Figure 2.4

Figure 2.1: Presentation of kitten before surgery

Figure 2.2: Preparation of operative site

Figure 2.3: Applying suture in muscle layer

Figure 2.4: Presentation of amputed limb

Figure 2.5

Figure 2.6

Figure 2.7

Figure 2.8

Figure 2.5: Applying the skin suture

Figure 2.6: Applying bandage on operating site

Figure 2.7: Providing oxygen as postoperative care

Figure 2.8: Presentation of kiten after surgery

CHAPTER III
RESULTS

During post-operative care the cat was good. After one week from the end of treatment the patient was brought for recheck up. The veterinarian observed that there was no complication of water accumulation, no sign of discomfort in the amputee limb and the kitten continues to ambulate on 3 limbs. 45 days after surgery the kitten abled to use 3 limbs for weight bearing.

CHAPTER IV
DISCUSSION

This case report describes a complete surgical technique of limb amputation including preoperative and postoperative management of limb amputation surgery of cat (Kitten) associated with severe leg injury. The technique described here has made it possible to free an injured cat from severe pain and ultimately save the life.

As veterinarian, surgeons have to follow some general principles of surgery like gentle handling of tissues, aseptic surgery, anatomical dissection, controlling hemorrhage, obliteration of dead space, using minimum quantity of suture materials, avoidance of suture tension, Immobilization etc. (Tyagi and Singh, 1995).

Previously, limb amputation was done in various animal like cat, dog, sheep, goat etc. for various reasons (O'Hagan, 2006; Hymavathi et al., 2014 and Raske et al., 2015). Sometimes, during post-operative care different types of complications occurred.

According to Boylan et al. (2019), after limb amputation of a cat's right hind limb due to metatarsal osteosarcoma, a little complication of ulceration occurred at the surgical site. Previously scientists (Forster et al., 2010) performed a study on 294 cats in which amputation was done for different reasons. Among them, 35% of cats experienced some signs of pain during recovery. Raske et al. (2015), reported 20.9% of wound infection after having a study on 39 dogs and 28 cats of limb amputation. Also, Gamsjaeger and Chigerwe (2018), mentioned chronic intermittent pain in some sheep and goat following limb amputation.

In this case report, no complication of water accumulation occurred during postoperative care which is somewhat different than the above studies. It is occurred due to give few gaps among skin sutures during surgery which is not observed in previous study.

This study helps to surgeon to provide a complete concept on limb amputation surgery including preoperative and postoperative management and helps to avoid complications after surgery.

CHAPTER V
CONCLUSION

Amputation for surgical approach is now common for correction of diseased or deformed condition. This report has a satisfactory outcome after successful surgery and following postoperative care and management.

CHAPTER VI
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The author

BIOGRAPHY

I am Partha Samanta. I passed my Secondary School Certificate (SSC) examination in 2012 and Higher Secondary Certificate (HSC) examination in 2014. I enrolled for Doctor of Veterinary Medicine (DVM) degree in Chattogram Veterinary and Animal Sciences University (CVASU) Bangladesh. I like to play musical instruments and like to travel new places. I have immense interest to work in the field of Pet Animal Medicine.