

## Unilateral Surgical Amputation of Horn Due to Different causes in Cattle and Goat: Case Report

Mulatu Z<sup>\*1</sup>, Dugassa J<sup>2</sup> and Telila C<sup>3</sup>

<sup>2</sup>Department of Clinical Studies, College of Veterinary Medicine and Agriculture, Addis Ababa University, Bishoftu, Ethiopia

<sup>3</sup>Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University, Bishoftu, Ethiopia

**\*Corresponding Author:** Mulatu Z, School of Veterinary Medicine, College of Agriculture and Veterinary Medicine, Jimma University, P. O. Box 307, Jimma, Ethiopia, Tel: +251921063287, E-mail: sanmulatu12@gmail.com

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### ABSTRACT

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

**Keywords:** Cattle; Cornual Nerve Block; Doe; Horn Amputation

## Introduction

The dehorning is a very common surgical procedure of removing horns from adult small and large animals (cattle, sheep, goat etc) after they have formed from the horn bud either to ease the management system or to treatment the horns if there is cancer, fracture, overgrown and misdirected horn [1,2], but it also critical in terms of animal welfare as it violates the integrity of the animals and causes stress and pain [1,3]. In modern dairy production systems' dehorning is the routine procedure, because dehorned ruminants are safer to handle and cause fewer injuries to workers and other nearby animals [4-6]. Various special tools for the amputation of the grown horn are available, these may include using cutting instruments such as gigli wire saw, bone chisels and osteotome, mallet, bone rongeur and bone cutter [7], especially in adult cattle or cattle older than 6 months. These method cause Different degree and types of damage of damage to the tissue, and may result in different experiences of pain when done without appropriate anesthesia and analgesia [8] and increased risks of bleeding and infection [3,8,9]. Other procedures such as the use of heat cauterization as well as caustic paste can be used to dehorn cattle and goats at an early age (before 2 month) to remove the horn before its attachment to the skull [4,9].

Local anesthesia, commonly given as a cornual nerve block but, when given alone, it may rise in physiological and behavioral indicators such as plasma cortisol concentration after the local anesthetic wears off [10,11]. Thus, administration of a non-steroidal anti-inflammatory drug (NSAID) reduces pain behaviors [11]. Besides, the use of sedatives has been shown to reduce handling stress [11] and may improve safety when dehorning older animals or when handling facilities are lacking. For treatment of fractured horn amputation of horn alone or along with appropriate chemotherapy were on reports [12]. Therefore, the aim of present case is to describe surgical procedures of unilateral surgical amputation of horn due to different causes in cattle and goat and its successful post-surgical management.

## Case Description

### Case history and examination

#### Case 1

Eight years old, *Bos indicus*, Arsi breed female cow weighing 200 kg was presented to Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with more than 24 hours history of fractured horn. The cow had given birth to four calves, which were all alive and of normal size. On physical examination, there was blackish discoloration and paste of the nearby bodies of fractured horn due to local haemorrhage of blood vessels (Figure 1A). The normal horn length of the cow was 12.5cm but the left horn was completely broken (cut) at two third of the horn length and the horn cavity was seen directly through visual examination. Further close examination of vital organ parameters such as body temperature, heart beat and respiratory rate of the cow were 38 °C, 64beats/minute and 28breaths/minute, respectively. Finally, based on the history and clinical observation, the case was diagnosed as complete horn fracture and decided to be managed through cosmetic surgical unilateral horn amputation.

#### Case 2

Ten years old, *Bos indicus*, Kereyu breed bull weighing 250 kg with a medium body condition was presented to Gerbicha veterinary clinic one month before within history of wound at the base of the horn and the bull was treated with 20% oxytetracycline injection (manufactured by Hebei Tianyuan Pharmaceutical Co., Ltd., Shijiazhuang, Hebei, China) @ 1ml/10kg intramuscularly for three days at 48 hours interval after amputating the horn at the half of the horn length by using saw but after one month, pus was oozing out of the wound, horn was avulsed and become necrotized without regressing. Then, the owner understood that the wound did not heal properly and the dehorned site was septic and finally referred the Veterinary Teaching Hospital, Addis Ababa University. The owner also complained of discharging of pus around the base of right horn following trauma around the base of the horn as a result of fighting with other bull. When clinically examined, the right horn was partially avulsed and there was oozing of unpleasant discharge through the opening as shown in (Figure 1B).

The bull tries to mutilate his horn by rubbing against inanimate object frequently. The depth of the affected horn would measure approximately (4 cm in diameter×7 cm in depth) and was observed near the base of the right horn. There was swelling and pain with signs of vocalization on palpation of the wound area. Further close examination of vital organ parameters such as body temperature, heart rate and respiratory rate of the bull were 38.5 °C, 60beats/minute and 30breaths/minute, respectively and revealed within physiological limits. Finally, based on the history and clinical findings, the case was diagnosed as irreparable wound at the base of horn and decided to be managed surgically by unilateral horn amputation.

### Case 3

Eight years old, *Bos indicus*, Arsi breed bull weighing 320 kg with a good body condition was presented to the Veterinary Teaching Hospital (VTH), Addis Ababa University within history of discharge of pus around the base of right horn following trauma as a result of rope that was used for the purpose of tying animal at their barn. When clinically examined, the structural make up of right horn was intact but there was oozing of unpleasant discharge through wound at the base of the horn as shown in (Figure 1C). The bull tries to mutilate his horn by rubbing against inanimate object frequently. The depth of the affected horn would measure approximately (3 cm in diameter×5 cm in depth) and was observed near the base of the right horn. There was swelling and pain with signs of vocalization on palpation of the wound area. Further close examination of vital organ parameters such as body temperature, heart rate and respiratory rate of the bull were 38.4 °C, 58beats/minute and 24breaths/minute, respectively and revealed within physiological limits. Finally, based on the history and clinical observation, the case was diagnosed as irreparable wound at the base of horn and decided to be managed surgically by unilateral horn amputation but the owner was not cooperative on the surgical amputation of the horn, so in order to obey the owner interest we administered 20% oxytetracycline injection (manufactured by Hebei Tianyuan Pharmaceutical Co., Ltd., Shijiazhuang, Hebei, China) @ 1ml/10kg intramuscularly for three days at 48 hours interval and daily washing of the wound by using savlon (manufactured by Sammyak Minerals & Chemicals Pvt. Ltd., Maharashtra, India) and 5% povidone iodine (manufactured by Voda Chemicals Pvt. Ltd., New Delhi, India). However, the bull was not get any change and after two weeks of final days of medical follow up the owner brought his bull and agreed with the decision of the clinician, which means surgical amputation of the horn.

### Case 4

A one year and two months old, Rift Valley family, Woyto-Guji breed female goat weighing 15 kg was presented to Veterinary Teaching Hospital, College of Veterinary Medicine and Agriculture, Addis Ababa University with history of right horn fractured following the falling from the hill one week before admitted to the VTH. The doe tries to mutilate her horn against the standing objects following that continuous oozing of blood was occurred. The owner tried to treat traditionally by different plants to stop bleeding and for wound healing at home but the doe doesn't get relief from the condition encountered rather than continuous to scratching against standing object. When clinically examined, the right horn was partially cut but the majority of the horn structure is intact and there was necrotized tissue and pus formation at fractured horn with oozing of unpleasant discharge through the opening as shown in (Figure 1D). Further close examination of vital organ parameters such as body temperature, heart rate and respiratory rate of the bull were 39 °C, 96beats/minute and 16breaths/minute, respectively and revealed within physiological limits. Based up on history and physical examination animal was suggested for cosmetic unilateral horn amputation.

### Pre-operative Preparation

After proper immobilization by using physical method in crush, the circumferential skin surface of the base of the affected horn was prepared aseptically by washing with antiseptic solution (Savlon, Sammyak Minerals & Chemicals Pvt. Ltd., Maharashtra, India) in order to remove coagulated blood and any dirty (foreign) material from surgical site. Then, the hair was shaved and scrubbed with 5% povidone iodine (manufactured by Voda Chemicals Pvt. Ltd., New Delhi, India).

### Anesthesia and Animal Control

Case 1, 2 and 3 were controlled in standing position in the well-built crush and the head was positioned straight forward by holding with bull holder; whereas, case 4 was controlled in lateral recumbent position on surgical table with affected horn up right



**Figure 1:** Fracture of horns in case 1 (A) and 4° and irreparable wound at the base of horns in case 2 (B) and 3 (C) up on presentatio

side. Before conual nerve block was conducted case 3 and 4 were sedated by xylazine (manufactured by M J Biopharm Pvt., Ltd., Maharashtra, India) @ 0.1 mg/kg I.M. in case 3 but through IV in case 4; whereas, case 1 and 2 were received diclofenac sulfate (manufactured by Livealth Biopharma Pvt., Ltd., Maharashtra, India) @ 2mg/kg through I.M. Cornual (zygomaticotemporal) nerve blocks were performed in all cases in addition, in case 4, infrathrocler nerve block was performed. The needle was inserted through the skin at a point midway between the lateral canthus of the eye and the base of the horn to block cornual branch of zygomaticotemporal nerve (Figure 2A). At this point, 10 and 5 ml of local anesthetic (2% lidocaine hydrochloride, jeil pharm. co. Ltd., Korea) were injected in a fanlike manner in case 1, 2, 3, and 4, respectively and another 2 ml were deposited under the skin as the needle was withdrawn. To block the infrathrocler nerve in case 4, the needle was inserted through the skin at a point of dorso-medial margin of the orbit. Then, the needle became directed subcutaneously towards the base of the horn, and an extra local anesthetic was deposited below the skin. The surgical site was given a final scrub prior to proceeding to surgery. After adequate analgesia and preparation dehorning was done by Flap method in case 1 as suggested by Kumar [13].

### Surgical Procedure

Two incisions: one towards the poll and a second towards the frontal ridge were made. These two incisions were joined together by taking an incision on anterior and posterior side of the horn at the junctions of the base of the horn and skin around the base of the horn was done for successful removal of corium. The incisions were deepened until bone was encountered, and the edges of the incision were undermined using sharp dissection to form the flap of the skin to allow placement of the obstetric wire ventrally and deep to the base of the horn on the frontal crest (Figure 2B). Bleeding was controlled by pressure hemostasis (Figure 2B) and by hemostatic forceps to occlude cornual artery. The bony stump was then removed using an obstetric wire as a saw (Figure 2C). After completion of removal horns and attached skin, the head was repositioned and prepared for the closure of the wound. The surgical site was flushed with a normal saline solution, to rinse out any bone dust and the skin was cleaned with antiseptic solution (savlon) to remove coagulated blood and scrubbed with 1% povidone iodine. Skin was closed by using silk (non-absorbable suture material) in a simple interrupted pattern in one layer (Figure 2F) in case 1 and 4, but in case 2 and 3 since wound edge was wide



**Figure 2:** Progression of surgical correction of unilateral fractured horn and irreparable wound at the base of horn; **(A)** Zygomaticotemporal nerve block **(B)** An incision to make skin flap and control bleeding by pressure **(C)** Amputation of horn on progression with embryotomy wire **(D)** Progression of open wound healing **(E)** Application of bandage on the wound **(F)** After completion of suturing of skin flap

and difficult to approximate it allowed healing openly (Figure 2D). Finally, in all cases protective bandage was applied over surgical site and secured to the normal horn and ear to assist hemostasis and reduction of dead space (Figure 2E).

### Post-operative Care

Post-operative treatment included administration of Fortified procaine penicillin (Intracin Pharmaceuticals Pvt., Ltd., and Gujarat, India) @ 22,000 IU/kg intramuscularly for five days. The wound was properly dressed with 5% povidone iodine (manufactured by Voda Chemicals Pvt. Ltd., New Delhi, India) and applying wound spray (cyclo spray, Hangzhou Ruijiang Chemical Co., Ltd., China) and daily changing of bandage with sterile gauze regularly for five days. However, in case 1 and 4 bandaging was applied only on the first days of operation. But, after fifth day wound dressing was done at seventh, ninth days up to twelfth days until healed. Subsequently, skin sutures were removed on fifteenth post-operative day in case 1. In case 1 and 4 the wound was uneventfully healed in fifteen days. However, in case 2 and 3 the wound was complicated with frontal sinusitis development and healed in one month of operative day.

### Result and Discussion

Dehorning is a routine procedure performed to destroy horn growth, the corium and surrounding tissue in adult animals for many reasons, including reducing the risk of injuries to other animals, to the animal itself, to increase need for space during resting and easy to market [14-16]. On other hand, dehorning can be done to treat several horn affections such as avulsion, fracture, empyema, septic horn maggot wound and horn cancer [17,18]. Similarly, in present case, out of four cases, two with fractured horn; while the remaining two cases with irreparable wound at the base of horn have been recorded. According to study conducted by Prasad et al., [18] stated that fracture can occur at any length of the horn, but fractured at the base of the horn is painful and causes bleeding. This is in agreement with present case, where complete fractures of horn with extensive bleeding in case 1 and the base of the horn were loose and hanged in case 4.

In present case, fractured horns were managed through amputation by traditional flap method [13,18]; whereas, in case of an irreparable wound at the base of horns were managed through amputation of the horns including the horn secreting tissues followed by irrigation with 1% povidone iodine [12]. After completion of amputation using mattress suture pattern to suture the skin flaps with silk No.2 was reported by Reddy et al. [18]. This agrees with present case, where the skin flaps were sutured by simple interrupted suture pattern with silk No.2 in case 1 and 4. However, in case 2 and 3 the wound were allowed to heal openly without suturing since the wound size was too wide and difficult to approximate. This is in agreement with the same previous case report by Dugassa and Fromsa [12] in terms of case management after amputating the horn.

In present case, dehorning was performed under cornual nerve block by Lidocaine Hcl 2% in combination with anti-pain using diclofenac sulfate @ 2mg/kg in case 1, and 2 [14,19-21], and with sedative using xylazine hydrochloride @ 0.1 mg/kg in case 3 and 4 [15,18,22]. In the first group the pain-related behavioral response such as vocalizations, struggles, tail movements and discomfort during the first hours after the procedure were not encountered, while in the second group head shaking and vocalization were evidenced especially in case 4. This is in agreement with the study conducted by Alvarez et al. [14] and Hempstead et al. [23] stated that using local anesthesia along with meloxicam could lower the behavioral response (vocalizations and struggles) after procedures.

In present case, wound was managed by dressing the wound with antiseptic solution (1% Povidone iodine solution), applying topical antibiotic (cyclo spray) and administration of fortified procaine penicillin 220,000 IU/kg to ensure better wound healing. This agrees with previous similar case report by Reddy et al. (2017) who used 0.1% Povidone iodine as wound dressing solution, Lorexane ointment as topical antibiotic and ceftriaxone (10mg/kg intramuscularly) as post-operative care. Some scholars also reported that the use of anti-pain after dehorning may reduce the risk of behavioral change, pain sensitivity and infection since the cortisol concentration increase after local anesthesia was wear off [6,11,24,25]. This agrees with the present case management where diclofenac sulphate was used after dehorning procedures were completed.

In present case, even if the dehorning was conducted under aseptic conditions, oozing of purulent fluid as a result of frontal sinusitis was encountered in case 2 and 3. This might be encountered due to improper dehorning at former clinic, which was exposed the cornual portion of the sinus in case 2, and contamination of bacteria into the wound from environment in case 3. This is in line with previous report of Dugassa and Fromsa [12] stated that post-operative complication may result due to formation of bone sequestra subsequent to dehorning, fracture or avulsion of horns which exposes the cornual portion of the sinus and contamination of bacteria into the wound from environment. However, in case 1 and 4 there were not such postoperative complications was encountered.

## Conclusion

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

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