

# Study on Comparison Between Lignocaine and Lignocaine-Xylazine on Caudal Epidural Injection on Fogera Breed Cow in Gondar University Dairy Farm

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## Research Article

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# Abstract

**Background:** Caudal epidural anesthesia commonly utilized in veterinary practice to allow diagnostic, obstetrical, and surgical interventions in the perineal region of cows. An experimental study conducted on epidural anesthesia from October 2018 to March 2019 on 6 cows with repeated treatments after one week by two groups of anesthetic drugs.

**Methods and materias** First Lignocaine is given for Group-I of cows in the first intercoccygeal space and then the same animals after one week injected Lignocaine-Xylazine together in the intercoccygeal space. The Clinical-physiological parameters such as the onset of analgesia, duration of analgesia, ataxia, sedation, heart rate, respiratory rate, and rectal temperature between the two groups studied by compression. Finally, the significance of the change in the study unit between Lignocaine and Lignocaine-Xylazine analyzed according to SPSS version 19 for t-test and P-value <0.05 taken as statistically significant.

**Results:** There was no significant change that appeared between the onset of analgesia of Lignocaine ( $4.3 \pm 0.6$ min) alone and Lignocaine-Xylazine ( $4.9 \pm 1.1$ min) injection together ( $t=1.17$ ;  $P>0.05$ ). This indicates that the addition of Xylazine to Lignocaine does not significantly delay the onset of anesthesia. However, there was a significant difference observed in the duration of analgesia between two groups ( $t=13.2$ ;  $P<0.05$ ) with Lignocaine-Xylazine ( $259.5 \pm 12.38$ min) longer duration than Lignocaine alone ( $84 \pm 4.05$ min). This indicates that Lignocaine and Xylazine have an additive effect on the duration of analgesia. In the case of physiological parameters, there were significant variations in heart rate ( $t=7.5$ ;  $P<0.05$ ) with **Group II** cows lower in heart rate than **Group I** cows. Statistically, a significant difference was also observed on respiratory rate ( $t=2.13$ ;  $P<0.05$ ) in which the addition of Xylazine on Lignocaine significantly lower breathing rate than Lignocaine injection alone. Finally, on rectal temperature, there was no statistically significant difference appeared ( $t=1.7$ ;  $P>0.005$ ) with rectal temperature in **Group I** cows ( $0.15 \pm 0.28$  °C) and in **Group II** cows ( $0.9 \pm 0.31$  °C) which indicate that addition of Xylazine to Lignocaine lower rectal temperature similar to Lignocaine injection alone. Mild ataxia was observed in three groups I, cows, and there was no sedation and salivation noted at all. In Group II, cows mild to severe ataxia, deep sedation, salivation, and falling observed. In both groups, there was no anesthetic complication during epidural analgesia and after recovery noted.

**Conclusion:** generally this study showed that, combination of Lignocaine and Xylazine have an additive effect on the duration and quality of analgesia.

## 1. Introduction

Surgical procedures in cows usually performed under local or regional anesthesia. Caudal epidural anesthesia commonly utilized in veterinary practice to allow diagnostic, obstetrical, and surgical interventions in the perineal region of cows [1]. The most frequently used local anesthetic agent was lignocaine although mepivacaine, bupivacaine, and procaine are also used [2]. Except for bupivacaine,

these groups of agents provide analgesia of relatively short duration (20–180 minutes) and may necessitate re-administration of the agent to allow completion of the procedure. Besides, local anesthetic agents indiscriminately block motor, sensory, and sympathetic nerve fibers causing mild ataxia, hind limb weakness, and occasionally recumbence [2].

For procedures requiring long-duration analgesia, epidural and intrathecal administration of agents may be more appropriate than others administration. These agents which selectively block sensory nerve fibers include opioids and alpha-2 adrenergic agonists, are providing significant analgesia with a decreased likelihood of rear limb dysfunction [3]. Xylazine is one of the alpha-2 adrenergic agonists, and widely used in veterinary practice both systemically as a sedative and analgesic drug [4]. Depending on the dose, xylazine can induce cardiopulmonary depression, reduction in swallowing (drooling of saliva) with an increased risk of aspiration, reduced body temperature, reduction in ruminal activity, and diuresis [4; 5].

following epidural administration of Xylazine with higher doses or another alpha-2 adrenergic agonist, used for caudal epidural analgesia in cattle may be caused ataxia and recumbency [6]. Although xylazine will provide relatively long periods of analgesia, the onset of analgesia generally prolonged (30 minutes) [4; 6]. Although the combination of Lignocaine and Xylazine has used epidurally to provide prolonged analgesia in cattle, no study has directly compared the length of onset and duration of analgesia of this combined with that of Lignocaine and Lignocaine-Xylazine combination in cows [2].

Because of its prolonged duration of action and decreased disruption of the motor function of the hind limbs, alpha2- agonists is superior to that induced by anesthetic agents commonly used to provide local anesthesia for surgery in standing cattle [8]. Production of the caudal block means that motor control of hind limbs is uninfluenced. Depending on the size of the animal, the total dose of Lignocaine (2%) is between 5 and 10 ml. Skin analgesia will develop in the tail and croup as far as the mid sacral region of the anus, vulva and perineum, and the posterior aspect of the thighs if the concentration of the solution is sufficient to paralyze the sensory fiber. Paralysis of motor fiber will cause the anal sphincter to relax and the posterior part of the rectum to balloon. Stretching of the vulva will produce no response and the vagina will dilate. During parturition, straining to cease but uterine contraction is uninfluenced [9].

Therefore, this study designed with the following objectives

#### **General objective:**

- To investigate the time to onset, duration of analgesia and area of desensitization produced by Lignocaine and Lignocaine-xylazine combination in the caudal epidural space of cows

#### **Specific objectives:**

- To compare significant of a change in physiological parameter between Lignocaine and Lignocaine-xylazine
- To find out the effect of this epidural analgesia grade of sedation and ataxia in cows.

- To record the anesthetic complication during epidural analgesia and after recovery, if any

## **3. Materials And Methods**

### **3.1. Study Area**

The study was conducted at the University of Gondar Livestock Farm. The Gondar city is located in Amhara regional state in the north Gondar zone. It located at about 738 Km. fare away from Addis Ababa in northwestern direction and latitudinally located at about 12°31' N, longitudinally, 37°25 'E, and altitude elevation is 1966 m (6450 ft.). Ecologically the area lies in dryland ecosystem and area receive a mean annual rainfall of about 1161 mm (45.7 in) of rainfall per year, or 96.8 mm (3.8 inches) per month. On average, there are 126 days per year with more than 0.1 mm (0.004 inches) of rainfall (precipitation) or 10.5 days with a quantity of rain, sleet, snow, etc. per month. The driest weather is in January when an average of 3 mm (0.1 inches) of rainfall (precipitation) occurs. The wettest weather is in July when an average of 326 mm (12.8 inches) of rainfall (precipitation) occurs. Gondar district have livestock population of 300,000-310,000 bovine, 40,000–43,000 ovine, and 42,000–43,000 caprine (CSA, 2008).

### **3.2. Study animals**

The study was conducted on dry Fogera breed of cows. Six Fogera cows were selected for the experimental study having almost the same body weight, age, breed and body condition and the study was a repeated trial in which, the animals treated by one independent variable (Lignocaine) was repeated after a week on the same animals by another independent variable (Lignocaine-xylazine).

### **3.3. The methodology of the Study**

The selected cows were first assigned as Group-I (Lignocaine) for the first trial and then in the second round assigned as Group-II (Lignocaine -Xylazine) for the second trial and each cow was used twice for the trial at weekly intervals. No surgery performed in all the cows being experimental study.

#### **3.3.1. Site preparation**

First Intercoccygeal space used for caudal epidural injection in all cows. The cows of both groups restrained in the crush and the area between the last sacrum and third Intercoccygeal joint was aseptically prepared by clipping the hairs and with surgical scrubbing using povidone-iodine.

#### **3.3.2. Epidural injection technique**

For caudal and epidural anesthesia the injection site used was between coccygeal C1 and C2 (located by raising tail in “pump handle” fashion, the first obvious articulation behind the sacrum being C1 /C2). For the assessment of the weight of the animal, the Shaffer’s formula was used.

In this experimental study, before giving calculated dose an insensitive skin weal made with Lignocaine by infiltration subcutaneously over the injection site (First Intercoccygeal space). An 18G, 3.8 cm length,

hypodermic needle inserted into the epidural space with the bevel point forward. Proper placement of the needle was determined by the loss of resistance and easy of injection of drugs. After ascertaining proper positioning of the needle the drugs administered slowly, approximately over 30 seconds. In all the cows of both groups, the time for onset of analgesia and duration of analgesia recorded.

### **3.3.3. Caudal epidural analgesia trial**

Group-I animals were given epidurally, Lignocaine hydrochloride without epinephrine (0.22 mg/kg). Group-II animals were given epidurally, Lignocaine hydrochloride without epinephrine (0.22 mg/kg) plus Xylazine hydrochloride (0.05 mg/kg). In all the cases, the drugs diluted uniformly to a quantity of 6.0 ml by mixing sterile distilled water. The drugs administered approximately over 30 seconds. Each cow used twice for the trial at weekly intervals.

### **3.3.4. Anesthetic parameters**

Parameters studied: Physiological parameters: Before starting the epidural procedure, the animal was calmed and was in resting position. The physiological parameters, rectal temperature, heart rate, and respiratory rate of the cows recorded in all the cows before, during, and after recovery from epidural anesthesia. Temperature is taken by inserting a clinical digital thermometer (produce sound after manipulation for 2 minutes in the rectum) at least 1.5-2.0 cm length inserted into the rectum and kept it in the position. Heart rate and Respiratory rate recorded by auscultation with a stethoscope placed over the left side of the chest and counting the abdominal movements respectively.

In all the cows of both groups, the time is taken for the onset of analgesia recorded. Immediately after giving the injection time of injection was recorded and waiting until the setting of desensitization. The desensitization was detected by needle prick and hemostat pressure and as soon as the animal is non-responsive for needle prick which indicates that the animal is desensitized and then the difference between the time of epidural injection and time of desensitization is recorded as the time taken for the onset of anesthesia.

After the onset of anesthesia recorded, the next step was measuring the duration of anesthesia. This measured by needle prick and hemostat pressure after 3-minute in-group I cows (lignocaine group) and after 5 minutes in group two cows, (Lignocaine-Xylazine group) sensitivity test repeated 5 minutes later in each group. The time interval between the time of desensitization and time of the return of sensitivity (time taken for needle prick response) was recorded as the duration of analgesia. The area of desensitization includes the cranial extent of analgesia and caudal body part from the point of injection assessed by needle prick and hemostat pressure response. The grade of sedation and ataxia were recorded in each group. The physiological parameters including rectal temperature; respiratory rate and heart rate of the animal were measured before, during, and after recovery from analgesia.

## **3.4. Sampling and sample size determination**

A simple random sampling technique was used because it is applicable when the population is small, homogeneous, and readily available. all sampling unit is given an equal (non zero) probability of

selection with the target population of dry dairy cow in Gondar university dairy farm and sampling frame (study population) with all dry Fogera dairy cows in Gondar university and a lottery system was used to determine which unit are to be selected. Sample size determination was according to the research behavior and it was experimental, the treatment repeated on the study animals. In each group, six animals investigated.

### **3.5. Study design**

The study design is a specific plan or protocol for conducting the study, which allows the investigator to translate the conceptual hypothesis into an operational one. In this study, clinical trial design selected which was convenient for tests in medical research and drug development that generate safety and efficacy data (information about adverse drug reaction and adverse effect of other treatment) for health intervention. Under clinical trial design, a randomized trial is preferable in which animals or groups randomly assigned for treatment and it provides the most convenient evidence of the relationship between exposure and effect.

### **3.6. Data analysis**

The data were first entered and managed into Microsoft excel worksheet and analyzed using statistical package for social sciences (SPSS) software version 19 and differences in change of independent variable between both groups were expressed as significant or not significant with 95% confidence interval. The significant difference between group one and group two was determined using clinical trial design; t-test and  $p < 0.05$  was considered as statistically significant.

### **3.7. Variables**

Variables are those in which the study is going to do on it and it can be a dependent variable or independent variable. Dependent variables are those variables in which the researcher eager to see in his study and it is the output of the experiment while, as independent variables are those variables in which the researcher used it as input. In my study, the dependent variable was the onset of anesthesia, duration of anesthesia, heart rate, breathing rate, and rectal temperature while an independent variable was lignocaine and lignocaine-xylazine.

### **3.8. Hypothesis testing**

A statistical hypothesis is a tentative assumption of the study or the expected result of the study. This assumption may or may not be true. It is also the formal procedure used by statisticians to accept or to reject the statistical hypothesis. In statistics, the result is statistically significant if it has been predicted as likely to occur by chance alone according to a predetermined threshold probability, the significant level. These tests used in determining what outcome of the study would lead to a rejection of the null hypothesis for a pre-specified level of significance. In this study t-test, the method of testing the hypothesis has used.

There are two types of statistical hypothesis; null hypothesis which denoted by  $H_0$  is usually the hypothesis that sample observation result purely from chance and the second one is an alternative hypothesis which denoted by  $H_a$  is usually the hypothesis that sample observation is influenced by some non-random cause.

The analysis plan includes decision rules for rejecting the null hypothesis. The decision rule has described in two ways concerning a P-value or concerning a region of acceptance (confidence interval). The strength of evidence in support of the null hypothesis was measured by P-value. Suppose that the statistic is equal to S, the P-value is the probability of observing statistic as extreme as S, assuming the null hypothesis is true. If the P-value is less than the significant level we reject the null hypothesis that is if one is true, the other must be false.

## 4. Result

The experimental study conducted from October 2015 to March 2016 on 6 cows with repeated treatment by different variables. Finally, the significance of a change independent variable between lignocaine and Lignocaine-Xylazine was recorded and then analyzed according to the t-test statistical analysis method.

### 4.1. Onset of analgesia

Three minutes after giving the anesthesia, epidurally the desensitization checked in both groups by using needle prick and hemostatic forceps. The data analyzed by the t-test and the result is as follows in Table 1. The dependent variable was the onset of desensitization; the independent variable was Lignocaine and Lignocaine -Xylazine.

Now calculated value of t is less than the table value of t which is  $t(\text{calculated}) = 1.17$  and  $t(\text{table}) = 1.81$  So that there was no significant difference between the onset of lignocaine and lignocaine-xylazine an epidural injection. Based upon the above result null hypothesis accepted and alternative hypothesis rejected. The onset of Lignocaine -Xylazine becomes equal to that of Lignocaine alone only 5% out of 100 bovines and the rest 95% is almost the same onset weather we inject Lignocaine alone or Lignocaine -Xylazine together.

### 4.2. Duration of analgesia

Duration of analgesia measured from desensitization of the site after injection and until the animal fully recovered and become responsive for needle prickle and moving his tail. The duration of anesthesia in each animal recorded and the data analyzed by the t-test and the result was as follows in Table 2.

According to the above table result calculated value of t larger than that of the table value which is  $t(\text{calculated}) = 13.2$  and  $t(\text{table}) = 1.81$ , so that null hypothesis is rejected and alternative hypothesis accepted. as the result indicate that the duration of lignocaine-xylazine injection was higher than that of lignocaine injection alone with 5% error (only 5 animal from hundred) may show no difference in duration in Lignocaine-Xylazine injection together than Lignocaine injection alone.

## 4.3. Analgesic Effects

The analgesic effects measured in both groups by observation for the presence of desensitization, ataxia, and sedation by needle prick and hemostatic forceps. In all cows, the caudal region both cranially from point of injection and distally from the tail to inguinal region and tarsal bone analgesic effects are investigated. In the simple and precise form, the effect of lignocaine alone and the effect of lignocaine - xylazine together recorded in the following Table 3.

According to the above table, the effect of lignocaine on the cows is moderate, in which the anesthetic effect extends cranially only one inch and distally up to the middle of the thigh region except in F04 and F02 in which it extended up to proximal to stifle joint. As mentioned in table 4, F08, F04, and F02 there was mild ataxia observed and in the rest of the animals, ataxia has not noted. In the experimental study of **Group I** animals; there was no sedation at all.

As mentioned in Table 4, In **group-II** animal ataxia achieved without hind limb dysfunction. Moderate to deep sedation and salivation observed in the post-injection period in Group-II. again animals fall appeared tired with drooping of the head, eyelids, and salivation.

## 4.4. Physiological parameters

Physiological parameters; rectal temperature respiration rate and heart rate, before and after injection in both **groups** of animals were recorded carefully and the data was analyzed by using a t-test separately for the significance of change between both groups as mentioned in Table 5.

According to the statistical analysis result mentioned in Table 6, even though temperature decreased in both groups after injection of anesthesia there was no significant difference between both groups for a decrease in temperature since the corresponding t-test indicates that the difference is no longer significant because t-calculated is less than the table value. t-calculated = 1.7 and t-table = 1.81 so that there is no sufficient evidence to reject the null hypothesis or also there is not sufficient evidence to conclude that there is a difference in rectal temperature decrement between Lignocaine and Lignocaine-Xylazine after injection

The corresponding t-test indicates that the difference is longer significant and the breathing rate is lower in lignocaine-xylazine than lignocaine alone as mentioned in Table 7. The value considered as significant at  $P < 0.05$  and  $P < 0.01$ . Therefore, the null hypothesis rejected and alternative hypothesis accepted with only a 5% error out of hundred animals.

Now the calculated value of t is larger than that of table value so that the difference is significant and the heart rate in Lignocaine -Xylazine is lower than in Lignocaine alone at 95% confidence interval and only 5% of 100 animals may be the same in heart rate in both injections.

## 4.5. Complications of caudal epidural anesthesia

In this study cows of both groups were investigated carefully even after recovery whether some complications present or not even some information was asked the farm assistance the next day. It found that there were no post-anesthetic complications in the feeding system, excretion, and respiration. The absence of complication does not indicate that anesthetic drug has no problem but it indicates appropriate preparation before injection and following the correct procedure and carrying of the cow until full recovery.

## 5. Discussion

This study revealed that the addition of Xylazine to Lignocaine does not bring significant change in the onset of analgesia even if xylazine delays the onset. A similar study in ruminant (goat) and camel in Oregon state university indicate no significant change in the onset of Lignocaine and Lignocaine – Xylazine [10] in large ruminants; a caudal epidural block is a commonly used block. However, under this block, in many instances, the motor fibers of the hind limb are completely or partially blocked by the drugs used. In the present investigation, the caudal epidural route was used to achieve analgesia of the hind part. Xylazine, on the other hand, is known to produce a delayed onset of action in comparison with lignocaine (Kumar and Thurmon, 2003). The combination produced complete analgesia of the hind leg, tail, and inguinal region after the injection of drugs. It has been observed that the distribution of the anesthetic solution in the cerebrospinal fluid determines the uptake of anesthetics [10]. Furthermore, uptake found to be the greatest where the concentration of the solution was greater (*i.e.* at the site of injection) and decreased above and below the site of highest concentration.

This study showed that a combination of Xylazine (an alpha-2 adrenergic agent) and Lignocaine (a local anesthetic agent) was additive for the duration of analgesia. Followed administration of the drug epidurally to cattle, prolonged duration of epidural anesthesia observed and a similar study was reported in horse and dogs [11], [12], [13]. However, the mechanism of prolonged duration is unknown. Some researchers said that alpha-2 adrenergic agonists may produce vasoconstriction or inhibit local anesthetic agents that induced vasodilatation and subsequently decrease vascular uptake of anesthetic agents [14]. Alternatively, the additive effect could be related to the fact that the provision of analgesia, by administering either alpha-2 adrenergic agonists or opioids, will intensify and prolong local and regional blockage provided by the local anesthetic agent [12]. This study also similar to the study of the effect of Lignocaine, Xylazine, and Lignocaine-Xylazine in cows in India [15]. The study in goats confirmed that an additive interaction between xylazine and lignocaine would produce Longer duration and greater depth of analgesia (Kumar and Thurmon, 2003).

The difference in Decrease Rectal temperature between both **groups** is not significant and this study contradicts with a significant change in rectal temperature in Lignocaine ( $0.3 \pm 0.25$ ), Xylazine ( $0.9 \pm 0.42$ ), and Lignocaine-Xylazine ( $0.66 \pm 0.32$ ) in cows between three groups each group having four cows in India [15]. In this study, the absence of significant difference in rectal temperature may be due local environmental factor that was Lignocaine was injected in the morning in which the sunlight is not as much hot. Lignocaine-Xylazine was injected at midday after all cow feed grass and drink water so that

the metabolism very increased during this time and the temperature decrease only slightly in group-II. A general decrease in temperature in both **groups** probably was due to reduced basal metabolic rate, reduced muscle activity, and depression of thermoregulatory centers. The alpha2-agonists also found to depress the hypothalamic nor-adrenergic alpha2-receptors to cause hypothermia. The present study shows that a decrease in rectal temperature observed following administration of Lignocaine in cattle was believed to be due to heat loss from the relaxation of thoracic and abdominal skeletal muscles and a combination of Lignocaine with Xylazine don't have an additive effect in decreasing the rectal temperature.

Respiration rate (RR) decreased in **groups-II** was sever as compared to **group-I** and this result is similar to study in ruminant (goat) and camel in Oregon state university [10]. Moreover, the South Africa veterinary association research center [16]. A decrease in RR may be due to direct depression of the respiratory centers by Xylazine [17]. These indicate an additive depressant effect of both classes of drugs on the respiratory function and confirmed the earlier findings. A slight respiratory depression by lignocaine alone in the present study probably may be due to the blockade of nerves innervating the muscles of respiration.

In **group-two** significant decrease was observed in heart rate as compared to **group-one**. A similar in Oregon state university indicated that a significant difference in heart rate was obserbed between Lignocaine and Lignocaine-xylazine [10]. This decrease can be explained by several mechanisms, which include decreased sympathetic outflow during Xylazine from CNS, inhibition of noradrenaline release from sympathetic nerve terminals, direct depression of cardiac pacemaker and conduction tissue, increased vagal tone and a direct increase in the release of acetylcholine from parasympathetic nerves in the heart. However, the mechanism of decreased heart rate not examined in this study.

Mild ataxia was observed in some of the group-I cows which may be due to local anesthetic agents block both sensory and motor fiber [8]. Moderate to severe ataxia noted in group-II cows may be due to xylazine postulated local anesthetic properties at the spinal cord level. Through venous sinuses, Blockade of motor fibers might be the reason for extreme ataxia initially; however, as the effect of lignocaine was off the animal's regained normal gait. It may be also due to structural similarity with lignocaine or because of its systemic uptake. No sedation observed on group-I cows at all, but medium to severe sedation observed in group-II cows. The sedation produced in this group may be the manifestation of the central effects of alpha2-agonist xylazine probably after its absorption from the epidural space. There was no salivation and falling noted in group-I cows due to lignocaine does not reach the central-nervous-system only block the fast voltage-gated Na<sup>+</sup> channels in the neuronal cell membrane responsible for signal propagation and don't have the ability to affect cerebellum as well as to induce salivation. Oppositely, Xylazine can defuse directly to the cerebellum it affects the balance system of the animal and thereby cause falling, and stimulate salivation by binding to the receptor site of saliva stimulator on the brain [18].

## 6. Conclusion And Recommendation

There are so many studies done on the anesthetic drug in domestic animals mainly in goat, camel, and bovine. The majority of the study was on comparing Clinico-physiological parameters such as duration of analgesia, degree of ataxia and sedation, salivation, heart rate, respiratory rate, rectal temperature, hematological and biochemical parameters between Lignocaine, Xylazine, Lignocaine-xylazine, and diazepam. Several study's find out that general anesthetics are mostly muscle relaxants and have a longer duration than local anesthetics. However, delayed onset than local anesthetics and this study revealed the same result in which Lignocaine has rapid onset as compared to xylazine and shorter duration as compared to xylazine and Lignocaine cause only loss of sensation without loss of consciousness while as xylazine cause loss of sensation and consciousness with mild to deep sedation. The area of desensitization by Lignocaine is also smaller in which extends only around thigh region and paralysis of the tail, mild ataxia, and no sedation, while as Xylazine cause the wide area of desensitization up to the tarsal bone and also diffuse cranially and cause severe ataxia, sedation, and salivation. However, the physiological parameters are highly decreased in group-II cows as compared to group-I cows except for rectal temperature. The rectal temperature in both groups decreases in the same manner.

Based upon the above conclusion the following recommendations are forwarded;

- For doing surgery which takes several minute xylazine should be used as a booster with other local anesthetics.
- For doing surgery in rectal prolapses, Teat canal surgery, and open castration to prevent animals from suffering Xylazine is the best of an anesthetic drug.
- Veterinarians should use general anesthesia for complete loss of sensation, consciousness, and to perform surgery without suffering the animal even for doing regional surgery.
- For animals in accidental injury around hind limb until surgical procedure completed surgeon shall have to use Xylazine alone or in combination with other anesthetic drugs to make animal immobile.
- Animal having heart stroke history or bradycardia xylazine should not be given because it may cause heart insufficiency.
- For animals having a respiratory problem, xylazine should not recommend because it causes respiratory muscle relaxation and respiratory depression.

## 7. Declarations

We, the under signed declare that the information presented here in our research is our original work, has not been presented for a degree in any other University and all that sources of material used for the research have been duly acknowledged.

**Author's contributions:** Dr. Endalkachew collected all of the samples for the study and designed the experiment, conducted all the laboratory tests, analyzed the data, and wrote the manuscript. Dr. Gashaw

recorded the information needed for publication, drew the ranch map for the manuscript, and reviewed the manuscript, and assisted in the writing and editing of the manuscript.

**Availability of data and Supplementary Materials:**The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

**Ethical approval:** this research work was approved by the ethical review committee of the Universities of Gondar and all methods were performed in accordance with the relevant guidelines and regulations

**Consent for publication:** Not applicable.

**Consent to participate:** informed consent was obtained from the animals owners who participated in this research.

### **About ARRIVE guidelines**

I confirm that this study was carried out in compliance with the arrive guidelines.

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**Conflicts of Interest:** The authors declare no conflict of interest.

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## Tables

Due to technical limitations, table 1,2,3,4,5,6,7 is only available as a download in the Supplemental Files section.

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