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

Endalkachew Hailu

Department of Clinical Medicine, College of Veterinary Medicine and Science,
University of Gondar, P.O. Box: 196, Gondar, Ethiopia

Abstract: 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. Lignocaine was given for Group-I of cows in the first inter-coccygeal space and then the same animals was injected Lignocaine-Xylazine (Group II) after one week in the inter-coccygeal 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 were compared. Finally, the significance of the change in the study unit between Lignocaine and Lignocaine-Xylazine were analyzed. There was no significant change that appeared between the onset of analgesia of Lignocaine (4.3±0.6 min) alone and Lignocaine-Xylazine (4.9±1.1 min) injection ($t=1.17$; $P>0.05$). This indicates that the addition of Xylazine to Lignocaine did not significantly delay the onset of anesthesia. However, there was a significant difference observed n the duration of analgesia between the two groups ($t=13.2$; $P<0.05$) with Lignocaine-Xylazine (259.5±12.38min) longer duration than Lignocaine alone (84±4.05min). 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 ($P<0.05$) in which the addition of Xylazine on Lignocaine significantly lower breathing rate than Lignocaine injection alone. The rectal temperature in Group I cows was (0.15± 0.28°C) and in Group II cows (0.9±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 animals of groups I. There was no sedation and salivation noted at all. In Group II, mild to severe ataxia, deep sedation, salivation and falling were observed. In both groups, there was no anesthetic complication during epidural analgesia and after recovery were noted.

Key words: Epidural Analgesia · Lignocaine · Lignocaine-Xylazine and Duration of Analgesia

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].

Epidural and intrathecal administration of agents with greater duration of action may be more appropriate for procedures requiring long-duration analgesia. These agents include opioids and alpha-2 adrenergic agonists, which selectively block sensory nerve fibers, thereby providing significant analgesia with a decreased likelihood of rear limb dysfunction [3]. Xylazine is one of the alpha-2 adrenergic agonists, that has been widely used in veterinary practice both systemically as a sedative and analgesic drug [4]. It causes muscle relaxation and depending on the dose used, it can induce cardiopulmonary depression, fall in body temperature,

Corresponding Author: Endalkachew Hailu, University of Gondar, College of Veterinary Medicine and Science, Department of Clinical Medicine, P.O. Box: 196, Gondar, Ethiopia.

reduction in ruminal activity, reduction in swallowing (drooling of saliva) with an increased risk of aspiration and diuresis [4, 5].

Ataxia and recumbency may occur also following epidural administration of either alpha 2 agonists, especially at higher doses, Xylazine, or another alpha-2 adrenergic agonist, used for caudal epidural analgesia in cattle [6]. Although xylazine will provide relatively long periods of analgesia, the onset of analgesia is generally prolonged than 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 [7].

Epidural analgesia induced by alpha2- agonists is superior to that induced by anesthetic agents commonly used to provide local anesthesia for surgery in standing cattle because it has a prolonged duration of action and decreased disruption of the motor function of the hind limbs [8]. Production of the caudal block means that motor control of hind limbs is uninfluenced. When 2% of the solution of Lignocaine was used, the total recommended dose ranged from 5 and 10 ml depending on the size of the animal. If the concentration of the solution used is sufficient to paralyze the sensory fiber, skin analgesia will develop in the tail and croup as far as the mid sacral region the anus vulva and perineum and the posterior aspect of the thighs. Paralysis of motor fiber will cause the anal sphincter to relax and the posterior part of the rectum to balloon. Defecation will be suspended 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 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, to compare the significant 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 and to record the anesthetic complication during epidural analgesia and after recovery, if any

MATERIALS AND METHODS

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).

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).

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.

Site Preparation: First Inter-coccygeal 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 Inter-coccygeal joint was aseptically prepared by clipping the hairs and with surgical scrubbing using povidone-iodine.

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 Inter-coccygeal 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.

Caudal Epidural Analgesia Trial: Group-I animals were given epidurally, Lignocaine hydrochloride without epinephrine (0.22mg/kg). Group-II animals were given epidurally, Lignocaine hydrochloride without epinephrine (0.22mg/kg) plus Xylazine hydrochloride (0.05mg/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.

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 was 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 was desensitized and then the difference between the time of epidural injection and time of desensitization was 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 included 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 for 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.

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 dray 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.

Study Design: The study design was 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.

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 I and group II was determined using clinical trial design; t-test and $P<0.05$ was considered statistically significant.

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 this 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.

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 Ho is usually the hypothesis that sample observation result purely from chance and the second one is an alternative hypothesis which denoted by Ha 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.

RESULTS

The experimental study was 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.

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. 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 (calculated) = 1.17 and t (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.

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.

According to the above table result calculated value of t larger than that of the table value which is t (calculated) = 13.2 and t (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.

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 were investigated. In the simple and precise form, the effect of lignocaine alone and the effect of lignocaine -xylazine together recorded in the following table.

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. In 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.

Table 1: T-test table for the time taken for the onset of lignocaine and lignocaine -xylazine analgesia in min

Groups	Obs	Mean	Std.error	Std. Dev.	95% conf.	Interval
Lignocaine	6	4.3	0.24	0.6	3.46	5.14
Lignocaine- Xylazine	6	4.9	0.44	1.1	3.36	6.44
Combined	12	4.6	0.55	1.35	3.41	5.79
Diff	0.6	0.14	0.1	1.3		

Diff = mean (Lignocaine-xylazine)-mean (Lignocaine) t= 1.17

H_0: onset is the same in both groups.

H_a: onset is delayed in Lignocaine-xylazine than Lignocaine alone.

DF=10

Table 2: T-test for the duration of lignocaine and lignocaine-xylazine analgesia in min

Groups	Obs	Mean	Std.err	Std. Dev.	95% conf.	Interval
Lignocaine alone	6	84	1.65	4.05	78.3	89.7
Lignocaine-xylazine	6	259.5	5.05	12.38	242.07	276.93
Combined	12	171.75	55.75	136.5	160.185	183.315
Diff	175.5	1.66	163.77	187.23		

Diff = mean (lignocaine-xylazine)-mean (lignocaine) t= 13.2

H_0: no difference in duration of lignocaine and lignocaine-xylazine injection

H_a: lignocaine-xylazine has significant duration than lignocaine alone

Df=10

Table 3: Analgesic Effects of the drug (lignocaine) on Group I animals

Ser. No.	Animal ID	Analgesic Effects
1.	F08	Analgesia noted one inch from point of injection cranially
		At the lower side, analgesia observed up to the middle of the thigh region
		Mild ataxia
		No sedation
2.	F04	Analgesia noted one inch from point of injection cranially
		Analgesia proximal to stifle joint caudally from point of injection
		Mild ataxia
		No sedation
3.	T	Analgesia noted one inch from point of injection cranially
		Analgesia up to the middle of the thigh region caudally from point of injection
		No ataxia
		No sedation
4.	FWB	Analgesia noted one inch from point of injection cranially
		Analgesia up to the middle of the thigh region caudally from point of injection
		No ataxia
		No sedation
5.	F02	Analgesia noted one inch from point of injection cranially
		Analgesia proximal to stifle joint
		Mild ataxia
		No sedation
6.	FWC	Analgesia noted one inch from point of injection cranially
		Analgesia up to middle thigh region caudally fro point of injection
		No ataxia
		No sedation

Table 4: Analgesic Effects of drugs (Lignocaine-Xylazine) on Group II animals

Ser. No.	Animal ID	Analgesic Effects
1	F08	Analgesia noted two inches from point of injection cranially
		Analgesia up to tarsal bone caudally
		Severe ataxia
		Sever sedation
		Salivation
		Falling
2	F04	Analgesia noted two inches from point of injection cranially
		Analgesia up to tarsal bone caudally
		Severe ataxia
		Moderate sedation
		Salivation
		Falling
3	T	Analgesia noted two inches from point of injection cranially
		Analgesia up to tarsal bone caudally
		Severe ataxia
		Moderate sedation
		Salivation
		Falling
4	FWB	Analgesia noted two inches from point of injection cranially
		Analgesia up to tarsal bone caudally
		Severe ataxia
		Sever sedation
		Salivation
		Falling
5	F02	Analgesia noted two inches from point of injection cranially
		Analgesia up to tarsal bone caudally
		Moderate ataxia
		Moderate sedation
		Salivation
		Falling
6	FWC	Analgesia noted two inches from point of injection cranially
		Analgesia up to tarsal bone caudally
		Severe ataxia
		Moderate sedation
		Salivation
		Falling

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.

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.

According to the statistical analysis result, 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. 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.

Table 5: T-test for rectal temperature between Lignocaine and Lignocaine –Xylazine in °C

Group	Obs	Mean	Std.err	Std. Dev.	95% conf.	Interval
G-I(lignocaine)	6	0.15	0.022	0.28	-0.152	0.452
G-II(lignocaine-xylazine)	6	0.9	0.44	0.31	0.15	1.65
Combined	12	0.52	0.27	0.67	-0.001	1.051
Diff	0.75	0.418	0.302	1.198		

Diff = mean (Lignocaine -Xylazine)-mean (Lignocaine) t= 1.7

H_0: The decrease in rectal temperature in both groups is the same

H_a: Decrease in rectal temperature in group-II cows is more significant than the decrease in Group-I cows

.Df=10

Table 6: T-test for a respiratory rate between Lignocaine and Lignocaine -xylazine

Group	Obs	Mean	Std.err	Std. Dev.	95% conf.	Interval
G-I(Lidocaine)	6	2	0.81	2	-0.81	4.81
G-II(Lidocain-xylazine	6	8	1.02	2.52	4.46	11.54
combined	12	5	2.39	5.86	1.825	8.175
Diff	6	0.933	5.27	6.73		

Diff = mean (Lignocaine-Xylazine)-mean (Lignocaine) t= 2.13

H_0: respiration rate after injection of Lignocaine is the same as respiration rate after injection of Lignocaine -Xylazine

H_a: A decrease in the respiration rate in Lignocaine-Xylazine is more significant than that of Lignocaine alone.

Df=10

Table 7: T-test for a heart rate between Lignocaine and Lignocaine-Xylazine

Group	Obs	Mean	Std.err	Std. Dev.	95% conf.	Interval
G-I(Lidocain)	6	1	0.44	1.09	-0.53	2.53
G-II(Lidocain-xylazine)	6	7	0.67	1.67	4.66	9.34
combined	12	4	1.86	4.56	2.06	5.935
Diff	6	0.67	5.19	6.81		

Diff = mean (Lignocaine -xylazine)-mean (Lignocaine) t= 7.5

H_0: no significant change in heart rate between Lignocaine alone and Lignocaine -Xylazine together

Ha: change in heart rate in Lignocaine -Xylazine is more significant

Df=10

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.

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.

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 were 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[9]. The combination produced complete analgesia of the hind leg, tail and inguinal region after the injection of drugs. It has observed that the distribution of

the anesthetic solution in the cerebrospinal fluid determines the uptake of anesthetics [10]. Furthermore, uptake was 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.

In this study, a combination of Xylazine (an alpha-2 adrenergic against) and Lignocaine (a local anesthetic agent) was additive for the duration of analgesia. when administered epidurally to cattle prolonged duration of epidural anesthesia following administration of alpha-2 adrenergic agonist and the local anesthetic combination has been reported in human beings [11], horse [12] and dogs [13]. Although the mechanism of prolonged duration is unknown, at least theories exist. Alpha-2 adrenergic agonists may produce vasoconstriction or inhibit local anesthetic agent-induced vasodilatation and subsquientelly 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 intensified and prolonged the local and regional blockage provided by the local anesthetic agent [12]. This result is also similar to the study in Lignocaine, Xylazine and Lignocaine-Xylazine in cows between three groups each group having four cows in India [15]. Longer duration and greater depth of analgesia in group-II suggested an additive interaction between xylazine and lignocaine, which confirms the findings in goats after the spinal administration of Xylazine and Lignocaine [9].

The difference in Decrease Rectal temperature between both groups was not significant and this study contradicts with a significant change in rectal temperature in Lignocaine (0.3± 0.25), Xylazine (0.9±0.42) and Lignocaine-Xylazine (0.66±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 hoot. 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 was also found to depress the hypothalamic nor-adrenergic alpha2-receptors to cause hypothermia. The present study showed 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.

A significant decrease in heart rate was observed in group-II as compared to group I. A similar study in ruminant (goat) and camel in Oregon state university indicated a significant difference in heart rate between Lignocaine and Lignocaine-xylazine [10]. This decrease was 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^+ 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].

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 raped onset as compared to xylazine and shorter duration as compared to xylazine and Lignocaine cause only loss of sensation without loss of consensuses while as xylazine cause loss of sensation and consensuses 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 defuse 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 prolepses, 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.

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