CLINICAL AND BIOCHEMICAL EFFECTS OF LIDIOCAINE HCL, KETAMINE HCL, AND THEIR COMBINATION FOR POSTERIOR EPIDURAL ANALGESIA IN BUFFALOES

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ABSTRACT

This study was performed to clarify the effects of lidiocaine Hcl, ketamine Hcl and their combination injected into the sacrococcygeal space for posterior epidural analgesia in buffaloes. Five adult buffaloes were randomly received 3 treatments with 2 week interval. The treatments were 7.5 ml of lidiocaine Hcl 2% *(Group I)*, 7.5 ml of ketamine Hcl 2% *(Group II)* and 7.5 ml combination of lidiocaine Hcl 2% and ketamine Hcl 2% *(Group III)*. Analgesic, sedative, ataxic, cardiopulmonary effects, rumen motility and biochemical parameters were observed and recorded. Average of onset and duration of analgesia were 4.8 & 77.0 min.; 3.8 & 25.8 min. and 5.2 & 90.0 min. in group I, II and III respectively. Analgesic areas were tail, perineum and the posterior aspect of hind limbs. There was no sedative effect in all groups. Slight ataxia was observed in one case in group I. The biochemical findings showed significant increase in serum glucose and cortisol in group III especially at 30 and 60 minutes from start of analegesia, while the creatnine level significantly increased in both group II and III at 15, 30, 60 minutes. However, these parameters fluctuated with in normal range and started to recover with in 90 min. Other examined parameters did not show any significant change. It could be concluded that, epidural administration of ketamine Hcl 2% had rapid onset and short duration of analgesia. Combination of lidiocaine Hcl and ketamine Hcl 2% treatment had rapid and long duration of analgesia like lidiocaine Hcl treatment. This study indicated also a possible additive analgesic interaction between epidurally administered lidiocaine Hcl and ketamine Hcl, with transient and minimal systemic effects in buffaloes.

INTRODUCTION

Low caudal epidural analgesia is more frequently used than the high epidural technique and differs only in the volume of the anesthetic solution injected ***(Skarda, 1986)***. Caudal epidural anesthesia is simple and inexpensive, and requires no sophisticated equipment ***(Thurmon, et al., 1996)***. It is routinely used in ruminants for obstetric manipulations, caudal surgical procedures, and as an adjunct treatment for control of rectal tenesmus ***(Muir, et al., 2000)***. Extradural analgesia is usually produced by local analgesic which usually lidiocaine 2% solution. ***(Hall, et al., 2001).*** Lidocaine has minimal near to no systemic side effect as it was shown in study of ***Kinjavdekar, et al., (2003)*** who reported that lidocaine did not induce any significant haematobiochemical changes when administrated in goat.

Ketamine, a potent noncompetitive antagonist at N-methyl-D-aspartate (NMDA) receptors in the spinal cord, has been used as a general anesthetic or analgesic in clinic ***(Beltrutti, et al., 1999 and Wagner, et al., 2002).*** Epidural use of ketamine has been reported in horse, cattle, buffalo calves and buffalo ***(Gomez de Segura et al., 1998; Kamiloglu, et al., 2003; Lee, et al., 2003; Singh, et al., 2005& 2006 and Saifzadeh, et al., 2007)***. Ketamine produced transient increase in serum glucose, creatnine, and urea and have no effects on serum electrolytes ***(Singh, et al., 2005 and Kinjavdekar, 2006).*** Also, **Singh, et al., 2006** reported that, ketamine induced increased serum cortisol and ALT.

The aim of this work is based on studying the analgesic, sedative, ataxic, cardiopulmonary and biochemical effects of sacrococcygeal posterior epidural injection of fixed volume (7.5 ml) and concentration (2%) for lidiocaine Hcl, ketamine Hcl and their combination in buffaloes.

MATERIALS & METHODS

Apparently healthy five adult non-pregnant buffaloes (2 to 4 years old and weighting range from 470-550 kg were used on 15 occasions in a crossover study at the Educational farm of Faculty of Veterinary Medicine, Suez Canal University. All buffaloes received 3 treatments with two week interval. Buffaloes were restrained in a chute. Skin area over the sacrococcygeal space was identified and aseptically prepared. Epidural puncture was performed, according to ***Hall, et al. (2001)***. Caudal epidural analgesia was induced with either 7.5 ml of lidiocaine Hcl 2% (Debocaine: 20mg/ml; El-nasr Pharm. Chemicals Co. for Al-Debeiky Pharma A.R.E.) ***(group I)***, ketamine Hcl 2% (3ml of 50mg/ml ketamine diluted in sterile saline 0.9% solution to reach the total volume 7.5

ml) (Ketamine Hcl 50 mg/ml: Rotex Medica. Trittau- Germany) ***(group II)*** and the combination of lidiocaine Hcl 2% and ketamine Hcl 2% (3.75 ml of 2% of lidiocaine Hcl and 3.75 ml of 2% ketamine Hcl to reach the total volume 7.5 ml) ***(group III)***. After administration of the treatments, the following parameters were observed, recorded and assessed:

Analgesic effect:

Onset, duration and anatomical distribution of the analgesic effect were recorded. The period from the injection to loss of the sensation was considered as the time of the onset of the analgesia. The presence of the analgesia was taken as lack of responses to pin pricking. The time from the loss to the return of the sensation was considered to be the duration of the analgesia. The analgesia in the tail, perineum and hind limbs were assessed by the responses to superficial and deep muscular pinpricks.

Needle pricks were started from just beneath the anus ventrally and continued forward toward the paralumbar fossa after administration of the treatments till 120 minutes. Positive responses to needle prick was defined as movement, kicking, or contraction of cutaneous muscles. In this way, the presence and the anatomic extend of the analgesia was determined.

Sedative effect:

Sedation was evaluated based on criteria described by ***Lin, et al., (1998)***.

Ataxic effect:

Ataxia was assessed according to ***Lin, et al. (1998)***. Ataxia was evaluated by the ability of the buffaloe to compensate when gently pushed or pulled, while in the stanchion.

Heart rate (HR), respiratory rate (RR), rumen motility (RM) and rectal temperature (RT)

These criteria were assessed before administration and at 15 min intervals until 120 min.

Blood samples

Blood samples were taken from jugular vein just before injection, and at 15, 30, 60, 90 and 120 minutes after injection. Serum creatinine and BUN were determined colorimetrically using commercial kits (Bio-Merieux Co. Maray-Le toile, Chrobonnieres-Les Bains, France) according to the methods of ***Fawcett and Scott, (1960) and Seeling and Wust, (1969)*** respectively. Serum calcium was determined colorimetrically with the help of (Perkin-Elimer) atomic absorption spectrophotometer, using commercial kits (Human, Gesell Schaft for Biochemical and Diagnostic, Wiesbaden, Germany) according to the method of ***Barnett et al. (1973).*** Inorganic phosp-

horus was determined colorimetrically using kits supplied by Biomerieux, France and according to the method of ***Golden berg and Fernands (1966).*** Serum GPT, GGT, total protein and albumin were estimated according to ***Bergmeyer et al. (1985), Persijin and Van der Slik (1976)***, ***Weichselbaum, (1973) and Doumas et al., (1971)*** respectively. Glucose according to ***Trinder, (1969)*** Sodium (Na), Potassium (K) and chloride analysis were accomplished by emission flame photometry after suitable dilution as described by ***Dean (1960).*** Cortisol hormone was assayed using radioimmunoassay kit using solid phase component system (Diagnostic Products Corporation DPC, Los Angeles, California, USA).

Statistics analysis:

Data were statistically analyzed by one way ANOVA using SPSS

RESULTS

The onset and duration of analgesia were 4.8 ± 1.30 minutes & 77.0 ± 9.74 minutes; 3.8 ± 1.64 minutes & 25.8 ± 8.13 minutes and 5.2 ± 1.30 minutes & 90.0 ± 12.24 minutes in group I, II & III respectively **(Table 1)**. The main analgesic areas were tail, perineum and the upper posterior aspect of upper part of the hind limbs, 15 cm under the perineum region in ketamine treatment. On the other hand, the analgesic areas of lidiocaine Hcl and the combination of lidiocaine Hcl & ketamine Hcl treatments were tail, perineum and the posterior aspect of hind limbs. Flaccidity of the tail was observed in all buffaloes given either of these treatments.

There was no sedative effect in all groups. Buffaloes made repeated attempts to kick, thrashed around in the chute, or swung its head at people nearby.

No apparent difference in the observed incidence of ataxia in group II & III. Slight ataxia was observed in one case after lidiocaine Hcl treatment at 20 minutes of administration and last for 12 minute. They are swaying.

The mean heart rates, respiratory rates, body temperatures and rumenal motility for all treatment were recorded in **Table (2)**.

The biochemical findings were recorded in **Table (3 & 4)**.

DISCUSSION

Production of caudal analgesia depends upon the total dose (volume × concentration) of the anesthetic administered. Recommended volume of solution for caudal epidural anesthesia is 5 to 10 ml in adult cattle or 1 ml per 100 kg of body weight ***(Thurmon, et al., 1996 and Hall, et al., 2001)***. For this reason, the concentration and volume of lidiocaine Hcl, ketamine Hcl and the combination was consistent in this study to assess the analgesic, sedative, ataxic and cardiopulmonary eff-

ects produced by epidurally administered. We used a slightly higher total volume of dilution (7.5 ml versus 5.0 ml) because this volume produced more reliable analgesia in a preliminary trial.

In this study, no significant difference was noted between all treatments in the onset of analgesia. The onset and area of analgesia were rapid and observed only in the perineal region after injected 7.5 ml of ketamine Hcl 2% in the epidural space. Moreover, the onset and area of analgesia after the combination of lidiocaine Hcl and ketamine Hcl were rapid and nearly similar in onset and area of analgesia with that of lidocaine Hcl treatment. These results were similar to the results mentioned in cattle by ***Grubb, et al. (2002) and Lee, et al. (2003)***. Although, ***Lee, et al. (2003)*** used high doses of 5, 10, 20 ml of 5% ketamine Hcl when injected in the epidural space.

The duration of analgesia was highly significantly increased in the combination of lidiocaine Hcl and ketamine Hcl as well as lidiocaine Hcl treatments that reached 90.0 & 77.0 minutes respectively in comparison with ketamine treatment (25.8 minutes). This result was disagreed with ***Lee, et al. (2003)*** who mentioned that the duration of analgesia of ketamine Hcl injected was about a half of lidiocaine Hcl in cattle. This may be attributed to species difference. As well as, ***Lee, et al. (2003)*** used large volume and concentration of ketamine Hcl.

Caudal epidural analgesia using local anesthetics is produced by the inhibition of conduction of impulses of sensory nerves located in the cauda equina ***(Covino, 1990)***. The action of local anesthetics is nonselective and depression of autonomic and motor nerves accompanies desensitization. This nonselective depression of motor nerves may result in recumbency.

Although it has been considered that ketamine acts on NMDA-receptors of the spinal cord, the spinal cord terminates in buffalo at the level of the 2^{nd} sacral vertebra ***(Singh and Roy, 1997)***. It could not be taken into account to explain the analgesia here, as the agent must migrate cranially to allow receptor site binding in the spinal cord.

Muir, et al. (2000) and Lee, et al. (2003) observed the differences in the analgesic response to epidurally administered ketamine Hcl. This was attributed to anatomic differences, dose regimen, and inhalation anesthesia. These complex actions and differences in analgesic response have made the evaluation of epidural ketamine Hcl difficult ***(Hall, et al., 2001)*** and the epidural analgesic effect of ketamine Hcl remain controversial ***(Beltrutti, et al., 1999)***.

From the clinic point of view, the duration of analgesia after epidural administration of lidiocaine Hcl 2%

and the combination of lidiocaine Hcl and ketamine Hcl 2% may be suitable for most common surgical procedures and pain relief of perineum. On the other hand, the duration of analgesia after epidural administration of ketamine Hcl 2% is short; it may be useful for obstetric procedures. These results were supported by ***Kamiloglu, et al. (2003)*** who mentioned that, epidural ketamine Hcl (2-3 mg/kg diluted one in four in 0.9% NaCl) provided satisfactory analgesia for superficial operations in the perineal region; however, there was inadequate muscle relaxation for some operations; in those situations it would be necessary to administer a muscle relaxant in combination with it.

Buffaloes in this study did not show any signs of sedation in all groups. This effect may be explained by the slow systemic absorption of ketamine Hcl 2% from the epidural space. As well as lidiocaine Hcl has not sedative effect. This result was supported by the result of ***(Hall, et al., 2001 and Lee, et al., 2003)***. On other hand, epidural ketamine Hcl of high dose (about 2 mg/kg) caused only mild sedation in horses ***(Gomez De Segura, et al., 1998)***. This may come from species difference, such as the different caudal extent of the spinal cord within the different epidural space, and difference of administration method ***(Gomez De Segura, et al., 1998)***.

As a result of slow systemic absorption, there were no significant changes in HR, RR, RT and RM, which may reflect the concentration of ketamine Hcl in blood stream. The same result was recorded in cattle by ***(Lee, et al., 2003)*** whom mentioned that, ketamine is known to have activity as a local analgesic, and NMDA antagonist, an opioid agonist/ antagonist and, possibly, as an antimuscarinic.

There was no apparent difference in the observed incidence of ataxia in all cases except one case of lidiocaine Hcl treatment that showed slight ataxia. This result was supported by ***Lee, et al. (2003)*** who mentioned that, the development of ataxia is dose-dependent using lidocaine, an expected phenomenon when using the high caudal epidural technique. Based on the proposed mechanism of action, the incidence of ataxia associated with the use of ketamine Hcl would be expected to be less than lidocaine Hcl.

The minimal biochemical changes were represented by slight increase in blood glucose and cortisol levels in both group II and III. These results are in agreement with data obtained by ***(Nicol et al., 2001, Kinjavdekar, 2006 and Singh, et al., 2006)***. In contrast no significant differenced were observed in lidiocaine group. These results may be due the effect of ketamine which is N-methyl D-aspartate (NMDA)-antagoists. As NMDA receptors are

involved in the physiologic pulsatile regulation of hormone release from the hypothalamo-pituitary-axis ***(Arslan, et al., 1992; Bhat, et al., 1995 and Jezova, et al., 1991).*** Also it is possible that the release of cortisol is triggered by a sympathomimetic effect of ketamine ***(Willems, et al., 2000 and Deuster, et al., 2000).*** The minimal increase in creatnine level only in group I and II at 15, 30 and 60 min then return to control level which is consider transient change and within normal ranges and in agreement with data obtained by ***(Kinjavdekar, 2006 and Singh, et al., 2005).***

It could be concluded that, buffaloes which were injected with 7.5 ml of ketamine Hcl 2% and 7.5 ml of lidiocaine Hcl and ketamine Hcl 2% combination by the epidural route remained standing. Epidural administration of ketamine Hcl 2% had rapid onset and short duration of analgesia. It may provide satisfactory analgesia for superficial operations in the perineal region and obstetric procedures. Lidiocaine Hcl and ketamine Hcl 2% combination had rapid and long duration of analgesia like lidiocaine Hcl treatment. Thus, it could be provided analgesia for common surgical procedures and pain relief of perineum and during parturition. This study indicated also a possible additive analgesic interaction between epidurally administered lidiocaine Hcl and ketamine Hcl, with transient and minimal systemic effects in buffaloes. Further study must be employed to assess their application in buffaloes practice.

Table (1): The onset and duration of analgesia (Mean SD) after posterior epidural injection of lidiocaine Hcl (Group I), ketamine Hcl (Group II) and the combination (Group III) in buffaloes.

Groups	Analgesia	
	Onset	**Duration**
I	4.8 ± 1.30	77.0 [a] ± 9.74
II	3.8 ± 1.64	25.8 [b] ± 8.13
III	5.2 ± 1.30	90.0 [a] ± 12.24

In the same column, different letters mean highly significant differences (P≤ 0.01)

Table (2): Heart rates, respiratory rates, body temperatures and ruminal motility (Mean SD) before (Baseline) and after posterior epidural injection of lidiocaine Hcl (Group I), ketamine Hcl (Group II) and the combination (Group III) in buffaloes.

		Time (min)								
	Groups	**0**	**15**	**30**	**45**	**60**	**75**	**90**	**105**	**120**
HR	**I**	66.8±4.0	67.2±4.1	66.6±3.9	65.6±4.5	67.0±3.4	66.2±5.6	66.8±2.3	67.6±2.7	66.4±2.60
(per	**II**	66.2±5.76	61.6±5.1	62.2±5.7	64.4±5.1	65.2±5.0	66.0±5.7	65.8±4.6	65.8±4.9	64.4±5.17
min)	**III**	6.0±5.7	62.0±4.8	62.6±3.8	65.2±5.0	65.2±5.4	66.2±5.7	65.6±4.5	67.6±3.8	66.2±5.67
RR	**I**	16.4±1.6	16.8±1.7	16.6±3.1	16.0±1.4	17.0±1.0	16.4±1.6	16.4±1.6	16.4±2.0	15.8±2.2
(per	**II**	16.0±3.1	15.6±2.7	15.8±1.4	15.4±0.8	15.2±0.8	15.6±1.5	15.8±1.4	15.4±1.1	15.2±1.9
min)	**III**	16.4±1.6	16.0±1.4	15.6±1.5	15.8±1.4	15.4±0.8	16.0±3.1	15.8±1.4	15.2±2.2	15.4±0.8
RT	**I**	38.5±0.2	38.5±0.2	38.4±0.1	38.5±0.1	38.4±0.1	38.2±0.1	38.4±0.2	38.5±0.1	38.5±0.1
	II	38.2±0.2	38.1±0.2	38.1±0.1	38.3±0.2	38.0±0.0	38.1±0.7	38.1±0.7	38.0±0.1	38.0±0.0
	III	38.2±0.1	38.1±0.1	38.1±0.1	38.2±0.2	38.2±0.1	38.2±0.2	38.3±0.2	38.2±0.2	38.2±0.1
RM	**I**	3.6±0.5	3.4±0.5	3.4±0.5	4.0±0.0	3.4±0.5	3.6±0.5	3.6±0.5	3.8±0.4	3.6±0.5
(per 2	**II**	3.8±0.4	3.8±0.4	3.6±0.5	3.6±0.5	3.8±0.4	3.8±0.4	3.6±0.5	4.0±0.0	4.0±0.0
min)	**III**	3.8±0.4	4.0±0.0	3.8±0.4	3.8±0.4	3.6±0.5	3.8±0.4	3.8±0.4	3.8±0.4	3.6±0.5

HR: heart rate; RR: respiratory rate; RT: rectal temperature; RM: rumen motility

Table (3): Serum kidney functions and electrolytes (Mean SD) before (Baseline) and after posterior epidural injection of lidiocaine Hcl (Group I), ketamine Hcl (Group II) and the combination (Group III) in buffaloes.

Parameters	Groups	0	15min	30 min	60 min	90 min	120 min
Creatnine (mg/dl)	I	1.15±0.17	1.22±0.18 A	1.22±0.13 A	1.18±0.10 A	1.30±0.11	1.16±0.18
	II	1.2±0.16 a	1.46±0.10 b B	1.66±0.18 c B	1.13±0.09 a A	1.18±0.10 a	1.2±0.12 a
	III	1.14±0.17 a	1.50±0.11b B	1.76±0.13 c B	1.49±0.19 b B	1.29±0.18 a	1.2±0.19 a
BUN (mg/dl)	I	22.4±2.54	23.4±2.14	23.9±2.64	24.1±2.59	25.6±2.14	24.6±2.24
	II	24.8±0.64	25.6±2.14	23.6±2.6	25.8±2.54	24.6±2.19	25.0±1.90
	III	25.7±1.54	26.7±1.90	24.3±2.14	25.0±1.54	24.7±1.64	25.3±1.35
Calcium (mg/dl)	I	8.9±0.84	8.4±0.76	8.0±0.64	8.4±0.61	8.9±0.64	8.6±0.64
	II	8.8±0.65	8.6±0.84	9.2±0.90	9.3±0.84	8.6±0.71	9.1±0.76
	III	9.3±0.64	9.0±0.70	8.8±0.64	8.6±0.82	8.8±0.76	9.6±0.89
Phosphorus (mg/dl)	I	5.5±0.54	5.4±0.43	5.1±0.59	4.9±0.44	5.1±0.41	5.8±0.50
	II	6.1±0.60	5.8±0.54	5.6±0.47	5.3±0.52	5.6±0.64	6.0±0.49
	III	6.2±0.59	5.6±0.54	6.4±0.61	5.3±0.54	6.1±0.53	5.6±0.45
Na (mmol/l)	I	136.8±8.08	141.2±11.14	139.6±13.0	145.0±12.16	138.8±12.30	140±12.60
	II	138.2±9.16	136.6±9.12	140.0±11.16	139.2±12.1	142.8±12.60	139.±11.1
	III	137.0±10.18	142.0±12.9	139.6±8.84	141.2±10.40	138.6±12.96	143±10.67
K (mmol/l)	I	3.9±0.17	3.8±0.30	4.2±0.33	3.8±0.3	4.4±0.37	4.3±0.38
	II	4.2±0.26	4.3±0.40	4.2±0.48	3.9±0.43	4.3±0.48	4.2±0.40
	III	4.3±0.27	4.0±0.31	3.8±0.31	4.4±0.49	4.2±0.32	3.9±0.29
Cl (mmol/l)	I	98.5±7.22	101.5±10.25	103.4±9.14	97.0±8.16	103.4±10.20	100.5±8.1
	II	91.2±8.21	95.9±9.23	99.1±8.11	102.0±9.07	98.1±8.70	96.0±9.0
	III	100.0±9.13	101.1±9.13	96.1±8.0	102.2±9.15	100.3±7.28	98.2±6.18

Values are expressed as means ± S.E.

Means bearing different superscripts (a,b,c) within the same row are differ significantly (P<0.05).

Means bearing different subscripts (A,B,C) within the same column are differ significantly (P<0.05).

Table (4): Serum glucose, liver functions and cortisol (Mean SD) before (Baseline) and after posterior epidural injection of lidiocaine Hcl (Group I), ketamine Hcl (Group II) and the combination (Group III) in buffaloes.

Parameters	Groups	0	15 min	30 min	60 min	90 min	120 min
glucose (mg/dl)	I	62.2±5.2	63.2±5	60.1±4.3A	64.0±4.36 A	63.5±3.38	62.3±4.56
	II	58.1±4.6	64.6±4.3	66.3±5.23A	65.1±5.10 A	62.2±5.97	60.4±5.0
	III	60.5±5.0a	65.0±5.34a	75.6±5.98bB	79.2±6.54bB	63.1±4.67a	61.3±5.64a
ALT (U/L)	I	56.3±4.14	60.1±4.24	61.3±5.52	53.4±4.14	50.6±5.14	53.3±5.14
	II	54.2±5.46	58.2±3.31	53.2±4.14	51.3±5.34	56.2±4.56	54.0±4.10
	III	53.5±3.34	54.0±4.21	56.0±5.11	49.3±3.34	57.1±5.74	57.6±3.14
GGT (U/L)	I	46.3±4.0	49.1±5.0	51.3±4.42	49.4±5.24	52.2±4.81	49.3±5.76
	II	44.0±4.16	48.1±4.41	50.2±5.14	49.3±4.94	54.2±5.34	52.0±5.10
	III	52.0±4.0	53.0±4.9	50.0±4.91	53.3±4.14	55.1±5.19	53.6±5.34
TP (g/dl)	I	7.1±0.44	7.2±0.71	7.3±0.57	7.4±0.34	7.6±0.54	7.4±0.64
	II	7.9±0.66	7.7±0.71	8.0±0.44	7.3±0.54	8.1.6±0.64	8.0±0.60
	III	7.5±0.44	7.6±0.51	7.4±0.61	7.3±0.64	7.7±0.54	7.9.6±0.64
Albumin (g/dl)	I	2.9±0.34	3.1±0.24	3.3±0.24	2.8.4±0.44	3.0±0.44	3.0±0.54
	II	3.8±0.44	3.8±0.44	3.6±0.54	3.8±0.44	3.6±0.54	4.0±0.40
	III	3.2±0.34	3.1±0.20	3.5±0.34	3.5±0.34	3.3±0.44	3.6±0.34
Cortisol (ug/dl)	I	8.8±0.54	9.4±0.71 A	8.4±0.65 A	8.4±0.74 A	8.1±0.84	8.6±0.64
	II	8.5±0.64	8.8±0.84 A	8.6±0.74 A	9.3±0.64 A	8.6±0.76	9.0±0.90
	III	9.2±0.74 a	12.0±0.70b B	14.8±0.9CB	14.6±1.04C B	10.8±0.94 a	9.3±0.74 a

Values are expressed as means ± S.E.

Means bearing different superscripts (a,b,c) within the same row are differ significantly (P<0.05).

Means bearing different subscripts (A,B,C) within the same column are differ significantly (P<0.05).

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الملخص العربى

التأثيرات السريرية والحيوية لحقن الليدوكيين هيدروكلوريد والكيتامين هيدروكلوريد والمركبين معا خارج الأم الجافية كمسكن لألم منطقة العجان فى الجاموس

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أجريت هذه الدراسة لتقييم تأثيرات حقن الليدوكيين هيدروكلوريد والكيتامين هيدروكلوريد والمركبين معا خارج الأم الجافية كمسكن لألم منطقة العجان فى الجاموس. تمت الدراسة على عدد خمس جاموسات بالغة حيث تم عمل المعاملة العشوائية لهم ثلاث مرات بفاصل اسبوعين. أستخدم فى المعاملة الأولى الليدوكيين هيدروكلوريد ٢% بجرعة ٧,٥مل و المعاملة الثانية الكيتامين هيدروكلوريد ٢% بجرعة ٧,٥ مل(٣مل من الكيتامين هيدروكلوريد ٥ % تخفف بمحلول ملح فسيولوجى ٠,٩% لتصل الى ٧,٥مل) والمعاملة الثالثة أستخدم ٣,٧٥ مل من الليدوكيين هيدروكلوريد ٢% و ٣,٧٥ مل من الكيتامين هيدروكلوريد ٢%. تم قياس تأثيرات فقد الالم وتهدئة الحيوان والترنح والوظائف الحيوية

وحركة الكرش قبل وبعد الحقن حتى ١٢٠ دقيقة. كانت بداية فقد الالم هى٤,٨ دقيقة واستمرت لمدة ٧٧ دقيقة فى منطقة الذيل والمنطقة العجانية و الجهة الخلفية للقوائم الخلفية عند حقن الليدوكيين هيدروكلوريد و٣,٨ دقيقة واستمرت لمدة ٢٥,٨ دقيقة فى منطقة الذيل والمنطقة العجانية عند حقن الكيتامين هيدروكلوريد و ٥,٢ دقيقة واستمرت لمدة ٩٠ دقيقة فى منطقة الذيل والمنطقة العجانية و الجهة الخلفية للقوائم الخلفية عند حقن المركبين معا. ولم يظهر أى تأثيرات واضحة على الحالة العامة للجاموس. ونخلص من هذه الدراسة أن حقن الكيتامين هيدروكلوريد ٢% يسبب فقدان سريع للألم مع قصر فترة التأثير والذى يكفى لعمل التدخل الجراحى البسيط فى المنطقة العجانية واستخدام الليدوكيين هيدروكلوريد والكيتامين هيدروكلوريد معا سريع البدء وطويل الفاعلية مما يتيح التدخل الجراحى المعتاد وليس له تأثير ملحوظ على الحالة العامة للجاموس بالأضافة الى التغير الطفيف والمؤقت للتغيرات الكيميائية عند استخدامها خارج الأم الجافية فى منطقة العجان.