

## Behavioral and analgesic effect of acepromazine maleate, lidocaine hydrochloride alone or in combination of them in lumbosacral epidural injection in sheep

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### Summary

The aim of the present study was to investigate the analgesic effect of Acepromazine 0.05 mg./kg B. w. and Lidocaine 0.5 mg/kg each alone or in combinations on the flank region in sheep after giving the drugs by lumbosacral injection. Fifteen healthy adult local breed sheep of both sexes weighting (17.50-30 kg) were used. Sheep were divided into three equal groups. Group (A), Acepromazine, group (B) Lidocaine, and group (C) Acepromazine and Lidocaine mixture. Data were collected immediately before administration of drugs (zero time) as control data. Parameters were included clinical measures: Heart Rate, Respiratory Rate, Rectal Temperature, Scores of analgesia of the flank, low abdomen, perineum, tail, hind limbs, fore limb, at time 10, 20, 30, 40, 50, 60, and 70 minutes after administration of drugs. The results revealed significant differences in flank, perineum, tail, low abdomen, and hind limbs analgesia, in which mild analgesia in group (B) at 10 to 50 minutes, and moderate analgesia in it group (C) combination at 10 to 50 minutes but no analgesic effect in group (A). In conclusion indicated that group (C) more effective than group (A) and group (B) alone and there was non-significant difference in rectal body temperature between animal groups, but significant differences in heart rate, respiratory rate.

**Keywords: Epidural anesthesia, Acepromazine, Lidocaine, Sheep.**

### Introduction

Ruminants are generally not considered good subjects for general anaesthesia mainly because of the hazards of regurgitation and inhalation of ruminal contents or saliva into the lungs if the airway is left unprotected (1). Surgical procedures in ruminants are usually performed under local or regional anaesthesia. Lumbosacral (L6-S1) epidural anaesthesia is the most common epidural technique used in sheep, goats and calves for all procedures caudal to the umbilicus. (2-4). Epidural anesthesia is commonly utilized in veterinary medicine to allow diagnostic, obstetrical and minor surgical procedures in the rear limbs, perineum, pelvis and tail. It provides excellent analgesia, and improves postoperative outcome (5). The most frequent disadvantages of epidural administration of local anaesthetics are motor impairment, sympathetic block, hypotension and local anaesthetic toxicity (6). In an attempt to diminish these undesirable side effects the adjuvant drugs have been routinely mixed with local anesthetic solution (7). Lidocaine hydrochloride, is widely employed local

anesthetic drug, is also used following central spinal, epidural or peripheral administration, as topical management of major pain. Clinics favor local administration of anesthetics for the relief of local pain due to the convenience of this type of application as well as to its reduced adverse effects (8 and 9).

Acepromazine (ACP) is a phenothiazine derivative that used for sedation and as part of general anesthesia in animals. It exerts sedative, anti-arrhythmic and vasodilator properties, which are considered to explain the protective effect of this drug against perioperative mortality during general anaesthesia (10). The aim of this object was to evaluate of analgesic effect of acepromazine and lidocaine under lumbosacral injection.

### Materials and Methods

This study was carried out using fifteen adult local breed sheep of both sexes weighing 17.50 - 30 Kg. The animals were housed in the Animal Farm of the College of Veterinary Medicine, University of Anbar, maintained in individual pens under similar conditions of management and feeding. Under

aseptic technique a needle (23- gauge mm) was used for Lumbosacral epidural administration of drugs. Animal were divided in to three equals group. Group (A) was injected with acepromazine maleate (Alfasaan Company, Holland) at a dose of 0.05 mg / Kg. Animals in group (B) was injected Lidocaine hydrochloride at a dose 0.5 mg / kg and group (C) was injected a mixture of acepromazine and lidocaine at the same dose mentioned above. Parameters were measured during the experiment include rectal temperature ( $^{\circ}\text{C}$ ), respiratory rate (breath/ min) and heart rate (beats / minutes). The mean value of these parameters were considered as base-line values or control (zero time values) and each 10 minutes until 70 minutes.

Analgesia was evaluated at different intervals by using pin - prick method advocated according to (11) to evaluate the analgesic action of Acepromazine and combination with lidocaine. A 23 gauge needle was applied on the coronet of the fore limbs and hind limbs, flank low abdominal hind limb, perineum, and tail. Onset of analgesia, and its potency scores were detected. Data were analyzed using the Complete Random Design (SAS). Comparisons between the means of the group in each parameters were tested by (Least Significant Difference) test. Probability was considered significant (at  $p < 0.05\%$ ) (SAS, 2001).

### Results and Discussion

Obtained results showed no analgesic effect at (A) group. Nevertheless, mild in-group (B), it was starting from 10 minutes after injection, which improve to moderate analgesia from 20-30 minutes, then gradually decreased until loss of analgesia at 50 minutes. In group (C) was a mild starting from 10 minutes after injection, moderate analgesia from 20-50 minutes, then gradually decreased until the end of experiment, there were no response to pin prick at caudal region (hind limbs, tail, anus, and perineum) bilateral following epidural administration of lidocaine, lidocaine and Acepromazine combination but no differences were present between the

administration and onset of analgesia. Acepromazine, does not have analgesic properties (12), It does not provide analgesia, but reduce the animal's reaction to handling of pain via sedation and C.N.S depression, and thus have an additional positive effect (13). While the present study showed that lidocaine induced analgesia, this result was agreed with (14) who showed Lidocaine induced analgesia by inhibiting propagation and conduction of nerve impulses through blockade of sodium channels in the cells with subsequent prevention of depolarization.

The using of combinations of lidocaine plus Acepromazine were providing analgesia and sedation to increase the duration of analgesia when compared with Acepromazine and lidocaine alone, which showed are increase in the period of analgesia reflecting the sedative effect of acepromazine.

At group (A), there was gradually decreased in respiratory rate followed 40 minutes of the epidural injected. The statistical analysis revealed significant differences ( $P < 0.05$ ) in 0, 10 and 30 minutes in comparing with other time (Table, 1). The result in group (A) was disagree with (15) whom described that injection of acepromazine has no effect on respiratory rate. In Group (B), respiratory rate slowly increased through the first 10 minutes and remain increased, until 50 minutes of observation. The statistical analysis revealed significant differences at the level of ( $P < 0.05$ ) at zero time with all times. The increase in respiratory rate may be due to conscious state of animal and frightened. The result was disagreed with (16) who revealed that lidocaine was caused mild decrease in respiratory rate. Lately in Group (B and A), respiratory rate slowly increased through the first 10 minutes following injection and return to normal value at 50 minutes of observation. The statistical analysis revealed no significant differences (Table, 1).

Statistical analysis of respiratory rate between groups revealed decreased in respiratory rate significantly ( $P < 0.05$ ) after the epidural injection in group (B) in comparison with other groups especially (C).

**Table,1: Effects of epidural injection in group (A), (B) and (C) on the respiratory rate (rate/minute).**

Time Group	0 min	10min	20min	30min	40min	50min	60min	70min
A	36±1.2 Ab	35.2±0.4 Ab	36±0.3 Ab	34.4±0.9 Bb	32±0.3 BCb	34.4±2.0 Ba	34.4±0.88 B	34.6±0.7 B
B	37.6±0.99 Da	41.6±0.03 Aa	45.6±0.7 1ABa	46.4±0.13 Aa	46.4±0.5 3Aa	44±0.90 Ba	42.4±0.40 C	42.4±1.6 0C
C	40±1.26 Ca	43.2±1.49 Ba	44±0.96 Aa	43.2±0.65 Ba	42.4±0.9 7BCa	40.8±1.4 9Ca	39.2±0.80 A	40±0.7 BC

Small different letters denoted that significant differences between period at (p<0.05). Capital different letters denoted that significant differences between groups (p<0.05).

There was no significant difference in heart rate with groups from zero time to the complete subsidy of analgesia signs. In between groups the result showed significant differences (P<0.05) in 10 min of group (A) with other groups, while in 20 and 40 minutes appeared between (A) and (B) groups. In 30 min the statistical analysis show significant difference between all groups (Table, 2). This result is commensurate with other research elucidate that the effect of clinical dose of acepromazine on heart rate is generally minimal despite of some investigators having reported a slight rise or no change. Acepromazine has antiarrhythmic effects on

the heart and protects against adrenaline-induced fibrillation and this property is an advantage when acepromazine is used for preanaesthetic medications (17 and 18). Other study showed an increased in heart rate at 15 and 20 min after injection in sheep receiving bupivacaine alone which may be due to primary normal compensatory mechanism for hypotension caused by sympathetic block 1, as bupivacaine like all local anesthetics injected epidurally reduces the sympathetic tone. Therefor the increased in heart rate after injection of lidocaine might be reverts to the same reason that was mentioned for a bupivacaine. (1 and 19)

**Table, 2: Effects of epidural injection in group (A), (B) and (C) on the heart rate (beat/minute).**

Time Groups	0 min	10min	20min	30min	40min	50min	60min	70min
A	117.6±4.6	144±9.7 a	132±17.4 a	106.4±10.6 .6 c	136±11.6 a	120±5.7	115.2±3.8	115.0±3.8
B	113.6±5.7	123.2±2.09 b	126.4±2.9a	126.4±2.43 a	125.6±2.15 a	123.2±1.75	119.2±4.5	113.6±4.33
C	112.8±6.11	121.6±3.91 b	121.6±1.60 b	121.6±1.60 b	121.6±1.60 b	120±2.52	120.0±3.57	120.0±2.52

Small different letters denoted that significant differences between period at (p<0.05). Capital different letters denoted that significant differences between groups (p<0.05).

In group (A), body temperature was mild decreased through the first 10 minutes till 70 min followed the epidural injection. The statistical analysis revealed no significant differences were conducted (Table, 3). This agree with (20) who indicated that acepromazine has no effect on body temperature, although hypothermia is a well

described non-desired effect of phenothiazine. The exact mechanisms of action are not fully understood, phenothiazine block post-synaptic dopamine receptors in the central nervous system, depress portions of the reticular activating system that assists in the control of body temperature, and a-adrenergic blocking effects. In Group (B), body

temperature slowly decreased through the first 10 minutes followed the epidural injection of lidocaine, stay decreased continuously, and extended to 70 minutes of observation. The statistical analysis revealed non-significant differences ( $P < 0.05$ ) (Table, 3). The rectal temperature varied according to the type of the local analgesic. Decrease in rectal temperature occurred after epidural injection of lidocaine. This similar to that recorded by (21). This might be attributed to the vasodilator effect of lidocaine in the area of

analgesia due to block of the sympathetic innervation beside the immobility of the animal that favor heat loss (1). In Group (C) body temperature gradually decreased through the first ten minutes following injection continuously stay decrease, and reached after 70 minutes. The statistical analysis revealed no significant differences was noticed (Table, 3). Finally no significant difference between all groups in concerning to body temperature.

**Table, 3: Effects of epidural injection in group (A), (B) and (C) on the rectal temperature.**

Time Groups	0 min	10min	20min	30min	40min	50min	60min	70min
A	39.86±0.06	39.78±0.09	39.60±1.80	39.50±2.22	39.50±2.14	39.50±1.86	39.50±1.86	39.50±1.86
B	39.62±1.46	39.56±1.60	39.44±1.47	39.48±1.46	39.46±1.36	39.50±1.22	39.56±1.12	39.56±1.12
C	39.68±0.08	39.60±1.30	39.52±1.59	39.52±1.59	39.56±1.28	39.58±1.24	39.58±1.24	39.58±1.24

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### التأثير السلوكي والمسكن للأسبيرومازين، واليدوكائين هيدروكلوريد وحدهما، او مزيجا للحقن فوق الجافية القطنية العجزية في الأغنام

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#### الخلاصة

هدفت الدراسة الحالية بيان تأثير اسبيرومازين بجرعة 0.05 ملغم/كغم من وزن الجسم وليدوكائين 0.5 ملغم/كغم كل عقار لوحده أو خليط لدوائين لتسكين منطقة الخاصرة في الاغنام بعد إعطاء العقاقير بالحقن فوق الجافي العجزي القطني . استخدمت في هذه التجربة خمسة عشر من الاغنام المحلية البالغة من كلا الجنسين وبمعدل وزن تراوحت (17.50 - 30 كغم) . قسمت الاغنام إلى ثلاثة مجاميع متساوية المجموعة (أ) اسبيرومازين، المجموعة (ب) ليدوكائين المجموعة (ج) مزيج الاسبيرومازين والليدوكائين. تم اخذ القراءات الفسلجية قبل حقن المركبات المستخدمة أي في (الوقت صفر) لاعتمادها معلومات سيطرة ، حيث اعتمدت المعايير السريرية الآتية: معدل ضربات القلب، معدل التنفس، درجة الحرارة، مدة ودرجة التسكين (للخاصره , اسفل البطن , المنطقة العجانية , الذيل , الأطراف الخلفية و الأطراف الأمامية وبعد إعطائه في الفترات 10 و 20 و 30 و 40 و 50 و 60 و 70 دقيقة. اظهرت النتائج وجود اختلافات معنوية عند مقارنة مجموعة (ب) مع مجموعة (ج) حيث ظهر تسكين معنوي خفيف لمنطقة الخاصرة , اسفل البطن , العجانية والذيل , الأطراف الخلفية في مجموعة (ب) للوقت مابين (10 - 50) دقيقة، في حين لم يظهر تسكين في مجموعة (أ) وتسكين متوسط لمجموعة (ج) للوقت مابين (10-50) دقيقة. نستنتج ان التسكين الحاصل في مجموعة (ج) افضل من مجموعة (ب) و (أ) وعدم وجود اختلافات معنوية في درجة الحرارة لكل المجموع. بينما كانت هنالك اختلافات معنوية في معدل ضربات القلب و معدل التنفس مابين المجموع.

الكلمات الافتتاحية: التخدير فوق الجافية، اسبيرومازين، ليدوكائين، الاغنام.