SEDATIVE AND ANALGESIC EFFECTS OF SOME ANESTHETICS ADMINISTERED EPIDURALLY AND INTRATHECALLY IN SHEEP

By

M.H. EL-Kammar, R.E. Abdel-Wahed, M. M Kassem and A. A. Kenawy

(Dep. of Surgery, Fac.Vet. Med., Alex. Univ.)

SUMMARY

Twelve clinically healthy sheep (1-2.5 years) weighing 27-35 kg were used in this study. Animals were divided into 4 groups (3 sheep for each).Sheep of each group received one of the following drugs epidurally and intrathecally, at week intervals: xylocaine Hcl as 2 mg/kg Bwt; xylazine Hcl as 0.3 mg/kg Bwt; detomidine Hcl as 0.04 mg/kg Bwt and ketamine Hcl as 4 mg/kg Bwt. Sedative and analgesic effects of these drugs were recorded. Onset, duration and degree of ataxia were determined. Pulse and respiratory rates, rectal temperature and ruminal motility were recorded 5 minutes before and continued for 90 minutes after administration of drugs. Blood was collected 5 minutes before and at 30, 60 minutes and 24 hours post injection for determination of hemoglobin (Hb%), total leucocytic count (TLC), AST, ALT, blood glucose and blood urea. Statistical analysis for the collected data was performed. Deep to marked sedation was evident in sheep epidurally or intrathecally injected with xylazine and detomidine. Prolonged ataxia was observed following Intrathecal administration of the four groups. Complete analgesia was evident following all drugs. Area of analgesia extended cranially following intrathecal administration. Duration of analgesia was longer following Intrathecal xylocaine as compared with Epidural one. Complete analgesia was observed following Epidural and Intrathecal xylazine. Injection of ketamine in both routes induced analgesia included the pelvic limb, perineum, tail and flank region till the last 3 ribs. Clinical and hematobiochemical parameters showed some physiological changes that gradually returned to the pre injection level.

It is therefore concluded that spinal administration of 2% xylazine Hcl induced satisfied sedative and analgesic effects in sheep especially when injected intrathecally as compared with detomidine Hcl, xylocaine Hcl, and ketamine Hcl.

INTRODUCTION

Both epidural and subarachnoid spinal nerves blocking provided excellent conditions for intra-abdominal, pelvic or hind limb surgery in sheep *(Hall and Clarke, 1991).* Surgical interference posterior to the diaphragm, as laparotomy in small and large animals, could be performed under the effect of spinal analgesia *(Saleh and Ali, 1993).* Intrathecal lignocaine injection (0.6-1.0 mg/kg) provided good analgesia for open castration of mature ram with short duration of pelvic limb ataxia *(Scott et al., 1996).* Detomidine induced sedation and analgesia of longer duration than the equivalent doses of xylazine *(Clarke and Taylor, 1986 and Jochle and Hamm, 1986).* Epidural injection of xylazine in ram induced analgesia through a local anaesthetic action and α2-adrenergic mechanism *(Aminkov and Hubenov, 1995).*

Deep sedation, massive salivation, mild hind limb ataxia, and moderate perineal analgesia were recorded in cow following epidural administration of detomidine in a dose of 0.04 mg\kg *(Kariman, 1997).*

Epidurally administered ketamine in horses produced local spinal and C.N.S. effects, with analgesia and sedation *(Gomez de segura et al., 1997).* While intrathecally, 1ml ketamine in donkey produced bilateral analgesia without effect on the motor function of pelvic limb *(Saleh, 1993).*

The present work was conducted to compare the sedative and analgesic effects of xylocaine Hcl, xylazine Hcl, detomidine Hcl, and ketamine Hcl when administered epidurally and Intrathecally in sheep.

MATERIALS AND METHODS

Twelve clinically healthy sheep (1-2.5 years) weighing 27-35kg were used in the present study. The animals were divided into 4 groups, (3 sheep for each). Every sheep in each group received one of the following treatments Epidurally then Intrathecally, at weekly intervals: Xylocaine Hcl as 2 mg/kg, (Lidocaine Hcl, Sweden); Xylazine Hcl as 0.3 mg/kg, (Rompun, Bayer Leverkusen, Germany); Detomidine Hcl as 0.04 mg/kg, (Domodsidan, Bohringer Ingelheim vetmedica Gmbh, Ingelheim, Germany); and Ketamine Hcl 4 mg/kg (ketalar, park Davis). The site of injection (lumbosacral depression) was prepared for aseptic administration. Epidural and Intrathecal administration was performed using a 18- gauge, 6 cm needle. Calculated doses of xylazine, detomidine and ketamine were injected after mixing with 2 cc of 0.9% saline. The onset, duration and degree of sedation and ataxia were determined according to their signs. Onset, duration, and area of analgesia were determined according to response to pin prick. Pulse and respiratory rates, rectal temperature and ruminal motility were recorded at 5 minutes before drug administration and continued for 90 minutes later. Blood samples were collected at 5 minutes before and at 30 and 60 minutes, and 24 hours post injection for determination of hemoglobin (Hb %), total leucocytic

count (TLC) and biochemical analysis for AST, ALT, Blood glucose and Blood urea. Statistical analysis for the collected data was performed according to *SAS (1987).*

RESULTS

Sedation was evident in sheep injected with xylazine and Detomidine. It began with incoordination, staggering and knuckling on fetlock joint. Mild sedation characterized by lowering of head and dropping of eye lids was noticed in sheep treated with xylocaine Hcl intrathecally. Marked sedation in form of sleep like state with complete recumbency were observed following intrathecal administration of xylazine. Onset of analgesia was rapid after intrathecal as compared with epidural administration of xylocaine (0.52 ± 0.28 min versus 1.17 ± 0.76 min, Tables, 1&4). Involved area of analgesia extended cranially following intrathecal xylocaine to include thoracic limbs (Tables, 1&4). Duration of analgesia was longer following Intrathecal as compared with epidural xylocaine, 126.7±20.8 min versus 85±10.0 min.

Onset of analgesia was reduced following intrathecal administration of xylazine, detomidine, and ketamine (1.67 ± 0.85 versus 0.67± 0.29; 1.50 ±0.50 versus 1.17± 0.29; and 0.58 ± 0.38 versus 0.33± 0.06 min., respectively, Tables, 1&4). Area of analgesia was nearly the same including the whole body following epidural and intrathecal administration of xylazine and detomidine, but its depth was complete following intrathecal route. Duration of analgesia was longer following epidural xylazine rather intrathecal (118.3 ± 17.6 min. rather 85.0 ± 5.0 min. Tables, 1&4). An inverse results were cleared with detomidine (40.0± 5.0 rather 103.3± 15.3 min), for epidural and intrathecal injections respectively, (Tables, 1&4).

Following epidural and Intrathecal administration of ketamine, the analgesia included pelvic limbs, perineum, tail and flank region to the last three ribs with average period lasted for 56.7 ± 10.41 and 90 ± 5.0 min., respectively (tables, 1&4).

Ataxia was observed following both epidural and Intrathecal administration of four drugs. Incidence of ataxia occurred rapidly following Intrathecal ketamine Hcl (0.33± 0.14 min.). While duration was longer following Intrathecal xylocaine (126.7± 30.82 min., tables, 1&4).

Rectal temperature, pulse and respiratory rates showed some physiological changes, varied between non significant to significant decrease following epidural and Intrathecal injections of all drugs. Gradual return to the pre injection level was noticed at the end of the experiment (Tables, 2&5).

Watery salivation was observed in sheep after epidural and Intrathecal detomidine. It was massive following epidural and Intrathecal administration of xylazine. Urination was observed in sheep treated with epidural and Intrathecal xylazine or detomidine. Ruminal hypomotility was recorded after

xylocaine administration in either route. Ruminal stasis with obvious bloat was clear after epidural and intrathecal injection of xylazine or detomidine. Changes in haematological levels (Hb% and total leucocytic count) and biochemical parameters (ALT, AST, blood glucose and blood urea) were non significant to significant in either routes in all groups. These changes were transient and returned to the pre injection values at the end of the experiment (Tables, 3&6).

DISCUSSION

Epidural injection of 2% xylocaine Hcl resulted in posterior paralysis and analgesia. However, intrathecal administration allowed prolonged duration and extended cranially to the level of the last three ribs associated with mild sedation allover the observation period. These results come in agreement with that obtained by *Grono (1966), Soma (1971) and Luna et al. (2000).* Spinal xylazine and detomidine produced variable degree of sedation and analgesia together with ataxia.

The sedative effect could be attributed to systemic uptake of the drugs as well as their interacting with the adrenergic system in the spinal cord *(Pascoe, 1997).* Detomodine Hcl appeared to induce sedation and analgesia of longer duration than that provided by equivalent doses of xylazine Hcl, when administered intrathecally. *Virtanen & Nyman (1985); Virtanen & Mac Donald (1985); Jochle & Hamm (1986); and Kenawy (1998)* attributed effects of detemidine Hcl and xylazine Hcl to their high potency and greater specificity to central adrenoceptor site. *Kariman (1997)* found that epidural injection of detomidine Hcl alone could not provide sufficient analgesia in the cow .On the contrary epidural xylazine achieved longer duration of analgesia extended foreward to the level of head and neck. Similar findings were obtained by *Nouh (1988), Kenawy (1998) and Ko et al. (1992).* A finding Sheep appeared to be more sensitive to spinal injection of ketamine Hcl that indicated by rapid onset following either route. Meanwhile, its administration is not satisfactory due to limited duration and area of analgesia. *Gomez de Segura (1997)* reached to a similar findings following epidural ketamine in the horse.

Significant decrease in pulse rate post epidural xylocaine injection was also noted by *Thurmon et al. (1996), Kenawy (1998), and Mpandujieted (1999),* $\alpha 2$ adrenoceptors proved also to induce significant decrease in pulse rate. *Nouh (1988) and Aminkove and Hubenov (1995)* mentioned similar findings with the use of xylazine. *Kenawy (1998)* found that detomidine induced more reduction than xylazine. Rectal temperature, respiratory rate and hemato-biochemical parameters didn't significantly differ among the four groups and returned to the pre injection values rapidly. Similar findings were reported by *Shokry et al. (1976), Nouh and EL- Ashmawy (1997), Kenawy (1998), Nouh and Abdel -Wahed (2000), and Abdel Wahed and Karrouf (2004).* Blood glucose increased significantly post xylazine and detomidine injection that may be attributed to increase in hepatic glucose production and

hyperglycemia due to inhibition of insulin secretion *(Shokry et al., 1976; Symonds, 1976, and Symonds and Mallinson 1978)*. Occurrence of excessive salivation was attributed to decrease swallowing *(Green and Thurmon (1988)*. Frequent urination following epidural administration of xylazine in rams was attributed to inhibition of ADA release *(Hall and Clark., 1991)*.

It is therefore concluded that spinal administration of 2% xylazine Hcl induced satisfied sedative and analgesic effects in sheep especially when injected intrathecally as compared with detomidine Hcl, xylocaine Hcl and ketamine Hcl,

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Table (1): Showing mean values ± S.D of Sedation, Analgesia, and Ataxia following epidural Administration of xylocaine, xylazine, detomidine and ketamine in sheep

Drugs	Sedation			Analgesia			Ataxia		
	Onset Min	Duration Min.	Degree	Onset Min.	Duration Min.	Area of analgesia	Onset Min	Duration Min.	Degree
Xylocaine HCL	No	No	No	1.17 ± 0.76 abc	85.0 ± 10.0 b	Extended cranially till the level of last 2 ribs	1.17 ± 0.76 bc	75.0 ± 10.0 b	Marked
Xylazine HCL	2.17 ± 0.76bc	38.3 ± 7.64bc	Deep	1.67 ± 0.85 a	118.3 ± 17.6 a	Extended till the level of last three ribs	2.03 ± 1.53 b	100.0 ± 20.0 a	Recumbent
Detomidine HCL	4.0 ± 1.0a	65.0 ± 5.0c	Deep	1.50 ± 0.50 ab	40.0 ± 5.0 c	Whole the body	5.0 ± 0.1a	32.5 ± 3.54 c	Recumbent
Ketamine HCL	No	No	No	0.58 ± 0.38 c	56.7 ± 10.41 c	Both Pelvic limbs, perineum tail and flank region till the 1st rib	0.85 ± 0.38 c	48.3 ± 7.64 c	Moderate

Means in the same column with similar letter do not differ significantly at P=0.05

Table (2): Showing Mean values ± S.D of rectal temperature, pulse and respiratory rates following epidural administration of xylocaine, xylazine, detomidine and ketamine in sheep

Drugs	Observation time (minutes)	Rectal temperature (C)	Pulse Rate /Min	Respiratory rate (Rate / Min)
	5 minutes before (control value)	40.6 ± 0.15	82.0 ± 2.6	26.0 ± 3.6
Xylocaine HCL	15 Min. after	40.7 ± 0.10	61.0 ± 404	30.3 ± 2.5
	30 Min. after	40.7 ± 0.15	65.3 ± 1.5*	28.3 ± 2.5*
	60 Min. after	40.4 ± 0.10	70.3 ± 1.5*	25.7 ± 3.1
	90 Min. after	40.5 ± 0.15	72.3 ± 2.5*	22.7 ± 2.5
Xylazine HCL	15 Min. after	40.3 ± 0.15	74.7 ± 1.2*	31.7 ± 9.7*
	30 Min. after	39.8 ± 0.20*	72.7 ± 1.2*	28.7 ± 7.8
	60 Min. after	39.1 ± 0.15*	70.7 ± 1.2*	25.7 ± 5.9
	90 Min. after	39.4 ± 0.15*	71.0 ± 1.0*	25.0 ± 3.8
Detomidine HCL	15 Min. after	40.2 ± 0.26	42.0 ± 2.0*	30.0 ± 3.0
	30 Min after	40.1 ± 0.26*	40.3 ± 1.5*	28.0 ± 2.0
	60 Min after	39.9 ± 0.26*	64.3 ± 1.5*	23.0 ± 2.6
	90 Min. after	40.4 ± 0.32	72.7 ± 2.5*	25.3 ± 3.5
Ketamine HCL	15 Min. after	40.9 ± 0.20	101.7 ± 1.5*	33.0 ± 3.0
	30 Min. after	40.8 ± 0.20	102.3 ± 1.5*	35.0 ± 3.0*
	60 Min. after	40.7 ± 0.20	100.0 ± 1.0*	32.0 ± 3.0
	90 Min. after	40.7 ± 0.21	99.3 ± 1.5	29.7 ± 3.5

Number of animals per group = 3
*significantly different compared to the value before injection (P < 0.05)

Table (3): Showing Mean values ± S.D of Hb%, TLC, ALT, AST, Blood glucose and Blood urea following epidural administration of xylocaine, xylazine, detomidine and ketamine in sheep

Drugs	Observation time (minutes)	Hemoglobin Hb % g / dl	Total leucocytic count (T LC)	ALT U /L	AST U / L	Blood Glucose mg/dl	Blood urea mg/dl
	5 minutes before (control value)	11.20 ± 0.10	10.00±2.00	12.0 ±2.0	65.0±1.0	114.0±1.0	44.0±2.0
Xylocaine HCL	30 min after	10.23 ± 0.06	14.00±1.00	8.0±4.00*	72.0±3.0*	120.0±1.0*	59.0±1.0*
	60 min after	8.80 ± 0.10*	14.50±1.00	20.0±3.0*	80.0±4.0*	118.0±2.0*	60.0±1.0*
	One day after	11.00 ± 0.10	13.00±1.00	14.0±2.0*	70.0±2.0*	113.0±1.0	80.0±1.0*
Xylazine HCL	30 min after	12.17 ± 0.1	8.00 ± 2.00*	16.0±1.0*	59.0±2.0*	206.0±2.0*	40.0±3.0*
	60 min after	12.50 ± 0.1	9.00±1.00	14.0±2.0*	54.0±2.0*	249.0±1.0*	35.0±2.0*
	One day after	11.8 ± 2.1	8.50±1.50	24.00±1.0*	47.0±2.0*	90.0 ± 5.0*	40.0±1.0*
Detomidine HCL	30 min after	9.20 ± 1.0*	7.00±2.00*	12.0±2.0*	65.0±5.0	220.0±1.0*	35.0±2.0*
	60 min after	9.90 ± 1.0*	8.00±1.00	10.0±1.0*	60.0±2.0*	262.0±2.0*	29.0±1.0*
	One day after	14.40 ± 1.0*	6.00±1.00	16.0±2.0*	70.0±1.0*	88.0±1.0*	33.0±3.0*
Ketamine HCL	30 min after	14.70 ± 0.2*	17.00±2.00*	11.0±1.0	60.0±1.0*	162.0±2.0*	50.0±5.0*
	60 min after	14.90 ± 0.2*	15.00±2.00*	9.0±2.0*	58.0±2.0*	170.0±1.0*	50.0±1.0*
	One day after	14.00 ± 1.0	12.00±2.00	7.0±1.0	69.0±1.0*	102.0±3.0	51.0±2.0*

Number of animals per group = 3
*significantly different compared to the value before injection (P < 0.05)

Table (4): Showing mean values ± S.D of Sedation, Analgesia, and Ataxia following intrathecal administration of xylocaine, xylazine, detomidine and ketamine in sheep

Drugs	Sedation			Analgesia			Ataxia		
	Onset Min.	Duration Min.	Degree	Onset Min.	Duration Min.	Area of analgesia	Onset Min.	Duration Min.	Degree
Xylocaine HCL	0.52 ± 0.28b	110 ± 10.6a	Mild	0.52 ± 0.28 b	126.7 ± 20.82 a	Extended till the level of thoracic limbs	0.52 ± 0.28 c	126.7 ± 20.82a	Marked
Xylazine HCL	2.17 ± 0.76b	38..3 ± 7.64b	Marked.	0.67 ± 0.29 ab	85.0 ± 5.00 b	Included the whole body	2.17 ± 0.76 b	***85.0 ± 5.00 b***	Recumbent
Detomidine Hcl	4.0 ± 1.0a	65.0 ± 5.0b	Deep	1.17 ± 0.29 a	103.3 ± 15.3 b	Included the whole body	4.00 ± 1.00 a	103.3 ± 15.3 b	Recumbent
Ketamine HCL	No	No	No	0.33 ± 0.06 b	90.0 ± 5.00 b	Included the Pelvic limbs, perineum, tail, flank and last 3 ribs	0.33 ± 0.14 c	90.0 ± 5.00 *b*	Moderate

Means in the same column with similar letter do not differ significantly at P=0.05

Table (5): Showing Mean values ± S.D of rectal temperature, pulse and respiratory rates following intrathecal administration of xylocaine, xylazine, detomidine and ketamine in sheep

Drugs	Observation time minutes	Rectal temperature (C)	Pulse Rate /Min	Respiratory rate (Rate / Min)
	5 minutes before (control value)	40.1 ± 0.20	90.0 ± 2.0	30.0 ± 2.0
Xylocaine HCL	15 Min. after	40.2 ± 0.25	89.3 ± 4.0	33.0 ± 2.65*
	30 Min. after	40.0 ± 0.31	88.0 ± 4.6	27.0 ± 2.65*
	60 Min. after	39.9 ± 0.25	69.7 ± 2.5*	23.0 ± 2.65
	90 Min. after	40.1 ± 0.20	80.7 ± 5.0*	28.0 ± 2.65
Xylazine HCL	15 Min. after	39.9 ± 0.25	64.0 ± 2.0*	35.0 ± 2.0*
	30 Min. after	39.7 ± 0.25*	60.0 ± 2.0*	32.0 ± 2.0
	60 Min. after	39.5 ± 0.25*	74.0 ± 2.0*	32.0 ± 2.0
	90 Min. after	40.0 ± 0.20	87.0 ± 2.0	31.0 ± 2.1
Detomidine HCL	15 Min. after	39.2 ± 0.20	85.0 ± 2.0*	39.0 ± 2.0*
	30 Min after	38.9 ± 0.20*	84.0 ± 2.0*	38.0 ± 2.0*
	60 Min after	38.4 ± 0.50*	81.0 ± 2.0*	35.0 ± 2.0*
	90 Min. after	39.0 ± 0.20*	87.0 ± 2.0	33.3 ± 4.2*
Ketamine HCL	15 Min. after	40.4 ± 0.20	84.3 ± 2.5*	43.0 ± 2.0*
	30 Min. after	40.4 ± 0.15	86.0 ± 2.0*	45.0 ± 2.0*
	60 Min. after	40.2 ± 0.20	84.0 ± 2.0*	46.3 ± 2.1*
	90 Min. after	40.5 ± 0.20*	83.7 ± 3.2*	41.0 ± 2.0*

Number of animals per group = 3

*significantly different compared to the value before injection (P < 0.05)

Table (6): Showing Mean values ± S.D of Hb%, TLC, ALT, AST, Blood glucose and Blood urea following intrathecal administration of xylocaine, xylazine, detomidine and ketamine in sheep

Drugs	Observation time (minutes)	Hemoglobin Hb % g / dl	Total leucocytic count (T / C)	ALT U / l	AST U / l	Blood Glucose mg/dl	Blood urea mg/dl
	5 minutes before (control value)	11.00 ±0.10	10.50±1.20	18.0±1.0	70.0±2.0	125.0±2.0	40.0±1.0
Xylocaine HCL	30 min after	9.20 ± 0.05	14.1±1.00*	12.1±2.0	80.0±3.0*	140.0±1.0*	46.0±1.2
	60 min after	8.00± 0.10*	14.3±1.00*	22.0±3.0*	85.0±4.0*	132.0±2.1*	54.0±0.5*
	One day after	10.1 ± 2.00*	12.1±1.5	16.1±2.1*	76.0±2.0*	128.0±3.0	60.0±1.0*
Xylazine HCL	30 min after	11.17 ± 3.30	10.1 ± 1.50	20.0±3.5*	75.0±2.0*	250.0±1,0*	38.0±3.0*
	60 min after	12.1 ± 1.5	9.8±1.00*	21.5±2.1*	64.1±2.0*	240.0±2.1*	35.0±2.0*
	One day after	12.3 ± 1.5	9.30±2.1	25.1±1.5*	60.0±1.o*	140.0±1.0*	39.0±1.0*
Detomidine HCL	30 min after	12.3± 0.05*	8.21±0.87*	16.0±2.1	68.0±3.0	230.0±1.0*	32.0±1.0*
	60 min after	12.00 ± 0.5*	7.50±0.50*	14.0±1.5*	60.0±2.0*	270.0±4.0*	30.0±0.5*
	One day after	11.90 ± 1.0*	7.00±1.00*	18.0±1.5	72.0±1.0*	130.0±2.0	35.0±3.0*
Ketamine HCL	30 min after	8.27 ± 1.02*	16.1±2.1*	14.0±1.o*	66.0±4.0*	150.0±1.1*	55.0±4.0*
	60 min after	11.87 ± 2.1*	14.50±1.5*	12.0±1.5*	62.0±1.0*	170.0±1.0*	57.0±3.1*
	One day after	11.21 ± 1.9	13.7±0.50*	10.0±1.0*	71.0±1.0	120.0±1.0	61.0±2.1*

Number of animals per group = 3

*significantly different compared to the value before injection ($P < 0.05$)

الملخص العربى

التأثير المهدئ والمسكن لبعض العقاقير المخدرة عند حقنها فوق الأم الجافية وتحت العنكبوتية فى الأغنام

(محمود حسين الكمار، رمضان السيد عبد الواحد، مصطفى محمد قاسم، أحمد عبد المنعم قناوى)

(قسم الجراحة، كلية الطب البيطرى، جامعة الإسكندرية)

استهدفت هذه الدراسة مقارنة التأثير المهدئ والمسكن لكلا من الزيلوكايين، والزيلازين، الديتوميدين والكيتامين عند حقنهم فوق الأم الجافية وتحت العنكبوتية فى الأغنام لذلك استخدمت إثنى عشر من الأغنام السليمة إكلينيكياً (1-2.5 سنة من العمر وتزن 27-35 كجم). قسمت الحيوانات إلى أربع مجموعات، كل مجموعة تتكون من ثلاثة أغنام، كل غنمة فى كل مجموعة تم حقنها بأحد الأربع عقاقير الآتية مرة فوق الأم الجافية وبعد أسبوع تم حقن نفس العقار تحت العنكبوتية:(الزيلوكايين 2مجم/كجم، والزيلازين 0.3/كجم، الديتوميدين 4 ,. مجم/كجم والكيتامين 4مجم/كجم). تم تسجيل التأثير المهدئ والمسكن لجميع العقاقير المخدرة وكذلك بداية ومدة رقود الأغنام. تم قياس معدل النبض، التنفس، درجة الحرارة وحركة الكرش قبل التجربة بخمس دقائق واستمر القياس لمدة تسعون دقيقة بعد حقن العقاقير فى كل تجربة. تم تجميع عينات الدم قبل كل تجربة بخمس دقائق وبعد ذلك عند 30، 60 دقيقة و24 ساعة بعد الحقن لقياس الهيموجلوبين، وكرات الدم البيضاء، وانزيمات وظائف الكبد وجلوكوز الدم وكذلك نسبة اليوريا فى الدم. تم الوصول إلى التأثير المهدئ الواضح فى جميع الأغنام التى تم حقنها بالزيلازين والديتوميدين أكثر من الزيلوكايين و الكيتامين وكذلك كان هناك رقود ظهر بعد الحقن فوق الأم الجافية وتحت العنكبوتية فى جميع الحيوانات فى كل المجموعات. مدة التأثير المسكن كانت طويلة بعد حقن الزيلوكايين تحت العنكبوتية بالمقارنة بحقنه فوق الأم الجافية. ظهرت حالة تأثير مسكن تام شمل كل الجسم بعد حقن الزيلازين فوق الأم الجافية وتحت العنكبوتية بينما حقن الديتوميدين تحت العنكبوتية أدى إلى تأثير مسكن استمر لمدة 103.3±15.3 دقيقة. وعند حقن الكيتامين أدى إلى تأثير مسكن شمل جميع المنطقة الخلفية لجسم الأغنام وحتى مستوى آخر ثلاثة ضلوع وقد لوحظ عدم قدرة الحيوان على الوقوف والترنح . جميع الأعراض الإكلينيكية والتغيرات البيوكيميائية وصورة الدم عادت كما كانت قبل التجربة . استناداً إلى هذه النتائج فقد تبين أن حقن الزيلازين فوق الأم الجافية وتحت العنكبوتية فى الأغنام نتج عنه تأثير مهدئ عميق و مسكن واضح بالمقارنة بحقن الديتوميد ين و الزيلوكايين و الكيتامين.