Website : www.asthafoundation.in
Progressive Research : An International Journal
Vol 17 (2) : 130-132 (July-2022), Print ISSN : 0973-6417, Online ISSN : 2454-6003
Society for Scientific Development in Agriculture and Technology, Meerut (U.P.) India

Midazolam with Glycopyrrolate and Xylazine Combination for Premedication in Ketamine Anaesthesia in Dog

Mithilesh Kumar[1] and Ramesh Kumar Singh[2]
[1]*Department Veterinary Surgery and Radiology, Bihar Veterinary College, Patna-800014*
[2]*Department Animal Breeding Genetics, Bihar Veterinary College, Patna-800014*

Abstract

Animals of group I were premedicated by I/M administration of glycopyrrolate (@0.011mg/kg b.wt) followed by xylazine (1.0mg/kg b.wt) at 15 minutes interval. Animals of group II along with glycopyrrolate and xylazine, after 10 minutes midazolam (@0.3mg/kg b.wt) were administered I/V. In the both the groups15 minutes after premedication, ketamine Hcl (@10mg/kg b.wt) I/M was injected for induction and I/V for maintenance of general anaesthesia. Haematological evaluation included haemoglobin (g/dl), packed cell volume (%), total leukocyte count (×103/cmm) and total erythrocyte count (106/cmm) before preanaesthetic drug administration, after preanaesthetic drug administration, at 30 minutes and 120 minutes after the administration of ketamine. Clinical examination revealed that induction of anaesthesia was smooth.Midazolam has dose sparing effect on ketamine anaesthesia used for induction and maintenance of anaesthesia in dogs.Midazolam potentiate the effect of ketamine resulting to longer duration of anaesthesia. These observations suggested that both above anaesthetic combination can be safely used in dogs but the best result can be achieved when midazolam with glycopyrrolate, xylazine combination as preanaesthetic. There was lack of any post anaesthetic complication or death.

Introduction

In veterinary practice, injectable anaesthetics techniques are preferred due to the inherent peculiarities of animal patients and the ease of administration of drugs. Commonly drugs combinations are being preferred to individual drugs, since it reduces the dose requirement and side effects. General anaesthesia is a state of reversible unconsciousness produced by a process of controlled, drug-induced intoxication of the central nervous system (CNS) in which the patient neither perceives nor recalls noxious stimuli .No single anaesthetic drug produces all of the components of general anaesthesia without depressing some vital organ function. So a multiple drug approach (balanced anaesthesia) is exploited to diminish sensory, motor, sympathetic and parasympathetic reflex activities, and to attenuate individual components of the anaesthetic state. The development of balanced anaesthesia is the key for achieving safe and satisfactory anaesthesia in diverse nature of surgical ailments. Preanaesthetics medication achieved by the agents popularly called “Pre-medicants” in the first step in the generation of balanced anaesthesia for surgery of varying magnitude. Among these, xylazine and ketamine are very popular anaesthetics combination for short duration surgical procedures. But untoward reactions like clonic, head and limb movement followed by vocalization after painful stimuli had been reported during recovery periods (1,2). Midazolam with glycopyrrolate-xylazine combination as preanaesthetics medication produced adequate sedation in dogs (3,4).

Materials and Methods

Animals of group I were premedicated by I/M administration of glycopyrrolate (@0.011mg/kg b.wt) followed by xylazine (1.0mg/kg b.wt) at 15 minutes interval. Animals of group II along with glycopyrrolate and xylazine, after 10 minutes midazolam (@0.3mg/kg b.wt) was administered I/V. 15 minutes after premedication in the both the groups ketamine Hcl (@10mg/kg b.wt) I/M for induction and I/V for maintenance of general anaesthesia. Clinical observation like sedation, analgesia, muscle relaxation, reflexes, positioning of eye ball, induction time, duration of surgical anaesthesia, depth of anaesthesia, recovery time were calculated. Hematological parameters were evaluated.

Results and Discussion

There was marginal decrease in rectal temperature after premedication and during anaesthesia in both the groups. The decrease in body temperature during xylazine-midazolam anaesthesia might be due to peripheral vasodilatation, decrease of basal metabolic rate and muscle tone and depression of thermoregulatory mechanism (5). There was decrease in pulse rate after premedication, during anaesthesia and recovery in both the groups except in group I where there was a mild increase after premedication.During anaesthesia there was significant decrease of respiration rate in group II than group I due to the sedative effect of midazolam. The observation made in this study confirms the findings of (6)

Received : March-2022; Revised : March-2022; Accepted : April-2022

Table-1 : Mean ± S.E. value of different parameters at different periods of interval in dogs.

Group	Period		During anaesthesia (30 min)	During recovery (120 min)
	Premedication			
	Before	After		
		(Hb)		
I	13.23^{bx} ± 0.28	12.4^{ax} ± 0.19	11.96^{ax} ± 0.15	12.6^{abx} ± 0.22
II	13.16^{bx} ± 0.18	12.55^{ax} ± 0.18	12.03^{ax} ± 0.26	12.45^{ax} ± 0.17
		(PCV) %		
I	39.7^{cx} ± 0.84	37.46^{abx} ± 0.53	$35.58^{a.x}$ ± 0.57	37.93^{bcx} ± 0.71
II	39.40^{cx} ± 0.45	38.15^{bx} ± 0.59	35.31^{ax} ± 0.55	37.25^{bx} ± 0.46
		Total erythrocyte count (106/ cmm.)		
I	6.59^{cx} ± 0.12	6.25^{bx} ± 0.09	5.87^{ax} ± 0.05	6.31^{bcx} ± 0.11
II	6.56^{cx} ± 0.07	6.35^{bcx} ± 0.10	5.85^{ax} ± 0.09	6.19^{bx} ± 0.08
		Total leucocyte count (103/ cmm.)		
I	10.03^{bx} ± 0.27	9.73^{bx} ± 0.28	8.73^{ax} ± 0.26	9.85^{bx} ± 0.27
II	9.61^{bx} ± 0.27	9.16^{bx} ± 0.26	$8.23^{a,x}$ ± 0.26	9.30^{bx} ±0.27

Values bearing same superscript in a row (a-c) did not differ significantly. Values bearing same superscript in a column(x-y) did not differ significantly.

Table-2 : Mean ± S.E. of Induction time, Duration of anaesthesia and recovery time and muscle relaxation time of anaesthetic agents in both experimental groups of dogs.

Group	Induction Time (in minutes)	Duration of anaesthesia (in minutes)	Recovery Time (in minutes)	Muscle relaxation (in minutes)
I	10.25 ± 0.66^{a}	36.33 ± 0.70^{a}	70.50 ± 2.22^{a}	39.58 ± 1.00^{a}
II	8.66 ± 0.44^{a}	44.00 ± 0.53^{b}	81.16 ± 1.38^{b}	45.91 ± 1.09^{b}

Values bearing same superscript in a column (a-b) did not differ significantly.

Table-3. Mean ± S.E. of scale of analgesia, scale of sedation and ketamine dose in both experimental groups of dogs.

Group	Scale of analgesia	Scale of sedation	Total Ketamine dose (ml)
I	1.83 ± 0.10^{a}	1.58 ± 0.15^{a}	7.21 ± 0.43^{a}
II	3.00 ± 0.0^{b}	2.91 ± 0.08^{b}	4.86 ± 0.27^{b}

Values bearing same superscript in a column (a-b) did not differ significantly.

who observed 27% decrease in the respiration rate at 45 min. after with xylazine-ketamine administration in dogs.

Hemoglobin, PCV, TEC and TLC decreased high significantly in all groups during the post-anaesthetic period. Pooling of circulatory blood cells in the spleen or other reservoirs secondary to sympathetic activity may explain the decrease in Hb, PCV, TEC and TLC recorded in the present study (7). During general anaesthesia the spleen usually expands, a process that can cause erythrocyte sequestration and a lowering of hematocrit and hemoglobin concentration. Induction of anaesthesia was smooth in both the groups. The induction time of anaesthesia was found non-significantly (7) quicker in group II dogs (8.66 ± 0.44 min) than in group I (10.25 ± 0.66 78 min) due to the added sedative effect of midazolam. Similar findings were also reported by (1) when midazolam was combined with ketamine. The recovery time was found more in Group II were midazolam was included for premedication (81.16 ± 1.38 min) than in Group I (70.50 ± 2.22 min) might be due to its hypnotic action (4). The muscle relaxation time was more in Group II (45.83±1.09 min) than in Group I (39.58 ±1.00 min). Good effect of ketamine and xylazine anaesthesia on muscle relaxation was also observed in dogs (8). The salivation during sedation period was not found in any groups due to antisialogogue effect of glycopyrrolate. In group I and group II the eye balls were observed slightly downward after preanaesthetic and fixed, centrally positioned during anaesthesia. The animals of both groups showed mild to excellent analgesia. The analgesia score was significantly more in group II (3 ± 0) than group I (1.83 ± 0.10). It is well documented that ^{2}-agonists produce analgesia by stimulating receptors at various sites in the pain pathway within the brain and spinal cord (9). Sedation was observed after administration of preanaesthetics agents in group I and II. Sedative action of xylazine was due to stimulation of ^{2}-adrenoceptors which caused release of norepinephrine or nor adrenaline in the CNS (10). Score of sedation was more in group II (2.91 ± 0.08) than group I (1.58 ± 0.15) which might be due to added action of midazolam.

The total dose of ketamine for induction and maintenance was found less in group II dogs (4.86 ± 0.27 ml) than in the group I (7.21 ± 0.43 ml) which might be due to dose sparing effect of midazolam on ketamine. (11) reported that midazolam (0.2-0.5 mg/kg) or diazepam

(0.3-0.5 mg/kg) administered IV after 2 mg/kg propofol significantly reduced the propofol dose required for tracheal intubation. Corneal and palpebral reflexes were moderately depressed after preanaesthetics in groupII animals, similar observation reported by (12).

Conclusions

These observations suggested that both above anaesthetic combination can be safely used in dogs but the best result can be achieved when midazolam with glycopyrrolate, xylazine combination as preanaesthetic. There was lack of any post anaesthetic complication or death.

References

1. Clark D.M., Martin R.A. and Short C.A. (1982). Cardiopulmonary responses toxylazine/ ketamine-anaesthesia in the dog. *J. Am. Anim. Hosp. Assoc.,* 18: 815-21.
2. Jhilick Banerjee, Ankita Sharma and Yogendra Singh and S.P. Singh (2021). Nutritional enhancement in legumes using recent plant breeding and biotechnological approaches. *Frontiers in Crop Improvement*, 9(2): 85-90.
3. Narayanan M.K., Rajankutty K., Amma, T.S., Syam K.V. and Devanand C.B. (2011). Midazolam with *glycopyrro-latexylazine* combination for premedication in ketamine anaesthesia in dogs. *J. Vet. Anim. Sci.,* 42: 48-52.
4. Ahila Devi Murugan (2020). Production of cell wall degrading enzymes by *Fusarium oxysporum f. sp. Vasinfectum. Frontiers in Crop Improvement*, 8(2): 107-113.
5. Koc Y., Alkan F. and Kul M. (2002). Effects of anaesthetic like combination of midazolam and xylazine on certain clinical parameters in dogs. *Indian Vet. J.,*79: 1281-1284.
6. Moens Y. and Fargetton X. (1990). A comparative study of medetomidine/ketamine and xylazine/ketamine anaesthesia in dogs. *Vet. Rec.,* 127(23): 567-571.
7. Wagner A.E., Muir W.W.III and Hinchcliff K.W. (1991). Cardiovascular effects of xylazine and detomidine in horses. *Am. J. Vet. Res.,* 52: 651-657.
8. Sindak N., Camkerten I. and Ceylan C. (2010). Clinical evaluation of ketamine-xylazineanesthesia in bozova greyhounds. *Journal of Animal and Veterinary Advances.,* 9(15): 2025-2029.
9. Stenberg D. (1989). Physiological role of 2-adreno-receptors in the regulation of vigilance and pain. Acta. Vet. Scan., 85: 21-28.
10. Lumb W.V. and Jones E.W. (1996).Veterinary anaesthesia.3rdedn. *Lea and Febiger,* Philadelphia.
11. Robinson R. and Borer-Weir K. (2015).The effects of diazepam or midazolam on the dose of propofol required to induce anaesthesia in cats. *Vet Anaesth Analg*.[Epub ahead of print].
12. Malik V., Kinjavdekar P., Amarpal, Aithal H.P., Pawde A.M. , Surbhi. (2011). Comparative evaluation of halothane anaesthesia in medetomidine-butorphanol and midazolam-butorphanol pre medicated water buffaloes (*Bubalusbubalis*). *J.S. Afr. Vet. Assoc.,* 82(1): 1019-9128.