International Journal of Science, Environment and Technology, Vol. 7, No 6, 2018, 1949 – 1953
ISSN 2278-3687 (O)
2277-663X (P)

CLINICAL EFFICACY OF KETOFOL AND PROPOFOL IN DOG

P.R. Shinde[1], *S.D. Chepte[2], M.G. Thorat[3], R.V. Raulkar[2], S. Sajid Ali[2], F.A. Fani[4], A.D. Anam[1], N.P. Bhave[1] and S.R. Vaidya[1]
[1]M.V.Sc. Scholar, [2]Assistant Professor, [3]Associate Professor and [4]Hospital Registrar
Department of Veterinary Surgery & Radiology
Post Graduate Institute of Veterinary and Animal Sciences, Akola-444104 (M.S.)
E-mail: drsharadchepte512@gmail.com (**Corresponding Author*)

Abstract: The present study was conducted on 12 clinical cases of dogs irrespective of age, sex, breed and surgical intervention. All the dogs were divided into two equal groups. Group 1 was anaesthetized with propofol @ 4mg/kg and ketofol (1:1) @ 4mg/kg was used in group 2. Assessment of anaesthesia, clinico-physiological and Heamto-biochemical attributes were evaluated during the study. This study revealed quick induction and recovery with reduction in induction dose of propofol and ketamine. The hematological values remained statistically non-significant in ketofol group. Biochemical estimations were statistically non-significant. Ketamine propofol admixture provides cardiopulmonary stability to anesthetized patients without altering its hemodynamic and respiratory profile. It also reduces the induction dose of each anesthetic agent when used in combination thus increasing both safety and efficacy.
Keywords: Ketofol, Propofol, Ketamine, Butorphanol and Dog.

INTRODUCTION

"Ketofol" is a moniker for ketamine and propofol administered either independently or as a single-syringe admixture offering the benefits of both agents, while reducing the adverse effects of either agent alone (Lee and Lee, 2016). No anaesthetic agent has been introduced without unfavorable effects. Appropriate selection and combination of anesthetic drugs is thus essential for the wellbeing of the surgical patient not only because of ethical reason but also to decrease the risk of complications during anesthetic procedure.

Clinical experience suggests that the use of ketamine- propofol admixture has some advantages such as limited incidence of propofol induced respiratory depression, provision of analgesia from ketamine (Tobias, 2004) and decrease the cardio-respiratory side effects over using ketamine or propofol alone (Mair et al., 2009). It is postulated that combining these two drugs may preserve sedation efficacy while minimizing their respective adverse effects. Most of the adverse effects are dose dependent and when used in combination the doses administered of each can also be reduced. The cardiovascular effects of each are opposing in action, thus balancing each other out when used together (Arora, 2007). The clinical efficacy

*Received Oct 15, 2018 * Published Dec 2, 2018 * www.ijset.net*

of both propofol and ketamine has been widely studied and demonstrated in many species under different conditions (Lerche et al. 2000; Wagner et al., 1991; Ilkiw and Pascoe, 2003; Pascoe et al., 2006).

METHODOLOGY

12 clinical cases of dogs irrespective of age, sex, breed and surgical intervention were divided into two equal groups. All dogs were pre-medicated with Inj.Meloxicam @ 0.3 mg/kg b.wt. I/M, Inj.Xylazine + inj. Butorphanol in a same syringe @ 2 mg/kg b.wt and 0.2 mg/kg b.wt I/M respectively and Inj. Atropine sulphate @ 0.04 mg/kg b.wt I/M. After pre-medication, Group 1 dogs were anaesthetized with propofol @ 4 mg/kg intravenously whereas dogs in Groups 2 were anaesthetized with ketofol (1:1) @ 4 mg/kg intravenously. During study period the surgical intervention performed were castration, ovariohystrectomy, cysytotomy, excision of tumor and amputation of limb. All surgical interventions were carried out under aseptic protocol.

Anesthetic assessment was carried out by recording induction time, anesthetic duration and recovery time. Clinical observations like respiratory rate, heart rate and rectal temperature were evaluated throughout the surgical procedure but were recorded up to 60 min. Venous blood samples were taken to estimate changes in various hemato-biochemical parameters occurring during the study. All hemato-biochemical parameters were recorded before induction (0 min), during anesthesia (45 min) and at recovery for all cases.

RESULT AND DISCUSSION

Anaesthetic Assessment

In Group 2 induction time was significantly less and quality of induction was excellent, quick without any stress. The variation recorded in both the groups was statistically non-significant. The duration time for propofol group ranged from 70 to 100 minutes with mean duration of 68.33±7.27 minutes whereas for ketofol group it lasted from 96 to 164 minutes with a mean duration of 109.17±16.11 minutes. This may be due to various types of surgeries undertaken during the study. The recovery was quick and smooth in both the groups but was quicker in ketofol group.

Table 1: Anaesthetic assessment of dogs in both groups

Groups	Induction time	Duration time	Recovery time
Group I	22.83±5.92	68.33±7.27	5.76±1.68
Group II	9.83±2.50	109.17±16.11	3.09±0.99

Clinico-physiological observations:

Dogs in Group 1 showed non-significant drop in rectal temperature when compared to Group 2. This may be due to hypotensive action of propofol causing decrease in peripheral blood pressure ultimately adding more stress during surgical intervention. Whereas ketamine component in ketofol cause stimulatory action on cardiovascular system thus cancelling the hypotensive effect caused by propofol resulting in maintenance of body temperature throughout the anaesthesia in ketofol group. Heart rate significantly increased in both the groups from 0 to 15 mins which may be attributed due to premedication with atropine sulphate. After 15 minutes heart rate fluctuated in Group 1 whereas in Group 2 heart rate remained stable after first 15 minutes. This may be due to opposing cardiopulmonary action of individual drug producing stability throughout the anaesthesia. Respiratory depression was observed between intervals in Group 1 whereas in Group 2 excellent airway patency was maintained.

Table 2: Clinico-physiological values at different intervals in both the groups.

Groups	Intervals (Min)	Rectal Temperature (˚F)	Heart Rate (beats/min)	Respiration Rate (breaths/min)
Group 1	0	100.55±0.60	75.83±6.87	15.00±2.37
	15	100.20±0.63	103.33±9.30	15.17±1.56
	30	99.80±0.63	105.00±8.52	14.00±1.37
	45	99.40±0.59	117.66±6.64	13.17±1.11
	60	98.97±0.68	112.67±6.36	12.83±1.17
Group 2	0	100.87±0.44	67.00±15.19	16.00±2.70
	15	100.51±0.41	105.17±11.70	16.50±2.19
	30	100.32±0.42	105.00±13.04	15.00±1.00
	45	100.12±0.37	110.50±11.12	15.33±0.72
	60	99.73±0.35	114.33±6.54	16.00±2.70

Hematological Estimations

Hematological estimations revealed non - significant differences between groups. Packed cell volume in Group 1 showed fluctuation between the intervals whereas PCV in Group 2 was in decreasing trend. The values were scrutinized and proved statistically non-significant. Non-significant decrease in TEC values between and within groups was observed but was within

normal physiological values. This may be due to splenic sequestration or due to shifting of fluids from the extra-vascular compartment to the intra-vascular compartment in order to maintain the cardiac output during anesthesia.

Table 3: Haematological values at different intervals in both the groups

Groups	Interval in Minutes	**Hb**	**PCV**	**TEC**
Group 1	0	9.80±0.70	35.33±2.87	5.38±0.50
	45	9.53±0.42	32.83±2.15	4.97±0.23
	After Recovery	9.50±0.58	38.17±5.72	5.13±0.39
Group 2	0	9.25±0.68	30.00±4.21	4.95±0.24
	45	9.55±1.36	29.33±4.33	4.81±0.70
	After Recovery	8.63±1.10	29.17±3.66	4.50±0.46

Biochemical Estimations

Biochemical estimation showed fluctuation in AST and ALT levels in Group 1 whereas a comparative decrease in AST and ALT levels was observed in Group 2. BUN was elevated in group 1 while it was decreasing plateau in group 2. Serum creatinine did not show much alteration in both groups. All biochemical changes were statistically non-significant and appeared within normal physiological limit.

Table 4: Biochemical values at different intervals in both the groups

Groups	Intervals (Min)	AST	ALT	BUN	Creatinine
Group 1	0	51.01±10.53	50.21±4.17	41.81±6.37	1.15±0.11
	45	52.77±9.69	51.93±5.05	39.62±6.98	1.21±0.10
	After Recovery	51.78±9.43	55.08±10.57	48.05±5.80	1.09±0.13
Group 2	0	61.68±16.17	60.27±3.89	53.17±17.50	1.34±0.31
	45	52.68±12.65	54.05±1.97	52.33±17.45	1.21±0.25
	After Recovery	52.30±12.03	52.08±4.98	50.40±14.29	1.24±0.22

CONCLUSION

In ketofol group, there is significant reduction in the induction dose with optimal degree of analgesia and muscle relaxation as compared to propofol group. Ketofol showed greater cardiopulmonary stability as compared to propofol alone. The co-administration of ketamine and propofol provides efficient anesthesia and postoperative analgesia with smooth

recovery in all cases. It can be concluded that, the admixture of ketamine and propofol helps to mask the side effects of the individual drugs which increases the safety and efficacy without changing the hemodynamic stability of the patient when used as general anesthetic in dog.

REFERENCES

[1] Arora, S. (2007) Combining Ketofol and Propofol (Ketofol) for Emergency Department Procedural Sedation and Analgesia: A Review. Western Journal of Emergency Medicine. 9(1): 20-23.

[2] Ilkiw, J.E and P. Pascoe (2003) Cardiovascular effects of propofol alone and in combination with ketamine for total intravenous anesthesia in cats. American Journal Anesthesia Research. 7: 913-917.

[3] Lee. K. C and Lee. B.C (2016) Ketofol as a Balanced Anesthetic for Procedural Sedation and Analgesia in the Obese Oral Surgery Patient: a Commentary. Int J Dentistry Oral Sci. 03(2), 190-192.

[4] Lerche P., A.M. Nolan and J. Reid (2000) Comparative study of propofol or propofol and ketamine for the induction of anaesthesia in dogs. Vet. Rec., 13(146):57-64.

[5] Mair A.R., P. Pawson, E. Courcier and D. Flaherty (2009) A comparison of the effect of two different doses of ketamine used for co-induction of anesthesia with a target-controlled infusion in dogs. Vet. Anaesthesia, Analgesia. 36(6): 532-538.

[6] Pascoe P.J., J.E. Ilkiw and J.F. Karen (2006) The effect of the duration of propofol administration on recovery from anesthesia in cats. Vet. AnaesthAnalg. 33(1): 2–7.

[7] Tobias J.D. (2004) Ketamine to reduce propofol injection pain. Paediatr. Anaesth. 14: 611.

[8] Wagner A.E., W.W. Muir, and K.W. Hinchcliff (1991) Cardiovascular effects of xylazine and detomidine in horses. Am. J. Vet., 52:651-657.