

CLINICAL STUDIES ON THE EFFECT OF GLYCOPYRROLATE, XYLAZINE, ACEPROMAZINE, DEXMEDETOMIDINE AND BUTORPHANOL IN DIFFERENT COMBINATIONS ON PROPOFOL- ISOFLURANE ANAESTHESIA IN DOGS

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The present study was conducted to compare the effect of pre-anaesthetic combinations such as glycopyrrolate-xylazine-butorphanol, glycopyrrolate-dexmedetomidine-butorphanol and glycopyrrolate-acepromazine-butorphanol on propofol induction and isoflurane maintenance general anaesthesia in 18 dogs. A combination of glycopyrrolate, xylazine and butorphanol was given intramuscularly @ 0.01, 0.5 and 0.2 mg/kg b.wt glycopyrrolate, dexmedetomidine and Butorphanol @ 0.01, 0.005 and 0.2 mg/kg b.wt. and glycopyrrolate, acepromazine and butorphanol @ 0.01, 0.05 and 0.2 mg/kg b.wt. in three different groups as a pre-medication 15 minutes prior to induction with propofol administered intravenously "to effect" and maintained with isoflurane in oxygen. Acepromazine group had good quality of sedation, abolished palpebral and pedal reflexes, response to intubation as compared to xylazine and dexmedetomidine groups.

Keywords: Dogs, Isoflurane, Preanaesthetics, Propofol.

Pre medication plays an important part of any balanced anaesthesia protocols. It also reduces the dose of induction and maintenance anaesthetic drugs with expected reduction in adverse effects. Xylazine is a typical α_2 adrenoceptor agonist and exerts its effects accordingly. Sedative doses of xylazine decrease heart rate and cardiac output significantly in dogs, while blood pressure and peripheral vascular resistance initially (Kinjavdekar *et al* 2013). In dogs and cats, dexmedetomidine produces dose dependent levels of sedation and the intensity of these effects is similar to that produced by twice the dose of Medetomidine. As with other alpha 2 adrenergic receptor agonists, higher doses of dexmedetomidine (20 mcg/kg) may induce profound hypnosis, substantially reducing injectable and inhalant anaesthetic requirements for producing anaesthesia (Kuusela *et al.*, 2001). Opioids are the most commonly used analgesics because they produce excellent intra and post operative analgesia without loss of consciousness. It has also been reported that opioids reduce the MAC (Minimal Alveolar

Concentration) of inhalant anaesthetics (Muir *et al.*, 2001; Valverde *et al.*, 2003). Butorphanol is used in cats, dogs for analgesia and sedative combinations with α_2 adrenoceptor agonists (Marini *et al.*, 1992). Propofol is an intravenous anaesthetic agent which is rapidly acting agent producing anaesthesia of short duration without side-effects. Inductions are smooth and excitement free. Recoveries are very smooth and rapid. Rapidity of recovery is due to propofol's rapid metabolism (Cullen and Reynoldson, 1993, Ummenhofer *et al.* 1998). Isoflurane is the most commonly used volatile anaesthetic because it has low solubility index and associated with quick onset of anaesthesia and faster recovery. It depresses cardiopulmonary system in a dose dependent manner but is less arrhythmogenic (Singh *et al.* 2013).

The objectives of the study is to evaluate the preanaesthetic and clinico-physiological effects of glycopyrrolate-xylazine-butorphanol, glycopyrrolate-dexmedetomidine-butorphanol and glycopyrrolate-acepromazine-butorphanol

combinations in clinical cases of dogs and also to evaluate the clinico-physiological, haemodynamic and haemato-biochemical effects of these pre-anaesthetic combinations on propofol-isoflurane anaesthesia in clinical cases of dogs.

Materials and Methods

The present clinical study was carried out on eighteen client-owned mixed breed dogs of either sex at the Department of Veterinary Surgery and Radiology, College of Veterinary Science and Animal Husbandry, Junagadh Agricultural University, Junagadh during the year 2016 to 2017. All eighteen dogs selected for present study were treated for variety of major surgeries like elective sterilizations, orthopaedic surgeries, tumour removal, cataract surgeries etc. They were randomly divided into three groups I, II, and III consisting of six dogs in each group. All the dogs were fasted 12 hours and water was withheld for 6 hours prior to surgery. All the surgeries were conducted in a temperature controlled environment with the operation theatre temperature maintained at 20° C.

Pre-anaesthetic evaluation was performed by observing the general health status and physical examination. The clinical status of the dogs were assessed by recording Heart Rate, (HR) Respiratory Rate (RR), Rectal Temperature (RT), Mucous Membrane (MM) color, Capillary Refill Time (CRT) and by conducting Haemodynamic and Haematological studies and those animals which were unfit was excluded from the study. The animals in group I were premedicated with a combination of glycopyrrolate (0.01 mg/kg), xylazine (0.5 mg/kg) butorphanol (0.2 mg/kg). This drug mixture was taken in a single syringe and administered IM 15 min. prior to induction. The animals in group II were premedicated with a combination of glycopyrrolate (0.01 mg/kg), dexmedetomidine (0.005 mg/kg) and butorphanol (0.2 mg/kg). This drug mixture was taken in a single syringe and

administered intramuscularly 15 min. prior to induction. The animals in group III were premedicated with a combination of glycopyrrolate (0.01 mg/kg), acepromazine (0.05 mg/kg) and butorphanol (0.2 mg/kg). This drug mixture was taken in a single syringe and administered IM 15 min. prior to induction. All three group animals were administered propofol for induction intravenously “to effect” and maintained with isoflurane in oxygen.

Results and Discussion

Total eighteen dogs of either sex were used selected and divided into three groups as a Group I, Group II and Group III of six dogs in each group. All the dogs were operated for different surgeries like Intramedullary pinning, cross pinning, bone plating, amputation, tumour excision, ovariohysterectomy etc. The selected dogs under study weighed an average of 20.44 ± 2.22 kg (Mean ± SE) with maximum weight 36 kg whereas the lowest weight recorded was 7 kg from different breeds of canines. The average range of age was 70.11 ± 11.45 months (Mean ± SE) with the higher limit of 156 months (13 years) and lower up to 4 months was recorded. None of the animals of all the three groups showed any complication during premedication. Among all the three groups none of the animals showed vomiting after premedication. Glycopyrrolate decreased the incidence and severity of bradyarrhythmias in dogs and butorphanol maintained the normal heart rate without any complications. All the animals of three groups had no sedation effect at base (0) time but slight to profound sedation shown at 10 and 15 min. interval after premedication and profound sedation was noticed after 15 min.

In all the three groups combination pre-medications produced moderate and deep sedation with excellent analgesia and muscle relaxation quite enough to perform intubation after propofol induction. During present study group III in which glycopyrrolate - acepromazine-butorphanol combination

produced profound sedation in 6 dogs (100 %) after 15 min. Relaxation of the jaw measured as per muscle relaxation, was scored by observing the resistance to opening of the jaw while pulling apart the lower and upper jaws. In the present study all the animals in the three different groups had not relaxation of jaw at base (0) time but jaw tone was significantly abolished at 10 and 15 min. after premedication and completely abolished in all three groups after 15 min. In the present study during isoflurane maintenance all the dogs in three different groups showed a non-significant decrease in heart rate as compared to induction. From induction to recovery there were consistent non-significant reductions in heart rates in all the dogs in three different groups.

In the present study all haematological parameters namely haemoglobin, packed cell volume, total Leucocytes count decreased non-significantly from base values during induction and maintenance in all animals in the Group I, Group II and Group III. In the present study serum biochemical parameters namely, serum creatinine, blood urea nitrogen, alanine aminotransferase and aspartate aminotransferase not show any significant changes during the entire study indicating that the drug combinations which was used not have any adverse effects on organ functions. Total quantity of isoflurane consumed per animal in each group were compared and observed non-significant reduction in the Group II and group III compared to the Group I. In the present study all eighteen dogs in the three different groups recovered well without any complication. Duration of anaesthesia between three different groups was non-significant. Recovery time was non-significant between three different groups.

Summary and Conclusions

The quality of sedation, jaw relaxation, palpebral reflex, pedal reflex and response to intubation was superior with acepromazine (Group III) compared to

xylazine (Group I) and dexmedetomidine (Group II). In the present study, glycopyrrolate-acepromazine –butorphanol combination had a better sedation quality. The induction dose of propofol used for acepromazine (group III) was found non-significantly lower as compared to xylazine (Group I) and dexmedetomidine (Group II). Acepromazine and dexmedetomidine showed sparing effect the on induction dose of anaesthesia with propofol. None of the animals showed any complications while induction of anaesthesia in all the three different groups. It is concluded that the, Glycopyrrolate-Dexmedetomidine-Butorphanol premedication with propofol induction and isoflurane maintenance was a better combination followed by glycopyrrolate-acepromazine-butorphanol and glycopyrrolate-xylazine-butorphanol anaesthetic protocol for varieties of surgeries in dogs.

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