HAEMATO-BIOCHEMICAL CHANGES IN ETOMIDATE AND PROPOFOL ANAESTHESIA FOLLOWING ATROPINE, DIAZEPAM AND FENTANYL PREMEDICATION IN GERIATRIC DOGS

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Twelve dogs of either sex age group of 7-14 years, presented to the college clinic with surgical problems were utilized to study the effect of etomidate and propofol after premedication with atropine sulphate, diazepam and fentanyl. The animals were divided into two groups of six animals each. Etomidate @ 0.3mg/kg b.wt was given intravenously to group I dogs and Propofol @ 6 mg/kg b.wt. intravenously was given to group II dogs. Induction quality was excellent, smooth and all animals in both groups attained sternal recumbency rapidly without struggling. Recovery from anaesthesia was smooth and excitement free in both the groups. However, etomidate with atropine, diazepam and fentanyl premedication provided better surgical anaesthesia with smooth induction and rapid, safe and smooth recovery in geriatric dogs.
Key words: Anaesthesia, Etomidate, Geriatric dogs, Haemato-biochemical, Propofol.

Anaesthesia is an indispensable pre-requisite to most of the surgical interventions, both in humans and animals, so that the surgeon can perform surgical intervention with maximum precision and sagacity. Procedural sedation and Analgesia (PSA) is a sedation technique involving the use of sedatives, dissociative agents and analgesics alone or in combination. The goals of PSA are to relieve fear and anxiety, provide analgesia, sedation and amnesia as needed for an unpleasant procedure and to minimize adverse effects of one another, maintain cardiorespiratory functions and control motor behaviour. The ideal agents for PSA satisfy all of these goals have a rapid onset and short duration of action, have the same effects irrespective of the route of administration and are reversible, safe at all ages and simple to administer. PSA agents must be chosen in combination or alone in order to provide as many of the desired goals as possible. Sams *et al.* (2008) observed significant decrease in PCV during etomidate anaesthesia in dogs. Whereas, Perk *et al.* (2002) recorded no significant changes in haematological parameters following etomidate - alfentanil anaesthesia in dogs. Muir and Gadawski (1998) and Lim-Jaehyun *et al.* (2000) recorded no significant changes in haemoglobin during propofol anaesthesia in dogs.

Etomidate and Propofol anaesthesia following Atropine, Diazepam and Fentanyl premedication in geriatric dogs was evaluated for haemato-biochemical changes together for their safety and efficacy to induce general anaesthesia in geriatric dogs.

Materials and Methods

Dogs with various surgical problems belong to different breeds, aged between 7 to 14 years with a body weight ranged between 14 to 43 kgs were utilized for the study. All these dogs were randomly selected and routine clinical and haematological examinations were carried out and those were found to be fit for surgery were utilized for study. Food and water were withheld for twelve hours prior to administration of anaesthetic drugs in all the dogs and were premedicated with atropine sulphate at the dose rate of 0.04mg/kg body weight subcutaneously. Ten minutes after premedication, the dogs were sedated with diazepam at the dose rate of 0.5 mg/kg body weight and fentanyl @ 0.002 mg/ kg body weight intravenously. After premedication,

the animals were divided into two groups of six animals each as follows.

Group I: Dogs were subjected to etomidate anaesthesia 0.3mg/kg b.wt I/V

Group II: Dogs were given propofol anaesthesia @ 6 mg/kg body weight I/V Five ml of venous blood from each animal was collected into sterilized vials containing anti-coagulant, ethylene diamine tetra acetate (EDTA). Alterations in haematological parameters such as haemoglobin and packed cell volume (Schlam *et al.* 1975) were estimated before and at 30, 60 minutes and 2 hrs following anaesthetic injections. The serum samples were also utilized for estimation of aspartate amino transferase , alanine amino transferase and alkaline phosphatise following Reitman and Frankle's method. The values were expressed as I.U/ml.

Results and Discussion

In our study, haemoglobin and PCV decreased non significantly in group I dogs during the period of study (Table1). A significant decrease in haemoglobin and PCV was observed in dogs subjected to propofol anaesthesia during the period of study (Table1). Pooling of circulatory blood cells in the spleen or other reservoirs secondary to decreased sympathetic activity explained the decrease in haemoglobin and PCV and might also be contributed due to shifting of fluid from extravascular compartment to intravascular compartment in order to maintain normal cardiac output in animals as also reported by Kushwaha *et al.* (2012).

Table 1: Variations in mean ± SE values of different haematological parameters before, during and after anaesthesia in geriatric dogs

Parameters	Groups	Minutes				
		0	**30**	**60**	**2 Hrs**	**Overall Mean**
Haemoglobin (grams / percentage)	Group I	10.81 ± 1.10^{a}	10.00 ± 1.01^{a}	9.26 ± 0.83^{a}	8.90 ± 0.75^{a}	9.74 ± 0.46^{A}
	Group II	10.70 ± 0.47^{a}	8.96 ± 0.31^{b}	8.45 ± 0.21^{b}	8.05 ± 0.16^{b}	9.04 ± 0.25^{A}
Packed cell volume(percentage)	Group I	32.45 ± 3.30^{a}	30.00 ± 3.03^{a}	27.80 ± 2.49^{a}	26.53 ± 2.32^{a}	29.19 ± 1.39^{A}
	Group II	32.10 ± 1.41^{a}	26.73 ± 0.87^{b}	25.35 ± 0.63^{b}	24.15 ± 0.48^{b}	27.08 ± 0.76^{A}

Means bearing different superscripts within a row (a, b...) vary significantly ($P \leq 0.05$)
Group I : Etomidate Group II : Propofol

A non significant increase in AST, ALT and AKP was noticed in group I dogs throughout the period of observation but this increase was within normal physiological limits which indicated no possibility of pathological changes in the liver (Table 2). However, Perk *et al.* (2002) recorded no significant change in AST, ALT during etomidate - alfentanil anaesthesia in dogs. A significant increase in AST, ALT and AKP values were recorded in group II dogs throughout the study. It corroborates with the findings of Bayan *et al.* (2002) who recorded significant increase in AST, ALT values during propofol anaesthesia in dogs. However, no significant changes in AST and ALT during anaesthesia were reported by Muir and Gadawski (1998) and Lim-Jaehyun *et al.* (2000) during propofol anaesthesia in dogs, and by Kim-Jiwan *et al.* (1999) with propofol-xylazine anaesthesia in dogs. To the contrary, decreases in AST and ALT values were reported by Kwon –Youngsam *et al.* (1999) during propofol anaesthesia in dogs.

Table 2: Variations in mean ± SE values of different biochemical parameters before, during and after anaesthesia in geriatric dogs.

Parameters	Groups	Minutes				
		0	**30**	**60**	2 Hrs	Overall Mean
Aspartate amino transferase (I.U/ml)	Group I	37.40±2.54^{a}	36.71±2.69^{a}	42.69±2.97^{ab}	47.24±3.61^{ab}	41.01±1.65^{A}
	Group II	51.79±7.95^{a}	71.87±7.65^{ab}	82.74±7.84 ^{b}	93.36±7.41 ^{b}	74.94±4.81^{B}
Alanine amino transferase (I.U/ml)	Group I	25.43±3.90 ^{a}	26.43±4.39 ^{a}	33.86±5.74^{a}	37.71±5.84 ^{a}	30.82±2.58^{A}
	Group II	28.70±5.58 ^{a}	37.86±6.95 ^{a}	49.05±7.64 ^{ab}	59.23±8.36 ^{bc}	43.71±4.12^{B}
Alkaline phosphatase (I.U/ml)	Group I	71.94±11.01^{a}	90.17±13.70^{a}	102.98±12.62^{a}	106.70±10.39^{a}	92.95±6.27^{A}
	Group II	72.38±12.31^{a}	94.33±15.02^{a}	112.71±14.42^{ab}	127.56±12.17^{ab}	101.74±7.64^{A}

Means bearing different superscripts within a row (a, b...) vary significantly ($P \leq 0.05$)
Group I : Etomidate Group II : Propofol

Age itself is not a contraindication for anaesthesia; however, age-related diseases make anaesthesia more challenging .It is concluded that both anaesthetic drug combinations can be used in geriatric dogs for major surgical procedures. However, etomidate is better for its haemodynamic stability over propofol. Hence, combination of etomidate following atropine, diazepam and fentanyl premedication can be relied on for both induction and maintenance of anaesthesia and for brief surgical procedures in geriatric dogs.

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