
EFFECT OF XYLAZINE - MIDAZOLAM COMBINATION WITH ASCORBIC ACID AS ANAESTHESIA ON HEALTH STATUS OF WEST AFRICA DWARF GOATS

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ABSTRACT

The use of a safer technique of achieving anaesthesia is a unique procedure to be explored, Thus this study was aimed to evaluate the effect of xylazine – midazolam combination with ascorbic acid on the haematological indices of West African dwarf (WAD) goats. A total number of ten (10) WAD goats were randomly allotted into two groups; Group I: Xylazine + Midazolam (XM) and Group II: Xylazine + Midazolam + Ascorbic acid (XMA₃₀₀). Blood samples were collected from all goats in each treatment via jugular vein before the medicines were administered (0 minutes), and during drug administration at 60 and 90 minutes for haematological examination. Results revealed significant ($P<0.05$) effect on the haematological indices of the WAD goats except the packed cell volume, red blood cell, mean corpuscular haemoglobin concentration and mean corpuscular haemoglobin. Goat administered XMA₃₀₀ had higher ($P<0.05$) haemoglobin values ($10.60 \pm 1.74\text{g/dL}$) at 90 min under anaesthesia. Goats administered XM recorded higher ($P<0.05$) WBC at 0 ($52.50 \pm 1.58 \times 10^5/\mu\text{L}$) and 60 ($71.00 \pm 1.58 \times 10^5/\mu\text{L}$) min while at 90 min, goats administered XMA₃₀₀ had higher value ($60.00 \pm 1.58 \times 10^5/\mu\text{L}$). The platelets values observed at 0 ($11.60 \pm 0.25 \times 10^7/\mu\text{L}$), 60 ($10.90 \pm 0.16 \times 10^7/\mu\text{L}$) and 90 ($12.80 \pm 0.16 \times 10^7/\mu\text{L}$) min of anaesthesia in this study were higher in group administered XM. Goats administered XMA₃₀₀ had higher ($P<0.05$) lymphocytes values at 0, 60 and 90 mins of anaesthesia. The mean corpuscular volume observed in this study was higher in goats administered XM ($29.00 \pm 1.58\text{ fl}$) at 60 min but was higher in goats administered XMA ($24.40 \pm 1.74\text{ fl}$) at 90 min. It can be concluded that addition of ascorbic acids with the drugs improved the haematological indices of WAD goats.

Keywords: Anaesthesia, Midazolam, xylazine, Ascorbic acids, haematological indices

INTRODUCTION

Anaesthesia is an indispensable pre-requisite to most of the surgical interventions, both in humans and animals, so that the surgeon can perform surgical procedures with maximum precision (Muhammad *et al.*, 2009). In addition to routine surgical procedures such as disbudding and castration, goats are often presented to the veterinary surgeon for types of surgery which are associated more with companion animals; for example, fracture repair (Reid *et al.*, 1993). The development of new sedatives and analgesics in recent years has solved some of the problems in handling complicated surgical problems in these species (Khan *et al.*, 2004). Except for a few, patients like to remain sedated during the surgical procedure. The state of wakefulness can produce anxiety and reduce cooperation in animals (Tejinder and Ravishanka, 2005). Midazolam (MDZ) is used commonly in humans for pre-anaesthetic medication and induction of anaesthesia (Reves *et al.*, 1985). The intravenous administration of MDZ to conscious goats results in a decrease in VE and arterial oxygen tension (Stegmann and Bester, 2001). Therefore, the pre-anaesthetic use of MDZ possibly may result in increased ventilator depression during maintenance of anaesthesia with isoflurane. This investigation is a preliminary investigation into the ventilatory effects of MDZ in goats during isoflurane anaesthesia. Ascorbic acid is an antioxidant vitamin which accumulates in the brain from the blood supply and serves as a neuromodulator in normal brain functioning and as a neuroprotective agent in various conditions of oxidative stress (Grunewald, 1993). The neuroprotective action of ascorbic acid has been mainly attributed to its antioxidant capacity. It exerts a modulatory influence on the central nervous system (Alireza and Goudarz, 2007). Impairment of central nervous system functions has been reported to occur after a deficiency of the vitamin (Ezenwanne and Anuka, 1991). Ascorbic acid is readily available, affordable and is almost non-toxic (Minka and Ayo, 2012). Hence, this necessitated the

need to evaluate the efficacy of xylazine, midazolam, ascorbic acid combination on haematological indices of WAD goats in this study.

MATERIAL AND METHODS

Experimental site and duration: The experiment was conducted at the Teaching and Research Farm, Federal College of Animal Health and Production Technology, Moor Plantation, Apata, Ibadan. The experiment lasted for nine (9) weeks, the temperature and relative humidity ranges from 35°C-40°C and 76-78% respectively.

Experimental animals, diet and design: A total of 10 West African dwarf (WAD) goats were purchased from Akinyele market in Ibadan, Oyo state. Prior to the arrival of the animals, the pens were thoroughly washed and disinfected with Povidone-iodine. The goats were confined in individual pen and quarantined for a period of four (4) weeks prior to the onset of the study. Fresh cool clean water, cassava peel and grasses were made available *ad libitum*. The WAD goats were given prophylactic treatments. After adaptation period, the ten animals were randomly allotted into two groups. Group I: Xylazine + Midazolam (XM) and Group II: Xylazine + Midazolam + Ascorbic acid (XMA₃₀₀).

Data Collection

Blood samples of approximately 5mL were obtained from the jugular vein before administration of the drugs (0mins), during the administration of the drugs at 60 and 90 mins respectively for haematological analysis. The haematological parameters analyzed were: leucocyte count, packed cell volume (PCV), haemoglobin concentration (Hb) and erythrocyte count (RBC). Each blood sample was collected and placed in a sample bottle containing lithium heparin at the rate of 1 mg/1 mL of blood.

Statistical Analysis: All data obtained were subjected to analysis of variance using statistical package; SAS (2005). The means among the variables were separated using Duncan multiple range test of the same statistical package

RESULTS AND DISCUSSION

Presented in Table1 is effect of Xylazine, Midazolam Combination with Ascorbic Acid on Haematological Indices in West Africa Dwarf Goats. Results revealed significant ($P<0.05$) effect on the haematological indices of the WAD goats except the packed cell volume, red blood cell, mean corpuscular haemoglobin concentration and mean corpuscular haemoglobin. Goat administered XMA₃₀₀ had higher ($P<0.05$) haemoglobin values ($10.60 \pm 1.74\text{g/dL}$) at 90 min under anaesthesia. The white blood cell (WBC) of the experimental goats differed significantly ($P<0.05$) at 0, 60 and 90 mins of anaesthesia. WAD goats administered XM recorded higher ($P<0.05$) WBC at 0 ($52.50 \pm 1.58 \times 10^5/\mu\text{L}$) and 60 ($71.00 \pm 1.58 \times 10^5/\mu\text{L}$) min while at 90 min, goats administered XMA₃₀₀ had higher value ($60.00 \pm 1.58 \times 10^5/\mu\text{L}$). The platelets values observed at 0 ($11.60 \pm 0.25 \times 10^7/\mu\text{L}$), 60 ($10.90 \pm 0.16 \times 10^7/\mu\text{L}$) and 90 ($12.80 \pm 0.16 \times 10^7/\mu\text{L}$) min of anaesthesia in this study were higher in group administered XM. Goats administered XMA₃₀₀ had higher ($P<0.05$) lymphocytes values at 0, 60 and 90 mins of anaesthesia. The neutrophils of WAD goat administered XM (41.00 ± 2.12) at 60 mins had higher value when compared with those administered XMA₃₀₀. Goats administered XM had higher eosinophils values at 0 mins of anaesthesia. The mean corpuscular volume observed in this study the values of was higher in goats administered XM ($29.00 \pm 1.58\text{ fl}$) at 60 min but was higher in goats administered XMA ($24.40 \pm 1.74\text{ fl}$) at 90 min.

DISCUSSION

The purpose of anaesthesia is to provide unconsciousness, amnesia and immobility with minimal risk to the animal (Thurmann *et al.*, 1996). One of the important requirement or advantage of any anaesthetic is its ability to exert its effects without serious compromise of the haematological indices. Although investigations have revealed that local anaesthetics when used alone have various side effects. However, the statistically significant increase observed in haemoglobin, WBC, lymphocytes, monocytes and MCV could be attributed to the effect of ascorbic acid combined with Xylazine and Midazolam which had been known to produce severe cardiovascular effect causing reduction in the haematological parameters (Swenson, 1981). The neuroprotective action of ascorbic acid has been mainly attributed to its antioxidant capacity. It exerts a modulatory influence on the central nervous system (Alireza and Goudarz, 2007).

Table 1: Effect of Xylazine - Midazolam Combination with Ascorbic Acid on Haematological Indices in West Africa Dwarf Goats

Parameters	Mins	Xylazine	Xylazine+Midazolam + Ascorbic Acid @500
PCV (%)	0	29.60 ± 2.41	29.60 ± 2.41
	60	1.58 ± 0.71	1.58 ± 0.71
	90	33.00 ± 1.58	33.00 ± 1.58
Haemoglobin (g/dL)	0	6.70 ± 3.78	10.20 ± 1.74
	60	9.90 ± 3.78	10.20 ± 1.74
	90	7.80 ± 0.84 ^b	10.60 ± 1.74 ^a
Red Blood Cell (×10 ³ /μL)	0	11.12 ± 2.17	9.30 ± 1.74
	60	12.57 ± 1.30	13.48 ± 1.75
	90	11.45 ± 1.30	13.48 ± 1.75
White Blood Cell (×10 ⁵ /μL)	0	52.50 ± 1.58 ^a	50.00 ± 1.58 ^b
	60	71.00 ± 1.58 ^a	62.50 ± 1.58 ^b
	90	56.00 ± 1.58 ^b	60.00 ± 1.58 ^a
Platelets (×10 ⁷ /μL)	0	11.60 ± 0.25 ^a	11.20 ± 0.25 ^b
	60	10.90 ± 0.16 ^a	9.30 ± 0.25 ^b
	90	12.80 ± 0.16 ^a	6.30 ± 0.25 ^b
Lymphocytes (%)	0	51.40 ± 3.78 ^b	60.20 ± 1.92 ^a
	60	53.00 ± 2.12 ^b	63.00 ± 1.58 ^a
	90	59.80 ± 1.30 ^b	65.00 ± 1.58 ^a
Neutrophils (%)	0	38.00 ± 2.12	38.00 ± 1.58
	60	41.00 ± 2.12 ^a	34.00 ± 1.58 ^b
	90	32.40 ± 3.78	31.00 ± 1.58
Monocytes (%)	0	1.20 ± 0.84	2.00 ± 1.58
	60	0.00 ± 0.00	1.20 ± 1.58
	90	0.00 ± 0.00 ^b	3.00 ± 1.58 ^a
Eosinophil (%)	0	2.40 ± 0.05 ^a	0.60 ± 0.89 ^b
	60	1.40 ± 0.55	2.00 ± 1.58
	90	2.40 ± 0.55	1.40 ± 1.14
MCHC (g/dL)	0	33.20 ± 1.74	32.10 ± 1.74
	60	33.80 ± 1.74	31.90 ± 1.74
	90	34.40 ± 1.7	32.10 ± 1.74
MCV (fl)	0	23.30 ± 1.74	23.40 ± 1.74
	60	29.00 ± 1.58 ^a	24.40 ± 1.74 ^b
	90	19.60 ± 1.46 ^b	24.50 ± 1.74 ^a
MCH (pg)	0	3.30 ± 1.74	3.20 ± 1.74
	60	3.40 ± 1.74	3.20 ± 1.74
	90	3.40 ± 1.74	3.20 ± 1.74

^{a,b} Means along the same row with different superscripts are significantly different (P<0.05)

CONCLUSION:

The study showed that addition of ascorbic acids with the drugs improved the haematological indices of WAD goats.

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