Nigerian Veterinary Journal 2010 31(2):177-181

Short Communication

EFFECT OF XYLAZINE SEDATION ON SOME CLINICO-PHYSIOLOGICAL AND HAEMATOLOGICAL PARAMETERS IN SOKOTO RED GOATS.

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INTRODUCTION

Xylazine hydrochloride (Xylazin® injection, 2% solution contains xylazine hydrochloride 23.33 mg/kg, Indian immunological Ltd., India) is an α_2-adrenergic agonist used in animals. It is a potent sedative/hypnotic agent (Hall and Clarke, 1983). Chemically, it is 2(2, 6-dimethylphenylamino) -4H-5, 6-dihydro-1, 3-thiamine hydrochloride (Adams, 2001). Xylazine is classified pharmacologically as an effective sedative, analgesic, muscle relaxant, immobilizing and hypnotic agent in domestic animals (Torre and Erausquine, 1988; Ewing, 1990; Adams, 2001). Xylazine is also known to significantly ameliorate the effects induced by stress stimuli (Ali *et al*., 2006). It does not possess the undesirable side-effects and deficiencies of the phenothiazine-derived tranquilizer (Mohammed and Yelwa, 1993), and xylazine infusion should not be used in horses during transition from isoflurane anaesthesia to recovery (Wagner *et al*., 2008).

As a well-defined breed in Africa, Sokoto red goats are known for quality skin which is in high demand for leather product with a high retail value (Devendra and McLeroy, 1988). Sokoto State is estimated to have 2.46 million goats with Sokoto red goats found virtually in every household within the state (Anonymous, 1992).

The objective of this research was to evaluate the sedative effect of xylazine in Sokoto red goats by way of ascertaining the onset of action, duration of action, effect on some clinico-physiological and haematological parameters.

Keywords: Xylazine, Sokoto Red Goat, Haematology, Clinico-physiology, Sedation

MATERIALS AND METHODS

This study was conducted in December 2005, in Sokoto, Sokoto State, Nigeria located on latitude 13^0 03'N and longitude 5^0 14'E.

The experimental animals were six (6) Sokoto red goats weighing 11-14 kg live weight. The goats were purchased from a local market and pre-conditioned for two (2) weeks prior to the experiment during which, blood and faecal analyses were conducted for haemoparasites and helminthes ova. The goats were housed in the Faculty small

ruminant pen on concrete floor and fed with beans offal and bran. Portable water was made available ad libitum.

The drug used was xylazine [Xylazine® injection (2% solution) xylazine hydrochloride 23.33 mg/kg, Indian immunological Ltd, India]. The drug was administered intramuscularly at a dose rate of 0.2 mg/kg body weight following fasting for 18 hours. Rectal temperature, heart and respiratory rates were recorded. Blood samples were obtained by venipuncture from the jugular vein before administration and at 30, 60, 120, 180 and 240 minutes post-administration using 21 gauge 5 ml syringe. The blood samples were collected into EDTA bottles and used to determine the packed cell volume, haemoglobin concentration and white blood cell count as described by Dennis and Joanna (2000). Onset of action and duration of action were also recorded.

The data obtained were summarized as means with standard deviations and comparison of means was done by Student T-test at least significant difference of 5% (Petrie and Watson, 1999).

RESULTS and DISCUSSION

The blood and faecal analyses conducted during the stabilization period were negative for haemoparasites and helminthes ova.

As shown in Table I, all the means for the respiratory rate decreased significantly ($P<0.05$) as compared to those before xylazine administration. The heart rate decreased significantly at 30, 60 and 120 minutes post-xylazine administration. At 120, 180 and 240 minutes, the rectal temperature decreased significantly.

There was an insignificant ($P>0.05$) decrease in the haemoglobin concentration and packed cell volume, while the white blood cell count increased insignificantly (Table II).

The onset of sedation was 3.33±0.51 min and duration of its action was 83.16±10.95 min. The other clinical manifestations observed in all the goats included profuse salivation, bleating, flexing of the neck and polyuria.

Table I: Changes in some vital parameters before and after xylazine administration.

Time after injection (minutes)	Respiratory rate (cycles/minute)	Heart rate (beats/minute)	Rectal temperature (^{0}C)
0	27.16±2.56	80.50±1.87	39.55±0.28
30	14.16±5.30[a]	64.83±8.54 [a]	39.53±0.27
60	16.00±4.30 [a]	68.00±5.05[a]	39.13±0.51
120	18.33±1.96[a]	74.00±3.34[a]	38.30±0.68 [a]
180	22.00±2.19[a]	77.50±3.20	38.18±0.72 [a]
240	24.33±0.81 [a]	78.66±3.01	38.65±0.45 [a]

[a:] means with superscript 'a' are significantly ($P<0.05$) different from the mean before xylazine administration.

Table II: Change in haematological values before and after xylazine administration

Time after injection (minutes)	Haemoglobin concentration (gdL^{-1})	Packed cell volume (%)	White blood cell (Per µL)
0	12.53 ± 1.37	32.96 ± 3.73	15.55 ± 1.72
30	12.28 ±1.90	31.20 ±1.75	15.90 ± 1.52
60	11.76 ±2.26	28.60 ±3.76	16.78 ±1.07
120	11.63 ±1.60	30.41 ±2.03	15.90 ±1.17
180	12.66 ±1.60	34.11 ±3.71	16.35 ±1.81
240	12.08 ± 1.41	32.15 ± 1.95	16.90 ±1.32

From the results obtained in this work, the onset of sedation induced by xylazine administered to Sokoto red goats was 3.33±0.51 min. Jenkins, (1986) reported an onset of action of 5-10 min after xylazine injection in cattle and sheep. The onset of action was observed to be 3-7 min in other ruminants (Mohammed and Yelwa, 1993) and 6.0±0.9 min was reported in Sahel goats (Mohammed, *et al.,* 2001). Mohammed and Yelwa (1993) reported 7.0±3.1 min onset of action on Sokoto red goats and this disparity may be attributed to the dose rate of 0.05mg/kg used compared to 0.2mg/kg in this research. The duration of action was 83.16±10.95 min which is in agreement with report by Mohammed and Yelwa (1993).

The respiratory rate decreased significantly ($P<0.05$) for all the period which is in conformity with observation made by Mohammed and Yelwa (1993), except that it returned to normal from 210 min post-xylazine injection. DeRossi *et al*. (2005) reported significant decrease in the respiratory rate. Xylazine administration has been reported to decrease the respiratory rate (White *et al*., 1987; Mohammed, *et al*., 2001) and it is contraindicated in animals with upper respiratory tract obstructions (Mohammed and Yelwa, 1993).

Xylazine has a depressive effect on the heart rate. The decrease in heart rate was significant ($P<0.05$) at 30, 60 and 120 min post-xylazine administration. The decrease was drastic within the first 30 min. Xylazine caused bradycardia by increasing the vagal tone; by decreasing sympathetic activity (Mohammed and Yelwa, 1993) or by responding to transient hypertension (Clark *et al*., 1982). The decrease in heart rate observed was similar to earlier reports (Mohammed and Yelwa, 1993; DeRossi *et al.,* 2001; Singh *et al*, 2007). Mohammed *et al.* (2001) recorded significant decrease in pulse rate. However, these results are contrary to findings by Ewing (1990) who demonstrated that xylazine injection given up to 0.6 mg/kg body weight I.M. to goats did not develop bradycardia in goats.

The rectal temperature decreased significantly ($P<0.05$) after xylazine injection at 120, 180 and 240 min, although there was a decrease at 30 and 60 min, respectively. This report agrees with that of Mohammed and Yelwa (1993), but contrary to Mohammed *et al.* (2001) who reported an increase in rectal temperature in Sahel goats. There were insignificant decreases in the haemoglobin concentration and packed cell volume ($P>0.05$). Singh *et al.*, (2007) also

reported non- significant decrease in haemoglobin concentration and packed cell volume.

Polyuria was observed in all goats irrespective of weight post-xylazine injection and may be as a result of prolonged hyperglycaemia (Mohammed and Yelwa, 1993). Hyperglycaemia can result from either continuous glucose production from organs other than the liver and viscera or by reduced utilization of blood glucose by peripheral tissue (Mohammed and Yelwa, 1993).

In this work, complications such as bloat, regurgitation of ruminal content and aspiration pneumonia, which are common in ruminants after xylazine injection (Adams, 2001), were not observed during recovery. This may be attributed to withdrawal of feed prior to xylazine administration.

There was loss of sensation to pin prick and pronounced salivation at 13.08±1.22 min post xylazine administration which agreed with report by Mohammed and Yelwa, (1993). Ruminal motility drastically decreased 30 to 60 min post-xylazine administration, but returned to normal at 120 min. Decrease in ruminal motility may interfere with eructation and cause secondary ruminal tympany and free gas bloat (Radostits *et al.,* 1998), a possible complication.

In conclusion, xylazine is an effective, suitable, cheap and relatively safe sedative agent for use in Sokoto red goats. However, caution(s) should be taken to guide against undesirable outcome. The drug should not be administered to pregnant goats in their last trimester because of its oxytocin-like effect on the uterus (Perez *et al.,* 1997); also to sick or debilitated animals or those with upper respiratory or urinary obstructions.

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