



Effects of *Pausinystalia Yohimbe* Extract On Xylazine Anaesthesia In The Red Sokoto Buck

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Accepted January, 2019 and Published February, 2019

ABSTRACT

The effects of Pausinystalia yohimbe extract and xylazine on the onset of sleep, duration of sleep and vital parameters were used as investigating parameters. Twenty (20) red Sokoto bucks were divided into four (4) groups consisting of five (5) bucks per group. Control group 1 (20mg Xylazine); Group 2 (10, 20, 30 mg plant extract); Group 3 (Plant extract and xylazine); Group 4. Different doses of Pausinystalia yohimbe extract were administered at 5 minutes pre-treatment time of xylazine HCl (20mg/kg). There was significant ($p < 0.05$) increase of different doses of Pausinystalia yohimbe in respiratory rate, pulse rate and temperature but a significant ($p < 0.05$) decrease on combination of xylazine and Pausinystalia yohimbe extract.

Keywords: Red Sokoto bucks, *Pausinystalia yohimbe*, Anaesthesia, Xylazine.

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INTRODUCTION

Anesthesia is the loss of sensations which allows medical and surgical procedures to be undertaken without causing discomfort; premedication prior to the anesthesia provides reduction of anxiety, pain and the dosage needed for anesthesia [1]. Xylazine HCl has a hypnotic depressant effect on the central nervous system which enables the patient to go to sleep more easily or intensify the depth of sleep. Xylazine is an α_2 -agonist with sedative analgesic and muscle relaxant properties; it is the most widely used chemical restraint agent in ruminants [2].

Pausinystalia yohimbe is an evergreen tree, native to the rain forest region of Nigeria, Cameroon and the Congo. Yohimbine which is the active compound of this plant, is the only medically recognized natural aphrodisiac and the only food and drugs administration (FDA) approved medicine for impotence [3]. This active alkaloid - yohimbine is chemically similar to reserpine and possesses alpha adrenergic blocking properties; it is used as the hydrochloride for its sympatholytic and mydriatic effects, and for the management of impotence [4].

Xylazine at a dose of 0.02mg/kg administered intramuscularly can produce recumbency for 1–2 hours in ruminants, and some residual anorexia and central nervous system (CNS) depression may manifest for up to 24 hours [5]. An antidote for the reversal of xylazine will allow shortening of the recovery period of goats sedated with xylazine, and therefore reduce the possibility of tympany, regurgitation, pressure damage to nerves or muscles, or other problems associated with the recumbent sedated

ruminant [6]. Moreover, because ruminants and especially goats require small doses of xylazine, an agent to reverse the effects of xylazine will be useful for treating accidental overdoses of xylazine.

Studies have shown that yohimbine antagonise xylazine in sheep [7], and in cattle [8]. Both drugs reverse xylazine/ketamine anaesthesia in goats [9] and horses [10]. However, there is no information available about *P. yohimbe* as an antagonist to xylazine in goats. The aim of this study is to evaluate the effects of *P. yohimbe* in goats treated with xylazine.

MATERIALS AND METHODS

Twenty (20) apparently healthy red Sokoto bucks aged between 8 to 14 months and weighting between 5 and 9 kg were kept under a semi-intensive method of management at the small ruminant unit of Faculty of Veterinary Medicine, Usman Danfodiyo University Sokoto. During the two week period of acclimatization, the bucks were dewormed with 25% albendazole oral suspension and treated with 20% Oxytetracycline. The bucks were fed wheat bran, bean chaff, hay and yam peelings. The animals were feed trice daily and clean water was provided *ad libitum*. All experimental protocols were in compliance with the Usmanu Danfodiyo University, Sokoto Ethics Committee on Research in Animals as well as internationally accepted principles for animal use and care.

Experimental Design

20 bucks were randomly placed into four (4) groups comprising of 5 bucks per group. (Group 1) were used as a control group for vital parameters.

(Group II) was used to determine vital parameter after administration of 20mg xylazine.

(Group III) was used to determine vital parameters after the administration of plant extract in doses of 10mg, 20mg, and 30mg of plant extract.

(Group IV) was used to determine vital parameters after administration of plant extract and 20mg xylazine.

Behavioral changes were also assessed in (Group III) after administration of plant extract at doses of 10mg, 20mg and 30mg, and 20mg xylazine.

The onset and duration of sleep after administration of xylazine and combination of xylazine and plant extract.

Statistical Analysis

The data generated were analyzed by analysis of variance (ANOVA). As the data were normally distributed, differences among mean values were treated with paired sample t-test. Statistical significance was considered at *P* value below 0.05. The results are presented as means $\pm$ standard deviation (SD). All data were analyzed using the SPSS19 (IBM Company, Version 19.0, SPSS Inc, USA, 2010) statistical package.

RESULTS

Table I shows the effects of xylazine and the plant extract on the changes in vital parameters of goats. There was no significant difference ($p < 0.05$) in temperature but a significant increase ($p > 0.05$) was observed in pulse and respiratory rates following administration of the different doses of the plant extract when

compared with the control group. There was also a significant decrease ($p < 0.05$) in pulse and respiratory rates during the administration of the plant extract and xylazine when compared with the control group.

Table II shows the behavioral changes following the administration of the plant extract and xylazine in goats. There was no significant difference ($p > 0.05$) in papillary dilation, penal erection and respiratory rates following administration of 20 mg/kg xylazine. There was however a significant increase ($p < 0.05$) in frequency of urination and prolapse of the third eyelid.

Table III shows the onset and duration of sleep after administration of xylazine and the plant extract. There was a significant ($p < 0.05$) early onset of sleep in the xylazine treated group when compared with the xylazine and the xylazine and extract treated group. A similar result was observed for the duration of sleep between the two groups.

Table IV shows changes in the liver function following treatment with xylazine and the plant extract. There was a significant increase ($p < 0.05$) in aspartate amino transferase (AST), alanine amino transferase (ALT), alkaline phosphatase and total protein but shows a significant decrease ($p > 0.05$) in albumin following administration of xylazine compared with the control group.

Table 1: Vital Parameters following the administration of xylazine and plant extract *Pausinystalia yohimbe*

Drugs	Respiration (cycle/minute)	Pulse rate (beats/minute)	Temperature (°C)
Control	23 ± 2.0	82.4 ± 3.64	38.6 ± 0.4
20/mg xylazine	15.4 ± 23*	56.2 ± 8.3	38.3 ± 0.3
10/mg plant extract	31.4 ± 1.9*	91 ± 1.6*	37.2 ± 0.14
20/mg plant extract	34.0 ± 0.7*	92 ± 1.6*	40.1 ± 0.14
30/mg plant extract	34.8 ± 0.8*	90 ± 1.1*	40.6 ± 0.21
Plant extract and xylazine	16.8 ± 1.9	57.2 ± 4.1*	37.7 ± 0.6

***p<0.05 when compared to control**

Table II. Behavioral Changes following *Pausinytsalia yohimbe* and Xylazine administration.

<i>Pausinystalia yohimbe</i> (mg/kg)	Pupillary dilatation.	Penile erection	Respiratory rate	Polyurea	Prolapse of 3 rd eyelid.
(1) 10	+	—	—	—	—
(2) 20	+	+	—	—	—
(3) 30	++	++	—	—	—
(4) 20mg Xylazine	—	—	+	+	+

— = Behavioral changes is Negative

+ = Behavioral changes is Positive

Table III: The onset and duration of sleep after administration of xylazine and combination of xylazine and plant extract dose.

	Xylazine	Xylazine + extract
Onset of sleep	9.4 ± 2.61 min	15.4 ± 16.9 min
Duration of sleep	50.6 ± 18.5 min	26.4 ± 4.72 min

DISCUSSION

The results obtained from the experiment shows that plant extract (*Pausinystalia yohimbe*) has an effect on the onset and duration of action of xylazine hydrochloride in bucks. The decrease in the duration of sleep as the dose of *Pausinystalia yohimbe* increases shows that at a low dose the changes were not significant but were significant at high doses and doses dependently.

These finding are in tandem with previous reports [11-12] that suggested *P. yohimbe* can be used as a stimulant by people who cannot take most stimulant due to high blood pressure. Our findings are also in agreement with Hall and Clark [13] who reported that behavioral excitation in goats when administered high oral doses of *P. yohimbe* (20-30mg/kg); however, in the *P. Yohimbe* and xylazine co-administration group, there was a decrease in the heart rate, respiratory rate and temperature of goat.

Generally anesthesia causes reduced muscular activity and depression of the thermoregulatory control [14]. *Pausinystalia yohimbe* administration in goat caused an increase in heart rate when compared to effect xylazine administered alone. In this study however, *Pausinystalia yohimbe* did not have any significant effect on temperature; this finding is

contrary to the previous reports of [12] that oral administration of *Pausinystalia yohimbe* causes an increase body temperature.

Monitoring of xylazine anesthesia revealed that at five minutes of xylazine administration the temperature, heart rate, respiratory rate and rumen motility decreases slightly and significantly decrease at 10 minutes but subsequently increase at 30 minutes of anesthesia.

Conclusion

This study reveals that *Pausinystalia yohimbe* reduces the duration of sleep in xylazine anesthesia and can thus reduce the sleeping time due to xylazine anesthesia.

REFERENCES

1. Egwu, G.O., Mshelia, G.D., Sanni, S., Onyeyili, P.A., Adeyanju, G.T. (2011). The Effects of vitamin C at varying times on physiological parameters in rabbits after xylazine anesthesia. *Veterinaria Italiana*, 47, 97-104.
2. Onakpa, M.M., Ajagbonna, O.P. and Onifade, K.I. (2010). Effects of Xylazine and Propofol Treatments on some Semen and Serum Biochemical

- Parameters of the Red Sokoto Buck. *Sahel Journal of Veterinary Sciences*. Vol 9(2) pp 29-33.
3. Cohen, P.A., Wang, Y.H., Maller, G. (2016). [Pharmaceutical quantities of yohimbine found in dietary supplements in the USA](#). *Drug Testing and Analysis*. 8(3-4):357-369.
 4. Dorland's Medical Dictionary for Health Consumers, 2007 Saunders, an imprint of Elsevier, Inc.
 5. Knight A.P. (1980). Xylazine. *Journal of the American Veterinary Medical Association* 176:454–455
 6. Taylor P.M. (1991). Anaesthesia in sheep and goats. *In Practice* 13: 31–36
 7. Hsu W.H., Schaffer D.D., Hanson C.E. (1987). Effect of tolazoline and yohimbine on xylazine-induced CNS depression, bradycardia and tachypnea in sheep. *Journal of the American Veterinary Medical Association* 190: 423–426
 8. Kitzman J.V., Booth N.H., Hatch R.C., Wallner B. (1982). Antagonism of xylazine sedation by 4-aminopyridine and yohimbine in cattle. *American Journal of Veterinary Research* 43: 2165–2169
 9. Kruse-Elliot K.T., Riebold T.W., Swanson C.R. (1987). Reversal of xylazine-ketamine anaesthesia in goats. *Veterinary Surgery* 16: 321
 10. Kitzman, J.V., Wilson R.C., Hatch R.C., Booth N.H. (1984). Antagonism of xylazine and ketamine anaesthesia by 4-aminopyridine and yohimbine in geldings. *American Journal of Veterinary Research* 45: 875–870
 11. Riley A.J. (1994) Yohimbine in the treatment of erectile disorder. *British Journal of Clinical Practice*. 48:133-136.
 12. De Smet, P.A., Smeets, O.S. (1994). Potential risks of health food products containing yohimbe extracts. *British Medical Journal*. pp309-958
 13. Hall, L.W., Clark, K.W., Trim, C.M. (2001): Veterinary anesthesia. 10th ed. W.B. Saunder's Co, London, 84-87, 352-353.
 14. Martin, B. (1995). General anaesthesia and other pharmacological properties of 2-(O-Chlorophenyl)-2-methyl aminocyclohexane HCL. *Journal of New drugs* pp 21-33.
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