Pharmacological Restraint of Domestic Duck (*Anas platyrhynchos domestica*) Using Xylazine

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**Abstract**

This study was aimed at evaluating the sedative effects of xylazine on domestic ducks of both sexes following intramuscular administration. Twelve adult ducks equally divided between the sexes were used for the study. Three doses of xylazine hydrochloride (Runpoum®) 3.0, 6.0 and 9.0mg/kg were administered to each subject at the rate of one dose per week allowing a wash out period of one week before the next dose is tested. Times to the manifestation of sedative and recovery signs were recorded. The heart and respiratory rates as well as the cloacal temperature were monitored with time prior to and post injection. Blood samples (2ml) were obtained prior to and twice post sedation and used to determine the PCV, Hb and total WBC. The results obtained show clearly that the male duck is more sensitive to sedative doses of xylazine. The female duck recovers faster than the male following sedation with identical doses. The basal HR and RR vary significantly among the sexes and were dose dependently and significantly depressed by xylazine administration, however these effects were transient. The mean cloacal temperature and the mean haematological values were not significantly altered. We conclude that xylazine could produce efficient and safe immobilisation of domestic duck. The sex must be considered in dosing as the apparent differences in basal metabolic rate could result in wide differences in the magnitude of effects and duration of recovery.

**Keywords**: Xylazine, Domestic Duck, Sedation, Vital Parameters, Haematological Values.

1. **Introduction**

Special problems presented by birds during anesthesia or sedation are related to their physiological, anatomical and metabolic differences from mammals (Clarke *et al.*, 1993). For many species of birds in Nigeria there is dearth of data to guide clinicians in the safe therapeutic applications of sedatives or anesthetics. Despite this there are many instances where these groups of drugs are clearly indicated in avian. Information on the use of sedatives in domestic duck in Nigeria is still scarce. In particular, there is dearth of information in the literature on the use of xylazine to restrain the domestic duck. However, several combination anaesthetic protocols have been studied in this species in other countries (Ludders *et al.*, 1989; Machin *et al.*, 1998; Livingstone *et al.*, 2002). The aim of this study is to evaluate the sedative effects of xylazine singly for pharmacological restrain of domestic duck.

2. **Materials and Methods**

2.1 **Experimental Animals**

Twelve (12) adult ducks equally divided between the sexes weighing between 1.7 to 2.8kg were purchased from Sokoto Central Market. The ducks were kept in two separate pens. They were conditioned for two (2) weeks before the experiment commenced, during this period each of them was administered with oxytetracycline long acting intramuscularly and piperazine once as antibiotic and anthelmithics prophylaxis respectively. The ducks were fed with soaked millet or millet bran and allowed clean fresh water *ad libitum*. Monitoring of the normal physiological values including blood during acclimation period was the basis for inclusion of any of the birds in the study.

2.2 **Drugs**
Xylazine (Rumpoun®) was used for the study. The drug was administered intramuscularly into the pectoral muscle using 1ml syringe.

2.3 Experimental Procedure
Three different doses of xylazine, 3.0, 6.0 and 9.0 mg/kg were administered to each of the twelve ducks at the rate of one dose per week separated by one-week wash out period. Following drug administration, the onset of sedation was noted, duration of sedation and the time for total recovery were also recorded. The respiratory rate was evaluated by direct observations of the pectoral region movements. The cloacal temperature was recorded using digital clinical thermometer. The heart rate was monitored by placing stethoscope on the pectoral region and counting. These parameters were monitored at 0, 30, 60, 90 minutes to the time of full recovery of the ducks. Blood samples were collected using 2ml syringe and EDTA bottles before and after drug administration at 0, 30 and 60 minutes by pectoral venepuncture and used to determine packed cell volume (PCV), haemoglobin concentration (Hb) and total white blood cell (WBC) count. The average environmental temperature during the duration of the study was 33.83 ± 1.8.

2.4 Statistical Analysis
The data obtain were summarized as mean, standard deviation and analysis of variance (ANOVA) were used to analyzed the data.

3. Results
The mean onset and duration of sedation and recovery times following xylazine administration are presented in Table 1. The mean onset of effect was not statistically altered with increasing doses or between the sexes. The mean duration of sedation increased significantly (P<0.05) with increasing doses. The mean RR began between 120th minute mean RR were not significantly different from baseline values. The mean RR decreased significantly (P<0.05) with increasing doses. The male appear to be more sensitive than the female to the same sedative doses.

3.1 Hematological Parameters
The following ranges of haematological parameters were determined before and after xylazine administration, PCV, 37.2±7.1 - 43.4±7.8, Hb, 12.4±2.4 - 15.5±2.0 g/dl and total WBC, 19.0x10^9 - 26.0x10^9. The baseline values for these haematological parameters did not differ significantly between the two sexes and were not significantly altered following xylazine administration.

4. Discussions
The results of this study indicate that apart from inherent individual variations in response to drug, the male and female duck respond differently to similar doses of xylazine. The male appear to be more sensitive than the female to the same sedative doses. This might not be unconnected with significant differences in the baseline values of some vital parameters e.g. heart rate and rate of respiratory movements noted in the results. These differences in baseline values, suggest differences in basal metabolic rates between the sexes which may translate to differences in the rate of biotransformation of substances, including xylazine, in the liver. Thus the sex of the bird should be considered in determination of appropriate doses when xylazine is employed in duck for pharmacological restraint. Data on the clinical use of sedatives and other CNS depressants in birds is still emerging. Several studies involving anesthesia in avian species including ducks, has been reported (Langan et al., 2000; Atalan et al., 2002; Langan et al., 2002; Methan et al., 2003). The non significant alteration of the cloacal temperature with all the three doses in this study is contrary to that reported earlier (Ludders et al., 1989). These investigators reported a significant elevation of the cloacal temperature following xylazine - ketamine combination in ducks. Unlike in this study, the ambient temperature under which they administered xylazine was not reported. It has however been noted that xylazine or detomidine may depress thermoregulatory mechanisms and hyperthermia or hyperthermia is a possibility depending on prevailing ambient air temperatures (Livingston et al., 1984; -
Onifade and Arowolo, 2015). The ketamine in the combination could also be responsible for alteration of cloacal temperature. The transient influence of the drug on the respiration and heart rates and lack of effect on cloacal temperature and haematological values, reported in this study, is an indication that fatalities from excessive depression of these vital parameters may not occur when recommended doses are administered. Some level of caution is however suggested when this protocol is employed under very low ambient temperatures.
5. Conclusions

The administration of xylazine singly for pharmacological restraint in domestic duck is a safe procedure. Taking note of the sex of the bird and ambient temperatures could be very important precautions during therapeutic applications of xylazine in ducks. The analgesic and muscle relaxing properties of xylazine would also be an advantage following pharmacological restraint where surgery has to be performed.

References


