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Clinico-biological observations in chemical immobilization for reference value information in wild felids

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Abstract

The study conducted to assess the clinical observations in tigers (*Panthera tigris*), leopard (*Panthera pardus*) and lion (*Panthera leo persica*). The work performed in eighteen wild felids at National Parks of Madhya Pradesh. Dose of xylazine and ketamine required for chemical immobilization in tigers, 1.77 ± 0.09 and 4.63 ± 0.33 mg/kg body weight respectively with induction time of 10.5 ± 1.09 min. Dose of xylazine and ketamine required for chemical immobilization in leopards, 1.5 ± 0.25 and 3.5 ± 0.5 mg/kg body weight respectively with induction time of 10.5 ± 0.76 min. While for chemical immobilization of lion, Xylazine and ketamine with the mean dose rate of 1.33 ± 0.13 and 3.12 ± 0.15 mg/kg body weight respectively was administered intramuscularly at the right thigh using a blow pipe with induction time of 11.17 ± 0.98 min. Atropine sulphate at the dose of 0.04 mg/kg body weight was administered intramuscularly.

Keywords: Anaesthesia, clinical parameter

Introduction

The physical and behavioral characteristics of wild felines reflect in the adaptation of these species to hunting activity, which requires extensive and continuous territories. Therefore, the population decline of these species is closely related to mass destruction or fragmentation of their natural habitats. To prevent an animal species from becoming extinct, it is paramount that some individuals, especially those that require large territories, such as the large felines, be kept under artificial conditions, at places such as zoos, where they represent a valuable genetic material bank (Larsson *et al.*, 2015) [1]. Given the difficulty in detecting signs of disease in captive animals, laboratory tests are essential for establishing or substantiating diagnoses (Soifer, 1974) [2]. In addition to the limited information on the many species of felines, another difficulty in wild animals studies is in the access to large numbers of free-living or captive individuals for testing, which leaves researchers with limited number of individuals and/or repeats. Therefore, it is difficult to obtain statistically significant reference value information (Wildt, 1989) [3].

Chemical immobilization is the safe method of capturing and immobilization of wild felids as chemical immobilization induce less stress, less morbidity and mortality due to trauma induced by dashing against the cages and vigorous struggling (Dembić *et al.*, 2004) [4]. Various anaesthetics and ancillary drugs were used for induction of chemical immobilization of wild captive and free ranging big cats. Xylazine is preferred as an integral agent of immobilization due to its potential sedative and analgesic action with less complication (Hubbell, 2009) [5]. Xylazine when administered along with ketamine prolonged the plasma half life of ketamine and moderated the bradycardic effect of xylazine by cardiotoxic action mediated through sympathetic stimulation and vagolytic action (Gross, 2001) [6].

Material and Methods

Xylazine and ketamine were administered intramuscularly at the right thigh using a blow pipe at mean dose rate of 1.5 ± 0.25 and 3.5 ± 0.5 mg/kg body weight respectively for chemical immobilization. The ear flick reflex was induced using a stiff wooden stick after 8 and 10 min of darting and animal was approached only when the ear flick reflex is absent. Atropine sulphate @ of 0.04 mg/kg body weight was administered intramuscularly.

General body conditions like alertness, body coat, gait, posture and physical status were assessed and recorded for individual animals. Simultaneously, physical parameters such

as rectal temperature (Fahrenheit, °F), pulse rate per minute and respiration rate per minute were also recorded.

The present research work was conducted on eighteen adult wild felids of either sex.

S. No.	Parameter	Number of animals	Species of wild felids
1.	Group I	Six	Tiger (<i>Panthera tigris</i>)
2.	Group II	Six	Leopard (<i>Panthera pardus</i>)
3.	Group III	Six	Lion (<i>Panthera leo persica</i>)

Table 1: Mean values of anaesthetics and induction time

S. No.	Parameter	Tiger	Leopard	Lion
1.	Xylazine mg/kg body weight	1.77±0.09	1.5±0.25	1.33±0.13
2.	Ketamine mg/kg body weight	4.63±0.33	3.5±0.5	3.12±0.15
3.	Induction time (min)	10.5±1.09	10.5±0.76	11.17±0.98

Results and Discussion

There are number of chemical immobilization technique being followed in wild felines with their merits and demerits. Xylazine-ketamine immobilization is commonly practiced in wild felines for immobilization (Fyumagawa *et al.*, 2012) [7].

The dose of xylazine and ketamine used in the study was similar to the earlier reports (Deem, 2004) [8]. The mean value of induction time was recorded as 10.5±0.76 min after dart (Lescano *et al.*, 2014) [9].

Table 2: Mean values of clinical parameters in wild felids

S. No.	Parameter	Tiger	Leopard	Lion
1.	Temperature (°F)	101.47 ±0.51	101.70±0.48	100.77±0.35
2.	Pulse Rate (per min)	80.00±1.15	78.67±1.46	80.00±1.46
3.	Respiration Rate (per min)	30.33±1.20	31.00±0.86	30.33±1.20

The mean value of the rectal temperature, pulse rate and respiratory rate in different tigers were in normal range. Larsson *et al.*, (2008) [10] Recorded range of heart rate in tigers from 56 to 97 bpm. Zeiler *et al.*, (2013) [11] also reported the body temperature (°C) 33.4 ± 0.96 and heart rate (beats/min) 53 ± 5.57.

The mean value of rectal temperature in different leopard was recorded to 101.70±0.48°F, pulse rate was 78.67±1.46 and respiratory rate per minute recorded to be 31.00±0.86 in between all the six animals which were in normal range. Lescano *et al.*, (2014) [9] studied on chemical immobilization on captive cougars *Puma concolor* and find the mean heart rate 122±10 beats/minute, mean respiratory rate 10±1 breaths/minute and mean body temperature was 39.1±0.2 °C. The findings of the present study were in accordance with Sabapara *et al.*, (2008) [12], where mean rectal temperature, heart rate (per minute) and respiration rate (per minute) for leopards were 101.36 ± 0.37 °F, 65.27 ± 2.47 and 13.87 ± 0.76 respectively.

The mean value of the rectal temperature in different lion recorded was 100.77±0.35°F. The temperature recorded was within the normal range. Similarly, the mean value of pulse rate recorded to be 80.00±1.46 and normal. The mean respiratory rate recorded was also normal, 30.33±1.20 in all the Lions of the present study. Jacquier *et al.*, (2006) [13] studied physiologic parameters in lions and the values simulates to the present study. The slight variations in the findings of pulse and respiration rate may be because of stress, excitement and altered habitat of animals.

Conclusions

There are number of chemical immobilization technique for wild felines with their merits and demerits, however regular monitoring of vital parameters are essential for safe maintenance and smooth recovery. The choice of drug

combination is very important and xylazine-ketamine produce safe anesthesia in wild feline species.

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