

**XYLAZINE-KETAMINE IMMOBILIZATION, KETAMINE OR
PROPOFOL INDUCTION AND ISOFLURANE MAINTENANCE
IN ASIATIC / HYBRID INDIAN CAPTIVE LIONS (*Panthera leo*)**

M.BHARATHIDASAN
I.D.NO. MVM 13048 (VSR)

**DEPARTMENT OF VETERINARY SURGERY AND RADIOLOGY
MADRAS VETERINARY COLLEGE
CHENNAI - 600 007**

**TAMIL NADU VETERINARY AND ANIMAL SCIENCES UNIVERSITY
CHENNAI-51**

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*Thesis submitted in partial fulfilment of the requirements
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CERTIFICATE

This is to certify that the thesis entitled **"XYLAZINE-KETAMINE IMMOBILIZATION, KETAMINE OR PROPOFOL INDUCTION AND ISOFLURANE MAINTENANCE IN ASIATIC / HYBRID INDIAN CAPTIVE LIONS (*Panthera leo*)"** submitted in partial fulfillment of the requirements for the degree of **MASTER OF VETERINARY SCIENCE in VETERINARY SURGERY AND RADIOLOGY** to the Tamilnadu Veterinary and Animal Sciences University, Chennai-51, is a record of bonafide research work carried out by **M.BHARATHIDASAN**, under my supervision and guidance and that no part of this thesis has been submitted for the award of any other degree, diploma, fellowship or other similar titles or prizes and that the work has not been published in part or full in any scientific or popular journal or magazine.

Date: 19.5.15
Place: Chennai- 600 007

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Chairman

:
(Dr. B. JUSTIN WILLIAM)

Members

:
1: (Dr. R. JAYA PRAKASH)
:
2: (Dr. T. A. KANNAN)

Date: 11.6.15
Place: Chennai

EXTERNAL EXAMINER

Dr. N. ARUL JOTHI, Ph.D.
Associate Professor
Dept. of Vet. Surgery & Radiology
(Teaching Hospital), RIVER
POUCHERRY - 605 009.

ABSTRACT

XYLAZINE – KETAMINE IMMOBILIZATION, KETAMINE OR PROPOFOL INDUCTION AND ISOFLURANE MAINTENANCE IN ASIATIC / HYBRID INDIAN CAPTIVE LIONS (*Panthera leo*)

<i>Name and ID. No.</i>	: M.BHARATHIDASAN MVM 13048(VSR)
<i>Degree for which submitted</i>	: M.V.Sc., in Veterinary Surgery & Radiology
<i>Name and Designation of Chairman</i>	: Dr. B. JUSTIN WILLIAM, Ph.D. Professor and Head Centre for Stem Cell Research & Regenerative Medicine Madras Veterinary College, Chennai – 600 007
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<i>University</i>	: Tamil Nadu Veterinary and Animal Sciences University, Chennai – 51

Asiatic lions (*Panthera leo persica*) and hybrid lions are often subjected to chemical immobilization and anaesthesia for various measures related to conservation and elective and emergency surgical procedures. Management of long term anaesthesia has been carried out under using injectable anaesthetics and ancillary drugs which pose problems due to change in depth of anaesthesia and alteration in homeostasis leading to stress and stress related complications. The present study was proposed to identify a suitable anaesthetic regimen using xylazine and ketamine as immobilizing agents, ketamine and propofol as induction agents, evolving a suitable technique for intubation and maintenance of anaesthesia with isoflurane with the objectives of minimizing the stress.

Asiatic and hybrid lions apparently healthy and fit for anaesthesia, referred from Arignar Anna Zoological Park, Vandalur, Chennai to Department of Veterinary Surgery and Radiology, Madras Veterinary College Teaching Hospital included in the

study. The selected 6 lion and 6 lioness were fasted for 24 hours without restriction of water and were subjected immobilization using xylazine and ketamine at the rate of 1.00 mg/kg and 2.00 mg/kg body weight respectively using darts based on the body weight assumed. All the lions were subjected to lateral radiography of neck and thorax and the distance between snout of the upper lip to proximal larynx through oropharynx was measured with the objective of selecting the optimal diameter and length of the endotracheal tube to position behind the larynx. Ketamine and propofol were used as induction agents sufficiently to achieve deep plane of anaesthesia and good jaw muscle relaxation. The commercially available large animal endotracheal tubes and custom made silicon medical grade tubes were used for intubation either by direct visualization of glottis or by digital palpation of glottis. Anaesthesia was maintained with isoflurane and oxygen was used as carrier gas.

The study revealed that the sub-adult and adult lions required 1.08 ± 0.10 and 2.70 ± 0.26 mg/kg and 1.06 ± 0.30 and 2.64 ± 0.08 mg/kg body weight of xylazine and ketamine for immobilization respectively. As an indicator for safe and appropriate time for approaching the lion after immobilization, reliability of ear flick reflex was studied and found that complete absence of ear flick reflex was attained only after 1.37 and 2.01 minutes after recumbency; which was attained after 7.13 ± 0.77 and 6.18 ± 0.40 minutes in sub-adult and adult lions. Radiographic and distance between snout and proximal larynx revealed that the endotracheal tubes one meter length and 30 mm diameter were suitable for intubation. As per the intubation difficulty scale digital palpation of glottis and intubation was easy and safe procedure for intubation considering the location of larynx between 5th and 6th cervical vertebrae and the structures present in the pharyngeal wall. The dose of ketamine and propofol required for induction was 1.00 mg/kg and 1.92 mg/kg body weight intravenously in immobilized lions respectively revealing both were safe. Isoflurane was administered at a concentration of 0.50 to 2.00 per cent. The mean erythrocyte count and packed cell volume decreased significantly ($p < 0.01$) after induction, during maintenance in both the groups of lions induced with ketamine and propofol. The leucocyte count revealed significant ($p < 0.01$) leukocytosis and neutrophilia with corresponding lymphopenia during maintenance and before recovery. Venous blood gas studies revealed decrease in pH towards acidic with corresponding compensatory metabolic alkalosis ($p < 0.01$) during maintenance and before recovery. Haemato-biochemical

parameters fluctuated between normal ranges except elevation in plasma cortisol level.

The study revealed that absence of ear flick reflex could be considered as safe indicator for approaching the lions after immobilization. Asiatic lions and hybrid lions could be intubated with one meter length endotracheal tubes of 30 mm ID and above. Ketamine and propofol could be used as safe induction agents in lions immobilized with xylazine-ketamine. Oropharyngeal intubation by digital palpation of glottis could be accomplished safely under propofol induction. Anaesthesia could be maintained with 0.50 to 2.00 percent isoflurane with 100 percent oxygen in closed circle system.